

# MGate MB3660 Series

## 8 and 16-port redundant Modbus gateways



### Features and Benefits

- Supports Auto Device Routing for easy configuration
- Supports route by TCP port or IP address for flexible deployment
- Innovative Command Learning for improving system performance
- Supports agent mode for high performance through active and parallel polling of serial devices
- Supports Modbus serial master to Modbus serial slave communications
- 2 Ethernet ports with the same IP or dual IP addresses for network redundancy
- SD card for configuration backup/duplication and event logs
- Accessed by up to 256 Modbus TCP clients
- Connects up to Modbus 128 TCP servers
- RJ45 serial interface (for “-J” models)
- Serial port with 2 kV isolation protection (for “-I” models)
- Dual VDC or VAC power inputs with wide power input range
- Embedded traffic monitoring/diagnostic information for easy troubleshooting
- Status monitoring and fault protection for easy maintenance

### Certifications



## Introduction

The MGate MB3660 (MB3660-8 and MB3660-16) 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. Routing through the serial ports can be controlled by IP address, TCP port number, or ID mapping. Serial-port routing by designated TCP port and IP address allows access for up to 4 TCP clients/masters, while routing by ID mapping (slave ID table) allows access for up to 256 TCP clients/masters. The MGate MB3660 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 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 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.

In order to provide better performance, the MGate MB3660 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.

## Auto-Device Routing for Easy Configuration

Moxa's Auto-Device Routing function helps eliminate many of the problems and inconveniences encountered by engineers who need to configure large numbers of Modbus devices. A single mouse click is all that's required to set up a slave ID routing table and configure Modbus gateways to automatically detect Modbus requests from a supervisory control and data acquisition (SCADA) system. By removing the need to manually create the slave ID routing table, the Auto-Device Routing function saves engineers significant time and reduces cost.

## 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:

- 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.
- Use different IP addresses for each of the two Ethernet ports. In this case, Modbus clients/masters can use both Ethernet ports to communicate with Modbus RTU/ASCII slave devices at the same time.

## Specifications

### Ethernet Interface

|                                       |                                             |
|---------------------------------------|---------------------------------------------|
| 10/100BaseT(X) Ports (RJ45 connector) | 2 IP addresses<br>Auto MDI/MDI-X connection |
|---------------------------------------|---------------------------------------------|

### Ethernet Software Features

|                       |                                                                                                                                     |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------|
| Industrial Protocols  | Modbus TCP Client (Master)<br>Modbus TCP Server (Slave)                                                                             |
| Configuration Options | Web Console (HTTP/HTTPS)<br>Device Search Utility (DSU)<br>MCC Tool<br>Telnet Console                                               |
| Management            | ARP<br>DHCP Client<br>DNS<br>HTTP<br>HTTPS<br>SMTP<br>SNMP Trap<br>SNMPv1/v2c/v3<br>TCP/IP<br>Telnet<br>UDP<br>NTP Client<br>RADIUS |
| MIB                   | RFC1213, RFC1317                                                                                                                    |
| Time Management       | NTP Client                                                                                                                          |

### Security Functions

|                    |                                        |
|--------------------|----------------------------------------|
| Authentication     | Local database<br>RADIUS               |
| Encryption         | HTTPS<br>AES-128<br>AES-256<br>SHA-256 |
| Security Protocols | SNMPv3<br>HTTPS (TLS 1.2)              |

### Serial Interface

|              |                                                          |
|--------------|----------------------------------------------------------|
| No. of Ports | MGate MB3660-8 models: 8<br>MGate MB3660-16 models: 16   |
| Connector    | MGate MB3660-8/16: DB9 male<br>MGate MB3660-8/16-J: RJ45 |

|                                   |                                                      |
|-----------------------------------|------------------------------------------------------|
| Serial Standards                  | RS-232/422/485 (software-selectable)                 |
| Baudrate                          | 50 bps to 921.6 kbps                                 |
| Data Bits                         | 7, 8                                                 |
| Stop Bits                         | 1, 2                                                 |
| Parity                            | None<br>Even<br>Odd<br>Space<br>Mark                 |
| Flow Control                      | RTS/CTS<br>DTR/DSR<br>RTS Toggle (RS-232 only)       |
| Console Port                      | RS-232 (TxD, RxD, GND), 8-pin RJ45 (115200, n, 8, 1) |
| Isolation                         | 2 kV (I models)                                      |
| RS-485 Data Direction Control     | ADDC (automatic data direction control)              |
| Pull High/Low Resistor for RS-485 | 1 kilo-ohm, 150 kilo-ohms                            |
| Terminator for RS-485             | 120 ohms                                             |

