

# Secondary Process Seal Assembly with (and without) Rupture Indication Sensor - SPSR / SPS Series

## Installation & Maintenance Information

**IF 1580**

SAVE THESE INSTRUCTIONS FOR FUTURE REFERENCE

**Class I, Division 1 & 2, Groups B, C, D**  
**Class II, Division 1 & 2, Groups E, F, G**  
**Zone 1 & 2, Groups B, C, D**  
**Zone 1 IIB+H<sub>2</sub> and Zone 2 IIB+H<sub>2</sub>**  
**NEMA 3, 4, 7BCD, 9**  
**Ambient range: -25°C to +50°C**  
**Protection up to 1500psi**  
**Rupture Indication at 60psi minimum**

**⚠ WARNING**

**To prevent risk of electric shock:**  
Electrical power must be OFF before and during installation and maintenance. Installation and maintenance procedure must be performed by a trained and competent electrician or technician.

**⚠ WARNING**

**To prevent risk of explosion:**  
Use this product only as an explosionproof and secondary process seal for the prevention of gas, fluid or vapor migration in the electrical system during a primary process seal rupture.  
This product is not designed or intended to be a relief valve for a process vessel.

**⚠ CAUTION**

**To prevent risk of electric shock:**  
This product must be installed by a qualified electrician.

### APPLICATION OF THIS PRODUCT:

These assemblies are ideal where flammable liquids or gases are stored, processed or transported under pressure. The Cooper Crouse-Hinds Secondary Process Seal Assembly is designed to monitor for primary process seal leaks and to prevent the passage of gases, vapors and fluids into the conduit or cable system (electrical).

### BEFORE INSTALLING:

Do not remove **Process Seal Rupture Indication Sensor (PSRIS)** assembly (if provided) from its package until it is required for installation. The SPSR Series is provided with a PSRIS.

**NOTE:** Inspect all threads before installing.

### TERMINAL HOUSING (GUAT16 SA)

3" Diameter Opening  
1/2" NPT hubs



### ULTRA HIGH PRESSURE SEAL (UHPS)

1/2" NPT x 1/2" NPT



### UNY 105 (OPTIONAL)

1/2" NPT



### RUPTURE SENSOR HUB (OPTIONAL)

1/2" NPT

**PSRIS**



### REED SWITCH ASSEMBLY (OPTIONAL)



### (ECD 16) DRAIN

1/2" NPT



## INSTALLATION INSTRUCTIONS:

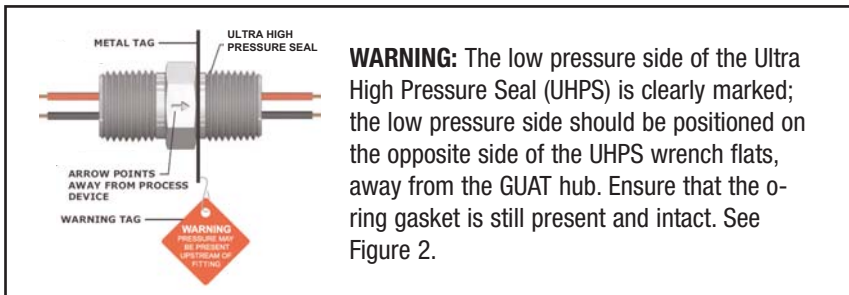
- 1) Prepare the electrical connections location of the instrument or sensor on the process vessel, check that all ½" NPT threads are not damaged; reduce or adapt as necessary, following all local codes.

**NOTE:** Visually inspect primary instrument process seal on process sensor for damage during installation.

- 2) Feed instrument or sensor wire leads into GUAT terminal housing hub.

**SUGGESTION:** A union fitting (Cooper Crouse-Hinds catalog number UNY105 (male) or UNF105 (female)) is recommended to ease assembly and ensure that the process instrument or sensor leads are not damaged during threading.

- 3) Install the ½" male thread and wire leads of the ultra high pressure seal into the GUAT terminal housing conduit outlet box (see Figure 1), and wrench tighten.



