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 over 30 years of industry experience, Moxa has connected more than 65 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

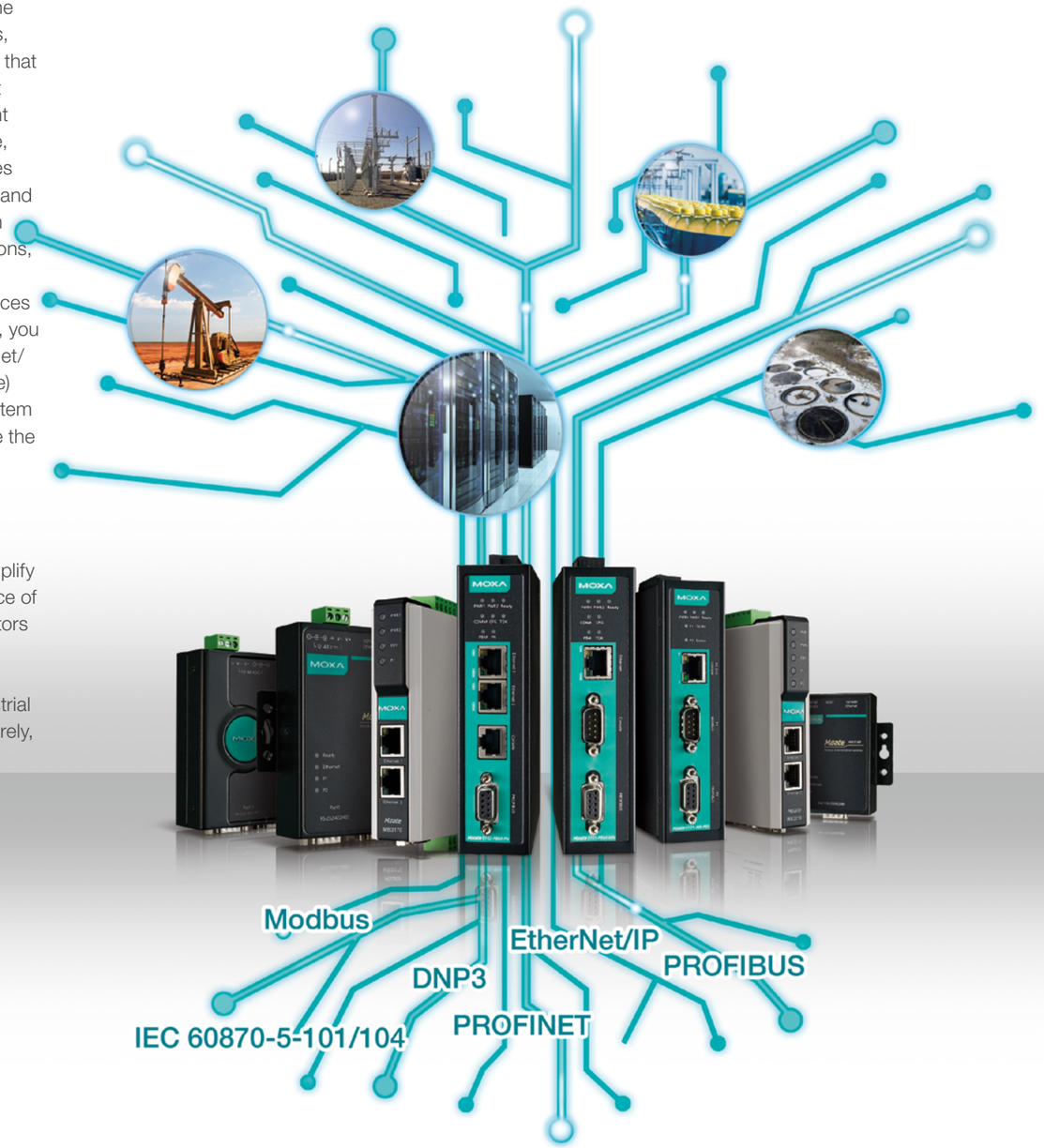
www.moxa.com

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. In addition to 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 onsite 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).

Visit the MGate website (www.moxa.com/MGate_Gateway) for further information or download free white papers.

