

INSTRUCTION, INSTALLATION & SERVICE BULLETIN

ZENER BARRIER SAFE PAK FOR USE WITH GEMS LEVEL & FLOW INDICATING EQUIPMENT

P/N 42740

DESCRIPTION

A SOLID STATE ENERGY LIMITING DEVICE FOR TRANSMITTING IN AN INTRINSICALLY SAFE MANNER DIRECT CURRENT SIGNALS OF LESS THAN 20 V. AND LESS THAN 100 ma.

DESIGNED TO BE USED IN CONJUNCTION WITH DELAVAL GEMS LEVEL & FLOW INDICATING EQUIPMENT IN HAZARDOUS AREAS DEFINED AS CLASS I, DIVISION 1, AND INCLUSIVE OF GROUPS A THROUGH D.

THE AMBIENT TEMPERATURE OPERATING RANGE OF THIS DEVICE IS 0° TO 60° C. (+32° TO +140° F.)



THIS DRAWING MUST NOT BE
CHANGED WITHOUT THE
APPROVAL OF FACTORY MUTUAL

43680
Rev. D
909

CONSIDERATIONS FOR INSTALLATION AND USE

1. Only one Sensor (Level, Flow etc.) may be connected to a barrier. (See Figure 1)
2. The barrier and receiving station must be located in a non-hazardous location.
3. The mounting bracket on the barrier must be connected to an earth ground from both mounting points and two lines for redundancy. The grounding should be adequate for conduction of line generated fault currents. The impedance of either line to earth should be maintained at less than one ohm.
4. To serve multiple tank installations additional barriers may be placed in an enclosure using a common earthing ground (See Figure 3). In this enclosure the intrinsically safe wiring should be segregated from non-intrinsically safe by independent raceways, wiring trays or other adequate means to insure the integrity of the installation. Additionally, when internal terminations are used intrinsically safe wiring and non-intrinsically safe wiring should not be adjacent or arranged in such a way as to create the potential to miswire or bypass the barrier when being serviced or tested. (See typical installation depicted in Figure 2)
5. Common commercially available signal wire may be used for field wiring and distances of up to 1000 ft. are acceptable using twisted wire. Characteristics of the signal line should not be modified by addition of capacitive or inductive components.

5. (Continued)

The governing wire parameters for various groups are as follows:

	<u>Group</u>	<u>Capacitance*</u>	<u>Inductance*</u>
Hydrogen & Acetylene	A & B	0.4 uf	0.9 MH
Ethylene	C	1.2 uf	5.0 MH
Methane	D	3.2 uf	10.0 MH

*Values are for any one loop in the hazardous area.

(i.e. Terminal 4 to 5 or 6 to 5)

6. Field Testing of Barrier

A. Never conduct tests while circuit is active. The use of instruments between input and output terminals will bypass barrier.

B. All testing is to be done with circuit inactive using the following instruments:

1. Ohmmeter with resolution down to less than 1 ohm.
2. D.C. power supply with an output of 0 to +25 VDC.
3. D.C. Voltmeter.

C. Test performance (see Figure 4).

Step 1. Disconnect all leads to unit under test except earthing/mounting tabs.

Step 2. a. Measure the resistance between terminals 1 & 4, then 3 & 6. It should be 250 ohms \pm 5% (\pm instrument tolerance).

b. Measure the resistance between terminals 5 & 2, then terminal 5 and the bracket. Both readings should be below one ohm.

6. C. Step 2. (Continued)

- c. Apply 24 volts to terminals 4 (+) and 5 (common), then read the voltage between terminals 1 (+) and 2 (common)*. This voltage must be between 18.5 and 21.5 volts. In the same fashion conduct this same test with the voltage impressed across 6 (+) and 5 (common) and measure the output across 3 (+) and 2 (common).
- d. Connect an ohmmeter between the mounting bracket (not the mounting screw) and the earth ground reference. The reading must be less than one ohm. The barrier must pass all parts of this test or it is unacceptable.

