



CONTROL SIGNAL

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Gilson Engineering Expands in Ohio and Kentucky

Gilson Engineering Sales is opening two new offices in Cincinnati, OH and Louisville, KY. Kendra Mitchell will be transferring to the Cincinnati office, and Steve Bryant will be heading our Louisville office.

Kendra has been working in our main office in Pittsburgh, PA for almost a year now. She graduated from Ohio University in 2008 with a bachelor's degree in Chemical Engineering. During her time at the Pittsburgh office, Kendra worked as an Applications Engineer concentrating on the Siemens product lines.

She was trained to become a Siemens Certified Radar Specialist and has gone through Siemens Top Gun wastewater training. Kendra worked with customers in all of our offices by providing over the phone technical support in product selection and configuration as well as setup and operation. She also supported the sales engineers by help-

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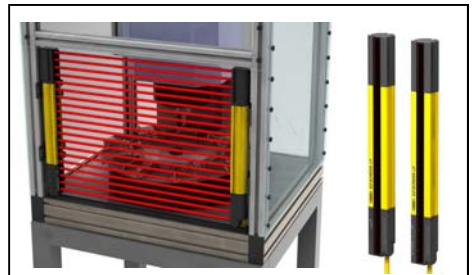
Banner Enhances, Expands Safety Product Offering

Banner Engineering's extensive line of machine safety products continues to grow, recently adding several new & updated products:

Low Profile Safety Light Screens

Banner's popular EZ-Screen Safety Light Curtains are now available in a new low-profile design. The EZ-Screen LP (low profile) features a slim housing with continuous sensing across the entire screen length, meaning no dead zone at the top or bottom of the curtain. The end-to-end sensing and small profile allow the EZ-Screen LP to fit in areas where other light curtains cant. With resolutions of

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EZ-Screen low profile safety light curtain

Hot New Products

Tough Level Measurement Made Easy

The PBLT2 Submersible Level Transmitter is manufactured for years of trouble free service even in the harshest applications. The PBLT2 measure the height of the liquid above its position via a piezoresistive sensing element encased in a very heavy duty 316 SS housing. This unit is designed specifically for operation in wastewater and slurry applications. This system is suitable in sludge pits, clarifiers, alum tanks, sumps, lime slurries, oil tanks and reservoirs. The PBLT2 includes as standard superior lightning and surge protection utilizing dual arrestor technology – eliminating both power supply surges and lightning ground strike transients. The unit features an extra large 316 SS diaphragm to prevent clogging and is resis-



tant to damage from floating solids and debris.

The unit is equipped with a 270 pound tensile strength, shielded, vented cable. Various cable lengths are available depending on your application. The transmitter is a two wire loop powered (13-30 VDC) design for simple electrical installation. An intrinsically safe design is available for installations in Class I, Div 1, Groups A, B, C, D; Class II, Div 1, Groups E, F, G; Class III, Div 1 hazardous locations.

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Employee Profile

Jim Wall graduated from Westminster College in western Pennsylvania in 1980. After spending two years with Koppers Forrest Products Division, Jim joined Gilson Engineering in 1982. After two years at "Gilson University" working as an applications engineer/inside sales support, Jim moved to Ohio to open the Columbus office in 1984 consistent with the Gilson philosophy of distributed offices to provide local support.

Jim is a hardworking, well-organized individual who strives to learn our broad product offering to be the expert, capable of examining all possible solutions to an application, and assisting the customer in finding the best fit. With 27 years of experience in instrumentation, Jim has proven to be an excellent resource to our customers, and Jim takes this seriously, striving to do his best day in and day out.



Jim and his wife Pam live in the northwest Columbus suburb of Dublin, Ohio. Jim enjoys sports of all kind, working out, yard work, and woodworking, when time allows. Jim's daughter recently graduated from Ohio State and is currently in Pharmacy school at Ohio State. Jim's son, the younger of his two children graduated from high school this year and is preparing to become an OSU Buckeye.

