

CONTROL SIGNAL

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Options for Level Measurement with Pump Control

Gilson provides many ways to obtain accurate level measurement with pump control. The level technologies include ultrasonic, radar, capacitance, point level, submersible and differential pressure. The level controllers are as simple as panel mount display with programmable relays, to more advanced controllers with logic designed around pump control.

The selection of the best level sensor depends on several factors. The submersible level sensor may be the least expensive level sensor, and will work in



Jazz pump controller indicating individual pump runtimes

many applications. If non-contact level monitoring is required, we can provide ultrasonic or radar level technology. These packages cost around \$1,200-\$1,500 depending upon selected op-

(Continued on page 5)

Banner LED Light Towers Replace Conventional Stack Lights

Introducing the EZ-Light TL50 Tower Light from Banner Engineering. They are preassembled and pre-configured multi-segment indicators that are simple to install and provide highly visible operator guidance and indication of equipment status. It is a completely self-contained design that requires no controller.

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Model K80L segmented indicator

Hot New Products

Low Cost Indicating Pressure Switch

Series EDA Electronic Pressure Control is a versatile compact package that can replace a separate gauge, two switches, and a transmitter in a system saving money, installation time, and panel space.

The EDA incorporates two SPDT relays that have the on and off points fully adjustable over the range for control or alarm use. A 4-20 ma or voltage output are also available. Front face has LED indicators for switch status and a large backlight two-line display showing process value and indication units. Programming is easy with simple menu structure, two-line display, and external programming buttons. Weatherproof housing is ideal for a wide variety of applications with panel mount, flush



mount, or pipe mount ability. Features include zero set, adjustable dampening, menu lock out, peak and valley indication, removable terminal blocks, adjustable time delay, and scalable transmitter output.

A fully loaded controller goes for \$255.00. The model EDA is available in pressure ranges from 0-20 PSIG to 0-8,000 PSIG.

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*To remove your name from our newsletter mailing list, please send email to: sales@gilsoneng.com
Subject: Gilson newsletter*

Employee Profile

Jason Bergstrom joined the Gilson Engineering Inside Sales team in May 2006. He brought with him to Gilson many years of customer service experience having spent 18 years in the Golf industry. He had also previously worked as an Assistant Hotel Manager in California.

As an Inside Sales assistant in the Pittsburgh office, Jason works directly with the accounts of Mike Patchen and Denny Petrovich but is always happy to help any of Gilson's customers by providing the best possible service and prompt answers to questions. Describing himself as a people person, he says the most enjoyable part of his job at Gilson is the daily interaction he has with customers and fellow employees. "It is very satisfying helping a customer find an answer to their question. Sometimes I wish I could do more, but that is the great part about Gilson, we work as a team. If Inside Sales can't answer a customer's question directly, we always have the Outside Salesperson or Application Engineers here for backup. I think we all work pretty well together"



Jason was raised just north of Pittsburgh in Harmony, PA and now lives in Cranberry Township. Having attended the University of Pittsburgh, he is a big fan of Pitt Panther football and basketball. In his spare time he enjoys golf, attending Steeler football games, and occasional travel.

Keeping "Hands on" with DO and TSS measurement

Insight Instrumentation Group manufactures both portable dissolved oxygen (DO) and total suspended solids (TSS) handheld analyzers, which are used extensively in the municipal waste water and industrial pre-treatment markets.

The Model 3100 Portable DO unit measures the dissolved oxygen in all aqueous solutions while the Model 3150 TSS unit measures suspended solids. Both of these handheld analyzers are rugged, easy to use, and fully programmable and have data logging with serial interface capabilities to a PC.

Insite's advanced electronics along with a solid-state optical sensor



Model 3100 portable DO meter



Roger Laferriere of Pinellas County Utilities South Cross Bayou WRF takes DO reading

make these devices maintenance free. The optical sensor technology does not require any membranes, fill solutions or cartridges to replace. Also, the sensor does not have to remain moist when not in use. For plant operators, laboratory personnel, engineers, technicians the Insite portable DO and TSS units are valuable tools for checking and controlling their process plant.

