# MGate™ MB3170/3270

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

> Supports Auto-Device Routing for easy configuration
> Supports route by TCP port or IP address for flexible deployment
> Accessible by up to 32 TCP master/client devices, or connect to up to 32 TCP slave/server devices
> Supports up to 31 or 62 serial slave devices
> Ethernet cascading for easy wiring
> Serial redirector function provided
> Embedded Modbus traffic monitor
> 10/100BaseTX (RJ45) or 100BaseFX (single mode or multi-mode with SC/ST connector)
> Emergency request tunnels ensure QoS control

## Overview

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 Communications

The MGate MB3170 fiber 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
**Protocols:** Modbus TCP
**Number of Ports:** 2 (1 IP, Ethernet cascade)
**Speed:** 10/100 Mbps, Auto MDI/MDIX
**Connector:** 8-pin RJ45
**Magnetic Isolation Protection:** 1.5 kV (built-in)

### Optical Fiber Interface

| | | 100BaseFX | | |
|---|---|---|---|---|
| | | **Multi-Mode** | | **Single-Mode** |
| **Fiber Cable Type** | | OM1 | 50/125 µm 800 MHz*km | G.652 |
| Typical Distance | | 4 km | 5 km | 40 km |
| Wave-length | Typical (nm) | 1300 | | 1310 |
| | TX Range (nm) | 1260 to 1360 | | 1280 to 1340 |
| | RX Range (nm) | 1100 to 1600 | | 1100 to 1600 |
| Optical Power | TX Range (dBm) | -10 to -20 | | 0 to -5 |
| | RX Range (dBm) | -3 to -32 | | -3 to -34 |
| | Link Budget (dB) | 12 | | 29 |
| | Dispersion Penalty (dB) | 3 | | 1 |

Note: When connecting a single-mode fiber transceiver, we recommend using an attenuator to prevent damage caused by excessive optical power.
Note: Compute the "typical distance" of a specific fiber transceiver as follows: Link budget (dB) > dispersion penalty (dB) + total link loss (dB).

### Serial Interface
**Protocol:** Modbus RTU/ASCII Master/Slave
**Number of Ports:**
MB3170/3170I: 1
MB3270/3270I: 2
**Serial Standards:** RS-232/422/485, software selectable
**Connectors:**
MB3170/3170I: DB9 male for RS-232, terminal block for RS-422/485
MB3270/3270I: DB9 male x 2
**Magnetic Isolation Protection:** 2 kV (for "I" models)
**ESD Protection:** 15 kV for all signals
**RS-485 Data Direction Control:** ADDC® (automatic data direction control)
**Pull High/Low Resistor for RS-485:** 1 kΩ, 150 kΩ
**Terminator for RS-485:** 120 Ω

### 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, Telnet Console, Windows Utility
**Utility:** MGate Manager for Windows2000, 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
**Multi-master and Multi-drop:**
Master mode: 32 TCP slaves
Slave mode: 32 TCP masters (request queue 32-deep for each master)
**Support:** Smart Routing, Serial Redirection, ProCOM, Priority Control, MXview, SNMP v1 (read only)

### Physical Characteristics
**Housing:** Plastic, IP30
**Weight:**
MGate MB3170: 360 g (0.79 lb)
MGate MB3270: 380 g (0.84 lb)
**Dimensions:**
Without ears: 29 x 89.2 x 118.5 mm (1.14 x 3.51 x 4.67 in)
With ears extended: 29 x 89.2 x 124.5 mm (1.14 x 3.51 x 4.90 in)

### 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:** -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:** 12 to 48 VDC
**Input Current:**
MGate MB3170: 435 mA @ 12 VDC
MGate MB3170I: 555 mA @ 12 VDC
MGate MB3270: 435 mA @ 12 VDC
MGate MB3270I: 510 mA @ 12 VDC
MGate MB3170-M-SC: 510 mA @ 12 VDC
MGate MB3170-M-ST: 510 mA @ 12 VDC
MGate MB3170-S-SC: 555 mA @ 12 VDC
MGate MB3170I-M-SC: 555 mA @ 12 VDC
MGate MB3170I-S-SC: 555 mA @ 12 VDC
**Power Connector:** Terminal block
**Relay Output:** 1 digital relay output to alarm (normal closed), with current carrying capacity 1 A @ 30 VDC

### Standards and Certifications
**Safety:** UL 508, EN 60950-1
**Hazardous Location:** Class 1 Division 2, ATEX, IECEx
**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: 150 kHz to 80 MHz: 10 V/m
IEC 61000-4-8 PFMF
IEC 61000-4-11
**Marine:** DNV

