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. Serial-port routing by TCP port and IP address allows access for up to 4 TCP clients/masters (MB3270 models), while routing by ID mapping allows access for up to 32 TCP clients/masters (MB3170/MB3270). 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

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

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.

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 800 MHz x km	G.652
Typical Distance		4 km	5 km	40 km
Wavelength	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).

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

No. of Ports	MGate MB3170 models: 1 MGate MB3270 models: 2
Connector	MGate MB3170 models: DB9 male for RS-232, Terminal block for RS-422/485 MGate MB3270 models: 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
Pull High/Low Resistor for RS-485	1 kilo-ohm, 150 kilo-ohms
Terminator for RS-485	120 ohms
Isolation	I models: 2 kV
RS-485 Data Direction Control	ADDC (automatic data direction control)

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 Voltage	12 to 48 VDC
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 models: 360 g (0.79 lb) MGate MB3270 models: 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 55032/35
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
Freefall	IEC 60068-2-32
Shock	IEC 60068-2-27
Vibration	IEC 60068-2-6 IEC 60068-2-64
Safety	UL 60950-1 IEC 60950-1 EN 62368-1 UL 508

MTBF

Time	MGate MB3170 models: 1,662,526 hrs MGate MB3170I models: 1,484,777 hrs MGate MB3270 models: 1,477,768 hrs MGate MB3270I models: 1,144,837 hrs MGate MB3170-M/-S models: 1,580,051 hrs MGate MB3170I-M/-S models: 1,385,414 hrs
Standards	Telcordia SR332

Warranty

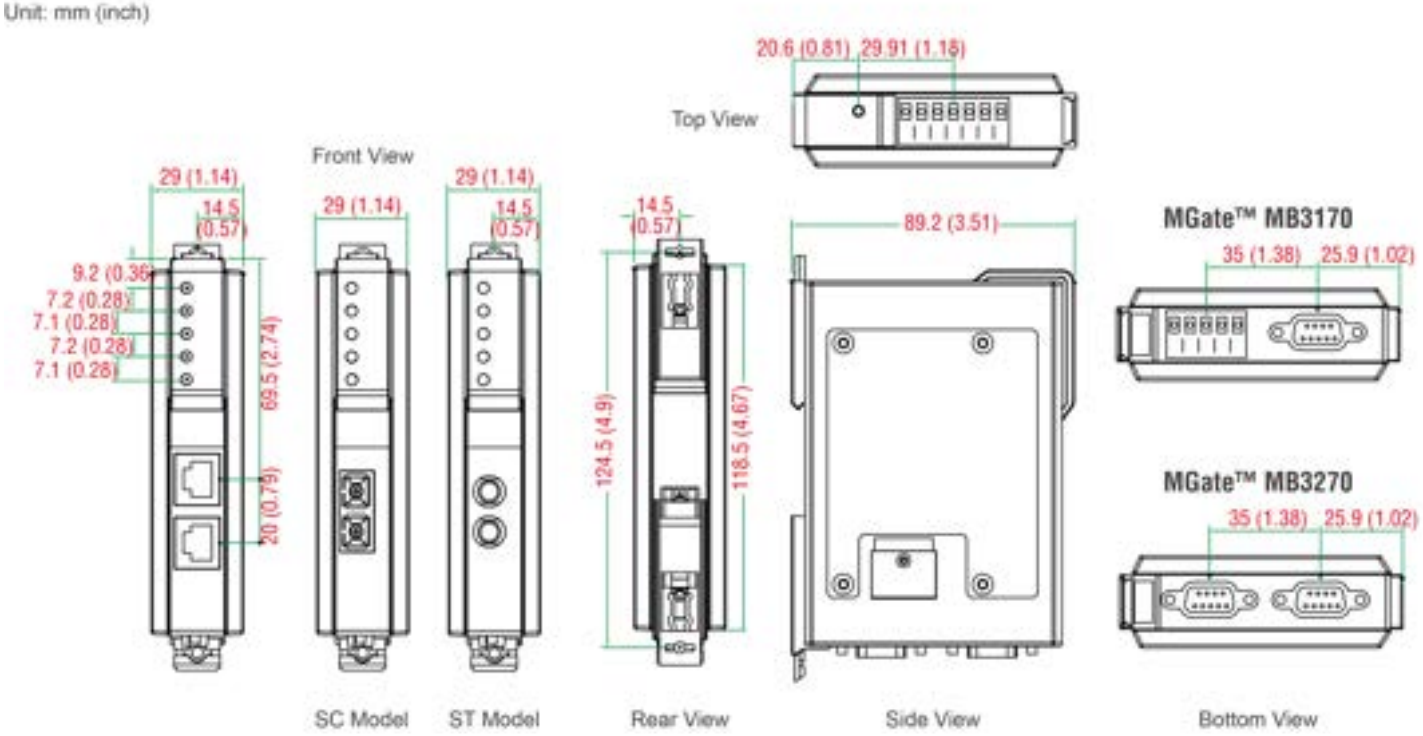
Warranty Period	5 years
Details	See www.moxa.com/warranty

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

Model Name	Ethernet	No. of Serial Ports	Serial Standards	Serial Isolation	Operating Temp.
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

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

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