In addition to the handheld Portable DO and TSS meters, Insite manufactures permanent DO, TSS, pH and ORP transmitters. The permanent mounted devices use the exact same sensor technology as the portables. The fixed transmitters are available in either a single channel, dual channel or four and eight channel versions. This allows the end user great flexibility when determining where to mount the transmitters in order to minimize the overall wiring. All the transmitters are microprocessor based, fully field programmable and have a local display and 4-20 mA output.

General News, Schedule of Events

Pittsburgh

March 9.

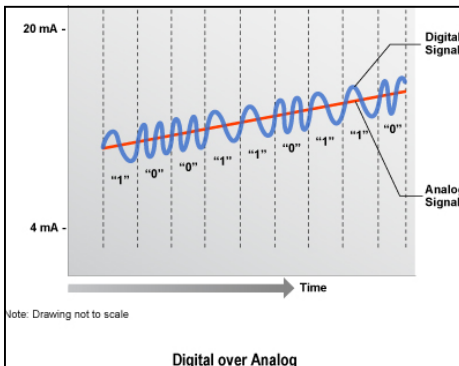
ISA Pittsburgh Section Education and Product Symposium
Regional Learning Center, Cranberry PA

www.gilsoneng.com

Establishing HART Communications Causing You Heartache?

From time to time, we have all experienced difficulty in establishing communications with a HART Smart devices in the field. Stepping back from the situation, and having a checklist of potential problems and how to check to pinpoint the source of your problem could possibly get you home in time for dinner some evening.

The term “HART modem” is used to describe a “converter” that when used with a laptop software like Siemens PDM, will allow programming of HART devices by turning your laptop into a handheld. These are available in both DB9 as well as a USB port versions, and have alligator clips for the loop side connection. “Hart Modem” is also the name used for a chip that resides in the transmitter capable of reading the 1100Hz and 2200Hz frequency shift signal known as

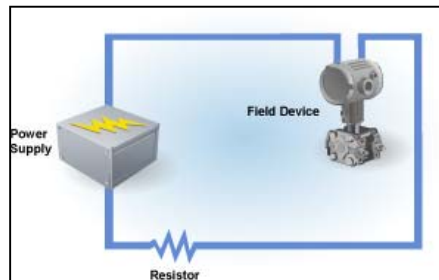


HART, and communicating back and forth between the transmitter processor and a handheld, laptop, and/or a control system running HART capable software for diagnostic and configuration purposes. We formulated a list of potential problems as follows:

BAD CONNECTION TO LOOP - It is always a good practice to minimize the amount of bare wire other than what is essential to make contact with terminals. It is important that terminals are loosened and the loop wires pulled out far enough for the alligator clips to make good contact with the wire, especially on compres-

sion type terminals. Remember to read-just inserting the loop leads again when done.

LOOP RESISTANCE - HART connection can be made anywhere in the loop in parallel as long as there is enough resistance (250 to 1100 Ohms). The impedance is needed to get the amplitude of the frequency pulses high enough to be read. An indication that this may be the problem is when you start reading the transmitter, and it faults out, or you drop out in the middle of communications. This situation can



also arise in the case of a PLC or DCS card being replaced in a loop where no resistor was required before. Now with newer higher resolution analog-to-digital converters, many replacement I/O cards no longer have 250ohms input impedance, only 50 ohms. The voltage drop in the loop is lower. Given the wide range of acceptable resistance, one can always add a resistor in series in one of the legs, and then connect across that resistor. Many customers opt to make it standard practice of always adding a 250ohm resistor on the negative loop leg at the control system terminal.

LOW POWER ON HANDHELD – HART communicators have a diagnostic to indicate low battery. Communications problems can rear their ugly head prior to this diagnostic flag appearing. It is a good idea to have access to fresh batteries at any point in time.

OLDER NON-ISOLATED HART MODEMS – Some of the early HART serial modems were not electrically isolated. This could cause a problem when using a laptop with the AC charger connected. If possible, try the laptop with the AC charger disconnected running on battery power. If this does not work, try using another computer. We have found that some notebook computers will not work as the voltage to the port pins is outside the acceptable range, leaving the modem with insufficient power.

