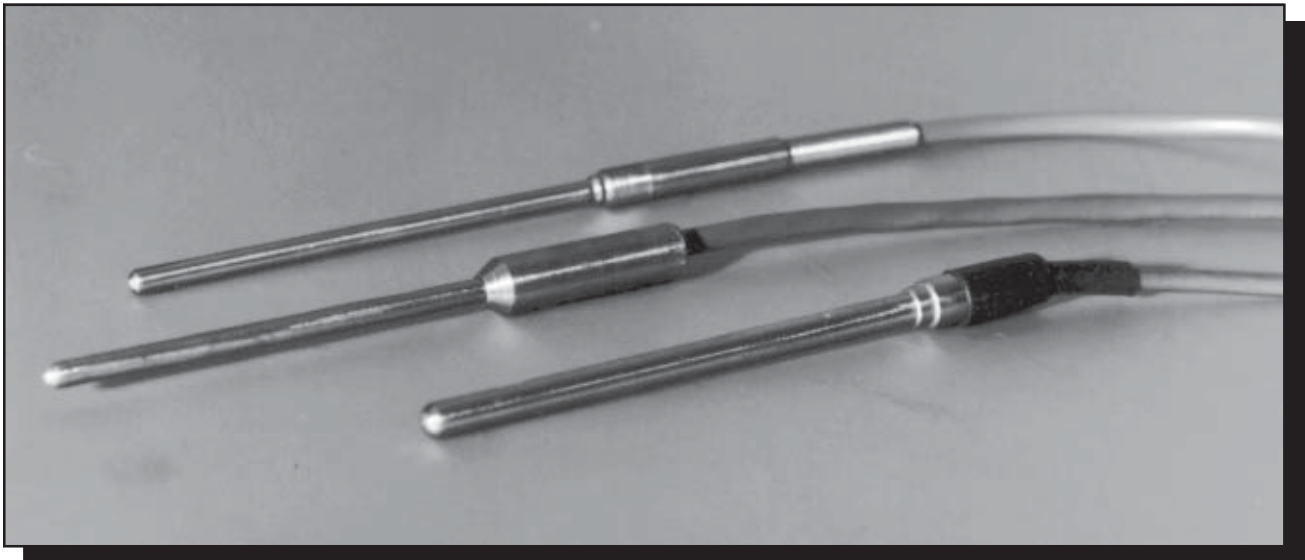


# Platinum Temperature Probe Model 4470-A



User's  
Manual



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# Introduction

The sensing element used in the Model 4470-A temperature probe is a platinum wire whose resistance varies in response to changes in temperature. The base resistance of the wire is 100 ohms at 0° C. Over its wide measuring range of -50° to +100° C, the Model 4470-A is accurate to  $\pm 0.1^\circ$ .

The probe's platinum element is enclosed in a stainless steel housing approximately 6" long, and a 5' length of interconnecting cable is provided. The probe may be paired with the Model 1420-A temperature module to provide an analog output voltage proportional to temperature. It can also be easily installed in a radiation shield such as the Model 8150 for environmental studies.

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# Installation

## CAUTION

- This instrument is ruggedly constructed. However, a severe blow to the sensor could damage the internal connections.
- Electrical currents in excess of 4 mA or voltages in excess of 0.4 VDC will increase the error band due to self-heating of the probe.
- Failure to observe the above cautions voids all warranties.

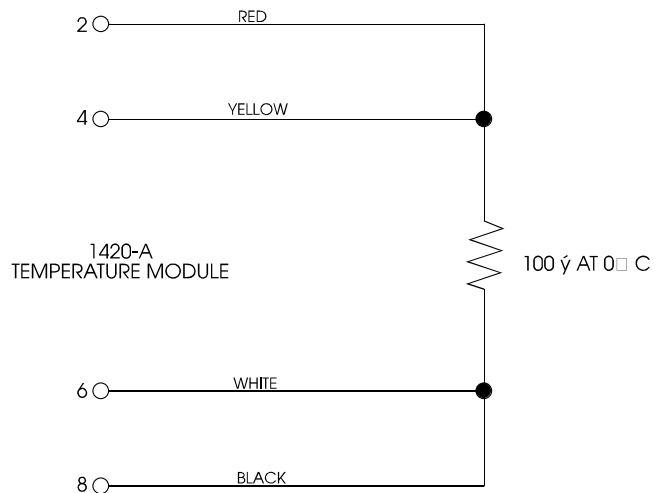
This instrument is thoroughly tested and fully calibrated at the factory and is ready for installation. Please refer to the return authorization card included in the packing box if damage has occurred. Also, notify All Weather Inc.

## Mounting

The temperature probe should be mounted in an area typical of the study being performed. The active area of the probe is the first 0.75" of the tip.

## Connection

A four-conductor cable is connected between the temperature sensor and the signal conditioning module. Connect the probe to the module using the diagram below as a reference.



**Figure 1**  
**4470-A to 1420-A**  
**Wiring Diagram**

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# Theory of Operation

The resistance of the platinum wire sensing element varies with temperature according to the calibration curve shown in **Figure 2**. The base resistance is 100 ohms at 0° C. The red and yellow wires are the active side of the probe, while the white and black wires form the return leads. The four leads are provided for convenience in nulling out the cable resistance in a bridge circuit.

Temperature °C	Resistance Ohms
-50	79.97
-40	84.00
-30	88.02
-20	92.03
-10	96.02
0	100.00
10	103.97
20	107.93
30	111.87
40	115.81
50	119.73
60	123.64
70	127.54
80	131.42
90	135.30
100	139.16

**Figure 2**  
**Temperature vs. Resistance**

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# Calibration

The sensor is calibrated by placing it in a precision calibration chamber equipped with a standardized temperature measuring system accurate to  $\pm 0.05^\circ$  C. The standard reading is compared to the sensor output resistance, measured by a precision bridge or a digital voltmeter traceable to the National Bureau of Standards. If the probe's output does not fall within the stated limits, it should be replaced.