#### Serial Signals

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

#### Serial Software Features

|                       |                                                   |
|-----------------------|---------------------------------------------------|
| Industrial Protocols  | Modbus RTU/ASCII Master<br>Modbus RTU/ASCII Slave |
| Configuration Options | Serial Console                                    |

#### Modbus RTU/ASCII

|                      |                              |
|----------------------|------------------------------|
| Mode                 | Master, Slave                |
| Functions Supported  | 1, 2, 3, 4, 5, 6, 15, 16, 23 |
| Max. No. of Commands | 256 per serial port          |
| Memory Size          | 65535 bytes                  |

#### Modbus TCP

|                                |                                 |
|--------------------------------|---------------------------------|
| Mode                           | Client (Master), Server (Slave) |
| Max. No. of Client Connections | 256                             |
| Max. No. of Server Connections | 128                             |
| Functions Supported            | 1, 2, 3, 4, 5, 6, 15, 16, 23    |
| Max. No. of Commands           | 256                             |
| Memory Size                    | 65535 bytes                     |

## Modbus (Transparent)

|                                |     |
|--------------------------------|-----|
| Max. No. of Client Connections | 256 |
| Max. No. of Server Connections | 128 |

## Power Parameters

|                     |                                                                                                                                                                                                                                                       |
|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Input Voltage       | All models: Redundant dual inputs<br>AC models: 100 to 240 VAC (50/60 Hz)<br>DC models: 20 to 60 VDC (1.5 kV isolation)                                                                                                                               |
| No. of Power Inputs | 2                                                                                                                                                                                                                                                     |
| Power Connector     | Terminal block (for DC models)                                                                                                                                                                                                                        |
| Power Consumption   | MGate MB3660-8-2AC: 109 mA @ 110 VAC<br>MGate MB3660-16-2AC: 141 mA @ 110 VAC<br>MGate MB3660-8/16-J-2AC: 235 mA @ 110 VAC<br>MGate MB3660I-8/16-2AC: 310 mA @ 110 VAC<br>MGate MB3660-8-2DC: 312 mA @ 24 VDC<br>MGate MB3660-16-2DC: 494 mA @ 24 VDC |

## Relays

|                        |                              |
|------------------------|------------------------------|
| Contact Current Rating | Resistive load: 2 A @ 30 VDC |
|------------------------|------------------------------|

## Physical Characteristics

|                           |                                                                                                                                                                                                                                                                                                                                        |
|---------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Housing                   | Metal                                                                                                                                                                                                                                                                                                                                  |
| IP Rating                 | IP30                                                                                                                                                                                                                                                                                                                                   |
| Dimensions (with ears)    | 480 x 45 x 198 mm (18.90 x 1.77 x 7.80 in)                                                                                                                                                                                                                                                                                             |
| Dimensions (without ears) | 440 x 45 x 198 mm (17.32 x 1.77 x 7.80 in)                                                                                                                                                                                                                                                                                             |
| Weight                    | MGate MB3660-8-J-2AC: 2600 g (5.73 lb)<br>MGate MB3660-16-J-2AC: 2670 g (5.89 lb)<br>MGate MB3660-8-2DC: 2684 g (5.92 lb)<br>MGate MB3660-8-2AC: 2731 g (6.02 lb)<br>MGate MB3660I-8-2AC: 2753 g (6.07 lb)<br>MGate MB3660-16-2DC: 2780 g (6.13 lb)<br>MGate MB3660I-16-2AC: 2820 g (6.22 lb)<br>MGate MB3660-16-2AC: 2830 g (6.24 lb) |

## Environmental Limits

|                                        |                            |
|----------------------------------------|----------------------------|
| Operating Temperature                  | 0 to 60°C (32 to 140°F)    |
| Storage Temperature (package included) | -40 to 85°C (-40 to 185°F) |
| Ambient Relative Humidity              | 5 to 95% (non-condensing)  |