- 4) Terminate process instrument leads and high pressure seal (UHPS) leads into terminal strips in the GUAT terminal housing, if provided. Alternatively, electrical connections inside the GUAT can be spliced using approved wire nuts. In areas of high condensation, a desiccant pack (not shown) may be positioned in the GUAT terminal housing to remove any moisture buildup. See Figure 3.

Ensure circuit connections are tight and wired correctly.

## INSTALLING THE PRIMARY SEAL RUPTURE INDICATION SENSOR (PSRIS), IF PROVIDED:

### **NOTE: WORKING PRINCIPLE:**

The reed switch contacts are closed by a magnetic field. The reed switch is threaded into the rupture sensor hub which has a diaphragm with a magnet inside of its cylinder. If the primary seal ruptures, the rupture sensor's hub diaphragm opens under pressure, which opens the reed switch circuit.

Before installing, inspect the PSRIS switch assembly components; handle these parts with care. Diaphragm may have sharp edges. Examine the switch assembly, checking the housing and cable for tears and scratches. Do not insert tools or debris into the rupture sensor hub, as this may cause a puncture of the pressure seal diaphragm. These can lead to false signals or otherwise affect the electrical or mechanical performance of the sensor.

The PSRIS rupture indication switch activates via a magnet, therefore do not locate the PSRIS assembly near strong magnetic sources (such as electromagnetic motors) or magnetic fields. Magnetic fields can damage the PSRIS components preventing it from operating appropriately.

- 5) Loosen cable gland nut on PSRIS barrel assembly. Check operation of spring loaded switch unit by lightly depressing and releasing. See Figure 4.



Figure 1



Figure 2



Figure 3



Figure 4

- 6) Inspect all threads on the Primary Seal Rupture Indication Sensor (PSRIS) and verify that they are clean and free from debris.

**CAUTION:** Ensure that the blind tap in the side of the rupture sensor hub is free from debris or liquids, and is clean and dry. See Figure 5.



Figure 5

Thread the reed switch assembly into the rupture sensor hub. The reed switch assembly must be threaded all the way until it bottoms out. Gently tighten with a wrench to ensure that it is seated and snug to prevent loosening.

- 7) Tighten cable gland nut: it's important to note that pulling on the silicon cable prior to tightening the cable gland will draw the reed switch away from its seated position against the sensor wall (which will open the circuit, causing a false indication). Ensure that the cable is slack prior to tightening the cable gland nut.
- 8) Check electrical continuity of switch. Switch will be "normally closed" when installed in the rupture sensor hub.
- 9) Thread the rupture sensor hub into the GUAT terminal housing, wrench tight. Note: Cooper Crouse-Hinds catalog number UNY105 union fitting can be installed between the GUAT and PSRIS, so that the reed switch assembly can be rotated to any desired position (see Figure 6).

Care should be taken to support and protect the cable from strain or from being pulled out. "Protection by Location" is recommended by using a wireway, wirebasket, or another similar support method. The cable may be anchored with tie wraps to surrounding structures to prevent the wire from being pulled during day-to-day operations.

In potentially corrosive environments, the reed switch assembly can be covered by a shrink wrap sleeve using a heat gun after mounting at point of use.

**NOTE:** Operating temperatures of vented material flowing through sensor: -25°C to +50° C. For more extreme temperatures, consult factory or local sales representative.

