

Your Trusted Partner in Automation

Moxa is a leading provider of edge connectivity, industrial computing, and network infrastructure solutions for enabling connectivity for the Industrial Internet of Things (IIoT). With 35 years of industry experience, Moxa has connected more than 82 million devices worldwide and has a distribution and service network that reaches customers in more than 80 countries. Moxa delivers lasting business value by empowering industries with reliable networks and sincere service. Information about Moxa's solutions is available at www.moxa.com.

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Connect Different Protocols— It's Quick, Easy, and Reliable



Industrial Protocol Gateway Solutions

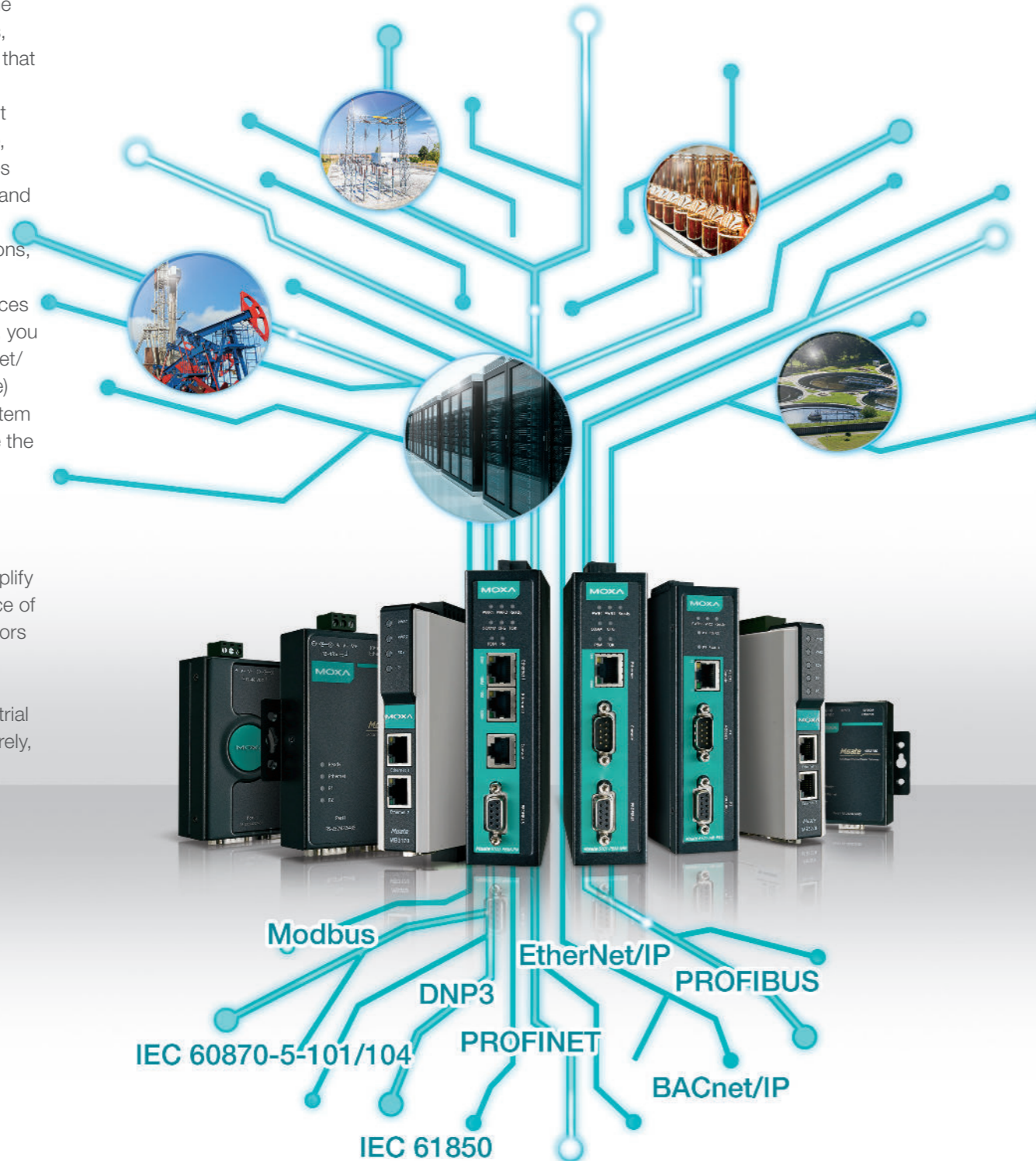
- **Quick** installation in just minutes
- **Easy** to maintain with built-in monitoring and diagnostics
- **Reliable** performance for uninterrupted operation

