MGate™ MB3170/3270

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

> Accessible by up to 16 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 port routing by IP address, TCP port, or ID mapping
> 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 16 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.

⁝ 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

MOXA®

⋮ 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

Fiber Cable Type	100BaseFX		
	Multi-Mode		Single-Mode
	OM1	50/125 µm 800 MHz*km	G.652
Typical Distance	4 km	5 km	40 km
Wave-length — Typical (nm)	1300		1310
Wave-length — TX Range (nm)	1260 to 1360		1280 to 1340
Wave-length — RX Range (nm)	1100 to 1600		1100 to 1600
Optical Power — TX Range (dBm)	-10 to -20		0 to -5
Optical Power — RX Range (dBm)	-3 to -32		-3 to -34
Optical Power — Link Budget (dB)	12		29
Optical Power — 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, Serial 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: 16 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: 435 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 55022/24
EMI: CISPR 22, 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
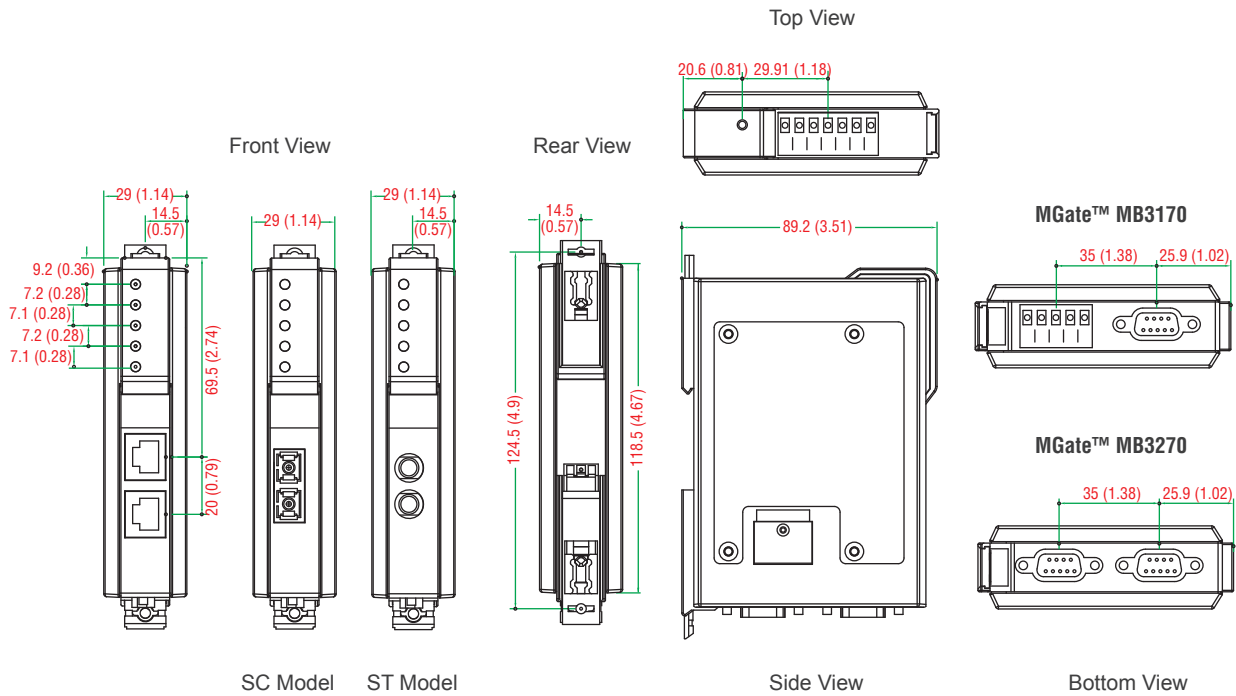**Marine:** DNV

MTBF (mean time between failures)
Time:
MGate MB3170: 346,790 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: 342,098 hrs
Standard: Telcordia SR332

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

Dimensions

Unit: mm (inch)

Top View

20.6 (0.81) 29.91 (1.18)

Front View

29 (1.14)
14.5 (0.57)
9.2 (0.36)
7.2 (0.28)
7.1 (0.28)
7.2 (0.28)
7.1 (0.28)
69.5 (2.74)
20 (0.79)

29 (1.14)

Rear View

29 (1.14)
14.5 (0.57)

14.5 (0.57)
124.5 (4.9)
118.5 (4.67)

89.2 (3.51)

MGate™ MB3170

35 (1.38)   25.9 (1.02)

MGate™ MB3270

35 (1.38)   25.9 (1.02)

SC Model   ST Model

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

Package Checklist

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