### INSTALLING THE ECD16 DRAIN VENT

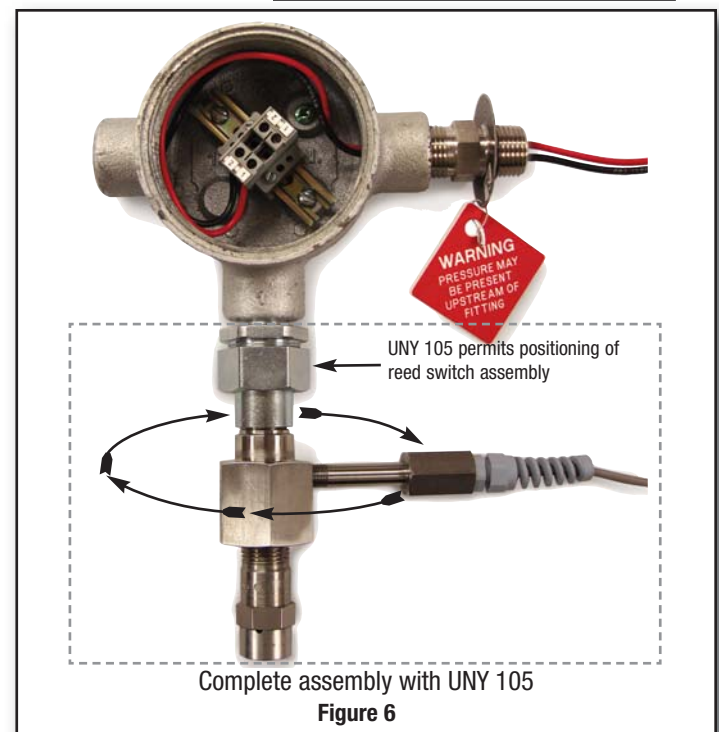
- 10) Install the ECD16 drain fitting into the female hub of the rupture sensor hub, and wrench tight. Note: the drain can be mated directly into the terminal housing if a PSRIS sensor is not used for this application.

**WARNING:** Vent must be oriented in downward position in outdoor environments to avoid water, ice build-up, or enclosed in weather resistant enclosure. If vent becomes corroded or clogged, replace with Crouse-Hinds Catalog #ECD16.

- 11) Install the cover to the terminal housing and fully thread onto body ensuring that the o-ring gasket is present and not damaged. Wrench tighten.

### INSTALLING THE NAMEPLATE

- 12) A metallic nameplate has been provided in the kit with a mounting strap. This should be installed where it is clearly visible to maintenance and inspection personnel.
- 13) Wrap the nameplate around the enclosure hub connected to the rupture indication sensor and/or explosionproof drain. Install the mounting strap through the nameplate slots, position the nameplate, and secure the strap.

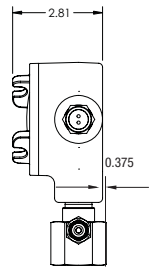


**OTHER INSTALLATION CONSIDERATIONS:**

Ensure adequate clearance exists between wall and outlet box to avoid interference with the rupture indication hub and/or UNY105 fitting.

**WIRING FOR REED SWITCH ASSEMBLY (FOR WIRING DIAGRAMS, PLEASE SEE APPENDIX)**

The reed switch is rated to 24VDC or VAC, and must be wired intrinsically safe (Div. 1 or 2, Zone 1 or 2), or non-incendive (Div. 2, Zone 2 only). The wiring diagrams provided depict how this is to be safely wired and isolated from the primary sensor or instrument circuit (for various installation types).



**UHPS SEAL AND CONDUCTOR CORROSION RESISTANCE:**

Certain process fluids, etc. may have detrimental effects to the secondary process seal over time. The epoxy of the UHPS is incompatible with strong oxidizing agents, Lewis and mineral acids. Decomposition products that affect the epoxy are: oxides of carbon, aldehydes, and process acids. The wire leads (of the UHPS) have a PVC jacket compound which performs as depicted in this chart.

Please keep in mind that the UHPS conductors will only be in contact with process fluids during a leak or rupture of the primary seal.

Legend	
P	Poor
F	Fair
G	Good
E	Excellent
O	Outstanding

Properties	
Oxidation Resistance	E
Heat Resistance	G-E
Oil Resistance	F
Low Temperature Flexibility	P-G
Ozone Resistance	E
Abrasion Resistance	F-G
Flame Resistance	E
Nuclear Radiation Resistance	F
Water Resistance	F-G
Acid Resistance	G-E
Alkali Resistance	G-E
Aliphatic Hydrocarbons Resistance (Gasoline, Kerosene, etc.)	P
Aromatic Hydrocarbons Resistance (Benzol, Toluol, etc.)	P-F
Halogenated Hydrocarbons Resistance (Degreaser Solvents)	P-F
Alcohol Resistance	P-F

**CARE AND MAINTENANCE**

Electrical and mechanical inspection of all components must be performed on a regularly scheduled basis, determined by the environment and frequency of use. It is recommended that inspection be performed a minimum of once a year. Per NFPA 70B.