Finding a Protocol Conversion Solution Between SCADA/PLCs and Devices

To optimize production and efficiency and reduce operational costs, more and more industrial automation operators are taking advantage of industrial Ethernet-based networking options—including PROFINET, EtherNet/IP, and Modbus TCP—for the centralized control of real-time data.

Many system operators know the benefits of automation networks, but they may hesitate moving in that direction because they still want to retain their existing investment in fieldbus devices. Furthermore, they want to use fieldbus devices that are the most cost-effective and provide the best performance in the new system. For these reasons, finding an easy enough way to connect SCADA/PLCs and devices that use different protocols (e.g., you may need to connect an EtherNet/IP PLC to a Modbus RTU device) will be a major challenge for system operators who want to embrace the benefits of both sides.

Fortunately, Moxa's industrial protocol gateways implement innovative technologies that simplify the deployment and maintenance of fieldbus devices. System operators can use Moxa's gateways as a convenient solution to connect their fieldbus devices with industrial network protocols—easily, securely, and reliably.



Connect Different Protocols—It's Quick, Easy, and Reliable



Quick installation in just minutes

To make integration easier, Moxa's industrial protocol gateways provide a user-friendly web console and automated technologies that allow users to configure the gateways in only a few minutes. A quick setup **wizard** enables the configuration of the MGate in three to five steps, and the AutoMapping function can be used for data mapping of the conversion between two protocols. In addition, the **Device Search Utility (DSU)** enables mass deployment of the configuration files, IP address modification, and firmware upgrades to save you time.

Easy to maintain with built-in monitoring and diagnostics

Unpredictable adverse events increase the cost of manufacturing operations. Moxa gateways provide effortless management tools, such as communication analysis, protocol diagnostics, and traffic monitoring for easy diagnostics and troubleshooting. Administrators can take advantage of these monitoring tools to reduce downtime and cut back on excessive resources to investigate the root cause of failures. Besides minimizing downtime, protocol gateways provide an event log to record important events, such as network problems and protocol issues, and use a relay to turn on alarms for on-site troubleshooting.

Reliable performance for uninterrupted operation

For mission-critical industrial applications, the failure of a single link can affect operational efficiency. Moxa's gateways are certified for use in hazardous environments (**ATEX Zone 2, Class 1 Division 2, IECEx**), support a **-40 to 75°C** wide operating temperature (the highest operating temperature on the market; available with some models), and feature **dual power inputs** for connecting to a redundant power source to ensure reliable performance. In addition, protocol gateways are recognized by several important organizations, such as PROFIBUS & PROFINET International (PI), Open DeviceNet Vendors Association (ODVA™), and the Modbus Organization (Modbus.org).

Applications

Monitoring a Small-scale Power Generator

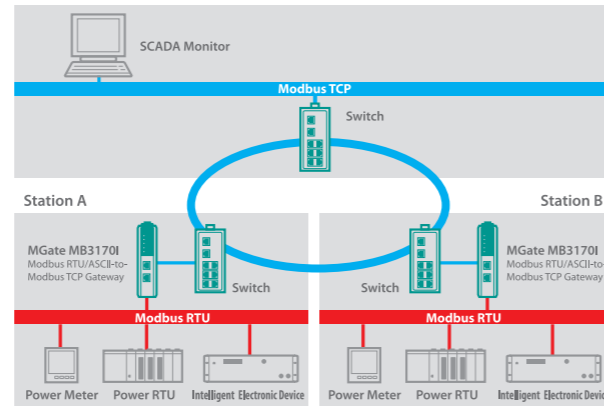


Modbus RTU/ASCII to Modbus TCP

Industrial facilities often have their own power generator to provide an uninterrupted power supply. To enable continuous power monitoring over a network, Modbus is commonly adopted as a communication protocol to transmit large volumes of Modbus RTU monitoring information from power RTUs, intelligent electronic devices (IEDs) and meters, via industrial gateways to a SCADA system running on a Modbus TCP network.

