ABB MEASUREMENT & ANALYTICS | APPLICATION NOTE

Wireless Guided Wave Radar with HART

Level and Interface Measurement, guided wave radar working reliably for dual level monitoring

01 Example wireless installation

Introduction

Wireless is popular in process industries for monitoring and control applications. In the oil and gas industry, it is widely used for level monitoring in upstream tank batteries. Tank batteries are used to store and process oil, water, and gas before transportation to downstream facilities. Level monitoring is essential in tank batteries to ensure efficient storage and prevent overflows, which can lead to safety hazards and environmental issues. Traditionally, level monitoring in tank batteries has been performed using wired sensors, which can be expensive to install and maintain as well as a safety concern in high H2S areas. However, with the advancements in wireless technology, wireless level monitoring has become a viable and cost-effective alternative.

Challenge

Typically, HART enabled devices are commonly used for configuration only. End users will often simply rely on a 4-20mA analog output as their primary level. In the case of upstream oil and gas, there is often the presence of water and oil making the measurement change from a single phase to a dual phase interface measurement. Utilizing a single 4-20mA output only allows for one level to be the output on this signal. Generally, this will be the upper oil level only, but with upgrades in wellhead automation, the need for dual level monitoring is key to automating scheduling for trucks or valve automation for pipeline distribution and lease automatic custody transfer (LACT) skids.

— 02 Typical LWT310 installation

— 03 Diagnostic waveform showing total level

— 04 Diagnostic waveform showing interface level

Rationalization

With all these capabilities, ABB takes it a few steps further empowering the device with a live waveform in real time of what the transmitter is seeing. If there's any metallic objects in close proximity, end users can quickly view this without having to hook up a hand held communicator. End users can also look at the entire waveform or detailed waveforms inside the coupler for diagnostics to ensure a proper echo launch. Adjusting the level and interface thresholds as well as blocking distances are also selectable on the local display.

The ABB Solution

When the transmitter communication is changed from analog to digital, the accuracy of measurement is increased and the additional HART variables are unlocked for controllers to effectively operate these sites. ABBs TotalFlow can interpret the readings and use ladder logic to throttle or fully open dump valves to maintain correct levels based on customer specifications.

The benefits of making the switch to a digital output not only enable the use of multiple variables, but also reduce power consumption making it an ideal solution for battery powered transmission devices. This is accomplished by putting the device in multidrop mode. The power consumption will change from a typical 24vdc to 4mA only. Finally, the wireless node attached to the ABB transmitter provides for bi-directional communications using HART compatible software. The HART communication is tunneled over wireless allowing HART software to configure, calibrate and troubleshoot the instrument without having to physically connect to it.

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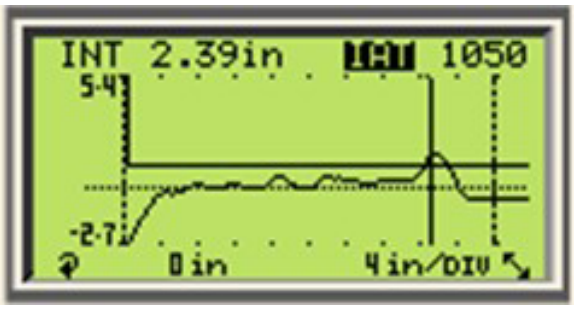

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Remote options for the transmitter heads are also available if areas with high concentrations of hydrogen sulfide are present.

Notes

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