NON-ISOLATED TRANSMITTERS OR FAULTY PRIMARIES

– Some lower cost temperature transmitters are not electrically isolated. Should a grounded junction thermocouple be the primary, an elevated ground potential in the field could be introduced to the transmitter and introduced to the loop, inhibiting HART communications. The same could be said for a capacitance probe with cracked insulation. Remove the primary element, and reattempt communications while keeping the loop side of the transmitter powered.

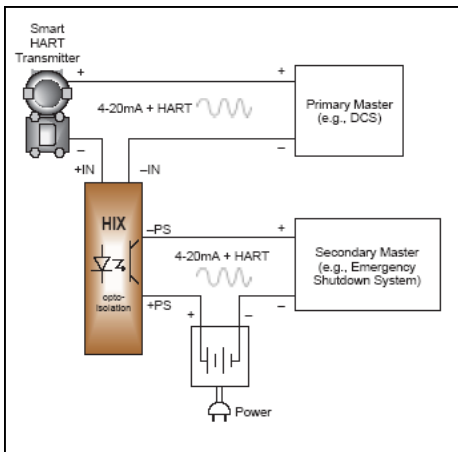
TRANSMITTER RUNNING ON MARGINAL POWER

– Each component added to a loop has a voltage drop. That drop becomes more significant as the measured variable drives upscale. If the transmitter runs on 12-45VDC, and starting with a 24VDC source, there remains only 12 volts after the transmitter is satisfied. Loading a loop too heavily not only presents the risk of not having enough voltage to drive to full scale 20mA when required, but also causing HART communications difficulty by starving the transmitter processor and internal modem. Try to minimize the input by either disconnecting the field primary, or lowering the measured variable such as flow rate in the case of a magnetic flowmeter, to get the transmitter output below 16mA.

(Continued on page 4)

(HART problems ,Continued from p. 3)

LOOP ISOLATORS – Loop isolators not only help eliminate the possibility of grounds in a loop dragging down other loops references to a common electrical point, such as on PLC or DCS non-isolated cards with a common negative loop connection, but they also filter out electrical noise. That includes 1100 and 2200 Hz. If a standard loop isolator is present, it will not allow passing of the HART signal, and therefore communications should be attempted with the isolator removed from the loop, or on the transmitter/field side of the isolator. Utilizing an isolator like the Moore Industries HIX (2-wire) or the HIT (4-wire) isolators will eliminate this possibility as they are designed to allow HART to pass.



Moore Industries HIX isolator allows HART signal to pass

INTRINSIC SAFETY BARRIERS – Consult with the barrier manufacture as to whether the specific barrier will pass HART. Some are designed to allow HART, some are not.

BAD OR LOW COST LOOP POWER SUPPLY – A power supply is basically a rectifier, taking in AC and having a resulting DC output. The amount of ripple refers to the amount of AC that is left after all filtering. Low cost power sup-

plies can leave enough AC that it corrupts the HART data packet, and communications will be rejected. The filtering can be damaged or degraded by power surges. This can be checked by simply switching a voltmeter to read AC, and check the loop for presence of AC. To verify, remove the instrument from the loop source, and power it with batteries by itself, either from a sourcing battery powered loop meter, or simply from a couple batteries making sure you have enough voltage. Connect and try to re-establish communications, keeping in mind that you still need the 250 ohms impedance even in a small transmitter/power supply loop. A power supply can also loose windings as either vibration or heat takes a toll on coil insulation. This can be detected by monitoring the voltage output for stability under load. An unloaded supply will rarely reveal its faulty condition. Many newer devices such as panel meters have switched from full bridge rectifiers to half wave rectifier, then add in AC filtering to limit noise. Sometimes this filtering also trims off the HART frequency. Removing process displays and other auxiliary devices, then adding them back into the loop one at a time could pinpoint the source of the problem.