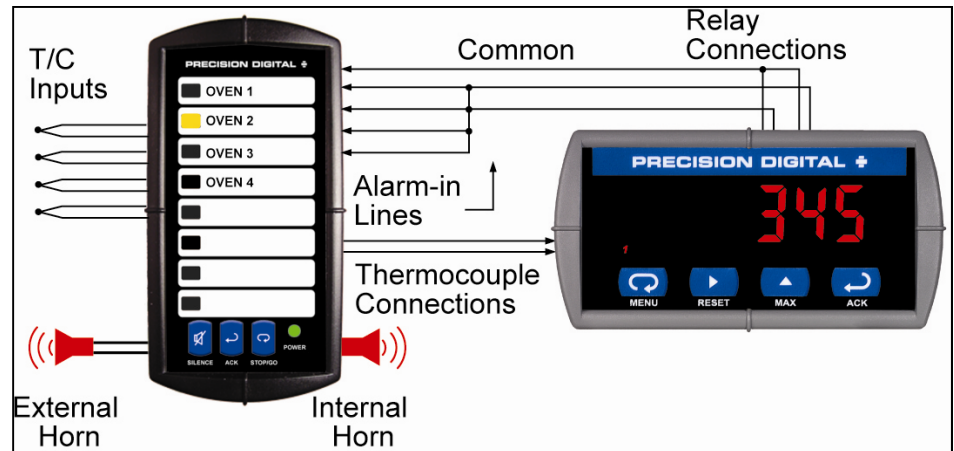
Let Jim assist you with your instrumentation applications. His experience and willingness to work hard can benefit your project as a strong dependable resource.

Low Cost Multiplexer from Precision Digital

Precision Digital's PD138 Minimax II is an eight channel analog input scanner and annunciator that provides low-cost multi-point display and alarming. Each Minimax II can switch up to eight process signals,

and send them to devices such as a digital panel meter, controller, or PLC. Signal switching is done with reed relays making the Minimax II ideal for switching thermocouples, RTDs, control loops, and AC & DC signals.

The most popular application for the Minimax II is temperature scanning. For maximum economy, Precision Digital has packaged the most popular



PDS178 combines multiplexer, display, and wall mount enclosure

PD138 product combinations for you at a significant savings. The PDS178 (pictured below) is a kit that includes a PD765-6R2-00 Trident Process & Temperature Panel Meter, a PD138 Minimax II Temperature & Process Scanner, and a PDA2821 Plastic NEMA 4X enclosure. You save about 20% when you purchase this package versus individual components.

General News, Schedule of Events

Florida Innov-X has named Gilson Engineering as their exclusive representative for Florida. Innov-x manufactures handheld material identification analyzers.

Pittsburgh

Aug 11-14. American Gas Measurement Short Course (AGMSC) show at Robert Morris University

Safety Instrumented Systems: The “Logic” of Single Loop Logic Solvers

The process industry is experiencing a dynamic growth in Functional Process Safety applications. Much of this growth has been driven by increased awareness of property, injuries and loss of life associated with tragic events that are widely publicized. Companies, of course, have a moral and legal obligation to limit the risk posed by their operations. In addition to their social responsibilities, the cost of litigation measuring in the billions of dollars has caught the eye of risk management executives worldwide.

As a result, management recognizes the financial rewards of utilizing a properly designed process system that optimizes reliability and safety.

That’s why companies are now actively taking steps to comply with various national and worldwide safety standards such as ANSI/ISA 84 and IEC 61508/61511. To accomplish this, safety practitioners look to a “new generation” of equipment specifically designed and approved for use in Safety Instrumented Systems that utilize Electrical and/or Electronic and/or Programmable (E/E/PE) technologies.

Safety Instrumented Systems

A Safety Instrumented System (SIS) is defined as an instrumented system used to implement one or more Safety Instrumented Functions (SIF). A SIS is composed of any combination of sensors, logic solvers and final control elements for the purpose of taking a process to a safe state when predetermined conditions are violated.

A SIF is a function to be implemented by a SIS that is intended to achieve or maintain a safe state for the process with respect to a specific hazardous event.

Examples of SIF applications include:

- Shutdown in a Hazardous Chemical Process Plant
- Open a Valve to Relieve Excess Pressure

- On/Off Control to Prevent Tank Overflow
- Shutdown Fuel Supply to a Furnace
- Add Coolant to Arrest Exothermic Runaway
- Automatic Shutdown When Operator Not Present
- Close a Feed Valve to Prevent Tank Overflow
- Initiate Release of a Fire Suppressant
- Initiate an Evacuation Alarm

IEC 61508 Provides Guidelines

To help companies implement a SIS, The International Electrotechnical Commission (IEC) developed IEC 61508, the standard for “Functional Safety of Electrical/Electronic/Programmable Electronic Safety-Related Systems”.

The main objective of IEC 61508 is to provide a design standard for Safety Instrumented Systems to reduce risk to a tolerable level by following the overall hardware and software safety life cycle procedures, and by maintaining the associated stringent documentation.

