Wireless Modbus systems

Modbus is the most widely used communications protocol in process industries today and the 'de facto' field-level connectivity solution. The MTL wireless solutions can connect a range of Modbus devices over a standalone network, or transfer the data to a host computer for remote monitoring and control. Both Modbus TCP and RTU protocols are supported, plus the ability to convert between them, which maximises the options when adding devices to a network. This combination ensures you can connect devices simply and effectively through a supported protocol.

INTRODUCTION

The majority of today's devices support some form of industrial communication protocol. Field powered, and hence more complex, devices typically have some form of communications port. The most commonly used protocol is Modbus with a wide array of controllers/control systems supporting either the serial (RTU) or Ethernet (Modbus/TCP) version of Modbus.

The MTL wireless products not only support multiple protocols but also provide a range of license-free frequencies to meet your needs for distance and bandwidth, regardless of your location.

SYSTEM DESCRIPTION

One of the challenges faced by the modern control system is accessing the data available from the various smart devices to which it is connected. Our radios enable this data exchange in a secure and cost effective way by making the data available across a new or existing 802.11 infrastructure, or by transparently transferring the data through a lower frequency network. Systems can be deployed in several ways to transfer data from Modbus TCP and RTU devices. For standalone networks, where there is no external host or master device, the WLN-2000 Wireless Device Server can be deployed as a Modbus TCP master to poll devices connected to the network and transfer data between them. Through the use of the TCP to RTU conversion feature, three interface types (Ethernet, RS232 and RS485) can exist on the network simultaneously and communicate to each other through the advanced features of the WLN-2000.
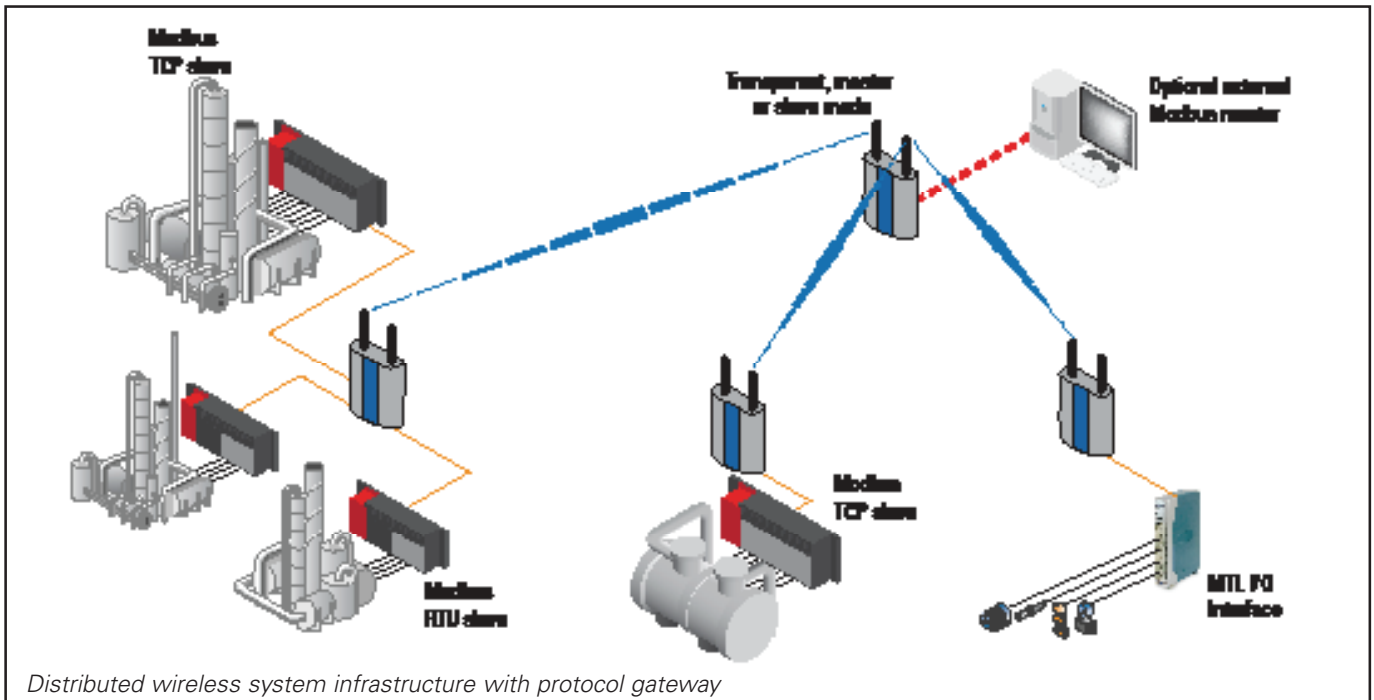
In addition to standalone networks, the WLN-2000 can be deployed to transfer data passively between master and slave in a transparent fashion, with the TCP to RTU conversion process still active as required. This supports a more traditional Modbus network - with the added benefit of replacing the cable - providing a wireless network infrastructure and a protocol converter all in one device.

