

The 109 is a rugged, accurate probe that measures air, soil, and water temperature for a variety of applications. It consists of a thermistor encapsulated in an epoxy-filled aluminum housing. The housing protects the thermistor allowing the 109 to be buried or submerged. The 109 measures from -50° to $+70^{\circ}\text{C}$.

Installation

Air Temperature

When exposed to sunlight, the 109 probe should be housed in a 41303-5A 6-plate Gill Radiation Shield. The 41303-5A's louvered construction allows air to pass freely through the shield thereby keeping the probe at or near ambient temperature. The shield's white color reflects solar radiation. The 41303-5A attaches to a crossarm, mast, or user-supplied pipe with a 1.0" to 2.1" OD.

Water Temperature

The 109 probe can be submerged to 50 feet (21 psi). Please note that 109 is not weighted. Therefore, the installer should either add a weighting system or secure the probe to a fixed, submerged object, such as a piling.

Soil Temperature

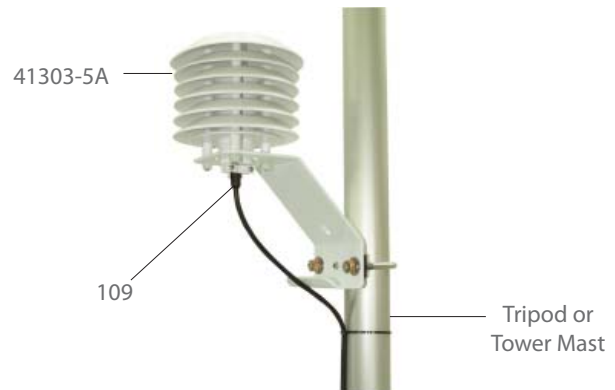
The 109 is suitable for shallow burial only. This probe should be placed horizontally at the desired measurement depth to avoid thermal conduction from the surface to the thermistor. Placement of the probe's cable inside a rugged conduit may be advisable for long cable runs—especially in locations subject to digging, mowing, traffic, use of power tools, or lightning strikes.

Ordering Information

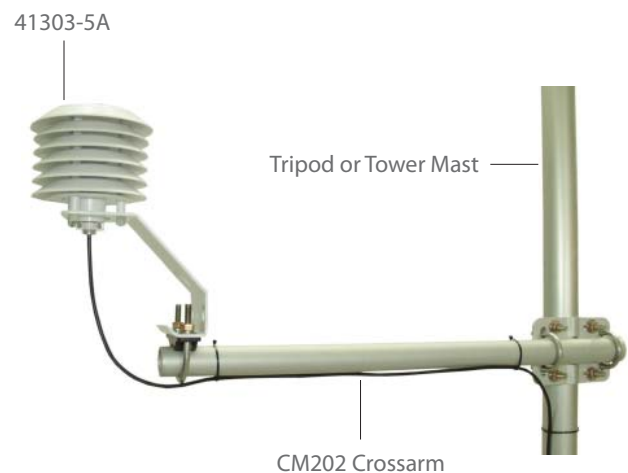
Model	Description
109-L	Temperature Probe for CR200-series dataloggers (-50° to $+70^{\circ}\text{C}$). Enter lead length, in feet, after the -L. Recommended lead lengths are provided on page 2.
-PW	Optional connector for pre-wired enclosures.
Solar Radiation Shield for Air Temperature Measurements	
41303-5A	6-Plate Gill Radiation Shield that houses a 109 for air temperature measurements.



The 109 was developed specifically for the CR200-series dataloggers.. This probe outputs a signal of 0 to 2.2 volts.



Above is a probe housed in the 41303-5A radiation shield. The U-bolt is placed in the holes on the side of the bracket to allow the 41303-5A to be attached to a mast or vertical pole.



To attach the 41303-5A to a CM202, CM204, or CM206 crossarm, place the 41303-5A's U-bolt in the bottom holes.

Recommended Lead Lengths for Air Temperature Measurements

2 m Height		Atop a tripod or tower via a 2 ft crossarm such as the CM202							
Mast/Leg	CM202	CM6	CM10	CM110	CM115	CM120	UT10	UT20	UT30
9'	11'	11'	14'	14'	19'	24'	14'	24'	37'
<i>Note: Add two feet to the cable length if you are mounting the enclosure on the leg base of a light-weight tripod.</i>									

Specifications

Weight: 5 oz per 10' cable

Length: 4.1" (10.4 cm)

Diameter: 0.3" (0.762 cm)

Sensor: BetaTherm 10K3A11B Thermistor

Temperature measurement range: -50° to +70°C

Temperature survival range: -50° to +100°C

Steinhart-Hart Equation Error

Maximum: 0.03°C at -50°C

Interchangeability error:

Typically $< \pm 0.2^\circ\text{C}$ over 0° to 70°C range;
increasing to $\pm 0.5^\circ\text{C}$ at -50°C

Time constant in air: Between 30 and 60 seconds
in a wind speed of 5 m sec⁻¹

