

INSTRUCTION MANUAL



Model 103 and 103B *Temperature Probes*

Revision: 4/03

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Model 103 and 103B Temperature Probes

1. General

Designed for use with the BDR301 and BDR320 Basic Data Recorders, the 103 and 103B Thermistor Probes are for sensing air and soil/water temperatures, respectively. The probes incorporate the Fenwal Electronics UUT51J1 Thermistor and are identical except that the 103B is designed to be buried or submerged up to 200 feet in water. The standard lead length is 10 feet; other lead lengths are available on request.

To prevent direct solar radiation from heating the probe (causing high air temperature readings), the 103 probe should be mounted in the model 41303 6 Plate Radiation Shield or equivalent.

The 103 is read by Instruction 11, "THERM" in the Prompt Programming mode, which makes a ratiometric measurement and converts the result to °C through a seventh order polynomial.

NOTE

The black outer jacket of the cable is Santoprene[®] rubber. This compound was chosen for its resistance to temperature extremes, moisture, and UV degradation. However, this jacket will support combustion in air. It is rated as slow burning when tested according to U.L. 94 H.B. and will pass FMVSS302. Local fire codes may preclude its use inside buildings.

2. Accuracy

The overall probe accuracy is a combination of Fenwal's interchangeability specification, the precision of the bridge resistors and the linearization error. In a "worst case" example all of the errors add in one direction to yield a $\pm 0.4^{\circ}\text{C}$ accuracy over the range of -33°C to $+48^{\circ}\text{C}$. The major error component is the $\pm 0.2^{\circ}\text{C}$ (0 to 60°C , $\pm 0.5^{\circ}\text{C}$ at -40°C) interchangeability specification of the thermistor. The error is typically less than the specification and if desired can be reduced with a single point calibration. The interchangeability error is predominantly offset and can be determined with a single point calibration. The error can then be compensated for with the offset entered in the measurement instruction.

The bridge resistors are 0.1% tolerance with a 10ppm temperature coefficient.

The error in the linearization used to calculate temperature from the measurement error is shown in Figure 1.

3. Hook-up Notes

The 103 probe is connected to the BDR301 excitation, analog ground, ground, and one of the 4 single-ended input channels as shown in Figure 2.

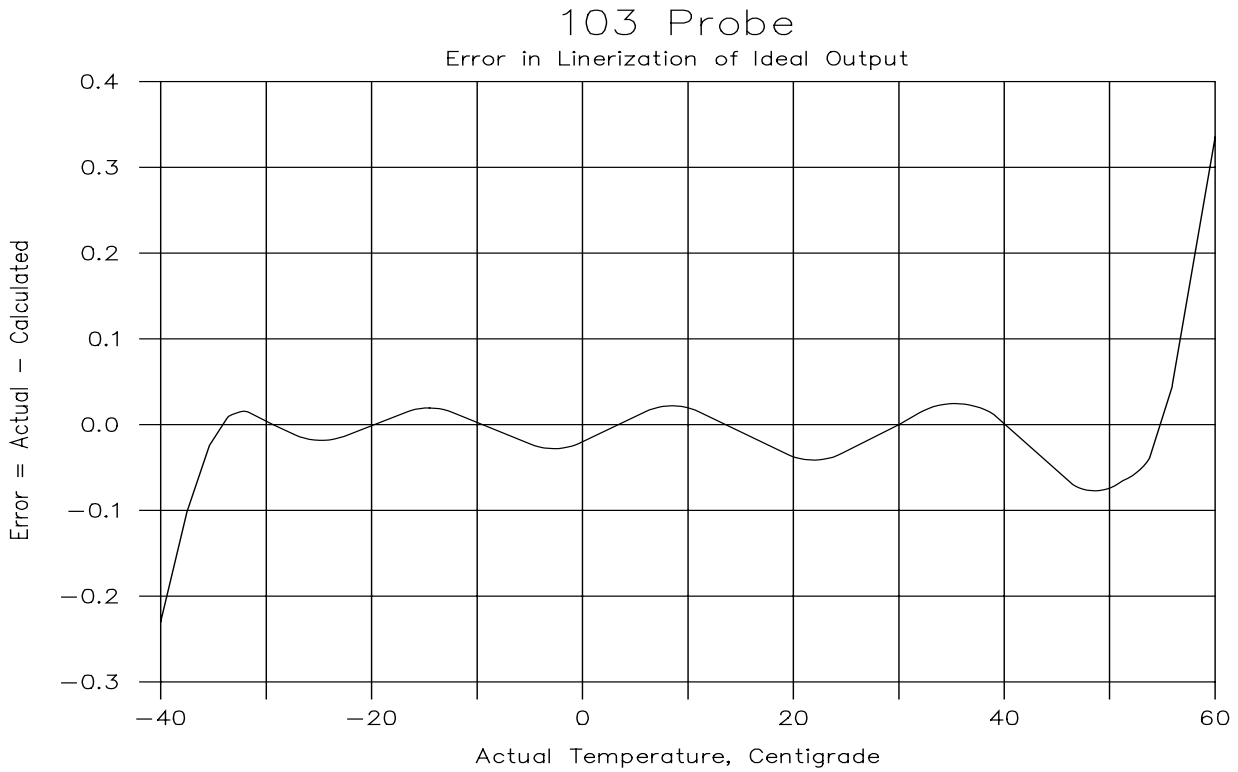


FIGURE 1. Linearization Error

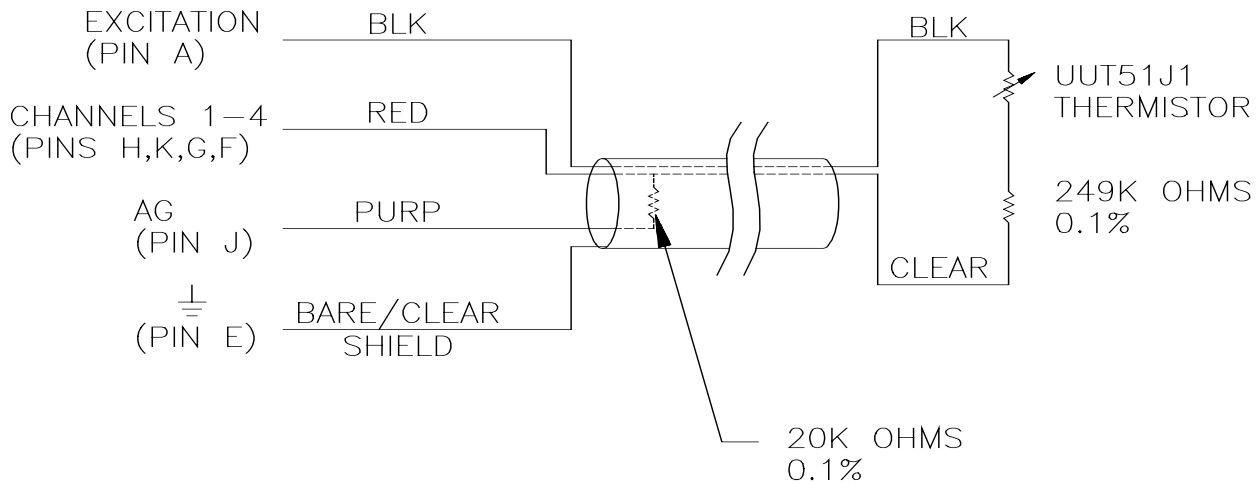


FIGURE 2. 103 Probe Schematic and Connections

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