The WLN-2000 is available in the 2.4GHz and 5GHz bands, with multiple channels available, and the ability to test radio channel characteristics for optimum channel selection. The WLN-2000 includes encryption, traffic management and routing features to ensure secure and compatible wireless networks.

For basic Modbus network deployments, the WMO series of Wireless Modems can effectively replace a cable, communicating over several kilometres/miles. This can be used to link a remote Modbus slave to a SCADA master and reduce costs.

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Distributed wireless system infrastructure with protocol gateway

The diagram above represents an installation in which the radios not only communicate between each other, but also convert from one protocol to another. This example is based on a subset of a small, remotely monitored, pumping station.

As seen above, our radios not only provide the backhaul and infrastructure for communications from the field to the control/interface room, but also serve in a protocol-gateway role so that all the components can communicate with each other seamlessly via the wireless network. The topmost WLN-2000 Wireless Device Server is configured as a Wireless Access Point to which each of the subsequent clients can connect in order to transfer the data from their connected devices. To improve uptimes and introduce tolerance of network faults, a mesh repeater network with redundant links can be deployed by enabling the Wireless Distribution System (WDS) and Spanning Tree Protocol (STP) options in the WLN-2000. For purely digital and analogue signal networks, We also offers an I/O interface to provide sensor and control information over the network also made available through the Modbus protocol. Wireless devices on the network can be configured remotely and live diagnostics can be obtained while the network is in operation, maximising network uptime and enabling a live and easy method of expansion if more sites are required.

OVER ALL BENEFITS

Deploying MTL wireless systems to transfer and manage Modbus device data, whether plant wide or for a single link, provides a range of benefits, which include:

• An ability to deploy a standalone solution or interface to the host PC with one equipment set.

• Multiple interfaces that support several types of Modbus devices.

SIO-100S and WLN-2000 devices

• Simpler and faster maintenance with remote diagnostics and configuration.

• MTL I/O interface options which provide a cost effective way to access sensor data.

• Redundant wireless links providing a fault tolerant system for high reliability networks.

• Digital status output that can provide wireless link indication status for fault notification.

• Repeater operation offering wide area coverage.

• TCP to RTU conversion enabling Ethernet and serial Modbus devices on the same network.

• Traffic filtering, which can isolate Modbus network, reducing traffic when connected to large networks

ECONOMIC BENEFITS

For longer distance communications, wireless inherently brings economic benefits in the form of reduced installation and upgrade costs. However, our wireless Modbus networking solution provides unique savings in:

• Reduced maintenance and commissioning costs due to remote configuration/diagnostic access.

• Lower network host equipment costs as the WLN-2000 can administer the network through DHCP for standalone systems.

• Reduced integration costs as the MTL solution can be connected to an existing Ethernet network.

• Reducing inventory costs, as a multi-purpose network provides multiple interfaces per wireless node.

• Easy upgrade options by reducing the cost of upgrading and expanding wireless networks.

RELATED PRODUCTS

We have a comprehensive line of related I/O products to transfer analogue, digital and thermocouple data from a remote site to either a SCADA / DCS system, or as regular outputs. Surge protection devices are also available to protect investments from dangerous electrical phenomena. Supporting products include:

• Temperature Multiplexers - both RTD and thermocouple - for hazardous areas.

• Antennas, cables and antenna surge protection.

• Digital and analogue I/O interfaces.

• Intrinsically safe barriers and isolators to monitor signals from hazardous areas.

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