GEMS Relays and Barriers Render Any Non-Voltage Producing Sensor or Switch Intrinsically Safe

- Provide method of eliminating explosive conditions
- Rapid, arc-free response provides positive, non-mechanical operation
- Solid-state reliability assures consistent performance
- Low-power switching; a few milliamps of current controls high-power loads
- Completely encapsulated construction
  Units are impervious to dust, moisture or foreign material
  They are tamper-proof and shock- and vibration-resistant
- Modular housings for easier installation
- Exceptionally long, trouble-free service life

Intrinsic Safety and its Advantages.

Instrument Society of American Specification ISA-RP12.2 Defining Intrinsically Safe Equipment:

"Intrinsically safe equipment and wiring is equipment and wiring which is incapable of releasing sufficient electrical or thermal energy under normal or abnormal conditions to cause ignition of a specific hazardous atmospheric mixture in its most ignited concentration. Intrinsically safe terminations and wiring may be brought into any hazardous location of any Group classification for which it is accepted without requiring explosion-proof housing or other means of protection."

To be certified "intrinsically safe," a device or circuit must be so designed that no two simultaneous failures can cause an explosion. Intrinsically safe systems are more dependable. The I.S. circuit must function reliably per specifications, with no explosions, during and after cycling through a number of operations.

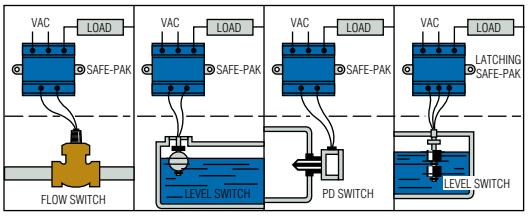
The units can also be installed more conveniently. Since no explosion is possible, no explosion-proof conduit or enclosures of any kind are needed in the hazardous area. Maintenance can be performed immediately as needed. And, intrinsically safe systems are more economical. Costly enclosures with their mounting requirements are unnecessary. No purging is required, thereby eliminating blowers, pressure switches, timers and relays.

SAFE-PAK® RELAYS: These intrinsically safe units amplify sensor load-handling capabilities in a wide diversity of AC and DC control switching applications.

Zener Barriers: These passive, energy-limiting devices, provide intrinsically safe DC outputs for a variety of sensors such as level and flow switches…level indicating transducers and transmitters…and many others. The maximum energy possible at the switch terminals of the SAFE-PAK and Zener Barriers is far below the explosive point of the most volatile surrounding gas conditions. The type of non-voltage-producing switch or sensor best suited for the application can be utilized, since the entire switching circuit is rendered intrinsically safe by the SAFE-PAK or Zener Barrier. As the switching circuit is low voltage, there is no shock hazard to operating or maintenance personnel.

Typical Applications

Switches Located in Hazardous Areas



Important points to remember when selecting Zener Barriers and Safe Pak® :

- The maximum input voltage rating of the barrier must be higher than your power supply. (i.e., a 24 VDC supply would require a 30 V barrier.)
- Make sure the barrier is rated for your hazardous area class, division, and group.

Intrinsic Safety Approvals – Safe-Pak® Relays and Zener Barriers

Model	Part Number	Approvals		Hazardous Locations									Page Number
		UL	CSA	Class	Division	Group							
						A	B	C	D	E	F	G	
SAFE-PAK®	22445	•	•	I, II	1, 2	•	•	•	•	•	•	•	L-4 and L-5
	25872	•	•			•	•	•	•	•	•	•	
	25873	•	•			•	•	•	•	•	•	•	
	64101	•				•	•	•	•	•	•	•	
	144600	•	•			•	•	•	•	•	•	•	
Programmable SAFE-PAK®	54820	•	•	I, II	1, 2	•	•	•	•	•	•	•	L-6 and L-7
	54825	•	•			•	•	•	•	•	•	•	
	54845	•	•			•	•	•	•	•	•	•	
Zener Barriers[2]	54801	•	•	I, II	1, 2				•				L-10 and L-11
	54803	•	•			•	•	•	•				
	54805	•	•			•	•	•	•				
	54806	•	•						•				
	111950	•	•	I, II	1, 2	•	•	•	•	•		•	L-8 and L-9
	111952	•	•			•	•	•	•	•		•	
	111954	•	•			•	•	•	•	•		•	
	111956	•	•			•	•	•	•	•		•	
	113000	•	•					•	•	•		•	
	114072	•	•					•	•	•		•	
	114074	•	•					•	•	•		•	
	114166	•	•			•	•	•	•	•		•	
	114175	•	•					•	•	•		•	