INDUCED ELECTRICAL NOISE – Electrical noise can come in along the run of loop leads. Check that the 4-20mA loop is run in grounded conduit. This helps drive any induced electrical voltage to ground with a low impedance. Make sure that cable shields are present on the loop wiring, and that they are tied to ground on only one end, not both. Once again, bringing out a battery source with short leads, and eliminating the rest of the loop can help confirm electrical noise as the culprit.

The chips for HART Smart transmitter must be obtained through a

small number of approved manufacturers approved by HART Foundation. Specifications for HART allow tolerances on the window of acceptable line noise, and therefore you may be on the fence with two transmitters of the same model in a noisy electrical environment, and find one unit allows communication, while the other does not. The above list can help narrow down the source of your HART communication problems.

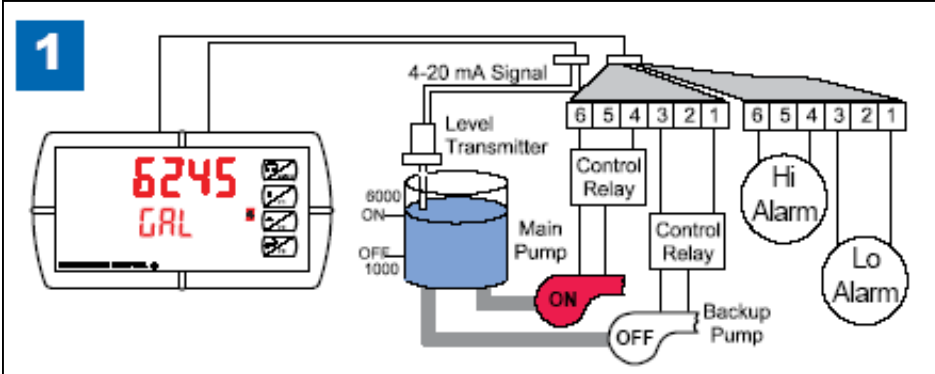
Gilson Engineering is pleased to announce that Tim Pappert will be relocating to our Louisville, KY office. Tim has 6 years of experience with Gilson as an Applications Engineer. Tim has tremendous experience in the application and troubleshooting of all of the Gilson product lines. Our Kentucky residents should feel free to contact Tim with any questions.

Office: 800-860-4499
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(Pump control, Continued from page 1) tions and units. If required by the application, we also offer other level sensing technologies such as TDR (guided wave radar) and RF capacitance.

The LUC500 can be configured to change pump control setpoints based on time of day. This can reduce pumping costs by pumping more at night when energy costs are lower. Discrete



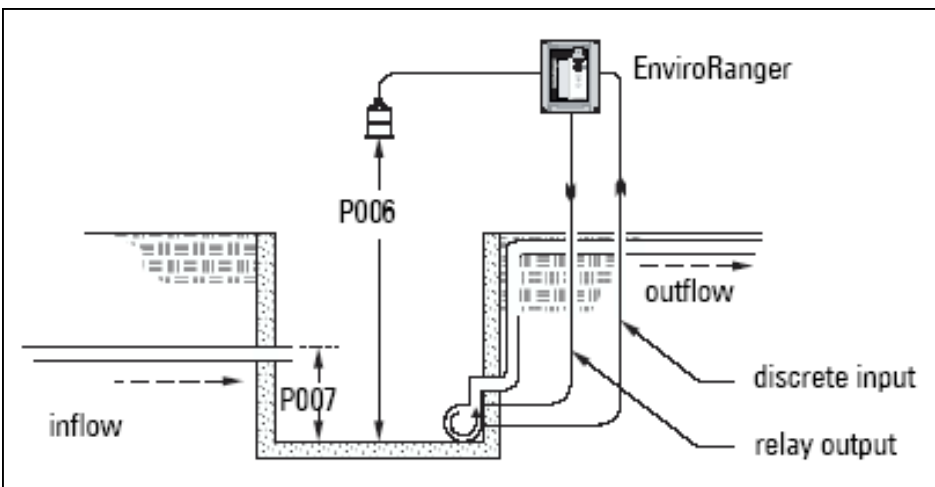
We offer several pump controllers. The Precision Digital PD6000 is a panel mounted display/control with up to 8 relays, and pump alternation for up to six pumps.

