Bulletin 937 Intrinsic Safety Modules

Specialized Solutions For Hazardous Location Applications

Features and Benefits

- Simple maintenance with **integrated diagnostics** and quick change of modules during ongoing operation
- **Simple configuration** using DIP switches or Field Device Tool software
- **Comprehensive standards compliance**, including up to SIL3 compliance for easy and reliable planning and documentation
- **Horizontal or vertical mounting** with no reduction in operational ratings
- **Line fault detection** for field circuits
- **Power Rail** for drastically reduced wiring, collective error messaging, for efficient troubleshooting and installation
- **Variety of module types** to meet applications needs, including:
  - **Isolated Barriers** for complete electrical isolation of intrinsic safety circuits
  - **Converter Barriers** to change readings from sensors to industry standardized signals
  - **Zener Barriers** for simple limiting of energy allowed through to hazardous locations

An intrinsic safety approach can be more cost-effective than other hazardous location protection/mitigation strategies in Class I, Division 1 (Zones 0 and 1) locations.

A signal interface bridge between hazardous locations and the control system

Bulletin 937 Intrinsic Safety Modules connect intrinsically safe rated equipment – such as transmitters, solenoids, proximity sensors and encapsulated assemblies—with control systems. An intrinsic safety approach can be more cost-effective than other hazardous location protection/ mitigation strategies in Class I, Division 1 (Zones 0 and 1) locations.

Intrinsic safety circuits are designed to operate at low enough energy levels that igniting hazardous materials will be averted--even in the event of a fault condition, such as a short circuit. Intrinsic safety circuits do not require expensive inert gas purging/pressurization or “explosion-proof”/ containment strategies for hazardous locations.

Bulletin 937 modules are part of the Allen-Bradley signal interface family of products. This family also includes Bulletin 931 signal conditioners, which can be used in less hazardous locations where intrinsic safety capability is not required.

These modules are available in a range of options that provide for a wide range of functionality in hazardous location applications in industries such as oil and gas, chemical/petrochemical and others. The Bulletin 937 product family consists of:

Isolated Barriers

With galvanic optical or transformer isolation these modules provide an interface to the intrinsic safety circuit that is electrically separated from the control system, and does not require a ground between the module and the intrinsically safe device. Available in high density (12.5 mm/0.5 in) and standard (20mm/0.8 in)widths.

Switch Amplifiers are used to transfer digital signals (NAMUR sensors/mechanical contacts) from a hazardous area to a safe area. Select modules are available with relay output or transistor output, in addition to signal splitters.

A unique collective error messaging feature is available when used with the Power Rail system. Due to its compact housing design and low heat dissipation, this device is useful for detecting positions, end stops, and switching states in space-critical applications.

SMART Transmitter Power Supplies supply 2-wire SMART transmitters in a hazardous area, and can also be used with 2-wire SMART current sources. They transfer the analog input signal to the safe area as an isolated current value. Modules with splitter feature provide two isolated output signals.

Temperature Repeaters transfer RTD resistance values from hazardous areas to safe areas. A 2-, 3-, or 4-wire mode is available depending on the required accuracy. The monitor registers the same load as if it were connected directly to the resistance in a hazardous area.

SMART Current Drivers drive SMART I/P converters, electrical valves, and positioners in hazardous areas.

Solenoid Drivers supply power to solenoids, LEDs, and audible alarms located in a hazardous area.

Switch Amplifiers

12.5 mm width

20 mm width

SMART Transmitter Supplies

Temperature Repeater

SMART Current Driver

Soleinoid Driver

Isolated Barriers						
Module Type	**Signal Type**	**Device Power**	**Channels**	**With Splitter**	**Width**	**Catalog Number**
Switch Amplifier	Digital Input, Optional Transistor Output	24V DC	1-channel	✓	12.5 mm	937TH-DISTS-DC1
			2-channel			937TH-DISAT-DC2
	Digital Input, Optional Relay Output		1-channel	✓		937TH-DISRS-DC1
			2-channel			937TH-DISAR-DC2
		115V AC	1-channel	✓	20 mm	937TS-DISRS-KD1
			2-channel			937TS-DISAR-KD2
		230V AC	1-channel	✓		937TS-DISRS-KF1
			2-channel			937TS-DISAR-KF2
Solenoid Driver	Digital Output	Input Loop Powered	1-channel		12.5 mm	937TH-DOSND-IP1
SMART Transmitter Supply	Analog Input	24V DC	1-channel		12.5 mm	937TH-AITXP-DC1
			1-channel	✓	12.5 mm	937TH-AITXS-DC1
			2-channel		20 mm	937TS-AITXP-DC2
Temperature Repeater	Analog Input	24V DC	1-channel		12.5 mm	937TH-AIRRP-DC1
SMART Current Driver	Analog Output	24V DC	1-channel		12.5 mm	937TH-AOSCD-DC1

Converter Barriers

Converters add functionality to the isolators by receiving signals from a hazardous area instrument i.e., temperature sensors, or load cells and then converting them to an industry standardized signal such as 0/4…20mA or 0/2…10V. Pulse evaluation units process a frequency signal at the input. A lead fault monitoring system signals a lead breakage or lead short-circuit on the signal cables.

