



Important Installation Considerations for Surface Platinum Resistance Thermometers

There are a variety of platinum resistance thermometers (PRTs) designed for measuring surface temperature. The accuracy of the temperature measurement that can be achieved with any of these sensors is highly dependent on the installation method and conditions to which the sensor will be exposed. There are a few general rules that should be followed to achieve the best accuracy possible from these sensors.

Locate the sensor in an appropriate location. For example, if a pipe is carrying a fluid and the pipe is not full, the sensor should be located where flow is present such as the bottom or side of the pipe. Placing the sensor on the top of the pipe will not give a good measurement unless the pipe is full. If the flow conditions are known, a location where turbulent flow exists is preferred to smooth, laminar flow. This will help to measure the overall temperature of material in the process and reduce errors due to thermal stratification.

Apply an appropriate conductive grease or adhesive capable of the temperature range of exposure between the surface of the PRT and the surface to be measured. This will improve the heat transfer between the surface and the sensor resulting in a more accurate and faster responding measurement. Test data shows that the presence of a thermally conductive material can reduce the measurement error by up to 50 %.^(1.)

Insulate over the sensor after it is installed. This will prevent heat loss around the sensor and help isolate the sensor from the ambient conditions which can exacerbate the heat loss when unfavorable conditions exist. Test data shows that the presence of insulation over the surface sensor can reduce the measurement error by up to 70 %.^(1.) Combining both the conductive material at the interface and the insulation over the top of the sensor can reduce the measurement error by a whopping 90 %.^(1.)

When determining the installation method, consider the need for calibration or replacement. Clamping or bolting the sensor in place will allow for easy removal for calibration or replacement. Cementing or welding will make removal difficult and likely result in damage to the sensor or system piping.

1. Based on test data using 50°C water flowing through a .5 inch SST tube at 3 feet per second. Ambient conditions varied between still air and forced airflow over the installation location.