

## Installation of Advanced Energy Trek 542P Series Probe in Vacuum Applications

For vacuum chamber application, the electrical connections associated with the Trek Model 542P probe series can be fed through a vacuum chamber bulkhead connector. The electrical voltage rating of each terminal of the connector relative to any other terminal and to the metallic shell of the connector should be 100 V AC minimum.

The 542P series probes may be applied and operated under vacuum conditions up to  $10^{-7}$  Torrs. These vacuum installations are accomplished by cutting the probe cable at the appropriate position which allows the proper cable length inside the vacuum chamber.

The procedure is as follows:

- A) Cut the cable at the appropriate position (which allows the proper cable length inside the vacuum chamber).
- B) Separate, dress, and solder the various cable connections on both ends of the cable using the following precautions:
  - 1) The WHITE wire shield is at a bias potential of up to  $\pm 10$  volts relative to the BLACK wire shield and the RED wire shield, therefore, care must be taken to ensure that the WHITE wire shield does not come into contact with either the BLACK wire shield or the RED wire shield.

A separate connector contact must be provided for the WHITE wire shield connection as shown in FIGURE 1 as contact "B". The shield for the BLACK wire and the shield for the RED wire are at a common potential and therefore may be connected together as shown in page 2 Diagram as contact "E".

(1 continued)

Electrical tape or heat-shrink tubing may be used to ensure that electrical separation is achieved and maintained between the WHITE wire shield and all other connectors.

- 2) If the shells of the high-voltage connector and its mating connector are of a conductive (metallic) material and these conducting shells are connected to EARTH GROUND due to their contact to the vacuum (metallic) chamber walls, care must be taken to ensure that all conductors of the probe cable have sufficient clearance to these shells to prevent arc over between the cable and the shells.

The sufficient clearance must support a voltage stress of up to 100 V AC.

**NOTE:** Pin designations A, B, C, D, and E are used for reference purposes only and do not necessarily describe the actual pin designations on the particular connector being used.

- C) Connect a protective zener diode type 1N965B between pin A and pin B of the high-voltage vacuum connector.

The zener diode cathode (the terminal normally denoted with a band) is connected to pin A of the vacuum connector, which is also the WHITE wire connection, while the anode of the zener diode is connected to pin B of the vacuum connector, which is also the WHITE wire shield connection.

# Advanced Energy Trek 542P Series Probe in Vacuum Applications Diagram

