



# Zener Safety Barriers

## Operating Principles for Leak Detection and Locating Systems

### Background

The TTB alarm and locator module is the most frequently used TraceTek electronic unit. It is approved by Underwriters' Laboratory, Inc.(UL), the Canadian Standard Association (CSA) and Factory Mutual (FM), for use in ordinary areas. However, when the sensing cable is to be installed in a hazardous area, a protective device, such as a zener safety barrier, must be installed between the alarm module and the sensing cable that it monitors.

The safety barrier assures that, even if the TraceTek module suffers a multiple failure, the energy transferred to the sensing cable (and thus to the hazardous area) will remain below explosive ignition levels, thus reducing the risk of fire or explosion.

Because the TraceTek system uses very low voltage and current levels, and because the sensing cable is a simple passive device, readily available commercial safety barriers can accomplish the required isolation.

### Application Specifics

Several manufacturers produce zener safety barriers. TraceTek has standardized on the MTL-765 model manufactured by MTL Incorporated. It is UL, CSA, FM, and British Approvals Service for Electrical Equipment in Flammable Atmospheres (Baseefa), approved.

Each MTL-765 barrier is capable of isolating two wires. Because the TraceTek circuit requires four wires to connect the alarm module to the sensing cable, two of the MTL-765 barriers are necessary. MTL also manufactures an enclosure designed to mount two barriers. The enclosure is designated MT-2. MTL will supply a ready-to-install, pre-assembled unit with two MTL-765s mounted in an MT-2 enclosure.

### Impact on TraceTek System Performance

During all expected modes of TraceTek operation (normal monitoring, leak detection or cable break) each of the four barrier channels appears as a 135-ohm resistor in series between the alarm module and the sensing cable. This has two implications for the performance of the TraceTek system:

1. When the system is mapped the MTL barrier will add 35 feet (11 meters) to the distance readout. All mapped distances and actual leak locations will be affected by the presence of the barrier.
2. When the Test button is pushed, the cable-length readout, displayed after the Test button is released, will show a reading of about 70 feet (21 meters) more than it would have if the zener

barrier were not installed. For instance, if 500 feet of actual sensing cable is installed, the Test-cable-length readout will show at least 570 feet (173 meters) or slightly more. The additional 70 feet added to the Test readout is a good indication that the zener barrier is correctly installed.

### Other Applications

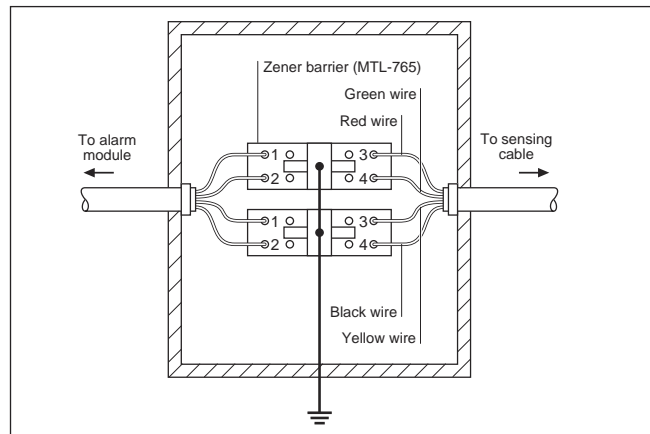
The MTL-765 zener safety barrier can also be used with the TTM alarm and locator module.

The TTG and TTA-1-UL alarm modules carry their own Class I Div 2 rating (module location) and Class I Div 1 (sensing cable location).

Models TTC ( alarm only) and TTE (alarm and locator) carry European equivalents to Class I Div 2 (module location) and Class I Div 1 (sensing cable location). However, if the European certification is not acceptable to the designer or local inspector, MTL-765 zener safety barriers can be installed as an extra precaution.

### Installation and Wiring

This is the wiring diagram for using MTL-765 barriers with the TTB alarm and locator module.



Note: The hazardous-area approvals are carried by the barrier manufacturer. In order to achieve the necessary level of protection, the barrier manufacturer's instructions must be followed exactly.

**Tyco Thermal Controls, LLC**  
**Commercial & Industrial**  
**Infrastructure Division**

**300 Constitution Drive**  
**Menlo Park, CA 94025-1164**

### REPRESENTED BY:

**INDUSTRIAL HEATER**  
**8400 Wolf Lake Dr.**  
**Suite 116**  
**Bartlett, TN 38133**

**Tel (888) 451-4328**  
**Fax (901) 382-4766**