- The GUAT terminal housing should be opened and inspected periodically for the presence of any process fluid. If any leakage is found, replacement of the primary seal and/or device is recommended.

**⚠ WARNING**

**To prevent damage to electrical system or injury to personnel:**  
 If any parts of the product appear to be missing, broken, or show signs of damage, DISCONTINUE USE IMMEDIATELY. Replace with the proper replacement part(s) before continuing service.

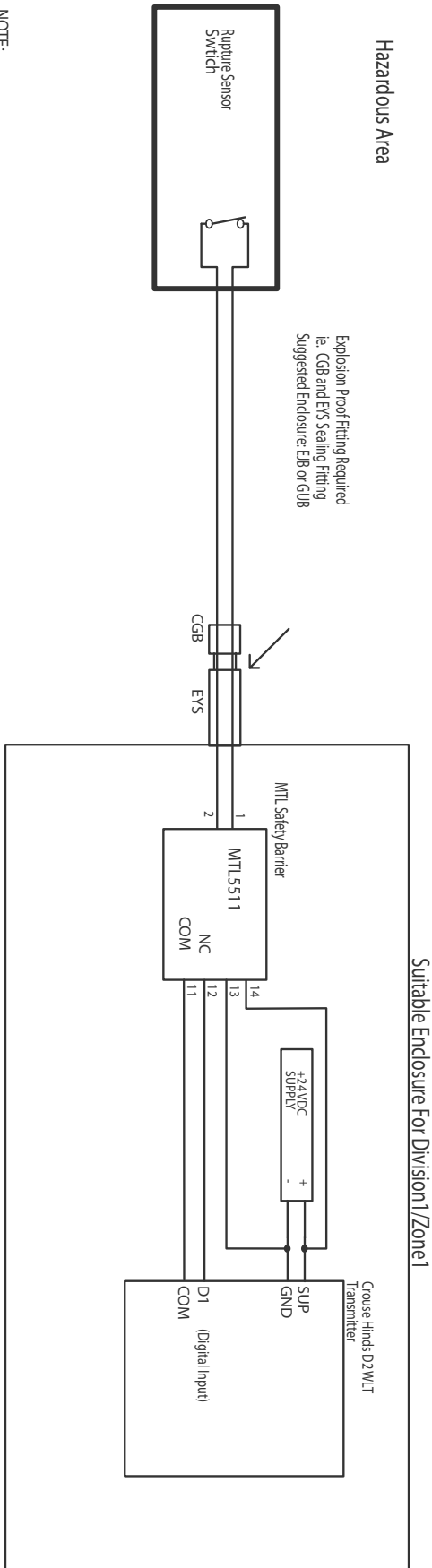
**⚠ WARNING**

**To prevent injury to personnel:**  
 Remove cover slowly to allow any positive pressure to bleed off. Pressure build-up could cause cover to jettison when threads are loosened quickly.

- Inspect all wire terminals for tightness. Discoloration due to excessive heat is an indicator of a possible problem and should be thoroughly investigated and repaired as necessary.
- In high humidity areas and wet locations subject to condensation or wash down, the system should be inspected for internal build-up of condensation.
- All mechanical and electrical connections should be inspected regularly for loosening, and be re-tightened according to these installation instructions.
- The silicon cable extending from the reed switch assembly should be inspected regularly for wear, fraying or strain in the cable. Replace cable as needed.
- Install in accordance with local electrical requirements and take care to allow for weather conditions and wash down conditions by using a drip loop in the cable.
- Do not locate where the cable connection may be damaged from bending, sharp edges, or stress.
- Check that the SPSR assembly materials are compatible with operating conditions to avoid damage or false signal generation due to corrosive attack.
- These sensors and activation assemblies must not be modified in any way except with the approval of Cooper Crouse-Hinds. Unapproved modification will affect type approval certification and/or sensor performance. Failure to obtain such approval voids product warranty.