Applications

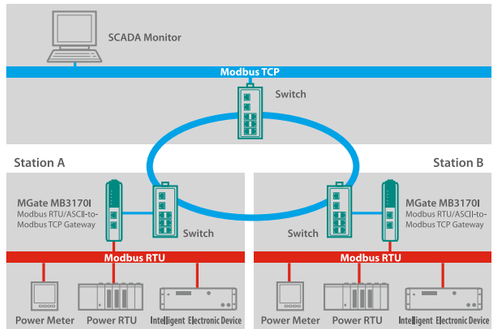
Monitoring a Small-scale Power Generator

Modbus RTU/ACSII 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



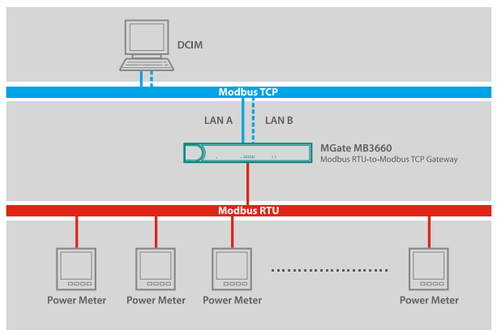
Data Center Power Monitoring

Modbus RTU/ACSII 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 located 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

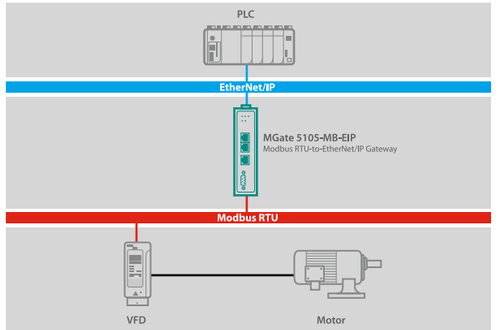
Modbus RTU/ASCII/TCP to EtherNet/IP

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 Rockwell PLCs (using EtherNet/IP) for remote monitoring purposes, 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 5105-MB-EIP

- Friendly web console for easy management
- Surge and isolation protection for serial ports
- Complete packet analysis and diagnostic information for maintenance
- microSD card slot for configuration and system log backup
- Winner of the *2015 Engineers' Choice Award*, for its flexible design that allows multiple configurations

EtherNet/IP



Production Line Control

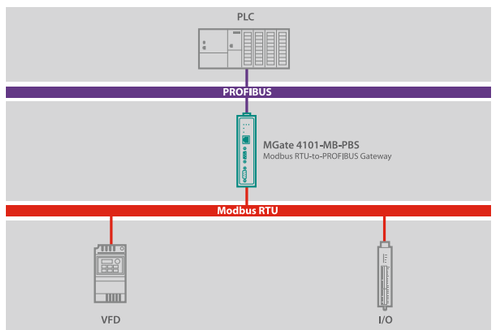
Modbus RTU/ASCII to PROFIBUS

As labor costs increase year after year, manufacturers have transitioned to using automation systems to reduce labor costs, with PLCs used as one solution to accomplish this. In process automation and machinery, Siemens' PLCs, which use the PROFIBUS protocol, are often used for this purpose. However, most devices still use Modbus RTU, which is 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

PROFIBUS • PROFINET



Applications

Water and Wastewater Treatment Automation

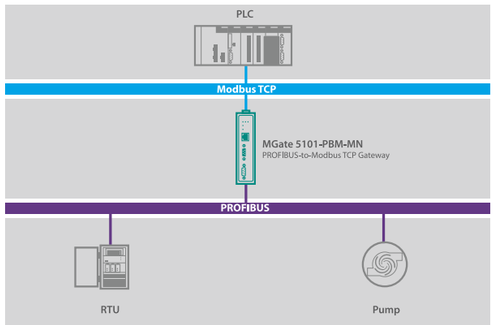
PROFIBUS to Modbus TCP

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

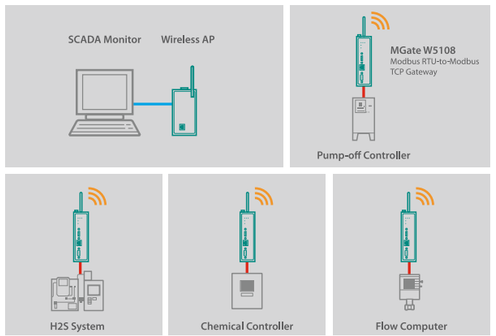
Modbus RTU/ASCII to Modbus TCP (IEEE 802.11a/b/g/n)

Oil-and-gas companies use sensors, meters, and RTUs to monitor and control pumpjack operation to ensure that oil-and-gas production is both safe and efficient. To achieve this, all of 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 Modbus TCP SCADA system. A straightforward Modbus RTU to Modbus TCP converter might be a good solution, but to reduce cable installation time, more and more companies are moving to a wireless solution.