* (Note for Step c.) The fuses located in the legs 4 - 1 and 6 - 3 are rated at 100 ma, therefore care should be exercised in testing this device so that no accidental current greater than 100 ma enters or leaves pins 1 or 3.

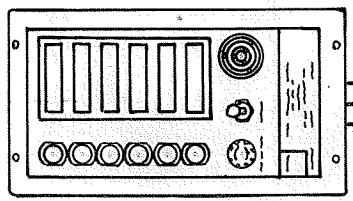
7. Every effort should be made to keep these barriers clean and free of contaminating atmospheres. A periodic check should be made to verify that they are in good condition both physically and electrically.
8. Each sensor must have its own ground return wire to pin 5.

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FIG. 1

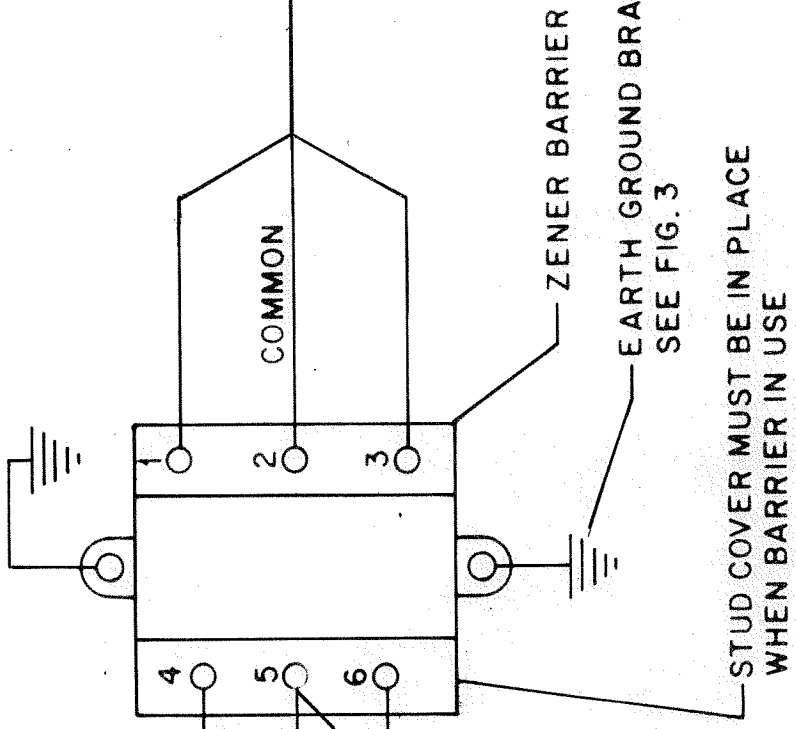
INSTALLATION DIAGRAM

RECEIVING STATION

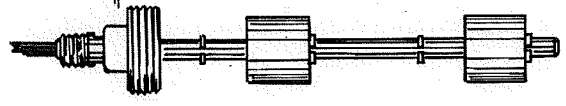


NON-HAZARDOUS AREA

HAZARDOUS AREA



LEVEL SWITCH - LS-800



'B'

