Product Data Sheet
00813-0100-4191, Rev EA
Catalog 2008 - 2009

Rosemount 470 Transient Protector

- *For field-mounted transmitters*
- *Prevents lightning damage*
- *Rated for repeated strikes up to 5,000 amps*
- *Functions under severe environmental conditions*
- *May be used with cathodic protection*

CE

FIGURE 1. Rosemount 470 Transient Protector Installed on the Rosemount 1151 Pressure Transmitter

Content

INTRODUCTION

The Rosemount® 470 Transient Protector prevents damage from transients induced by lightning, welding, heavy electrical equipment, or switch gears. The Rosemount 470 continues to protect transmitters even after repeated strikes of up to 5,000 amps. In laboratory simulated lightning tests, the Rosemount 470 withstood 2,000 amps or 10,000 volts without damage to either the transient protector or the transmitter.

Models 470D and 470C are designed to protect two-wire transmitters that are capable of withstanding 120 volts from lead to case, and can also be used to protect the receiver or RTU. Models 470L and 470J are designed to protect low power or other three-wire transmitters.

The weatherproof, stainless steel-cased protector functions under severe environmental conditions including high temperature and humidity.

OPERATION

The Rosemount 470 Transient Protector consists of separate circuits—one for each lead wire (excluding the green ground wire) epoxy-sealed inside a 1/2–14 NPT stainless steel pipe nipple for direct mounting to a transmitter. Each signal lead uses an identical protector circuit consisting of a gas-filled spark gap, an inductor, and a fast-response bipolar zener diode.

A high-voltage transient appearing on any field signal wire is conducted to the case through the gas-filled spark gap. This device conducts large currents, but has a slow reaction time. The fast-rising portion of the transient is conducted to the case through the zener diode, which has a fast reaction time. The inductor limits the diode current during the time required for the spark gap to conduct.

The bypass wire connected between the protector case and instrument case ensures that both remain at the same potential, thus preventing dielectric breakdown inside the protected device.

Once the spark gap has begun to conduct, it will continue to do so unless the instrument power supply limits current to 0.5 amps or less. A 47-ohm quenching resistor can be added to prevent conduction after the transient has discharged.

The green lead used in the Model 470C or 470J is connected directly to the protector case, and is used only in those instances where a separate instrument case ground is desired. It cannot be used to replace the bypass wire, and cannot be used in cathodically protected installations.

WARNING

This protector is intended to protect only the instrument being bypassed, and is not a safety device. To prevent damage or injury to other equipment or to personnel in event of a nearby lightning strike, the equipment to which the protector is bypassed must be well-grounded in accordance with the National Electrical Code (ANSI C2-1977), the Lightning Protection Code (NFPA 78-1968; ANSI C5.1-1969), and Section 9 of the National Electric Safety Code (ANSI C2-1984).

Specifications

Temperature Limits
–40 to 212 °F (–40 to 100 °C)

Humidity Limits
0 to 100% relative humidity

Maximum Clamping Voltage
Any lead to case(1)

dc
68 V

100 kV/microsecond surge
70 V peak

1,000 kV/microsecond surge
120 V peak

Transient Surge Current(1)
Up to 5,000 amps for 20 microseconds—repeated strikes

470D and 470C Transient Protector

Transmitter Output Compatibility
4–20 mA

Transmitter Power Supply
45 V dc maximum

Loop Resistance Added by Protector(1)
20 ohms maximum

470L and 470J Transient Protector

Transmitter Output Compatibility
4–20 mA (regular power)
0.8 to 3.2 V (low power)
1.0 to 5.0 V (low power)

Transmitter Power Supply
45 V dc maximum, 5 V dc minimum

Loop Resistance Added by Protector(1)
1 ohm per lead maximum

(1) Tested under reference operating conditions.

Product Certifications

Approved Manufacturing Locations

Emerson Process Management Rosemount Division - Chanhassen, Minnesota, USA

Rosemount Temperature GmbH - Germany

Emerson Process Management Asia Pacific - Singapore

HAZARDOUS LOCATIONS CERTIFICATIONS

North American Certifications

Canadian Standards Association (CSA) Approvals

E6 Explosion-Proof for Class I, Division 1, Groups C and D; Class II, Division 1, Groups E, F, and G; Class III, Division 1 hazardous locations;
Class I Division 2 Groups A, B, C, and D. CSA Enclosure Type 4. Factory Sealed.