Moxa's Solution:

MGate W5108/W5208

- Supports IEEE 802.11a/b/g/n wireless networks
- Supports Modbus RTU/ASCII/TCP and DNP3 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

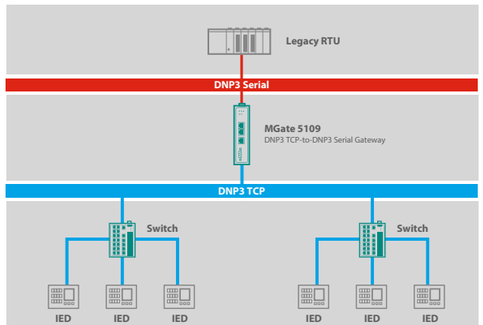
DNP3 TCP to DNP3 Serial

To reap the benefits of the smart grid, operators are starting to digitalize 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

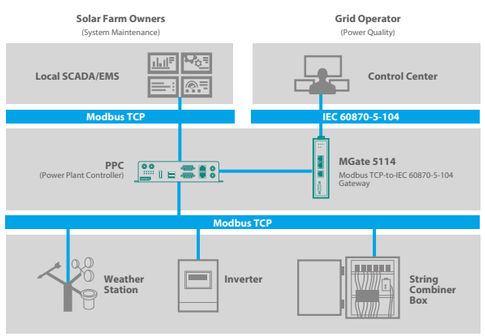
Modbus TCP to IEC 60870-5-104

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 is different 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 Outstaion	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
Modbus RTU/ASCII Slave	-	1) MB3000	-	4101/5111	5118	-	-	-	-	-	5105	MB3000/2) W5x08 5109	5105	5105	5103	-	5109	-	5114	5105
Modbus RTU/ASCII Master	1) MB3000	-	-	4101/5111	5118	-	-	-	-	-	MB3000/2) W5x08 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 Outstaion	-	-	-	-	-	-	-	-	-	-	-	5109	-	-	-	-	2) W5x08 5109	-	-	-
DNP3 Serial Master	-	-	-	-	-	-	-	-	-	-	5109	5109	-	-	-	2) W5x08 5109	-	-	-	-
DF1	-	-	-	-	-	-	-	-	-	-	-	-	EIP3000	EIP3000	-	-	-	-	-	-
IEC 60870-5-101 Slave	-	-	-	-	-	-	-	-	-	-	-	5114	-	-	-	-	-	-	5114	--
IEC 60870-5-101 Master	-	-	-	-	-	-	-	-	-	-	5114	-	-	-	-	-	-	5114	-	-
Modbus TCP Server	5105	MB3000/2) W5x08 5109	5101	5111	5118	-	5109	-	-	5114	-	-	5105	5105	5103	-	5109	-	5114	5105
Modbus TCP Client	MB3000/2) W5x08 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	5105	-	5111	5118	-	-	EIP3000	-	-	5105	5105	-	-	5103	-	-	-	-	-
PROFINET Controller	5103	5103	5102	5111	5118	-	-	-	-	-	5103	5103	-	5103	-	-	-	-	-	-
DNP3 TCP Outstation	-	5109	-	-	-	-	2) W5x08 5109	-	-	-	-	5109	-	-	-	-	-	-	-	-
DNP3 TCP Client	5109	5109	-	-	-	2) W5x08/5109	-	-	-	-	5109	5109	-	-	-	-	-	-	-	-
IEC 60870-5-104 Server	-	5114	-	-	-	-	-	-	-	5114	-	5114	-	-	-	-	-	-	-	-
IEC 60870-5-104 Client	5114	-	-	-	-	-	-	-	5114	-	5114	-	-	-	-	-	-	-	-	-
MQTT	5105	-	-	-	-	-	-	-	-	-	5105	-	5105	-	-	-	-	-	-	-

1) Applies only to the MB3270/3660 2) W5x08 = W5108/W5208 (supports IEEE 802.11a/b/g/n)


MGate MB3000

MGate MB3660


MGate EIP3000


MGate 4101-MB-PBS


MGate 5101-PBM-MN


MGate 5102-PBM-PN


MGate 5103


MGate 5105-MB-EIP


MGate 5109


MGate 5111


MGate 5114


MGate 5118


MGate W5108/W5208

▶ To learn more, visit: www.moxa.com/protocol-gateway