

MGate MB3170/MB3270 Series

1 and 2-port advanced serial-to-Ethernet Modbus gateways



Features and Benefits

- Supports Auto Device Routing for easy configuration
- Supports route by TCP port or IP address for flexible deployment
- Connects up to 32 Modbus TCP servers
- Connects up to 31 or 62 Modbus RTU/ASCII slaves
- Accessed by up to 32 Modbus TCP clients (retains 32 Modbus requests for each Master)
- Supports Modbus serial master to Modbus serial slave communications
- Built-in Ethernet cascading for easy wiring
- 10/100BaseTX (RJ45) or 100BaseFX (single mode or multi-mode with SC/ST connector)
- Emergency request tunnels ensure QoS control
- Embedded Modbus traffic monitoring for easy troubleshooting
- Serial port with 2 kV isolation protection (for “-I” models)
- -40 to 75°C wide operating temperature models available
- Supports redundant dual DC power inputs and 1 relay output

Certifications



Introduction

The MGate MB3170 and MB3270 are 1 and 2-port Modbus gateways, respectively, that convert between Modbus TCP, ASCII, and RTU communications protocols. The gateways provide both serial-to-Ethernet communication and serial (master) to serial (slave) communications. In addition, the gateways support simultaneously connecting serial and Ethernet masters with serial Modbus devices. The MGate MB3170 and MB3270 Series gateways can be accessed by up to 32 TCP master/clients or connect to up to 32 TCP slave/servers. Routing through the serial ports can be controlled by IP address, TCP port number, or ID mapping. A featured priority control function allows urgent commands to obtain an immediate response. All models are rugged, DIN-rail mountable, and offer optional built-in optical isolation for serial signals.

Integrate TCP Masters without Altering the Modbus RTU/ASCII Network or Software

The MB3270 can integrate Modbus TCP with Modbus RTU/ASCII, without modifying the existing Modbus RTU/ASCII architecture or software. With the serial redirector function, a serial master can maintain direct access to serial slave devices through a specially mapped serial port. This allows the serial and TCP masters to access serial slaves simultaneously.

Optical Fiber for Ethernet Communication

The MGate MB3170 Series includes 100BaseFX fiber models that support transmission distances up to 4 km for multi-mode models, and up to 40 km for single-mode models. Optical fiber is well-suited for industrial applications because it is immune to electromagnetic noise and interference. For environments that experience high ground loop voltages, fiber provides the best isolation protection, and because there is no danger of sparking, optical fiber is safer than copper wire to use in hazardous environments.

Auto-Device Routing for Easy Configuration (Patent Pending)

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 cost.

Priority Control for Urgent Commands (Patented)

As Modbus networks increase in size and complexity, the lag time between commands and responses becomes a major concern. Advanced models of the MB3000 Series provide a priority control function for urgent commands, allowing users to force certain commands to get an immediate response. Depending on your system's requirements, different methods are available to define which commands receive priority.

Patent Numbers: (US/TW)

- US7,743,192 B2/I332618
- US7,725,635 B2/I321007

Specifications

Ethernet Interface

| | | | | |
|---------------------------------------|---|-------------------------|--------------|-------|
| 10/100BaseT(X) Ports (RJ45 connector) | 2 (1 IP, Ethernet cascade) Auto MDI/MDI-X connection | | | |
| Magnetic Isolation Protection | 1.5 kV (built-in) | | | |
| Optical Fiber | | | 100BaseFX | |
| | | | Multi-Mode | |
| | | | Single-Mode | |
| | Fiber Cable Type | OM1 | 50/125 μm | G.652 |
| | | | 800 MHz x km | |
| | Typical Distance | | 4 km | 5 km |
| | Wavelength | Typical (nm) | 1300 | |
| | | TX Range (nm) | 1260 to 1360 | |
| | | RX Range (nm) | 1100 to 1600 | |
| | Optical Power | TX Range (dBm) | -10 to -20 | |
| | | RX Range (dBm) | -3 to -32 | |
| | | Link Budget (dB) | 12 | |
| | | Dispersion Penalty (dB) | 3 | |
| | <p>Note: When connecting a single-mode fiber transceiver, we recommend using an attenuator to prevent damage caused by excessive optical power.</p> <p>Note: Compute the “typical distance” of a specific fiber transceiver as follows: Link budget (dB) > dispersion penalty (dB) + total link loss (dB).</p> | | | |

Ethernet Software Features

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

Security Functions

| | |
|--------------------|----------------------------------|
| Authentication | Local database |
| Encryption | HTTPS, AES-128, AES-256, SHA-256 |
| Security Protocols | SNMPv3 HTTPS (TLS 1.2) |