Notes:

1. Certified intrinsically safe under MSHA certification No. 1662 for use on permissible equipment. For Group D use only.
2. Zener Barrier models, Part Numbers 54801, 54803, 54805, 54806; Programmable SAFE-PAK models, Part Numbers 54820, 54825, 54845 are certified by CSA for mounting inside a suitable enclosure in Division 2 or non-hazardous locations and must be connected by means of the two studs provided to grounded copper busbar or equivalent.

For information on non-intrinsically safe holding relays and switching units, see Pages L-12 and L-13.

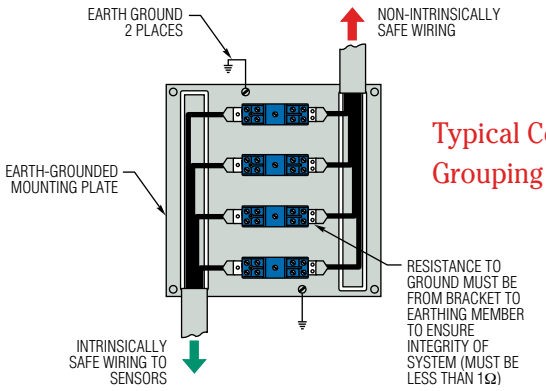
MSHA — Bureau of Mines

UL — Underwriter's Laboratories, Inc.

CSA — Canadian Standards Association

Installation and Maintenance

SAFE-PAK and Zener Barrier units are installed in a safe area and connected to the sensor in a hazardous location…no explosion-proof or protective housings of any kind are needed. Units install singly, in any position…or can be grouped on a common, earth-grounded plate with mounting tabs to provide electrical grounding. No. 6-32 threaded electrical terminals are conveniently placed atop the unit housings. Barriers and relays may be grouped on a common, earth-grounded mounting plate. Intrinsically safe sensor wiring must be separated from non-intrinsically-safe input wiring in separate conduits or raceways to prevent by-pass during testing or servicing.



Typical Common Grouping

The only maintenance normally required is routine inspection approximately every two years or less to check integrity of earth-grounding and electrical connections, and to make sure the unit is clean.

GEMS SAFE-PAKS and Zener Barriers must be installed in conformance with the National Electrical Code and the INSTRUCTION, INSTALLATION AND SERVICE Bulletin supplied with all units. Periodic checks of ground bonding and cleanliness of units and terminals constitute the only maintenance required.

Warning

Misapplication of intrinsically safe products may result in injuries or damages. The circuit diagrams presented in this catalog are typical and may not represent your application.

Hazardous Locations as defined by the National Electrical Code Handbook. . .

The degree of hazard is normally indicated by a three-part designation: “Class-, Division, and Group-.” Class I, Division 1, Group A denotes the most severely and continually hazardous condition.

Class I Locations — Are those in which flammable bases or vapors are or may be present in the air in quantities sufficient to produce explosive or ignitable mixtures.

Class II Locations — Are those which are hazardous because of the presence of combustible dust.

Class III Locations — Are those which are hazardous because of the presence of easily ignitable fibers or flyings, but in which such fibers or flyings are not likely to be in suspension in air quantities sufficient to produce ignitable mixtures.

Division 1 — Locations in which hazardous concentrations in the air exist continuously, intermittently, or periodically under normal operating conditions.

Division 2 — Locations in which hazardous concentrations are handled, processed, or used, but are normally confined within closed containers or closed systems from which they can escape only in case of accidental rupture or breakdown.

Group A — Atmospheres containing acetylene.

Group B — Atmospheres containing hydrogen, or gases or vapors of equivalent hazard, such as manufactured gas.

Group C — Atmospheres containing ethyl-ether vapors, ethylene or cyclopropane.

Group D — Atmospheres containing gasoline, hexane, naphtha, benzine, butane, propane, alcohol, acetone, benzol, lacquer solvent vapors or natural gas.

Group E — Atmospheres containing metal dust, including aluminum, magnesium, and their commercial alloys and other metals of similarly hazardous characteristics.

Group F — Atmospheres containing carbon black, coal or coke dust.

Group G — Atmospheres containing flour, starch, or grain dusts.