## Standards and Certifications

|          |                                                                                                                                                                                                                                            |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| EMC      | EN 55032/35                                                                                                                                                                                                                                |
| EMI      | CISPR 32, FCC Part 15B Class A                                                                                                                                                                                                             |
| EMS      | IEC 61000-4-2 ESD: Contact: 6 kV; Air: 8 kV<br>IEC 61000-4-3 RS: 80 MHz to 1 GHz: 10 V/m<br>IEC 61000-4-4 EFT: Power: 1 kV; Signal: 1 kV<br>IEC 61000-4-5 Surge: Power: 2 kV; Signal: 1 kV<br>IEC 61000-4-6 CS: 10 V<br>IEC 61000-4-8 PFMF |
| Safety   | All models excluding "J" models: IEC 62368-1, UL 62368-1, IEC 60950-1, UL 60950-1                                                                                                                                                          |
| Freefall | IEC 60068-2-31                                                                                                                                                                                                                             |

|           |                                 |
|-----------|---------------------------------|
| Shock     | IEC 60068-2-27                  |
| Vibration | IEC 60068-2-6<br>IEC 60068-2-64 |

#### MTBF

|           |                                                                                                                                                                                                                                                                                                |
|-----------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Time      | MGate MB3660-8-2AC: 721,988 hrs<br>MGate MB3660-8-2DC: 711,978 hrs<br>MGate MB3660-8-J-2AC: 616,505 hrs<br>MGate MB3660-16-2AC: 495,416 hrs<br>MGate MB3660-16-2DC: 490,684 hrs<br>MGate MB3660-16-J-2AC: 437,337 hrs<br>MGate MB3660I-8-2AC: 429,807 hrs<br>MGate MB3660I-16-2AC: 256,208 hrs |
| Standards | Telcordia SR332                                                                                                                                                                                                                                                                                |

#### Warranty

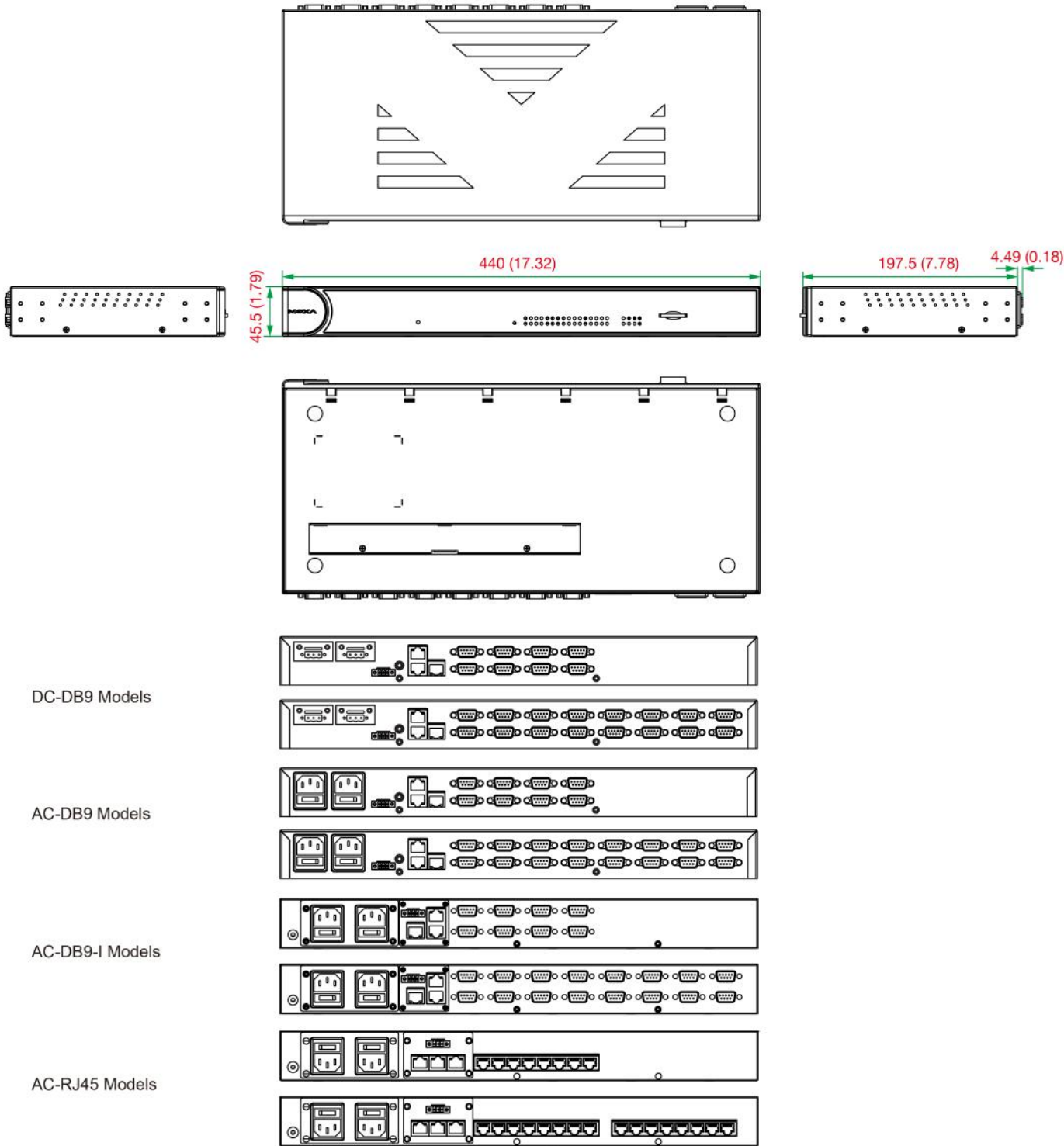
|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| Warranty Period | 5 years                                                              |
| Details         | See <a href="http://www.moxa.com/warranty">www.moxa.com/warranty</a> |

