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

Device

SCADA/PLC

Industrial Ethernet Gateway Solutions

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

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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 also want to 1) retain their existing investment in Fieldbus devices, and 2) 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 Ethernet 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.

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

Quick installation, in just minutes

To make integration easier, Moxa's industrial Ethernet gateways provide automatic technologies that allow users to configure the gateways in only a few minutes. The **AutoScan** function enables MGate to automatically detect PROFIBUS devices with just one click, and the **AutoCalibration** function can be used to easily configure response timeout settings. In addition, the **QuickLink** function allows gateways to automatically detect parameters, and map them into a format suitable for use by PLCs.

Easy to maintain, with built-in monitoring and diagnostics

Unpredictable adverse events will increase the cost of manufacturing operations, and Moxa gateways provide effortless management tools for easy monitoring and troubleshooting. Administrators can take advantage of the web-based monitoring tool to monitor I/O data and log recordings from field devices. In addition to minimizing downtime, Moxa gateways provide an **Event Log** to record important events such as network problems and protocol issues, and use a **Fault 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, Moxa 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/ACSII to Modbus TCP

Industrial facilities often have their own power generator to provide an uninterrupted power supply. To enable continuous power monitoring over the network, Modbus is commonly adopted as a communication protocol to transmit large volumes of Modbus RTU monitoring information from power RTUs, intelligent electronic devices, 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 multi-drop network to connect multiple field devices
- Modbus traffic log for easy troubleshooting
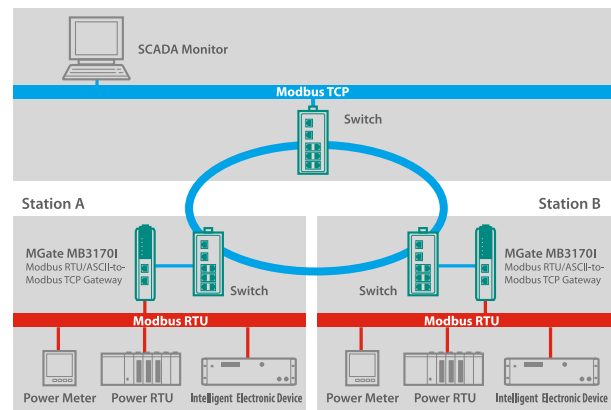
## Data Center Power Monitoring

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 DCIM (data center infrastructure management) system.

Moxa's Solution:
MGate MB3660 (available Q4, 2015)

- 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

3
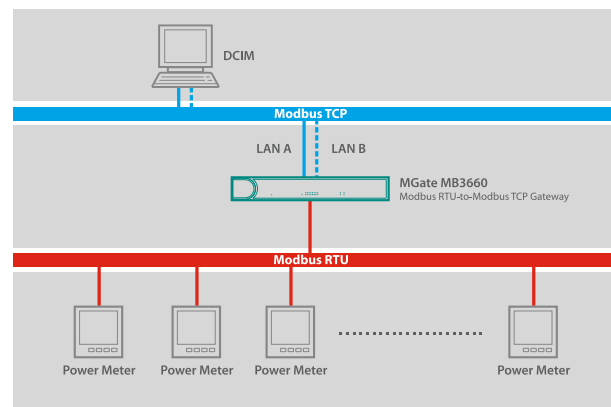
Applications

HVAC Control and Monitoring

### Modbus RTU/ASCII/TCP to EtherNet/IP

In response to demands for greater energy efficiency, most factories are using VFDs (Variable Frequency Drives) 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 take way too much installation effort. For this reason, gateways have become a cost-effective way to satisfy 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*, due to a flexible design that allows multiple configurations