Moxa's Solution: MGate MB3170I

- Surge and isolation protection of serial ports to prevent damage in high-power noise environments
- Software-selectable RS-232/422/485 function
- Supports up to 16 TCP masters for multiple access
- Supports up to 31 RS-485 devices on a multidrop network to connect multiple field devices
- Modbus traffic log for easy troubleshooting



Data Center Power Monitoring

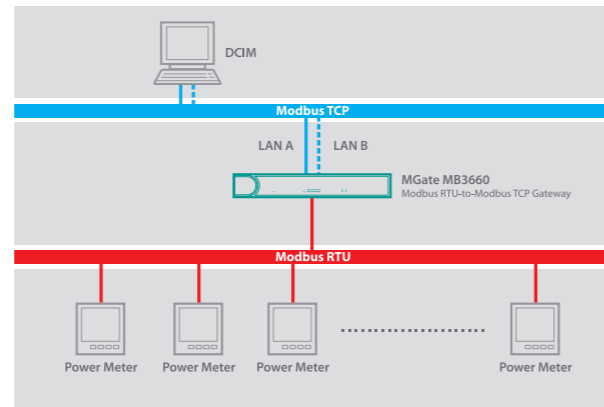


Modbus RTU/ASCII to Modbus TCP

Data centers and server rooms use a significant amount of energy, with many industrial facilities spending nearly 25% of their total operating budget on this expense. Consumption is measured by power meters throughout the facility, with many of the meters integrated with a Modbus RTU. Data from the meters is transmitted via an industrial gateway to a Modbus TCP network, and finally to a data center infrastructure management (DCIM) system.

Moxa's Solution: MGate MB3660

- High port-density solution that provides 8 or 16 RS-232/422/485 ports
- High performance with active and parallel polling on serial ports (different from the traditional one-request/one-response method)
- Dual IP addresses for hardware-based redundancy
- Dual VAC or VDC power inputs for better system reliability



Applications

HVAC Control and Monitoring

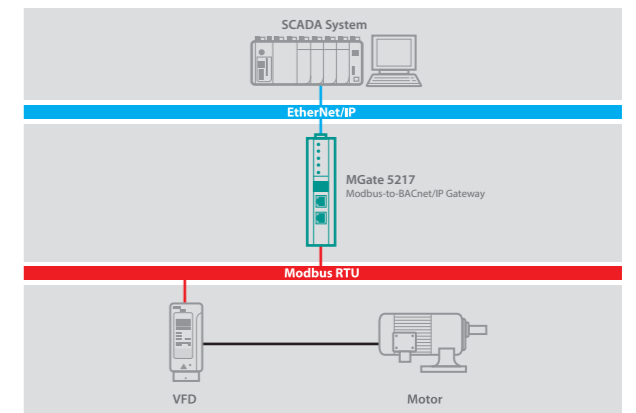


Modbus RTU/ASCII/TCP to BACnet/IP

In response to demands for greater energy efficiency, most factories are using variable frequency drives (VFDs) to optimize power consumption by controlling electric motors that operate pumps and fans. Although VFD communication modules or PLC Modbus modules can be used to easily connect the VFDs (using Modbus RTU) to SCADA Systems (using BACnet/IP) for remote monitoring, this option may be too expensive and involve way too much installation effort. For this reason, gateways have become a cost-effective way to meet Modbus communication requirements.

Moxa's Solution: MGate 5217

- User-friendly web console for easy management
- Serial port with 2 kV isolation protection
- Complete packet analysis and diagnostic information for maintenance
- Supports 600 points and 1200 points models



