



HART™ Backhaul Over Wireless

AN9038

Industry standard HART™ enabled instrumentation gives benefits beyond that of standard 4-20mA. MTL wireless products can transport this HART™ information over a long or short range wireless connection making this important diagnostic information available at several remote locations on a plant or site.



INTRODUCTION

Sensors are rarely located close to the point at which the data is monitored and controlled, so the more information gathered about the operation of these devices, the easier it is to plan maintenance and site visits. The HART™ protocol is a well supported and established industry standard which has been employed by a wide range of industries to improve communications and data collection from field instrumentation. HART enabled field devices add value to a project by transferring more than just the mA reading information from each instrument. This provides benefits far beyond that of a standard 4-20mA interface, particularly for collection of diagnostic information. Maintenance schedules can move to a predictive format rather than being reactive or time scheduled, which translates into more efficient plant management. MTL's industrial networking devices can collect the data from these smart HART instruments and transfer them over a long or short range radio connection, expanding the possibilities of how and where HART sensor data can be collected.

SYSTEM DESCRIPTION

The MTL4850 HART multiplexer has been used extensively to provide an interface between the DCS (Distributed control system)/SCADA system and HART enabled transmitters. This system type is deployed to access not only the measurement of pressure, flow, vibration and other physical quantities but also to communicate with the HART instrument itself to collect

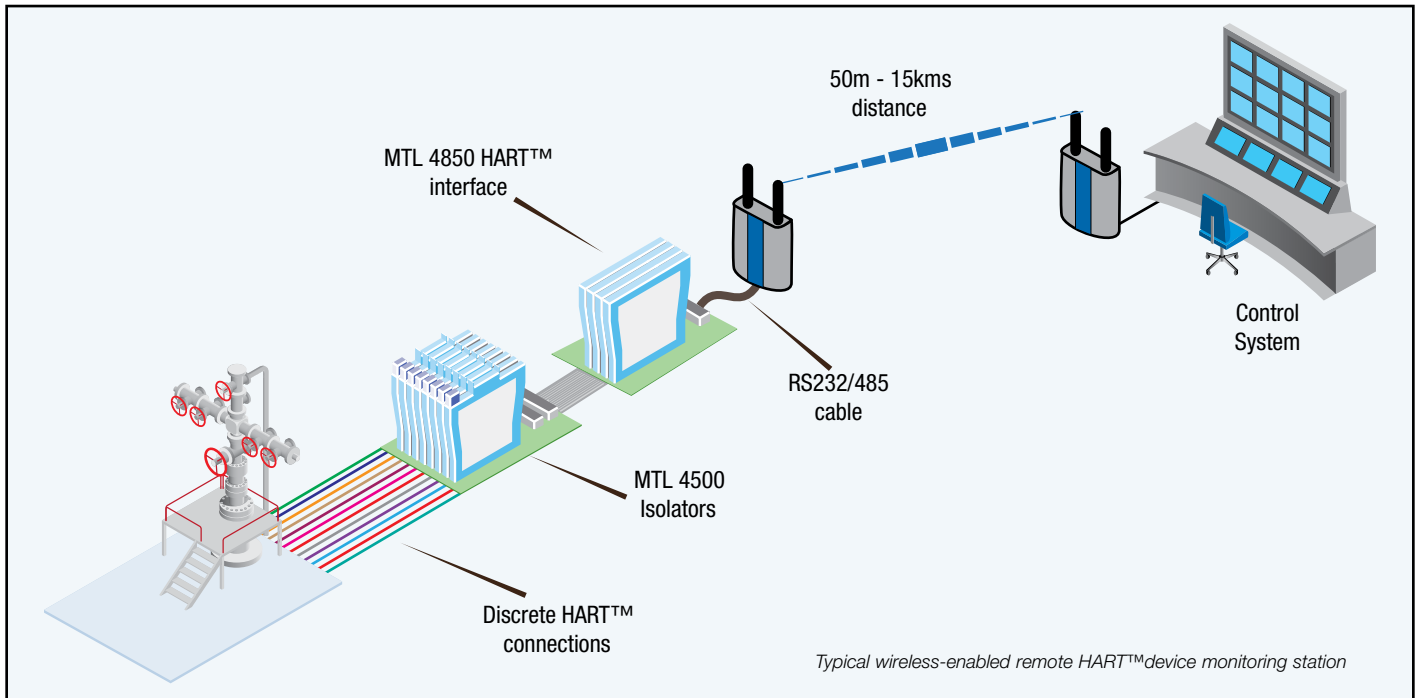
diagnostic information and send commands resulting in a higher awareness of instrumentation condition.

Typically the connection is made from the MTL HART multiplexer to the control system via a wired RS232/485 connection. This serial connection can be extended wirelessly over a long range using MTL's serial radio modems increasing the installation options, range and usefulness of the HART enabled instrumentation. This solution also removes the requirement for RS232 to RS485 converters as the conversion is done by the radio equipment.

MTL intrinsic safety barriers and isolators can be utilised to enable sensor location in Div 1 / Zone 0 or Zone 1 with installation of the wireless and multiplexer equipment possible in Div 2 / Zone 2.



MTL Wireless module



SYSTEM DIAGRAM

Above is a visual depiction of how HART transmitters can connect to the multiplexer through isolators, then from the multiplexer to the DCS over a wireless link. Several radio frequencies are available to ensure license-free operation for most regions of the world. Short or long ranges are possible for distances up to several km, meaning that the data from a cluster of remote HART devices can be brought back to the control system simply and reliably over a wide area.

The control system continuously requests sensor transmitter data from the multiplexer via the radio link. Configuration of the radios is required to ensure that the data is secure and to set up any system addressing. From the perspective of the control system and the HART multiplexer, it appears as a direct wired connection and does not require any other changes to the DCS or the multiplexer settings. Up to 32 HART devices can be connected through a single multiplexer, with several multiplexers connected to the radio system, permitting large I/O counts with access to diagnostics and HART commands.

Whole measurement systems can be deployed in this fashion to provide the benefit of locating the HART multiplexers and thus the cable marshalling in the best possible location rather than in cable range of the control system.

OVERALL BENEFITS

Deploying MTL systems to transfer and manage HART device data, whether plant wide or for a single link, provides a range of benefits including:

- Increased options for remote location of the HART™ instrumentation
- Multiple interfaces support both RS232 and RS485 connections and can convert between them
- Simpler and faster maintenance with remote diagnostics

- Easy expansion for additional sites being added to the network
- Both safe area and hazardous area sensors can be connected to the same multiplexer
- Digital status output can provide wireless link indication status for fault notification

ECONOMIC BENEFITS

For longer distance communications, wireless generically brings economic benefit in the form of reduced installation and upgrade costs. In addition, MTL's HART over wireless networking solution provides unique savings in:

- Reduced maintenance and commissioning costs due to remote configuration/diagnostic access
- Reduced installation costs and improved timescales
- Reduced integration costs as the MTL solution can be deployed transparently
- Multi-purpose network provides multiple interfaces per wireless node, reducing inventory costs
- Easy upgrade options reduce costs of upgrading and expanding wireless networks

Each project will have different valuations for the above economic indicators and the overall net benefit will therefore be site, and to some extent, application specific.