Serial Interface

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|--------------|---|
| No. of Ports | MGate MB3170 Series: 1 MGate MB3270 Series: 2 |
| Connector | MGate MB3170/MB3170I: DB9 male for RS-232 and terminal block for RS-422/485 |

| | |
|-----------------------------------|--|
| | MGate MB3270/MB3270I: 2 x DB9 male |
| Serial Standards | RS-232/422/485 (software selectable) |
| Baudrate | 50 bps to 921.6 kbps |
| Data Bits | 7, 8 |
| Parity | None, Even, Odd, Space, Mark |
| Stop Bits | 1, 2 |
| Flow Control | DTR/DSR, RTS Toggle (RS-232 only), RTS/CTS |
| 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 |
| Isolation | 2 kV (I models) |

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, Modbus RTU/ASCII Slave |
|----------------------|---|

Modbus (Transparent)

| | |
|--------------------------------|----|
| Max. No. of Client Connections | 32 |
| Max. No. of Server Connections | 32 |

Power Parameters

| | |
|-----------------|--|
| Input Current | MGate MB3170/MB3270: 435 mA @ 12 VDC MGate MB3170I/MB3170-S-SC/MB3170I-M-SC/MB3170I-S-SC: 555 mA @ 12 VDC MGate MB3270I/MB3170-M-SC/MB3170-M-ST: 510 mA @ 12 VDC |
| Power Connector | 7-pin terminal block |

Relays

| | |
|------------------------|------------------------------|
| Contact Current Rating | Resistive load: 1 A @ 30 VDC |
|------------------------|------------------------------|

Physical Characteristics

| | |
|---------------------------|--|
| Housing | Plastic |
| IP Rating | IP30 |
| Dimensions (with ears) | 29 x 89.2 x 124.5 mm (1.14 x 3.51 x 4.90 in) |
| Dimensions (without ears) | 29 x 89.2 x 118.5 mm (1.14 x 3.51 x 4.67 in) |
| Weight | MGate MB3170 Series: 360 g (0.79 lb) MGate MB3270 Series: 380 g (0.84 lb) |

Environmental Limits

| | |
|--|--|
| Operating Temperature | Standard Models : 0 to 60°C (32 to 140°F) Wide Temp. Models: -40 to 75°C (-40 to 167°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 55032/24 |
| 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: 4 kV; Signal: 2 kV IEC 61000-4-5 Surge: Power: 2 kV IEC 61000-4-6 CS: 10 V IEC 61000-4-8 PFMF IEC 61000-4-11 |
| Hazardous Locations | ATEX, Class I Division 2, IECEx |
| Maritime | DNV-GL |
| Freefall | IEC 60068-2-32 |
| Shock | IEC 60068-2-27 |
| Vibration | IEC 60068-2-6, IEC 60068-2-64 |
| Safety | EN 60950-1, IEC 60950-1, IEC 62368-1, UL 62368-1 |

MTBF

| | |
|-----------|---|
| Time | MGate MB3170/MB3170I Series: 1,349,710 hrs MGate MB3170-M-SC/M-ST/S-SC Series: 1,175,887 hrs MGate MB3170I-M-SC Series: 768,343 hrs MGate MB3170I-S-SC Series: 763,707 hrs MGate MB3270/MB3270I Series: 1,236,384 hrs |
| Standards | Telcordia SR332 |