ZENER BARRIER
COMMON
EARTH GROUND BRACKET AT TWO POINTS
SEE FIG. 3

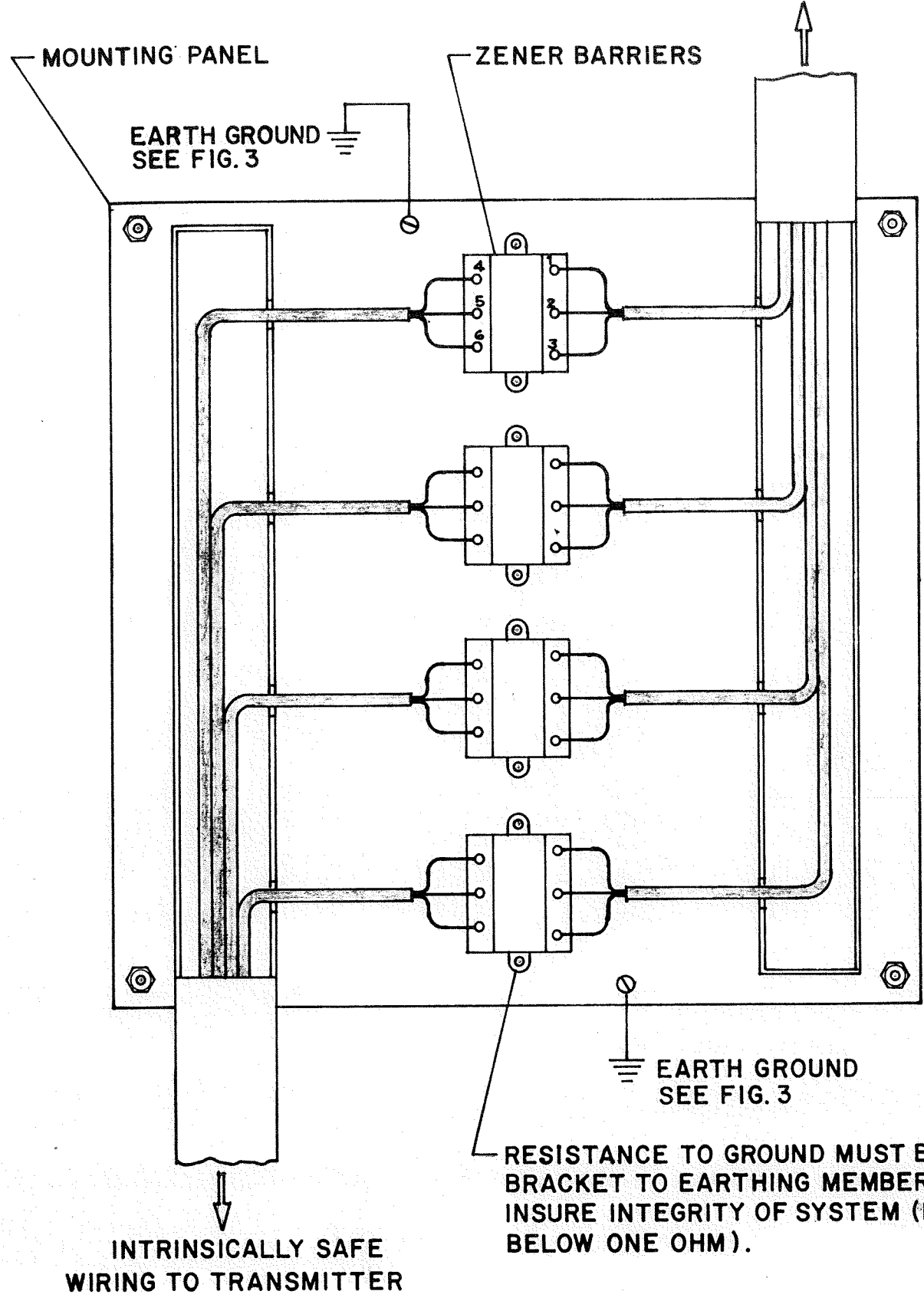
STUD COVER MUST BE IN PLACE
WHEN BARRIER IN USE

FIG. 2

MULTIPLE BARRIER MOUNTING

IMPORTANT: All barriers used for multiple barrier mounting must be of the same polarity.

