

INSTALLATION, WIRING AND CONFIGURATION



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Safety Guidelines



WARNING: Providing a safe operating environment for personnel and equipment is your responsibility and should be your primary goal during system planning and installation. Automation systems can fail and may result in situations that can cause serious injury to personnel or damage to equipment. Do not rely on the automation system alone to provide a safe operating environment. You should use external electromechanical devices, such as relays or limit switches, that are independent of the PLC application to provide protection for any part of the system that may cause personal injury or damage. Every automation application is different, so there may be special requirements for your particular application. Make sure you follow all national, state, and local government requirements for the proper installation and use of your equipment.

Plan for Safety

The best way to provide a safe operating environment is to make personnel and equipment safety part of the planning process. You should examine every aspect of the system to determine which areas are critical to operator or machine safety. If you are not familiar with control system installation practices, or your company does not have established installation guidelines, you should obtain additional information from the following sources.

- NEMA — The National Electrical Manufacturers Association, located in Washington, D.C. publishes many different documents that discuss standards for industrial control systems. You can order these publications directly from NEMA. Some of these include:

ICS 1, General Standards for Industrial Control and Systems

ICS 3, Industrial Systems

ICS 6, Enclosures for Industrial Control Systems

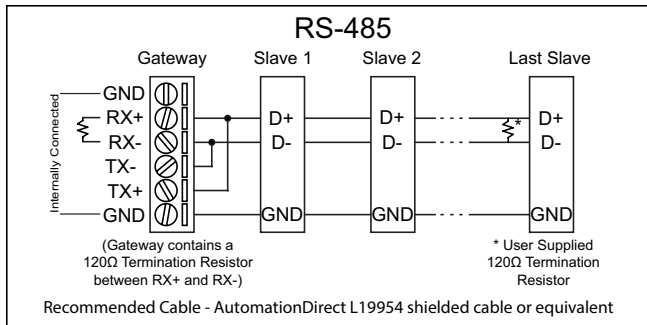
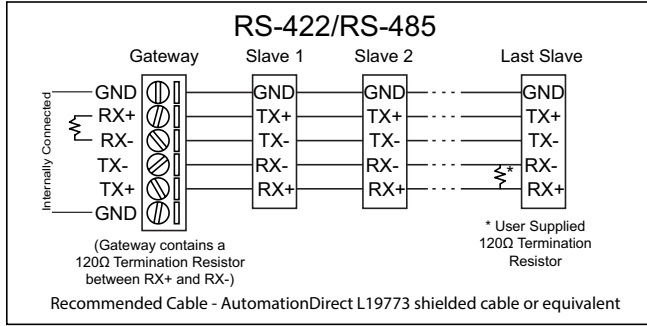
- NEC — The National Electrical Code provides regulations concerning the installation and use of various types of electrical equipment. Copies of the NEC Handbook can often be obtained from your local electrical equipment distributor or your local library.
- Local and State Agencies — many local governments and state governments have additional requirements above and beyond those described in the NEC Handbook. Check with your local Electrical Inspector or Fire Marshall office for information.

Security Considerations

When implementing any method of remote access to your equipment, you need to consider the security exposure in order to minimize the risks to your processes and your equipment. Security should always be carefully evaluated for each installation. Refer to “Appendix C: Security Considerations for Control Systems Networks” for more information.

Wiring Diagrams

The MB-GATEWAY module can be wired in either 4-wire or 2-wire mode.



MB-GATEWAY Configuration

The MB-GATEWAY supports 128 Modbus RTU nodes on the serial side. The RS-485 specification supports up to 32 devices before a repeater device is required. Proper cabling and termination is required. For RS-485 4-wire installations, a cable with the proper shielding and impedance should be used such as a Belden model 9843. For RS-485 2 wire installations, a cable such as the Belden model 9842 should be used. A 120 ohm resistor should be used for termination on each end of the network as shown in the previous wiring diagrams. The GATEWAY module has a termination resistor pre-installed so only one resistor needs to be added to the opposite end of the network away from the Gateway module.

The MB-GATEWAY module supports up to 12 simultaneous Modbus TCP connections. The MB-GATEWAY's TCP listening port is the standard Modbus TCP port 502 (not configurable).

One of the major features of the MB-GATEWAY module is the “Automatic Read” function. This feature utilizes the ‘idle’ time of the module while it is waiting for Ethernet requests. The Automatic Read function can be configured to poll specific Modbus data points of the serial nodes and place that data into a local ‘data buffer’. If a Modbus Ethernet request comes in for one of those data points, the MB-GATEWAY module will immediately respond with the data from local buffer and thereby respond much faster than it would if it had to generate a new serial request. See Chapter 5 for more information.

The factory IP setting of the MB-GATEWAY module is to retrieve an IP address via DHCP. In order to see what IP address has been assigned and/or to change that setting the NetEdit software tool will be required to discover and configure the MB-GATEWAY TCP/IP settings. NetEdit is a free tool that is accessible at AutomationDirect's website or HOST engineering's website (http://www.hosteng.com/SW-Products/SP_Demo_Utilites.htm#NetEdit3).