APPENDIX:

Process Rupture Sensor Hookup Diagram Showing Connection To A Crouse Hinds D2 WLT Transmitter  
Intrinsically Safe Div. 1/Zone 1 Suggested Connections Shown



NOTE:  
Sensor switch will be normally closed except when the process seal has ruptured or when the switch assembly is removed from the sensor housing.

Switch rating: 24V/AC/DC 174mA MAX.

It is important to keep in mind that depending on the materials passed through the sensor in the event of a rupture condition, the sensor switch may revert back to a closed state in approximately 30 seconds. It is therefore recommended to "latch" the initial trip of the sensor.

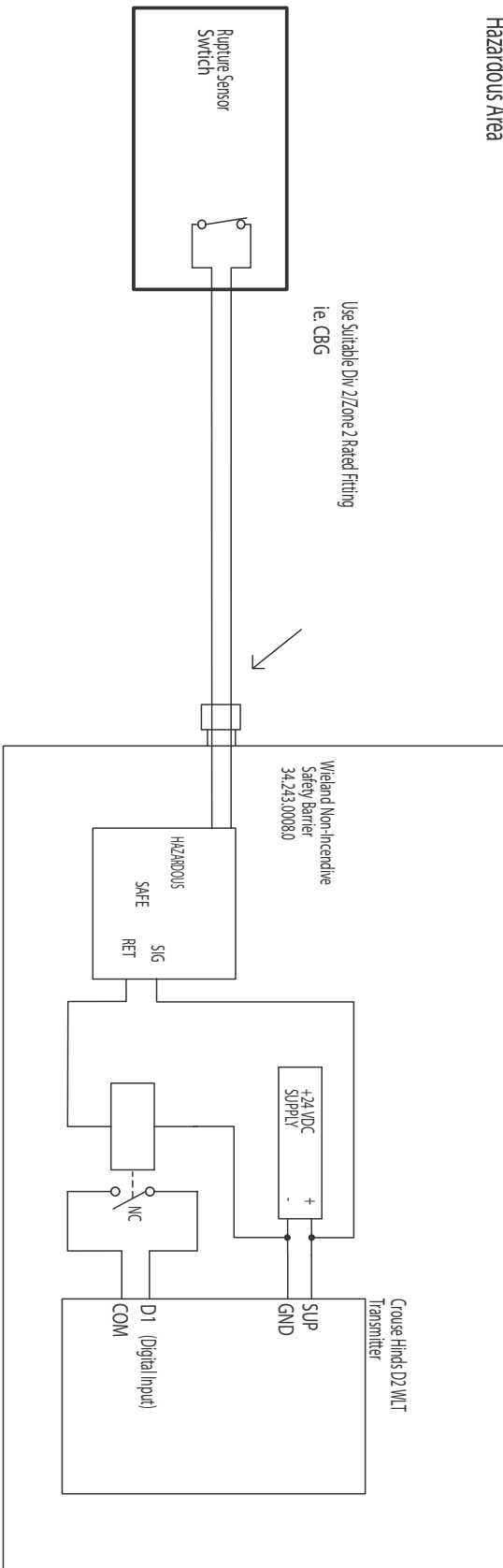
The installation must be in accordance with the National Electrical Code, NFPA 70, Articles 501, 504 and 505, and ANSI/ISA-81.12.06-01.

Install intrinsically safe systems per this drawing, in accordance with local codes, articles 501, 504 and 505 of the National Electrical Code and NFPA 70.

APPENDIX:

Process Rupture Sensor Hookup Diagram Showing Connection To A Crouse Hinds D2 WLT Transmitter  
 Non-Incendive Div. 2/Zone 2 Suggested Connections Shown

Hazardous Area



NOTE:

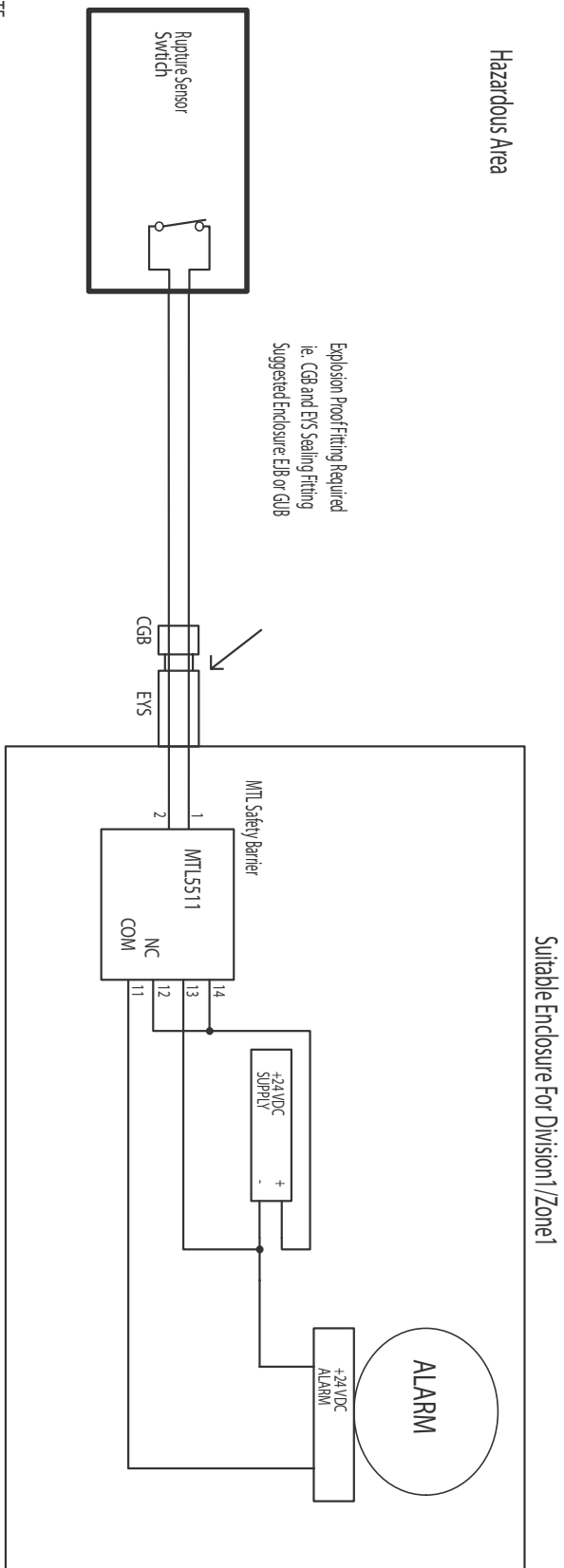
Sensor switch will be normally closed except when the process seal has ruptured or when the switch assembly is removed from the sensor housing.

Switch rating: 24V AC/DC 174mA MAX.

It is important to keep in mind that depending on the materials passed through the sensor in the event of a rupture condition, the sensor switch may revert back to a closed state in approximately 30 seconds. It is therefore recommended to "latch" the initial trip of the sensor.

The installation must be in accordance with the National Electrical Code, NFPA 70, Articles 504 and 505, and ANSI/ISA-PP12.06.01.

Process Rupture Sensor Hookup Diagram Showing Connection To A Low Voltage Alarm Circuit  
 Intrinsically Safe Div. 1/Zone 1 Suggested Connections Shown



**NOTE:**

Sensor switch will be normally closed except when the process seal has ruptured or when the switch assembly is removed from the sensor housing.

Switch rating: 24V AC/DC 174mA MAX.

