

## **OMEGA Goes to Any Length (or Depth) for Its Customers**

### **Portable RTD Meter with Selector Switch Does Field Measurements in Remote Locations**

#### **INTRODUCTION**

An environmental research team in the Pacific Northwest was conducting a wide-ranging survey of the winter frost line. This entailed below-ground temperature measurements at different depths in various soil types. The more remote locations lacked access to electric power.

#### **THE PROBLEM**

At each measurement site, the research team planned to insert a protection tube in the soil to a depth of 10 feet. They needed a number of temperature sensors to go inside the tube and take readings at different levels. The thermometer used in conjunction with the sensors had to be lightweight enough to be fully portable, with a large display and a convenient way to switch between the different temperature sensors. For safe, dry transport and operation, the thermometer would require a weather-resistant case.

#### **THE SOLUTION**

Omega installed a bundle of resistance temperature detectors (RTDs) inside each stainless steel protection tube, with lead wires extending to the top of the tube. The wires terminated in a single standard SUB-D type connector, which provided quick attachment to a portable readout device. In this instance, OMEGA's customer engineering staff chose a model 450 APT digital handheld thermometer.

The next challenge was to make the thermometer operable from outside the weather-resistant case. The answer—decidedly low-tech but extremely cost-effective—was to mount the thermometer inside the case with Velcro, behind a window built into the case wall. A selector switch leading to the thermometer was mounted on the case next to the window, while the mating connector from the bundle of RTD probes came into the case from the side.

The research team could now monitor the temperature from each RTD sensor in the tube with a single, fully protected readout device that could easily move from site to site. What at first seemed like a complicated and expensive proposition became, with OMEGA's help, a simple, economical, and highly reliable field measurement system.

Cost of the thermometer and enclosure: \$835. General purpose RTD probes from OMEGA start at about \$70.

## WHAT IS A RESISTANCE TEMPERATURE DETECTOR?

The RTD, a fairly recent development in temperature sensing, offers high accuracy, as well as excellent stability and repeatability. Because it is also relatively immune to electrical noise, it finds utility in industrial environments where motors and automation equipment can interfere with sensor readings. Another benefit of the RTD is compactness—it can often go where space limitations preclude other types of probes.

A standard RTD element consists of fine wire coiled around a ceramic or glass core. It is made of platinum (most accurate), nickel, copper, and certain other pure materials whose resistance at various temperatures has been established. The element's predictable change in resistance with changing temperature makes for very reliable measurements. Since an RTD element can be fragile, it is usually protected in a sheathed probe.

OMEGA offers a wide range of [RTD configurations](#) and prides itself in producing the world's most accurate, durable, and thoroughly tested finished probes.

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