NOTE: NetEdit version 3.8 or later is required to support MB-GATEWAY

MB-GATEWAY Configuration continued on the next page

NetEdit Configuration

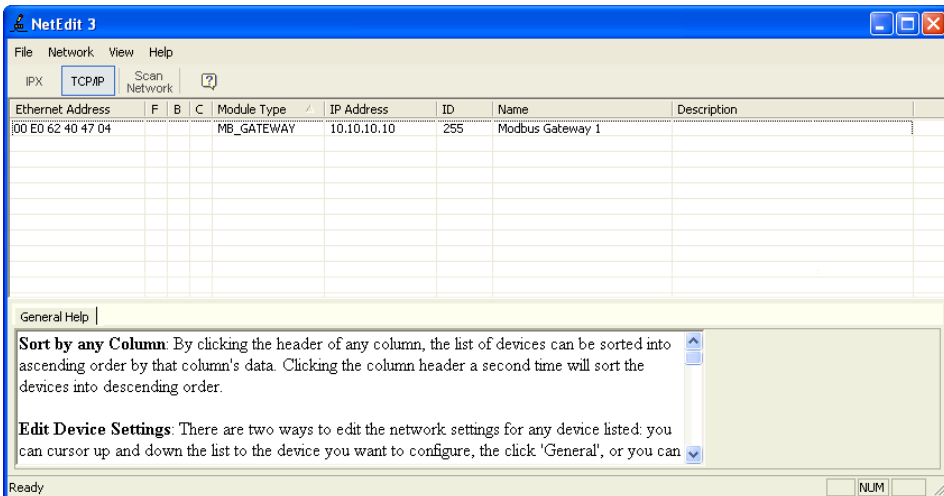
Using NetEdit is very simple. Once the software has been installed, follow the steps below to configure the settings of your MB-GATEWAY module.

- Start the software. It will scan automatically when you start it but if your MB-GATEWAY is inaccessible at the point of starting the software, you can press the “Scan Network” button at the top to make it scan again once the MB-GATEWAY has become accessible.

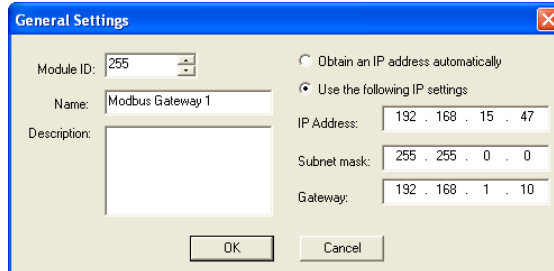


NOTE: If you are unable to see the MB-GATEWAY...

- 1) If your PC has more than one NIC (Network Interface Card), e.g. a wireless and a wired, then you may need to either disable the NIC(s) you are not using, or re-prioritize them such that the NIC you are using is top priority.
- 2) Verify the Network Interface on your PC is functioning properly
- 3) Verify all connections between the PC and the MB-GATEWAY are properly made
- 4) Disable your firewall or open TCP port 28787 to allow NetEdit.
- 5) NetEdit version 3.8 or later is required to support MB-GATEWAY.



- In the Main window, double click on the MB-GATEWAY module that you want to configure.



- Select “Use the following IP settings”.
- Type in the settings that are compatible with your network and press the OK button and the MB-GATEWAY module’s IP settings are now configured.

After the MB-GATEWAY module's IP settings have been configured to be compatible with the subnet of your PC, you can open Internet Explorer (or the Web browser of your choice) and continue the configuration for your application. You can also right click on the MB-GATEWAY in the main NetEdit window and choose "Start Web based config..." to start your default Web browser with the correct IP address pre-configured for you.

Function Codes Supported

The function codes supported by the MB-GATEWAY differ based upon whether the target from the Modbus Client is the MB-GATEWAY directly by utilizing the Gateway Modbus ID and the Automatic Read function or direct access to a Modbus serial slave by specifying the Unit ID of the Modbus Slave node itself.

Target = MB-GATEWAY Module (using Gateway Modbus ID and Automatic Read Function):

- Function Code 1 (Read Coils 0xxxxx)
- Function Code 2 (Read Input Bits 1xxxxx)
- Function Code 3 (Read Holding Registers 4xxxxx)
- Function Code 4 (Read Input Registers 3xxxxx)
- Function Code 8 (Read Diagnostics <Read Query Data Function>)

Target = MB-GATEWAY Modbus Slave Node (using Unit ID of Slave Node):

- Any function code supported by the Modbus Slave device

Log Modbus/TCP and/or RTU requests to SMTPViewer

Available in firmware 1.0.679 and later

Using the SMTPViewer (download from HostEng.com and install it in the \HAPTtools folder), you can see the TCP and RTU requests that are being processed by the MB-GATEWAY. This logging feature will only send packets to the PC that requested the logging; therefore it is not using broadcast packets, and each Gateway can only log data to 1 PC at a time.

To use logging, connect to MB_GATEWAY with SMTPViewer (UDP only; port 0x7272) and issue the following command:

```
'Log [req] [rsp] [rtu] [tcp] [dev #] [raw]'
```

req = Log requests
rsp = Log responses
rtu = Log RTU transactions
tcp = Log TCP transactions
raw = Show raw bytes instead of decoding transactions
dev # = Ex 'dev 1' would show only transactions for device 1

For example, to see all Modbus/RTU transactions (requests and responses) to/from device 1 in a decoded form, the command is: 'Log rtu req rsp dev 1'

The command 'log' by itself defaults to 'log req rsp rtu tcp' which will show all requests and responses for all devices in a decoded form. All forms of the log command toggle from on to off, so you can issue the same command again to turn logging off.