IEC 61508 has become the benchmark used mainly by safety

Table 1. The SIL is the measure of the amount of risk reduction provided by a Safety Instrumented Function

Safety Integrity Level (SIL)	Safety Availability	Probability of Failure on Demand Avg (PFDavg)	Risk Reduction Factor (RRF)
SIL 4	>99.99%	0.0001 to 0.00001	10,000 to 100,000
SIL 3	99.90% to 99.99%	0.001 to 0.0001	1,000 to 10,000
SIL 2	99.00% to 99.90%	0.01 to 0.001	100 to 1,000
SIL 1	90.00% to 99.00%	0.1 to 0.01	10 to 100

Safety Availability: The availability of a SIS to perform the task for which it was designed as presented in percentage (%) in order of magnitude steps from 90% to 99% for SIL 1 up through 99.99% to 99.999% for SIL 4

Probability of Failure on Demand Average (PFDavg): Likelihood that a SIS component will not be able to perform its safety action when called upon to do so. A SIL is based on a PFD average of the safety function.

Risk Reduction Factor (RRF): Defined as 1/PFDavg, the number of times that the risk is reduced as a result of the application of a safeguard (typically a more convenient expression for describing SIF effectiveness than SIL or availability)



Moore Industries model STA programmable safety trip

equipment suppliers to show that their equipment is suitable for use in Safety Integrity Level (SIL) rated systems.

Safety Integrity Level (SIL)

To determine a SIL, the safety practitioner team RISK/PROCESS HAZARD ANALYSIS (PHA) procedure identifies all process hazards, estimates their risk, and decides if that risk is tolerable. Once a SIL has been assigned to a process, the safety practitioner has to

(Continued on page 4)

(Safety systems, continued from page 3) verify that the individual components (sensors, logic solvers, final element, etc.) that are working together to implement the individual Safety Instrumented Functions (SIF) comply with the constraints of the required SIL.

For any device used in a SIS, the team must pay close attention to each device's Safety Failure Fraction (SFF) and Probability of Failure on Demand (PFDavg). See Table 1 for additional information. For each device in the SIF, both of these numbers have to be compared to the rules outlined in the safety standards to ensure that they are sufficient for use in the required SIL of the SIS. If these devices are classified as type B, such as microprocessor based devices, the development process including software must also be assessed and approved for the required SIL level. While the standards do allow proven-in-use data as proof of a device's reliability, such information is usually very hard to verify and document. For this reason many end users prefer fully assessed devices by third party organizations.

It is always the responsibility of the end user to perform or verify the calculations for the entire safety loop. Since a SIF relies on more than one device, it is imperative that all devices in the loop work together to meet the required SIL levels. The device's SFF and the PFDavg values used for these calculations can be found in a FMEDA report.

IEC 61508 requires a quantitative, as well as qualitative assessment of risk. A Failure Modes, Effects and Diagnostics Analysis (FMEDA) provides a systematic way to assess the effects of all probable and known failure modes, including on-line monitoring and error checking, of a SIS component. It is a detailed circuit and performance evaluation that estimates failure rates, failure modes and diagnostic capability of a device. This data is provided to be used by



MSA Gas Detectors



FLT93B - FlexSwitch

FCI model FLT93 flow/level/temperature switch



Moore Industries TDZ2 temperature transmitter

a competent functional safety practitioner to determine a device's applicability in a specific safety related application. It is best if the FMEDA report is certified by a well qualified third party agency that specializes in functional safety approvals.

Today some Single Loop Logic Solvers (Safety Trip Alarms) are designed "from the ground up" in accordance with IEC61508. An essential requirement to verify their design is a third-

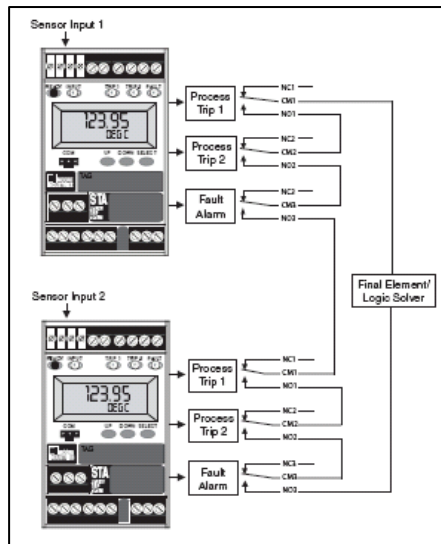


Figure 1. Safety trip alarms in a 1oo2 redundant/voting architecture

party from TUV, Exida, or a similarly accredited approval body. This certification provides unbiased, verified evidence that the unit is appropriate for use in specific SIS strategies. For example, the certification may verify that the device is appropriate for SIFs up to SIL 2 in a simplex or 1oo1 configuration. For increased process availability and/or higher SILs (such as SIL 3), the device may be applied in 1oo2 or 2oo3 architectures (figure 1). Hazardous area approvals, specifically Class 1 Div 2 for non-incendive (Type N) applications and Zone 2 applications are a must.