### MTBF (mean time between failures)
**Time:**
MGate MB3170: 1,349,710 hrs
MGate MB3170-M-SC: 1,175,887 hrs
MGate MB3170-M-ST: 1,175,887 hrs
MGate MB3170-S-SC: 1,175,887 hrs
MGate MB3170I-M-SC: 768,343 hrs
MGate MB3170I-S-SC: 763,707 hrs
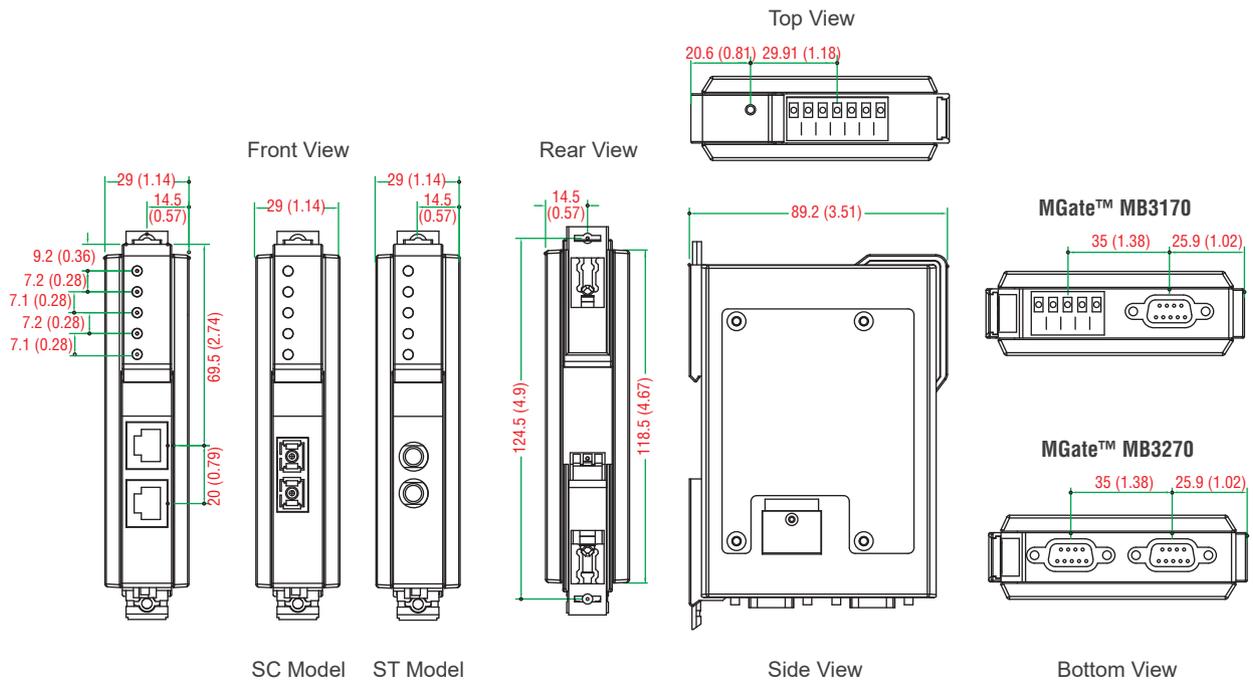MGate MB3270: 1,236,384 hrs
**Standard:** Telcordia SR332

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

## Dimensions

Unit: mm (inch)



Top View

Front View

Rear View

SC Model   ST Model

Side View

MGate™ MB3170

MGate™ MB3270

Bottom View

## Ordering Information

### Available Models

**MGate MB3170:** 1-port advanced Modbus gateway, 0 to 60°C operating temperature

**MGate MB3170I:** 1-port advanced Modbus gateway with 2 kV isolation, 0 to 60°C operating temperature

**MGate MB3270:** 2-port advanced Modbus gateway, 0 to 60°C operating temperature

**MGate MB3270I:** 2-port advanced Modbus gateway with 2 kV isolation, 0 to 60°C operating temperature

**MGate MB3170-T:** 1-port advanced Modbus gateway, -40 to 75°C operating temperature

**MGate MB3170I-T:** 1-port advanced Modbus gateway with 2 kV isolation, -40 to 75°C operating temperature

**MGate MB3270-T:** 2-port advanced Modbus gateway, -40 to 75°C operating temperature

**MGate MB3270I-T:** 2-port advanced Modbus gateway with 2 kV isolation, -40 to 75°C operating temperature

**MGate MB3170-M-SC:** 1-port advanced Modbus gateway with 100BaseFX multi-mode fiber port (SC connector), 0 to 60°C operating temperature

**MGate MB3170-M-SC-T:** 1-port advanced Modbus gateway with 100BaseFX multi-mode fiber port (SC connector), -40 to 75°C operating temperature

**MGate MB3170-M-ST:** 1-port advanced Modbus gateway with 100BaseFX multi-mode fiber port (ST connector), 0 to 60°C operating temperature

**MGate MB3170-M-ST-T:** 1-port advanced Modbus gateway with 100BaseFX multi-mode fiber port (ST connector), -40 to 75°C operating temperature

**MGate MB3170-S-SC:** 1-port advanced Modbus gateway with 100BaseFX single-mode fiber port (SC connector), 0 to 60°C operating temperature

**MGate MB3170-S-SC-T:** 1-port advanced Modbus gateway with 100BaseFX single-mode fiber port (SC connector), -40 to 75°C operating temperature

**MGate MB3170I-M-SC:** 1-port advanced Modbus gateway with 100BaseFX multi-mode fiber port (SC connector) and 2 kV optical isolation, 0 to 60°C operating temperature

**MGate MB3170I-M-SC-T:** 1-port advanced Modbus gateway with 100BaseFX multi-mode fiber port (SC connector) and 2 kV optical isolation, -40 to 75°C operating temperature

**MGate MB3170I-S-SC:** 1-port advanced Modbus gateway with 100BaseFX single-mode fiber port (SC connector) and 2 kV optical isolation, 0 to 60°C operating temperature

**MGate MB3170I-S-SC-T:** 1-port advanced Modbus gateway with 100BaseFX single-mode fiber port (SC connector) and 2 kV optical isolation, -40 to 75°C operating temperature

### Optional Accessories (can be purchased separately)

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

#### Package Checklist

- 1 MGate MB3170 or MB3270 Modbus gateway
- Documentation and software CD
- Quick installation guide (printed)
- Warranty card