

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  $-50^{\circ}$  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-in. to 2.1-in. outer diameter.

#### *Water Temperature*

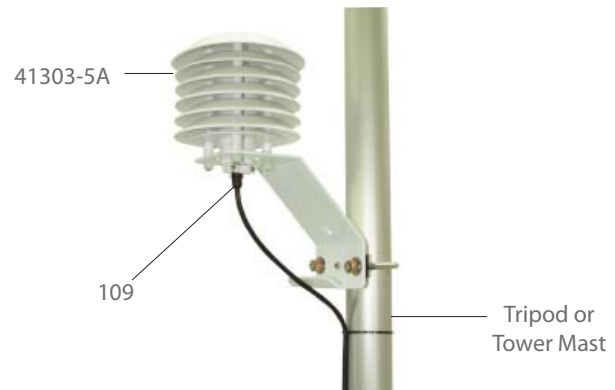
The 109 probe can be submerged to 50 feet (21 psi). Please note that 109 is not weighted. Therefore, the installer should either add a weighting system or secure the probe to a fixed, submerged object, such as a piling.

#### *Soil Temperature*

The 109 is suitable for shallow burial only. 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.



The 109 was developed specifically for the CR200(X)-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.

### Ordering Information

#### Temperature Probe

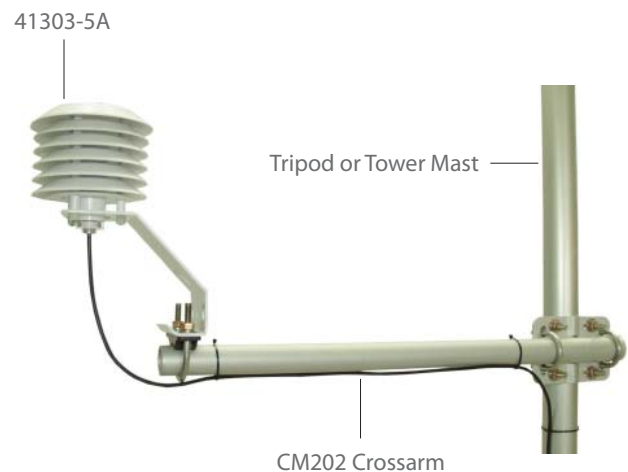
**109-L** Temperature Probe for CR200(X)-Series Dataloggers ( $-50^{\circ}$  to  $+70^{\circ}\text{C}$ ). Enter cable length, in feet, after the -L. Recommended cable lengths are provided on page 2. Must choose a cable termination option (see below).

#### Cable Termination Options (choose one)

- PT** Cable terminates in stripped and tinned leads for direct connection to a datalogger's terminals.
- PW** Cable terminates in connector for attachment to a prewired enclosure.
- CWS** Cable terminates in a connector for attachment to a CWS900 interface. Connection to a CWS900 interface allows the 109 to be used in a wireless sensor network.

#### Solar Radiation Shield for Air Temperature Measurements

**41303-5A** 6-Plate Gill Radiation Shield that houses a 109 for air temperature measurements.



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

## Recommended Cable 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	CM106	CM10	CM110	CM115	CM120	UT10	UT20	UT30
9 ft	11 ft	11 ft	14 ft	14 ft	14 ft	19 ft	24 ft	14 ft	24 ft	37 ft

*Note: Add two feet to the cable length if mounting the enclosure to the leg base of a CM106, CM110, CM115, or CM120 tripod.*

## Specifications

<b>Sensor:</b>	BetaTherm 10K3A11B Thermistor	<b>Time Constant in Air:</b>	30 to 60 seconds in a wind speed of 5 m sec <sup>-1</sup>
<b>Tolerance:</b>	±0.2°C over 0° to 70°C range	<b>Maximum Cable Length:</b>	1000 ft (305 m)
<b>Measurement Range:</b>	-50° to +70°C	<b>Probe Length:</b>	4.1 in. (10.4 cm)
<b>Steinhart-Hart Equation Error (maximum):</b>	0.03°C at -50°C	<b>Probe Diameter:</b>	0.3 in. (0.762 cm)
<b>Interchangeability Error:</b>	<±0.2°C over 0° to 70°C range; increasing to ±0.5°C at -50°C	<b>Weight with 10-ft cable:</b>	5 oz (136 g)