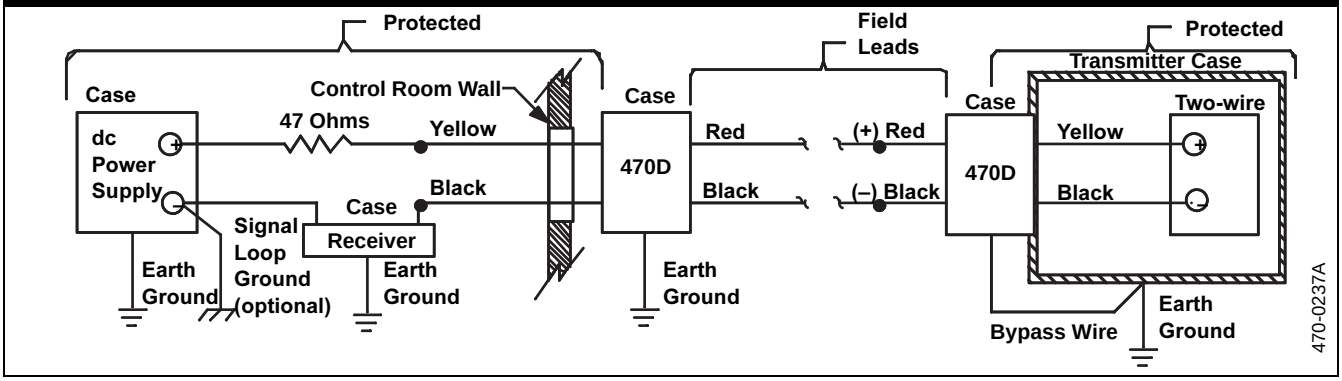
I6 Intrinsic Safety for Class I, Division 1, Groups A, B, C, and D. Intrinsic safety approval only when used with the barrier parameter in Table 1.
CSA Enclosure Type 4.

TABLE 1. CSA Entity Approvals.

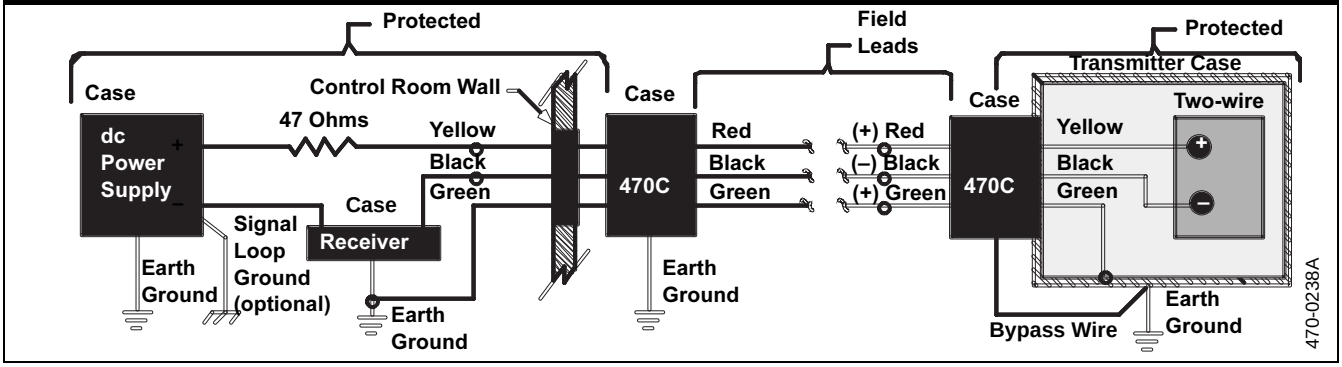
Barrier Manufacturer/Model	CSA Approved for Class 1, Division 1, Groups A	B	C	D
Any CSA approved zener barrier ≤ 30 V, ≥ 330 Ω or ≤ 28 V, ≥ 300 Ω or ≤ 22 V, ≥ 180 Ω	•	•	•	•
Foxboro Converters 2AI-I2V-CGB, 2AI-I3V-CGB 2AS-I3I-CGB, 2AS-I2I-CGB 3AD-I3IA-CS-E / CGB-A 3A2-I2D-CS-E / CGB-A 3A2-I3D-CS-E / CGB-A 3A4-I2DA-CS-E / CGB-A 3F4-I2DA1-CS-E / CGB-A	NA	•	•	•