Gilson has developed custom software for the Unitronics Jazz controller. The pump control features include pump alternation for up to four pumps, startup delay on resumption of power, and displaying pump runtime. The Jazz panel mount controller is available for less than \$250.00. Mated with a submersible level sensor, a complete level control package with pump algorithms is available for less than \$800.00.

For advanced control algorithms, Siemens offers the Hydroranger and LUC500 (formerly Enviranger).

inputs can be used to confirm a pump's operation, and remove it from the duty schedule if it is not operating properly.

Gilson can provide point level measurement if continuous measurement is not required. This could consist of a point level switch or probe to detect for level at a single high or low point. Some of these options include the capacitance level switches, and floats. Point level switches are often used in conjunction with continuous level transmitters as backup should the primary level sensor fail.



Siemens pump controller can accept discrete input from pump, confirming pump operation, and removing it from schedule if fault

Defining Beam Angle

When shopping for ultrasonic or radar level transmitters, you will run across a term called 'Beam Angle'. Most people have a good idea what beam angle is, but don't know exactly what it represents, or how to use this value when designing an installation.

Manufacturers define beam angle as the angle at which the transmitted energy is 50% (-3 dB) of the power of the transmission axis (fig 1). The beam angle is the entire angle, not just the angle from the transmission axis to one -3 dB point. There is still energy outside this cone, but the level drops off as the angle increases. The beam angle can be affected by the sensor frequency, and sensor size. Generally, the larger the ultrasonic sensor diameter, or the larger the radar horn diameter, the smaller the beam angle.

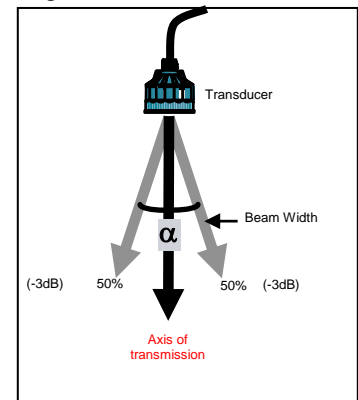


Fig 1

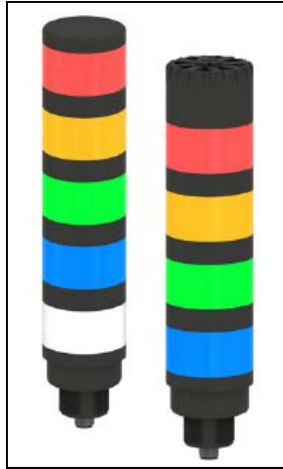
How is beam angle used to determine sensor mounting location? In both ultrasonic and radar installations, we want a majority of the energy to reflect off of the product we want to measure, liquid or solid. Obstructions in the vessel such as pipes, ladder rungs, thermowells, etc. can cause reflections. Keeping these obstructions outside the beam angle will give best results. However, this is not an absolute rule.

In many cases a sensor may be mounted with a smooth vertical sidewall within the beam angle, and work just fine. In other cases, a large horizontal reflective surface mounted just outside the beam angle may create a large reflection compared to the desired surface. Advancements in false echo rejections may help tune out these false returns.

(LED Light tower, continued from p. 1)

The TL50 is designed to be time and energy efficient (green technology). It is made with extremely long-lasting LED's which provide >100,000 hours (11 years) of continuous working life. This eliminates false indication from ambient light because the indicators appear grey when off. It has a very low power consumption of less than 2W compared to competitive units that consume up to 15W. Like all of Banner products, it is aesthetically designed to fit onto any equipment and has superior shock, vibration and impact resistance.

Easy installation and wiring is another key feature to the EZ-Light



TL50 5-light column, and 4-light column with audible alarm

TL50. It installs directly on a machine quickly and easily with pre-wired or quick-disconnect options, no assembly is required. There is a 30mm threaded base for direct cabinet and panel mounting with a single drilled hole and can be provided with standoff pipes and adaptors for elevated mounting.

Banner also manufactures other LED products, such as sensor emulators, pick-to-light sensors, and daylight visible lights for outdoor applications.



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