EtherNet√IP™
conformance tested

PLC

EtherNet/IP

MGate 5105-MB-EIP
Modbus RTU-to-EtherNet/IP Gateway

Modbus RTU

VFD   Motor
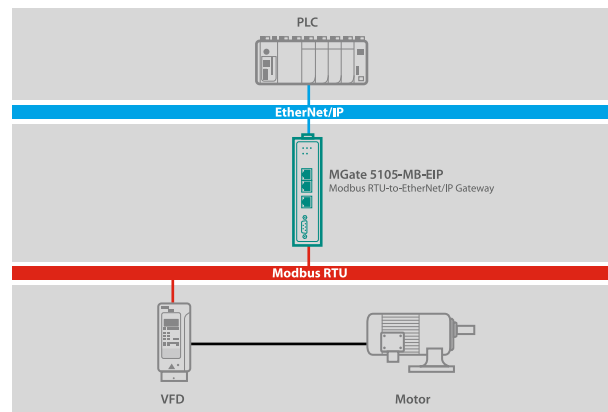
## Production Line Control

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

PI CERTIFIED
PROFIBUS • PROFINET

PLC

PROFIBUS

MGate 4101-MB-PBS
Modbus RTU-to-PROFIBUS Gateway

Modbus RTU

VFD   I/O
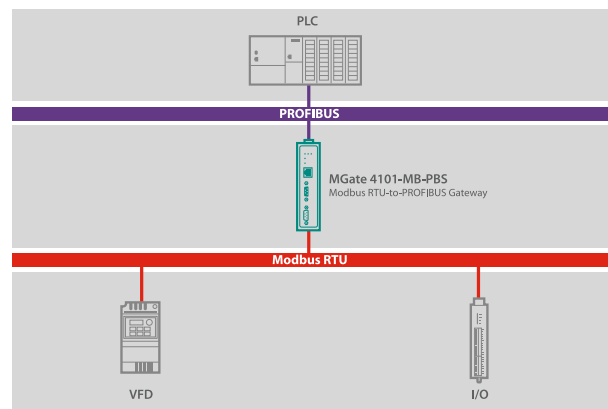
Applications

## 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
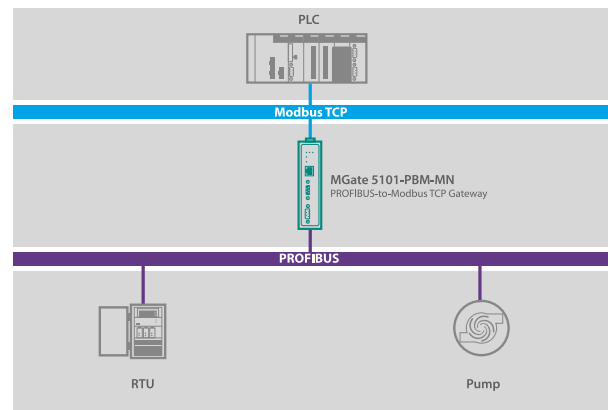

Oil and Gas Wellhead Monitoring

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.
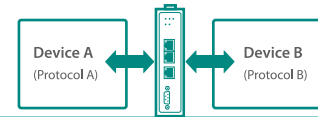
Moxa's Solutions:
MGate W5108/W5208 (available Q3, 2015)
- Supports IEEE 802.11a/b/g/n wireless networks
- Supports Modbus RTU/ASCII/TCP and DNP3 protocols
- Embedded Modbus protocol analyzer for easy maintenance
- MicroSD slot for configuration backup
- Wide -40 to 75°C operating temperature suitable for outdoor environments
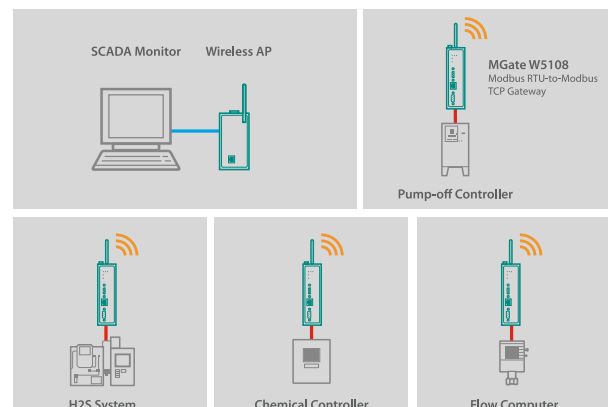
Find an MGate Solution