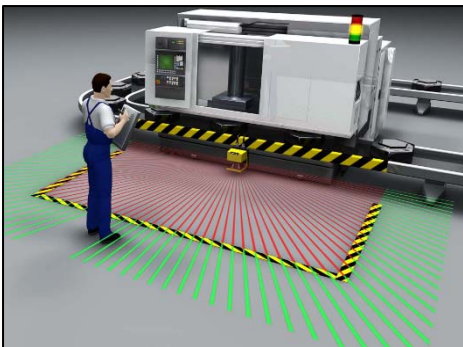
The following is a list of products offered by Gilson Engineering that have FMEDA data available for SIL applications.

Manufacturer	Model
Alarms	
Moore Industries	ECA
Moore Industries	SPA
Moore Industries	SPA2
Moore Industries	STA
Temperature Transmitters	
Moore Industries	TRY
Moore Industries	THZ2
Moore Industries	TDZ2
Isolators	
Moore Industries	ECT
Moore Industries	HIX
Pneumatic Converters	
Moore Industries	IPT2
Level/Flow	
FCI	FLT-93
Drexelbrook	Intellipoint
Gas Detectors	
MSA	UltimaX

(Banner Safety, continued from page 1)
14mm or 25 mm, blanking, and cascading capabilities, the new EZ Screen LP is a great addition to the Banner light curtain family.

Safety Laser Scanner

The AG4-4E Safety laser scanner provides 2-dimensional safeguarding of danger zones by scanning a user-defined area. If a person or object is detected within the designated field, an emergency stop signal is sent to the machinery. The laser scanner is capable of protecting fields up to 4m and can scan up to 190°F. It can be programmed for up to 8 different zones and has advance warning detection up to 15 m. The AG4-4E provides protection for stationary and mobile systems and meets all requirements for Type 3 applications per IEC 61496-1/-2 and Safety Integrity Level (SIL) 2 per IEC 61508.



Load-Bearing Adjustable Hinge Switch

Hinge switches have been a popular way to safeguard machinery, but Banner has taken the concept one step further with the SI-HG63 load-bearing hinge switch. The Stainless steel switch is capable of loads up to 1200N with an adjustable



setpoint anywhere along its 270°F range of motion. Unlike other hinge switches, the setpoint can be re-adjusted. To complete the package, Banner also offers an identical “dummy” load-bearing hinge without the electronics to simplify your machine design.

Configurable Safety Controller with Ethernet IP Communications

The SC-22 Safety Controller is a configurable controller capable of taking up to 22 configurable inputs, eliminating the need for multiple safety mod-



ules. With local pushbuttons and a display, the controller is site-programmable or easily configured with a free configuration software. The controller has 3 safety outputs and 10 non-safety status outputs which can be individually configured to inputs 1 through 22. Recently, Banner has added Ethernet IP or Modbus TCP communications to make the SC-22 Safety Controller a versatile solution.

(Gilson expands, continued from p. 1)
ing with quotations and field service. Kendra is very excited to head back to the Buckeye State!

Steve Bryant has 20 years of experience in the process automation industry. Most recently Steve was a sales engineer for Logical Innovations, a Richmond, VA DCS systems house. Previously, Steve was sales engineer for RECO, Inc, a Cincinnati-based Siemens automation distributor, and Pfeiffer Engineering, a Louisville based process systems integrator. Steve attended the University of Kentucky and then the University of Louisville, where he graduated with a master's degree in Electrical Engineering. Steve is an avid Kentucky sports fan, and is a player on a 35+ men's senior baseball league team during the summers.

Both Kendra and Steve will be supported by our experienced inside sales and application staff. Linda Crago will provide inside support to the Louisville office, and Lauren Schultz will provide inside support to the Cincinnati office. Linda and Lauren can provide support with pricing information, order entry, expedite requests, and order status. Should you need technical support, they can transfer you to one of our three application engineers. For inside and application support call 1-800-860-4499.



Precision Digital Panel Meters are 'Growing'

Precision Digital has enhanced the PD765 panel meter, now offering a 1/8 DIN LED display with 1.2" high digits. This is the largest of any 1/8 DIN panel meter.

The PD765 is a programmable display that can be setup for milliamp, voltage, thermocouple, or RTD inputs. Options include 2 relays with alternation, retransmitting 4-20 ma output, 24 VDC loop power supply, and serial communications. The PD765 has as standard a 3

year warranty.

Besides having industry leading 1.2" high digits, the brightness may be setup for sunlight readability. This combination makes it ideal for outdoor applications.

All parameters are configured from the face mounted pushbuttons, or via PC with free Meterview configuration software.



1/8 DIN panel display with 1.2" high digits (shown with optional wall mount NEMA 4X enclosure)



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