

Redundant Level Measurement for Chemical Overfill Prevention

Application

In the chemical industry, level instrumentation is required to measure continuous liquid level in flammable tanks and to prevent potential overfill. Chemical plants stringently enforce environment, health, and safety (EH&S or HS&E) management practices with the expectation that their suppliers have a similar culture. One way of achieving a high level of reliability in instrumentation is to provide redundant level measurement using separate technologies. In this case, one technology for continuous measurement and the other as a high level switch for overfill prevention.

Solution

Due to space limitations and the added expense of having multiple process connections, it was requested to offer both technologies from the same process connection—a single 3" flange. Open communication and accurate feedback allowed for the special design to be accommodated.

Guided wave radar (GWR) technology was chosen for continuous level measurement to pair with ultrasonic gap switches. GWR is the fastest growing level measurement technology in the market, with Magnetrol pioneering the first of its kind in the late 90s. Ultrasonic gap switches are a popular technology for high level indication. The ultrasonic transducers can be supplied in single or dual-gap design, and with relay or two-wire current shift outputs from the electronics. Both technologies are suitable for use in Safety Integrity Level (SIL) 2 loops. Wireless communication was also desired, and the level devices were seamlessly integrated into the third-party wireless transmitter.



Figure 1: KMCO installation with Echotel® 961 ultrasonic high level switch (left) and Eclipse® 706 guided wave radar (right)

Result

Daniel Charles / Engineering Manager / KMCO / Crosby, Texas, USA

KMCO is one of the world's largest tolling facilities and our customer base reaches all over the world. Because of the turnover of multiple products in tanks, finding the right fit for a level transmitter was difficult. We went through several vendors and couldn't quite get what we needed. After meeting Magnetrol, we knew we were going on the right path. Our initial order was roughly 20 706 GWRs. We were able to set these up in the shop and install them much faster than any competitive unit. We were able to install twice as many transmitters in half the time it would take any other brand. The key to this is the display. We can navigate through it quickly and ensure that our set-up is accurate the first time, every time.

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After putting the 20 units up I met with Magnetrol® and asked them if they could somehow fit a level switch in the flange assembly. Our tanks have only one or two process connections on top and using two ports for level indication is difficult. We use switches in all of our tanks to give the operator redundant communications to prevent over filling of a vessel. We are very focused on HS&E here at KMCO and any step we can do to prevent errors we take. What was just wish and prayer became reality in a few short weeks. Magnetrol got back to me with a design quickly and we purchased the first batch of these units. The install was just as easy as with the 706s. All five were up in a day. These are now our “go to” level transmitters and they will be put on any future tank level project.

By using Magnetrol products, we are able to make the operator more productive and make the process safer. Using Magnetrol has streamlined our tank level indication installation, allowing us to install more for less cost than the competitors. We have over 1000 tanks at our facility and with the customer service and quality products we receive from Magnetrol, it will just be a matter of time before all of them have Magnetrol devices to depend on.

Thomas Kemme / Product Manager / Magnetrol / Aurora, Illinois, USA

We have the corporate vision to be our customer’s preferred partner for level and flow solutions. When Kent Hanks, Magnetrol Regional Sales Manager, reached out to the Product Management team, we knew that we had to come up with a solution. It was a multi-department effort including Engineering, Sales, Support, and Production. The relationship that Kent has fostered with KMCO is exceptional. They are a premier specialty chemical company and we share a common philosophy: satisfy the customer.

About the Technologies

Eclipse 706® GWR is a two-wire, 24 VDC loop-powered transmitter. It is based upon the technology of time domain reflectometry (TDR). TDR utilizes pulses of electromagnetic energy transmitted down a wave guide (probe). When a pulse reaches a surface that has a higher dielectric constant than air, a portion of the pulse is reflected. The transmit time of the pulse is then measured.



Model 706

Echotel® contact switches utilize ultrasonic energy to detect the presence or absence of liquid. They are available for single point (Model 961) or dual point (Model 962) level detection. Advanced self-test features provide unsurpassed testing of the electronics and transducers.



Model 961

Model 962

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