Dimensional Drawings

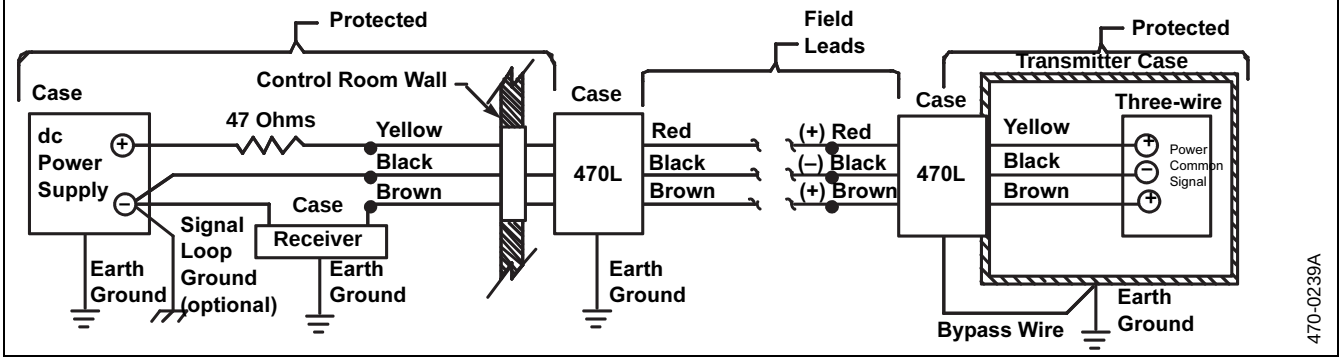
Installation Schematic for Two-wire Transmitter and Control Room Equipment Using Two Rosemount 470D Transient Protectors



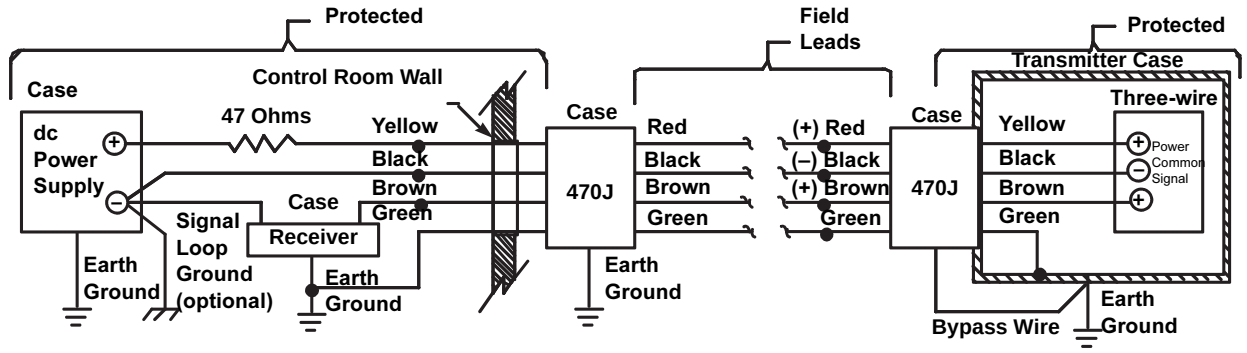
Installation Schematic for Two-wire Transmitter and Control Room Equipment Using Two Rosemount 470C Transient Protectors



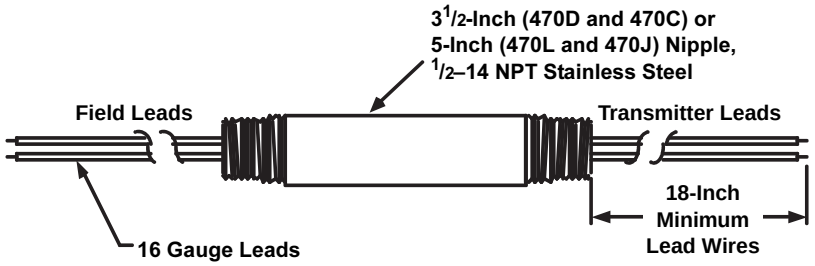
Installation Schematic for Three-wire Transmitter and Control Room Equipment Using Two Rosemount 470L Transient Protectors



Installation Schematic for Three-wire Transmitter and Control Room Equipment Using Two Rosemount 470J Transient Protectors



Dimensional Drawing



Ordering Information

Model	Product Description
470D	Transient Protector; 4-20MA, 3½-inch Nipple length
470C	Transient Protector; 4-20MA; with Ground Wire 3½-inch Nipple length
470L	Transient Protector; Max. Supply Voltage 45 5-inch Nipple length
470J	Transient Protector; Low Power; with Ground Wire 5-inch Nipple length
Code	**Loop Resistance**
1	20 Ohms Max
1	1 Ohm Per Lead; Max
Code	**Options**
NA	No Approval Required
E6	CSA Explosion-Proof Approval
I6	CSA Intrinsic Safety Approval
Typical Model Number: 470D 1 NA	

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Cover Photo: 470-002ab

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