Production Line Control

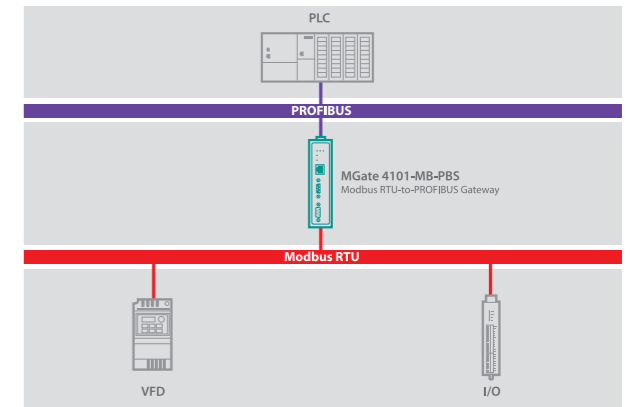


Modbus RTU/ASCII to PROFIBUS

As labor costs increase year after year, manufacturers have transitioned to using automation systems to reduce labor costs. PLCs are often used to automate systems. Siemens' PLCs, which use the PROFIBUS protocol, are most commonly used in process automation and machinery. However, most devices still use Modbus RTU, the most common protocol. For this reason, industrial Ethernet gateways are the right choice for converting Modbus RTU to PROFIBUS, which can be controlled by PROFIBUS PLCs.

Moxa's Solution: MGate 4101-MB-PBS

- Windows utilities with the innovative QuickLink function for automatic configuration within minutes
- Relay output provides the power input status
- Redundant dual DC power inputs for better system reliability



Applications

Water and Wastewater Treatment Automation



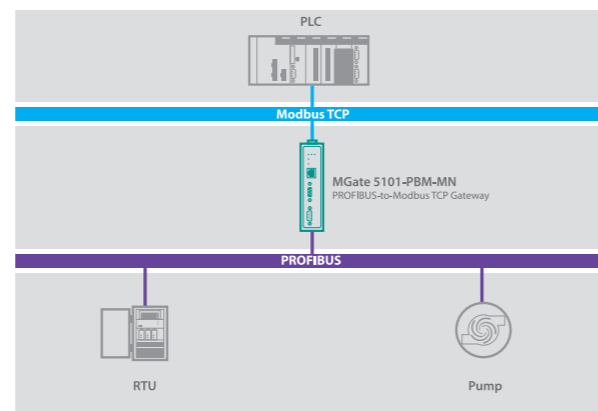
PROFIBUS to Modbus TCP

Most water and wastewater treatment facilities are designed to last for more than 20 years. However, you can expect the electrical components of a treatment plant to be obsolete after only 5 years. Because of this, systems are being refurbished all the time by adding capacity or functionality to PLCs, or using I/O technology to improve monitoring and control. A solution seen more and more frequently is using industrial gateways for protocol conversion to connect PROFIBUS I/Os, RTUs, and pumps to Modbus TCP PLCs.

Moxa's Solution:

MGate 5101-PBM-MN

- One-click AutoScan function that allows gateways to detect data from PROFIBUS I/O modules directly
- Web-based monitoring tool that enables easy maintenance and configuration
- Fault value function that allows gateways to automatically send a preset value to a device to prevent unpredictable operation when the SCADA connection is lost



Oil-and-gas Wellhead Monitoring



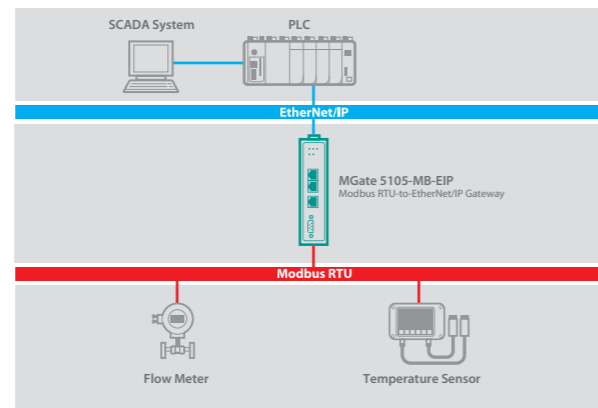
Modbus RTU/ASCII to EtherNet/IP

Oil-and-gas companies use sensors, meters, and RTUs to monitor and control pumpjack operations to ensure that oil-and-gas production is both safe and efficient. To achieve this, all the devices making up the wellhead are connected to a control center. However, since most of these devices use the Modbus RTU protocol, a suitable method must be found to connect serial devices to a central EtherNet/IP SCADA system.