Device A / Device B	Modbus RTU/ASCII Slave	Modbus RTU/ASCII Master	DF1	PROFI-BUS Slave	PROFI-BUS Master	DNP3 Serial	Modbus TCP Server	Modbus TCP Client	EtherNet/IP Adapter	EtherNet/IP Scanner	PROFINET Controller	DNP3 TCP
Modbus RTU/ASCII Slave	MB3660	MB3270 MB3660	–	–	4101-MB-PBS	–	MB3660, 5105-MB-EIP	MB3000, MB3660, W5x08, W5106, W5207	5105-MB-EIP	5105-MB-EIP	–	–
Modbus RTU/ASCII Master	MB3270 MB3660	MB3660	–	–	4101-MB-PBS	–	MB3000, MB3660, W5x08, W5106, W5207	MB3660, 5105-MB-EIP	5105-MB-EIP	5105-MB-EIP	–	–
DF1	–	–	–	–	–	–	–	–	EIP3000	EIP3000	–	–
PROFIBUS Slave	–	–	–	–	–	–	5101-PBM-MN	5101-PBM-MN	–	–	5102-PBM-PN	–
PROFIBUS Master	4101-MB-PBS	4101-MB-PBS	–	–	–	–	–	–	–	–	–	–
DNP3 Serial	–	–	–	–	–	–	–	–	–	–	–	W5108/5208 W5106/5207
Modbus TCP Server	MB3660, 5105-MB-EIP	MB3000, MB3660, W5x08, W5106, W5207	–	5101-PBM-MN	–	–	MB3660, 5105-MB-EIP	MB3660, 5105-MB-EIP	5105-MB-EIP	5105-MB-EIP	–	–
Modbus TCP Client	MB3000, MB3660, W5x08, W5106, W5207	MB3660, 5105-MB-EIP	–	5101-PBM-MN	–	–	MB3660, 5105-MB-EIP	MB3660, 5105-MB-EIP	5105-MB-EIP	5105-MB-EIP	–	–
EtherNet/IP Adapter	5105-MB-EIP	5105-MB-EIP	EIP3000	–	–	–	5105-MB-EIP	5105-MB-EIP	–	–	–	–
EtherNet/IP Scanner	5105-MB-EIP	5105-MB-EIP	EIP3000	–	–	–	5105-MB-EIP	5105-MB-EIP	–	–	–	–
PROFINET Controller	–	–	–	5102-PBM-PN	–	–	–	–	–	–	–	–
DNP3 TCP	–	–	–	–	–	W5108/5208 W5106/5207	–	–	–	–	–	–

MGate MB3000/ EIP3000

MGate 5101-PBM-MN

MGate 5102-PBM-PN

MGate 5105-MB-EIP

MGate 4101-MB-PBS

MGate MB3660
(available Q4, 2015)

MGate W5108/W5208
(available Q3, 2015)

MGate W5106/W5207
(available Q4, 2015)

MOXA®

Reliable Networks ▲ Sincere Service

Your Trusted Partner in Automation

Moxa is a leading provider of industrial networking, computing, and automation solutions for enabling the Industrial Internet of Things. With over 25 years of industry experience, Moxa has connected more than 30 million devices worldwide and has a distribution and service network that reaches customers in more than 70 countries. Moxa delivers lasting business value by empowering industry with reliable networks and sincere service for industrial communications infrastructures.

Moxa Sales and Marketing Headquarters

Moxa Corporate Plaza
601 Valencia Ave., Suite 200
Brea, CA 92823, U.S.A.
Toll Free: 1-888-669-2872
Tel: +1-714-528-6777
Fax: +1-714-528-6778
usa@moxa.com

Moxa Design and Engineering Headquarters

Fl. 4, No. 135, Lane 235, Baoqiao Rd.
Xindian Dist., New Taipei City,
Taiwan, R.O.C.
Tel: +886-2-8919-1230
Fax: +886-2-8919-1231

The Americas
Moxa Americas

Toll Free: 1-888-MOXA-USA
Tel: +1-714-528-6777
Fax: +1-714-528-6778
usa@moxa.com

Moxa Brazil

Tel: +55-11-2495-3555
Fax: +55-11-2495-6555
brazil@moxa.com

Europe
Moxa Germany

Tel: +49-89-3700-399-0
Fax: +49-89-3700-399-99
europe@moxa.com

Moxa France

Tel: +33-1-30-85-41-80
Fax: + 33-1-30-47-35-91
france@moxa.com

Moxa UK

Tel: +44-1844-355-601
Fax: +44-1844-353-553
uk@moxa.com

Asia-Pacific
Moxa Asia-Pacific and Taiwan

Tel: +886-2-8919-1230
Fax: +886-2-8919-1231
asia@moxa.com
japan@moxa.com
taiwan@moxa.com

Moxa India

Tel: +91-80-4172-9088
Fax: +91-80-4132-1045
india@moxa.com

Moxa Russia

Tel: +7-495-287-0929
Fax: +7-495-269-0929
russia@moxa.com

Moxa Korea

Tel: +82-31-625-4048
Fax: +82-31-609-7996
korea@moxa.com

China
Moxa Shanghai

Tel: +86-21-5258-9955
Fax: +86-21-5258-5505
china@moxa.com

Moxa Beijing

Tel: +86-10-5976-6123/24/25/26
Fax: +86-10-5976-6122
china@moxa.com

Moxa Shenzhen

Tel: +86-755-8368-4084/94
Fax: +86-755-8368-4148
china@moxa.com