Warranty

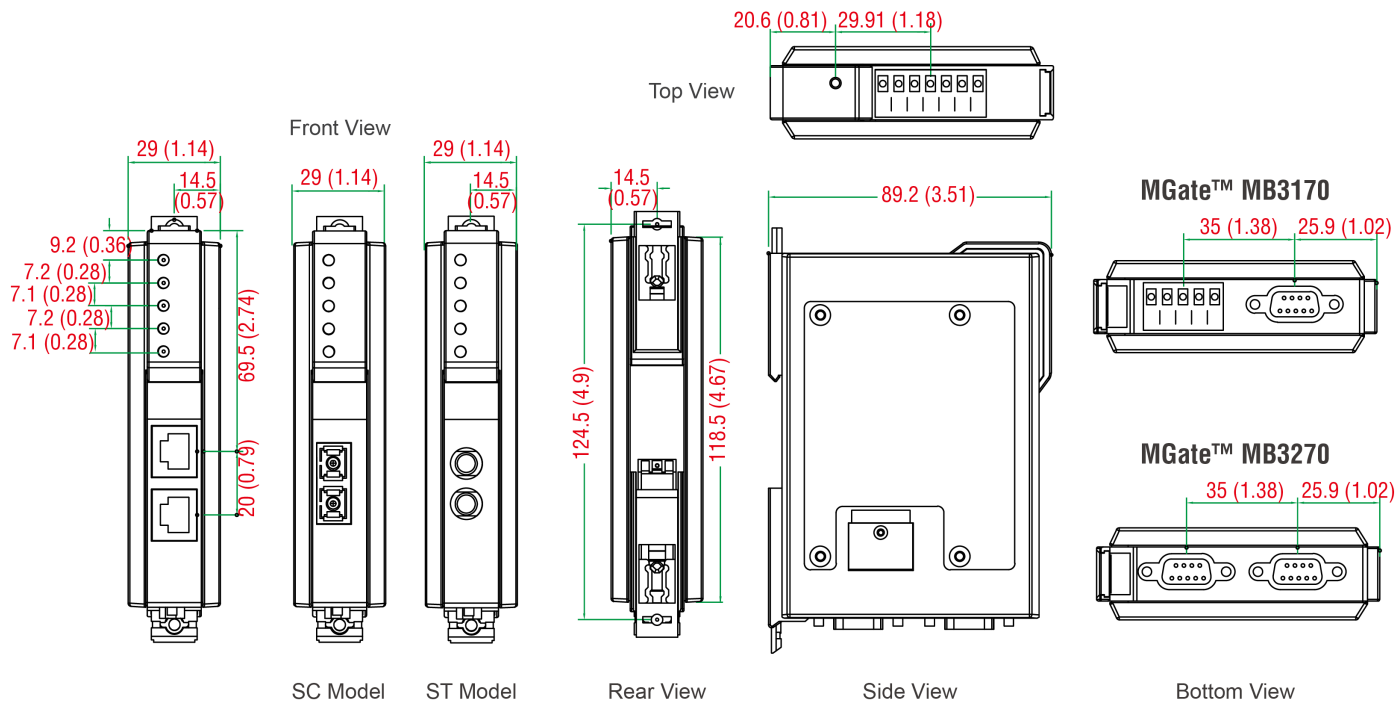
| | |
|-----------------|--|
| Warranty Period | 5 years |
| Details | See www.moxa.com/warranty |

Package Contents

| | |
|---------------|---|
| Device | 1 x MGate MB3170/MB3270 Series gateway |
| Documentation | 1 x quick installation guide 1 x warranty card |

Dimensions

Unit: mm (inch)



Ordering Information

| Model Name | Ethernet | No. of Serial Ports | Serial Standards | Serial Isolation | Operating Temp. |
|----------------------|--------------------|---------------------|------------------|------------------|-----------------|
| MGate MB3170 | 2 x RJ45 | 1 | RS-232/422/485 | - | 0 to 60°C |
| MGate MB3170I | 2 x RJ45 | 1 | RS-232/422/485 | 2 kV | 0 to 60°C |
| MGate MB3270 | 2 x RJ45 | 2 | RS-232/422/485 | - | 0 to 60°C |
| MGate MB3270I | 2 x RJ45 | 2 | RS-232/422/485 | 2 kV | 0 to 60°C |
| MGate MB3170-T | 2 x RJ45 | 1 | RS-232/422/485 | - | -40 to 75°C |
| MGate MB3170I-T | 2 x RJ45 | 1 | RS-232/422/485 | 2 kV | -40 to 75°C |
| MGate MB3270-T | 2 x RJ45 | 2 | RS-232/422/485 | - | -40 to 75°C |
| MGate MB3270I-T | 2 x RJ45 | 2 | RS-232/422/485 | 2 kV | -40 to 75°C |
| MGate MB3170-M-SC | 1 x Multi-Mode SC | 1 | RS-232/422/485 | - | 0 to 60°C |
| MGate MB3170-M-ST | 1 x Multi-Mode ST | 1 | RS-232/422/485 | - | 0 to 60°C |
| MGate MB3170-S-SC | 1 x Single-Mode SC | 1 | RS-232/422/485 | - | 0 to 60°C |
| MGate MB3170I-M-SC | 1 x Multi-Mode SC | 1 | RS-232/422/485 | 2 kV | 0 to 60°C |
| MGate MB3170I-S-SC | 1 x Single-Mode SC | 1 | RS-232/422/485 | 2 kV | 0 to 60°C |
| MGate MB3170-M-SC-T | 1 x Multi-Mode SC | 1 | RS-232/422/485 | - | -40 to 75°C |
| MGate MB3170-M-ST-T | 1 x Multi-Mode ST | 1 | RS-232/422/485 | - | -40 to 75°C |
| MGate MB3170-S-SC-T | 1 x Single-Mode SC | 1 | RS-232/422/485 | - | -40 to 75°C |
| MGate MB3170I-M-SC-T | 1 x Multi-mode SC | 1 | RS-232/422/485 | 2 kV | -40 to 75°C |
| MGate MB3170I-S-SC-T | 1 x Single-Mode SC | 1 | RS-232/422/485 | 2 kV | -40 to 75°C |

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 |

Connectors

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

Power Cords

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|-------------|--|
| CBL-PJTB-10 | Non-locking barrel plug to bare-wire cable |
|-------------|--|

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