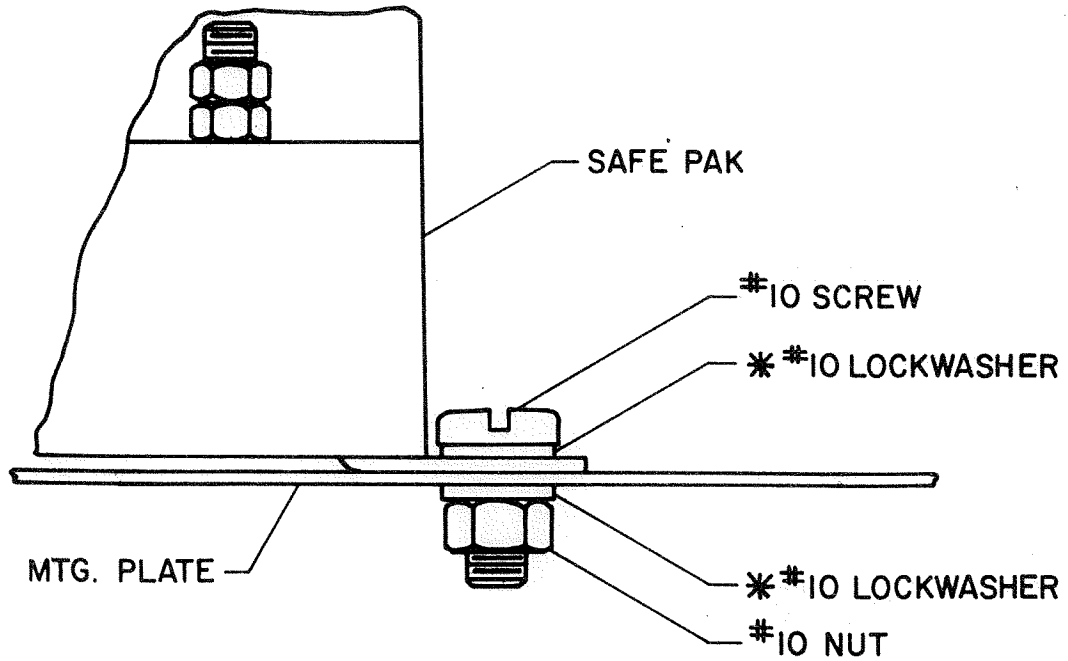
NON INTRINSICALLY SAFE WIRING TO RECEIVER



INTRINSICALLY SAFE WIRING TO TRANSMITTER

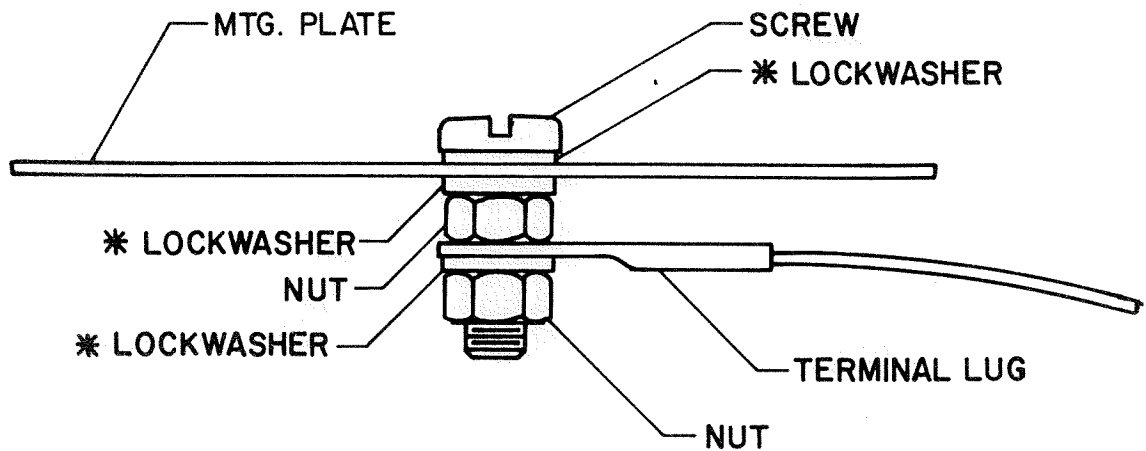
RESISTANCE TO GROUND MUST BE FROM BRACKET TO EARTHING MEMBER TO INSURE INTEGRITY OF SYSTEM (MUST BE BELOW ONE OHM).