#### Package Contents

|                  |                                                   |
|------------------|---------------------------------------------------|
| Device           | 1 x MGate MB3660 Series gateway                   |
| Power Supply     | 1 x power cord, suitable for your region          |
| Cable            | 1 x RJ45-to-DB9 console cable                     |
| Documentation    | 1 x quick installation guide<br>1 x warranty card |
| Installation Kit | 1 x rack-mounting kit                             |

Dimensions

Unit: mm (inch)



Ordering Information

| Model Name          | No. of Serial Ports | Serial Connector | Serial Isolation | Input Voltage                |
|---------------------|---------------------|------------------|------------------|------------------------------|
| MGate MB3660-8-2DC  | 8                   | DB9 male         | –                | 20-60 VDC (1.5 kV isolation) |
| MGate MB3660-16-2DC | 16                  | DB9 male         | –                | 20-60 VDC (1.5 kV isolation) |
| MGate MB3660-8-2AC  | 8                   | DB9 male         | –                | 100-240 VAC (47-63 Hz)       |
| MGate MB3660-16-2AC | 16                  | DB9 male         | –                | 100-240 VAC (47-63 Hz)       |
| MGate MB3660I-8-2AC | 8                   | DB9 male         | 2 kV             | 100-240 VAC (47-63 Hz)       |

| Model Name            | No. of Serial Ports | Serial Connector | Serial Isolation | Input Voltage          |
|-----------------------|---------------------|------------------|------------------|------------------------|
| MGate MB3660I-16-2AC  | 16                  | DB9 male         | 2 kV             | 100-240 VAC (47-63 Hz) |
| MGate MB3660-8-J-2AC  | 8                   | RJ45             | –                | 100-240 VAC (47-63 Hz) |
| MGate MB3660-16-J-2AC | 16                  | RJ45             | –                | 100-240 VAC (47-63 Hz) |

## Accessories (sold separately)

### Cables

|                 |                                                            |
|-----------------|------------------------------------------------------------|
| CBL-F9M9-150    | DB9 female to DB9 male serial cable, 1.5 m                 |
| CBL-F9M9-20     | DB9 female to DB9 male serial cable, 20 cm                 |
| CBL-RJ45F9-150  | 8-pin RJ45 to DB9 female serial cable, 1.5m                |
| CBL-RJ45SF9-150 | 8-pin RJ45 to DB9 female serial cable with shielding, 1.5m |

### Connectors

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

### Power Cords

|                  |                                               |
|------------------|-----------------------------------------------|
| PWC-C13AU-3B-183 | Power cord with AU plug, 1.83 m               |
| PWC-C13CN-3B-183 | Power cord with three-prong CN plug, 1.83 m   |
| PWC-C13EU-3B-183 | Power cord with EU/KR plug, 1.83 m            |
| PWC-C13JP-3B-183 | Power cord with JP plug plug, 7A/125V, 1.83 m |
| PWC-C13UK-3B-183 | Power cord with UK plug, 1.83 m               |
| PWC-C13US-3B-183 | Power cord with US plug, 1.83 m               |
| CBL-PJTB-10      | Non-locking barrel plug to bare-wire cable    |

### Mounting Kits

|          |                                                                  |
|----------|------------------------------------------------------------------|
| WK-45-01 | Rack-mounting kit, 2 L-shaped plates, 8 screws, 45 x 57 x 2.5 mm |
|----------|------------------------------------------------------------------|

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