Moxa's Solution:

MGate 5105-MB-EIP

- Supports Modbus RTU/ASCII/TCP and EtherNet/IP protocols
- Embedded Modbus protocol analyzer for easy maintenance
- microSD slot for configuration backup
- Wide -40 to 75°C operating temperature suitable for outdoor environments



Applications

Substation Retrofitting



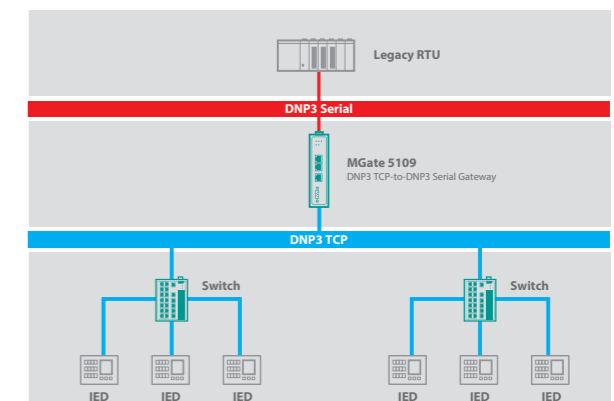
DNP3 TCP to DNP3 Serial

To reap the benefits of the smart grid, operators are digitalizing their legacy systems in order to collect more information from substations. However, when dozens of IEDs have been upgraded with Ethernet-based DNP3 TCP protocols, the challenge is to monitor these IEDs through legacy RTUs that use DNP3 serial protocols. A standalone and easy-to-use protocol gateway can be helpful for engineers under these conditions.

Moxa's Solution:

MGate 5109

- User-friendly web console that walks you through the configuration within four steps
- Built-in troubleshooting tool to find the root cause easily
- Supports thousands of data points for binary inputs (8192 points), binary outputs (8192 points), analog inputs (2048 points), analog outputs (2048 points), and counters (2048 points), making wiring easy for dozens of IEDs.



Renewable Energy Monitoring



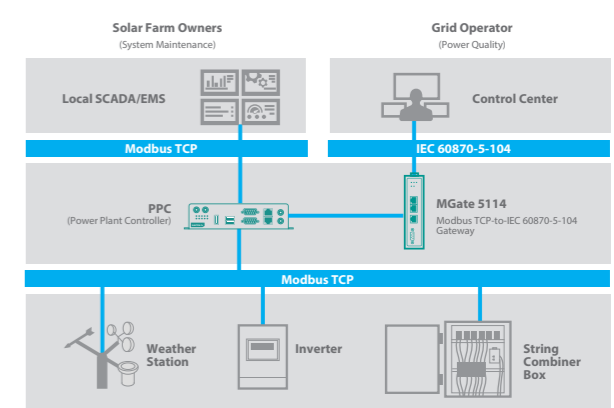
Modbus TCP to IEC 60870-5-104

With renewable energy increasingly being adopted worldwide, governments require the monitoring of the status of these power systems to ensure quality deliverance. If your renewable solution uses Modbus TCP, which differs from IEC 60870-5-104 used in the national grid, then adding an extra protocol gateway will enable the monitoring of the grid's status without affecting the current renewable energy system operation.

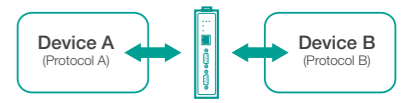
Moxa's Solution:

MGate 5114

- A standalone protocol gateway supports both Modbus TCP and IEC 60870-5-104
- Effortless configurations compared with programming on computers
- Built-in troubleshooting tool to find the root cause easily