Universal Temperature Converters are designed to connect RTDs, thermocouples or potentiometers in the hazardous area, and provide a proportional 0/4 mA ... 20 mA signal to the safe area.

Transmitter Supply Converters supply 2-wire and 3-wire transmitters in a hazardous area, and can also be used with active current sources.

HART Loop Converters provide power to transmitters or can be connected to existing HART loops in parallel. They are able to evaluate up to four HART variables (PV, SV, TV, QV). Of those four HART variables, the data contained in any three of them can be converted to three different 4 mA ... 20 mA current signals.

Strain Gauge Converters are used with strain gauges, load cells and resistance measuring bridges.

Universal Frequency Converters change a digital input (NAMUR sensor/mechanical contact) into a proportional, adjustable 0/4 mA ... 20 mA analog output and functions as a switch amplifier and a trip alarm.

Universal Temp Converter

HART Loop Converter

Strain Gauge Converter

Transmitter Supply Converter

Frequency Converters

Converter Barriers					
Module Type	**Signal Type**	**Device Power**	**Channels**	**Width**	**Catalog Number**
Universal Temp Converter	Analog Input	24V DC	1-channel	20 mm	937CS-AITMP-DC1*
Transmitter Supply Converter	Analog Input	24V DC		40 mm	937CU-AITXF-DC1
HART Loop Converter	Analog Input				937CU-AIHLP-DC1
Strain Gauge Converter	Analog Input				937CU-AISTR-DC1
Frequency Converter	Digital Input				937CU-DIFRQ-DC1
	Digital Input	20-90VDC/48-253 VAC			937CU-DIFRQ-BC1

*Configured via Field Device Tool (FDT) software such as Rockwell Software FactoryTalk™ AssetCentre or PACTware.

Zener Barriers

Zener barriers have long been a cost-effective solution for providing an intrinsically safe interface with field devices located in the hazardous area.

Allen-Bradley Zener barriers provide protection for electrical signals within hazardous areas and feature a narrow profile of just 12.5 mm to maximize control panel space. Zener barrier prevents the transfer of unacceptably high energy from the safe area into the hazardous area. These Zener barriers have a positive polarity, which means the anodes of the Zener diodes are grounded. Depending on the application, increased or decreased intrinsic safety parameters apply for serial or parallel connection. These barriers simply snap onto a standard DIN rail for easy installation and grounding.

Standard one- or two-channel barriers

The diode return feature prevents a current into the hazardous area, therefore the current assumption for intrinsic safety calculations is zero

In addition to the diode return feature, the high power version has a smaller serial resistance and therefore provides higher voltage to the field device

Zener Barriers					
Signal Type	**Max Resistance**	**Channels**	**Other Functionality**	**Width**	**Catalog Number**
Positive Polarity DC	646 Ohm	2-channel		12.5 mm	937ZH-DPAN-2
	327 Ohm	1-channel			937ZH-DPBN-1
	36 + 0.9V Ohm	2-channel	Diode Return		937ZH-DPCD-2
	327 Ohm	2-channel			937ZH-DPBN-2
	250 Ohm	2-channel	Diode Return, High Power		937ZH-DPDP-2

Accessories

For use with isolators and converters, an innovative power rail system is available. Used with a power feed module, bulletin 937 isolators and converters and can draw power directly from this rail. This combination provides a tremendous amount of versatility, simplifies wiring and reduces wiring expenses. All products are also compatible with standard DIN rails.

Accessories			
Power Rail Feed Module	Power Feed Module for Power Rail System	Width: 20 mm	937A-PSFD
Power Rail 0.8 Meter	Power Rail with Cover and 2 End Caps	Length: 0.8 M	937A-PR08
Power Rail 2 Meter	Power Rail with Cover and 2 End Caps	Length: 2 M	937A-PR20
Power Rail End Caps	Power Rail End Caps	–	937A-PREC
USB Interface Cable	USB Interface Programming Cable	–	937A-USBA
Cold Junction Compensation Connector	Cold junction compensation for 937CS-AITMP-DC1 (thermocouples)	–	937A-TCJC

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