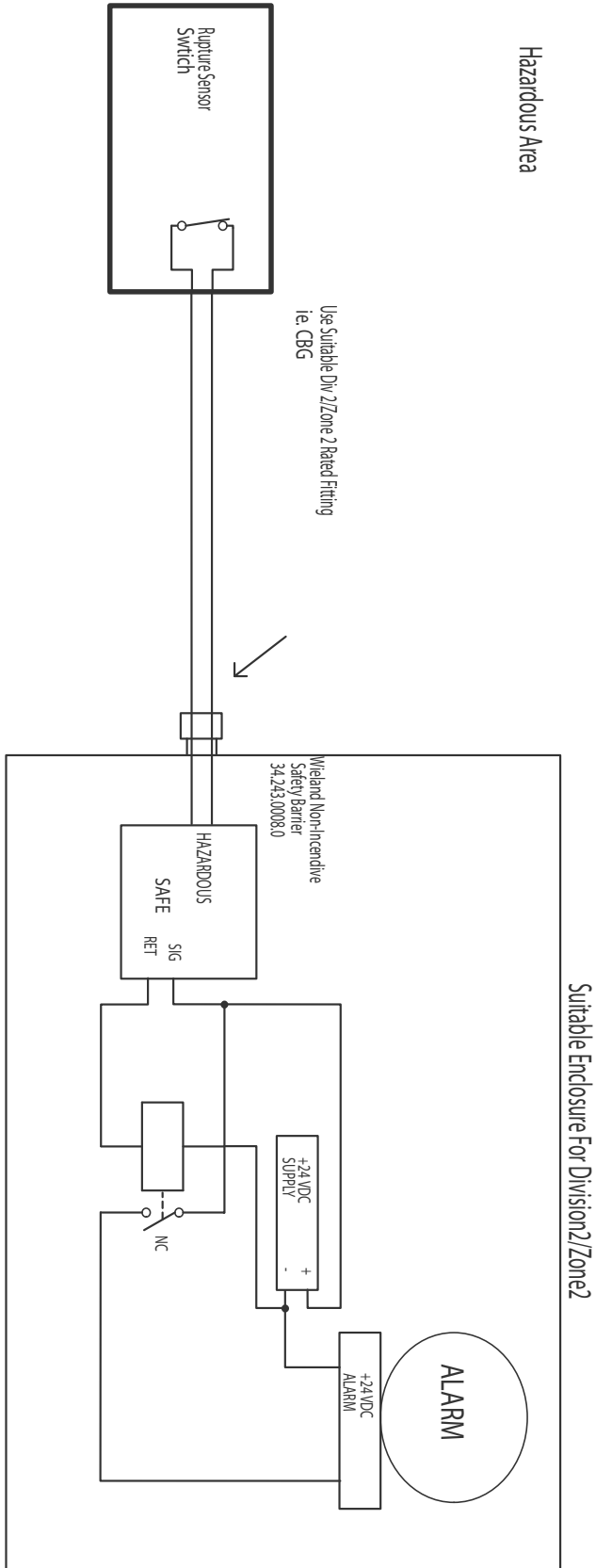
It is important to keep in mind that depending on the materials passed through the sensor in the event of a rupture condition, the sensor switch may revert back to a closed state in approximately 30 seconds. It is therefore recommended to latch the initial trip of the sensor.

The installation must be in accordance with the National Electrical Code, NFPA 70.

Articles 504 and 505, and ANSI/ISA-RP12.06.01.

Install intrinsically safe systems per this drawing, in accordance with local codes, articles 504 and 505 of the National Electrical Code and NFPA 70.

Process Rupture Sensor Hookup Diagram Showing Connection To A Low Voltage Alarm Circuit  
 Non-Incendive Div. 2/Zone 2 Suggested Connections Shown



**NOTE:**  
 Sensor switch will be normally closed except when the process seal has ruptured or when the switch assembly is removed from the sensor housing.  
 Switch rating: 24VAC/DC 174mA MAX.