DETAIL OF SAFE PAK GROUNDING TO PLATE



* LOCKWASHERS TO BE INTERNAL OR EXTERNAL TOOTH TYPE

DETAIL OF EARTH GROUNDING



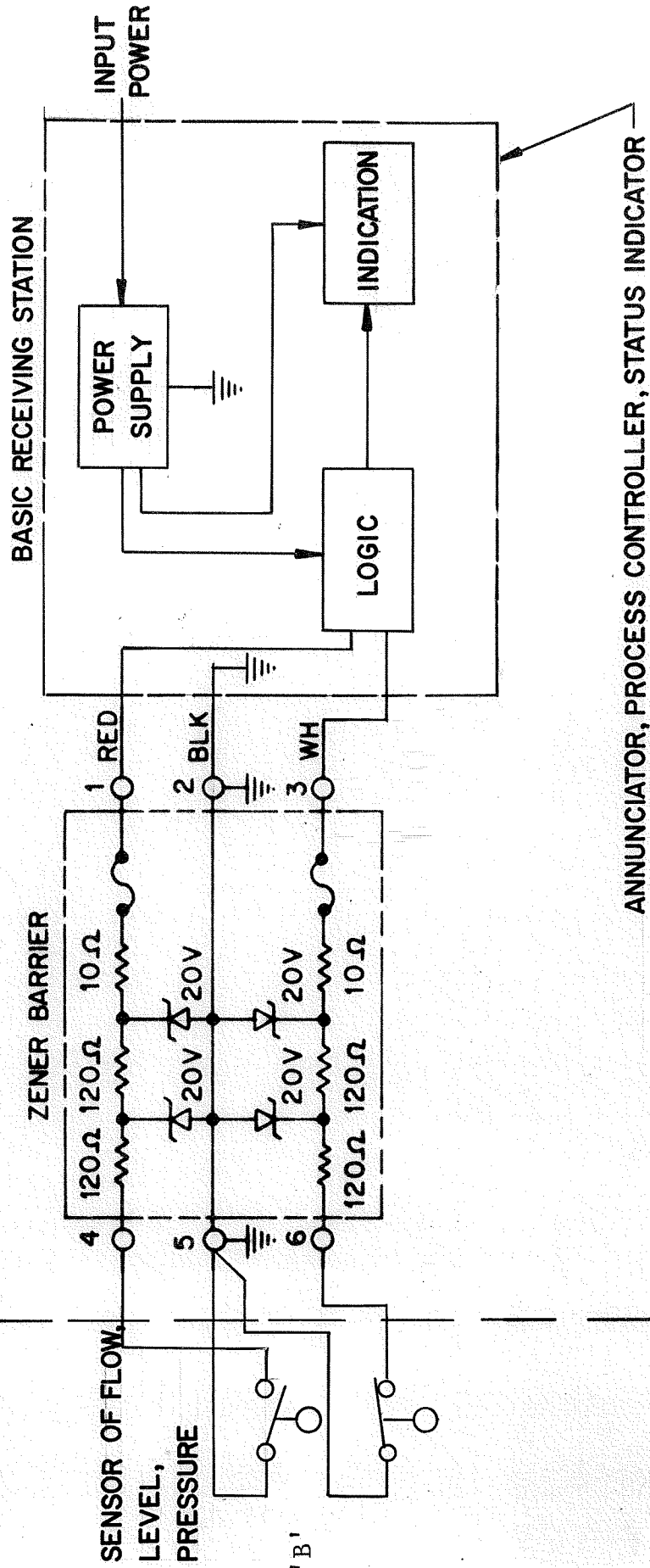
GROUNDING HARDWARE TO BE #8 OR LARGER & S.S.

FIG. 4

INTRINSICALLY SAFE LOOP SCHEMATIC

NON-HAZARDOUS
AREA

HAZARDOUS
AREA



ANNUNCIATOR, PROCESS CONTROLLER, STATUS INDICATOR