Find an MGate Solution



| Device A / Device B | Modbus RTU/ASCII Slave | Modbus RTU/ASCII Master | PROFIBUS Slave | PROFIBUS Master | J1939 | DNP3 Serial Outstation | DNP3 Serial Master | DF1 | IEC 60870-5-101 Slave | IEC 60870-5-101 Master | Modbus TCP Server | Modbus TCP Client | EtherNet/IP Adapter | EtherNet/IP Scanner | PROFINET Controller | DNP3 TCP Outstation | DNP3 TCP Client | IEC 60870-5-104 Server | IEC 60870-5-104 Client | MQTT Broker | BACnet/IP Client | IEC 61850 MMS Client |
|-------------------------|------------------------|-------------------------|----------------|-----------------|-------|------------------------|--------------------|---------|-----------------------|------------------------|-------------------|-------------------|---------------------|---------------------|---------------------|---------------------|-----------------|------------------------|------------------------|-------------|------------------|----------------------|
| Modbus RTU/ASCII Slave | - | 1) MB3000 | - | 4101, 5111 | 5118 | - | - | - | - | - | 5105 | MB3000, 5109 | 5105 | 5105, 5135/5435 | 5103, 5134 | - | 5109 | - | 5114 | 5105 | 5217 | 5119 |
| Modbus RTU/ASCII Master | 1) MB3000 | - | - | 4101, 5111 | 5118 | - | - | - | - | - | MB3000, 5109 | 5105, 5109 | 5105 | 5105 | 5103 | 5109 | 5109 | 5114 | - | - | - | - |
| PROFIBUS Slave | - | - | - | - | - | - | - | - | - | - | 5101 | 5101 | - | - | 5102 | - | - | - | - | - | - | - |
| PROFIBUS Master | 4101, 5111 | 4101, 5111 | - | - | - | - | - | - | - | - | 5111 | 5111 | - | 5111 | 5111 | - | - | - | - | - | - | - |
| J1939 | 5118 | 5118 | - | - | - | - | - | - | - | - | 5118 | 5118 | 5118 | 5118 | 5118 | - | - | - | - | - | - | - |
| DNP3 Serial Outstation | - | - | - | - | - | - | - | - | - | - | - | 5109 | - | - | - | - | 5109 | - | - | - | - | 5119 |
| DNP3 Serial Master | - | - | - | - | - | - | - | - | - | - | 5109 | 5109 | - | - | - | 5109 | - | - | - | - | - | - |
| DF1 | - | - | - | - | - | - | - | - | - | - | - | - | EIP3000 | EIP3000 | - | - | - | - | - | - | - | - |
| IEC 60870-5-101 Slave | - | - | - | - | - | - | - | - | - | - | - | 5114 | - | - | - | - | - | - | - | - | - | 5119 |
| IEC 60870-5-101 Master | - | - | - | - | - | - | - | - | - | - | 5114 | - | - | - | - | - | - | 5114 | - | - | - | - |
| Modbus TCP Server | 5105 | MB3000, 5109 | 5101 | 5111 | 5118 | - | 5109 | - | - | 5114 | - | - | 5105 | 5105, 5135/5435 | 5103, 5134 | - | 5109 | - | 5114 | 5105 | 5217 | 5119 |
| Modbus TCP Client | MB3000, 5109 | 5105, 5109 | 5101 | 5111 | 5118 | 5109 | 5109 | - | 5114 | - | - | 5109 | 5105 | 5105 | 5103 | 5109 | 5109 | 5114 | - | - | - | - |
| EtherNet/IP Adapter | 5105 | 5105 | - | - | 5118 | - | - | EIP3000 | - | - | 5105 | 5105 | - | - | - | - | - | - | - | - | 5105 | - |
| EtherNet/IP Scanner | 5105, 5135/5435 | 5105 | - | 5111 | 5118 | - | - | EIP3000 | - | - | 5105, 5135/5435 | 5105 | - | - | 5103 | - | - | - | - | - | - | - |
| PROFINET Controller | 5103, 5134 | 5103 | 5102 | 5111 | 5118 | - | - | - | - | - | 5103, 5134 | 5103 | - | 5103 | - | - | - | - | - | - | - | - |
| DNP3 TCP Outstation | - | 5109 | - | - | - | - | 5109 | - | - | - | - | 5109 | - | - | - | - | - | - | - | - | - | 5119 |
| DNP3 TCP Client | 5109 | 5109 | - | - | - | 5109 | - | - | - | - | 5109 | 5109 | - | - | - | - | - | - | - | - | - | - |
| IEC 60870-5-104 Server | - | 5114 | - | - | - | - | - | - | - | 5114 | - | 5114 | - | - | - | - | - | - | - | - | - | 5119 |
| IEC 60870-5-104 Client | 5114 | - | - | - | - | - | - | - | 5114 | - | 5114 | - | - | - | - | - | - | - | - | - | - | - |
| MQTT Broker | 5105 | - | - | - | - | - | - | - | - | - | 5105 | - | 5105 | - | - | - | - | - | - | - | - | - |
| BACnet/IP Client | 5217 | - | - | - | - | - | - | - | - | - | 5217 | - | - | - | - | - | - | - | - | - | - | - |
| IEC 61850 MMS Client | 5119 | - | - | - | - | 5119 | - | - | 5119 | - | 5119 | - | - | - | - | 5119 | - | 5119 | - | - | - | - |

1) Applies only to the MB3270/3660.