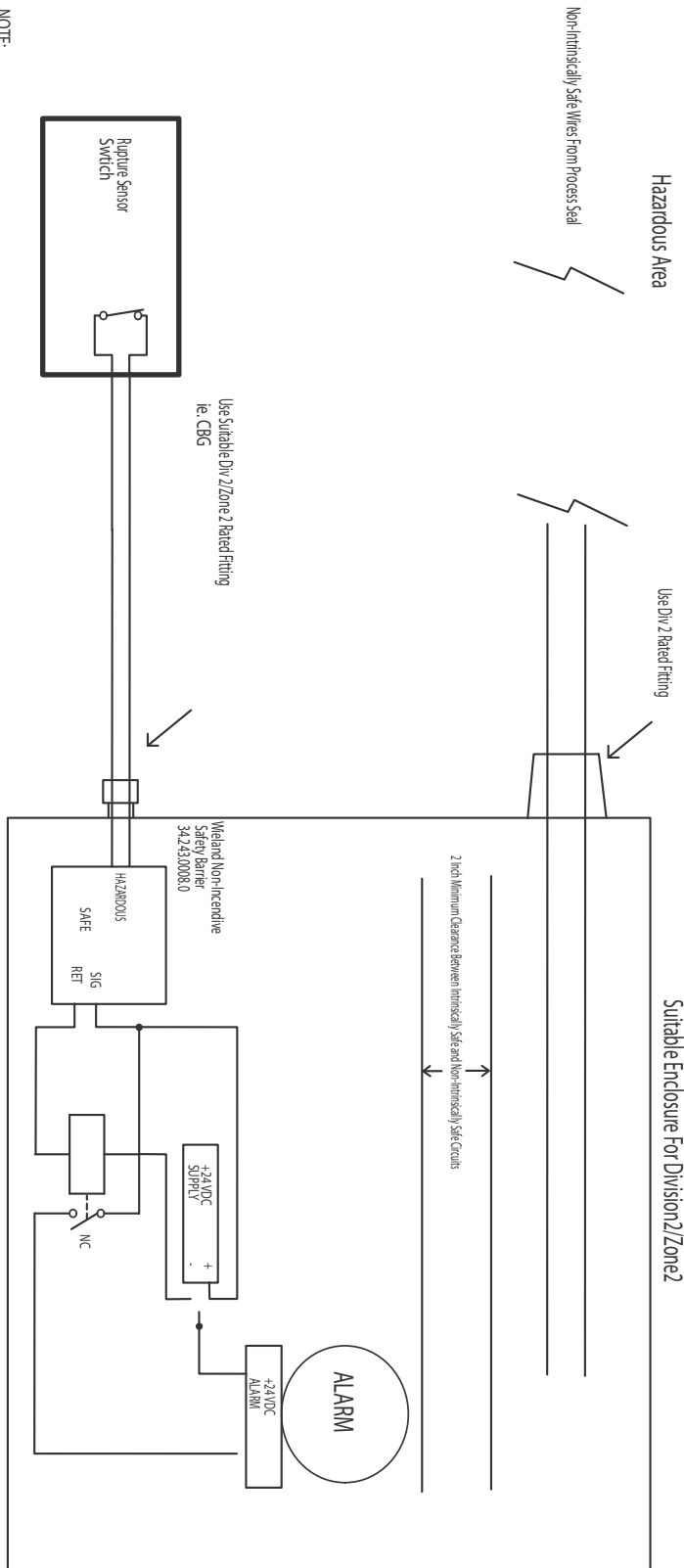
It is important to keep in mind that depending on the material passed through the sensor in the event of a rupture condition, the sensor switch may revert back to a closed state in approximately 30 seconds. It is therefore recommended to "latch" the initial trip of the sensor.

The installation must be in accordance with the National Electrical Code, NFPA 70, Articles 504 and 505, and ANSI/ISA-PR1 2.06.01.



APPENDIX:

Process Rupture Sensor Hookup Diagram Showing Connection To A Low Voltage Alarm Circuit  
 Non-Incendive Div. 2/Zone 2 Suggested Connections Shown With All Wiring In Same Enclosure



NOTE:  
 Sensor switch will be normally closed except when the process seal has ruptured or when the switch assembly is removed from the sensor housing.  
 Switch rating: 24V AC/DC 174mA MAX.

It is important to keep in mind that depending on the materials passed through the sensor in the event of a rupture condition, the sensor switch may revert back to a closed state in approximately 30 seconds. It is therefore recommended to "latch" the initial trip of the sensor.  
 The installation must be in accordance with the National Electrical Code (NFPA 70) Articles 504 and 505, and ANSI/ISA-81.20.01.

All statements, technical information and recommendations contained herein are based on information and tests we believe to be reliable. The accuracy or completeness thereof are not guaranteed. In accordance with Crouse-Hinds "Terms and Conditions of Sale," and since conditions of use are outside our control, the purchaser should determine the suitability of the product for his intended use and assumes all risk and liability whatsoever in connection therewith.