A useful method for checking sensor calibration in the field is to compare the sensor to a known standard at ambient temperature and again while submerged in an ice bath.

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# Maintenance

No maintenance is normally required with this sensor other than a periodic calibration check. Should the sensor be in need of repair, return it to All Weather Inc. with a detailed written description of the problem.

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# Warranty

Unless specified otherwise, All Weather Inc. (the Company) warrants its products to be free from defects in material and workmanship under normal use and service for one year from date of shipment, subject to the following conditions:

- a. The obligation of the Company under this warranty is limited to repairing or replacing items or parts which have been returned to the Company and which upon examination are disclosed, to the Company's satisfaction, to have been defective in material or workmanship at time of manufacture.
- b. The claimant shall pay the cost of shipping any part or instrument to the Company. If the Company determines the part to be defective in material or workmanship, the Company shall prepay the cost of shipping the repaired instrument to the claimant. Under no circumstances will the Company reimburse claimant for cost incurred in removing and/or reinstalling replacement parts.
- c. This warranty shall not apply to any Company products which have been subjected to misuse, negligence, or accident.
- d. This warranty and the Company's obligation thereunder is in lieu of all other warranties, express or implied, including warranties of merchantability and fitness for a particular purpose, consequential damages, and all other obligations or liabilities.

No other person or organization is authorized to give any other warranty or to assume any additional obligation on the Company's behalf, unless made in writing and signed by an authorized officer of the Company.

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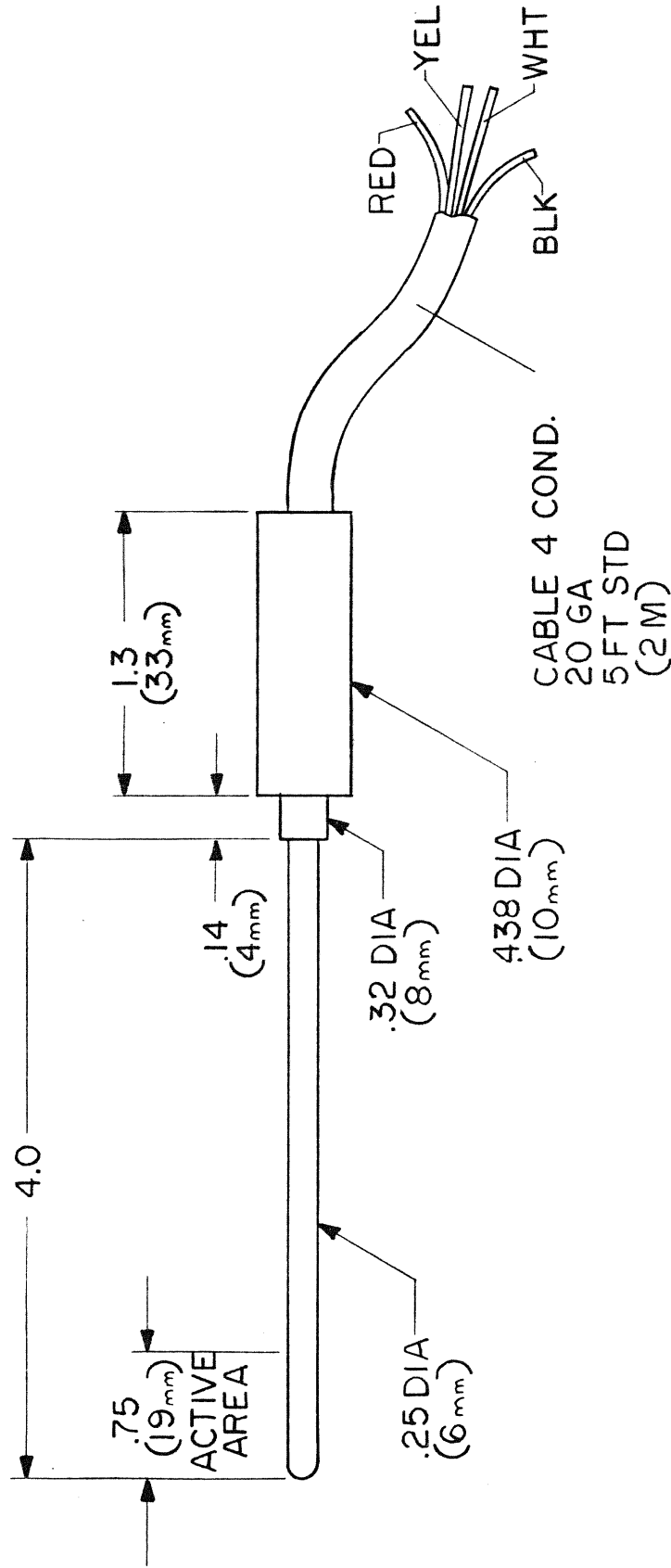
# Specifications

Range .....	-50 to +100° C
Sensitivity .....	See calibration curve ( <b>Figure 2</b> )
Absolute accuracy and interchangeability .....	±0.1° C
Time constant .....	15 seconds
Cable length .....	5 feet (2 meters)
Number of conductors .....	4
Active element size .....	0.75" of tip
Size .....	0.25" dia. x 6" L (6 mm dia. x 150 mm L)
Weight/Shipping .....	0.5 lbs./1 lb. (0.22 kg/0.45 kg)

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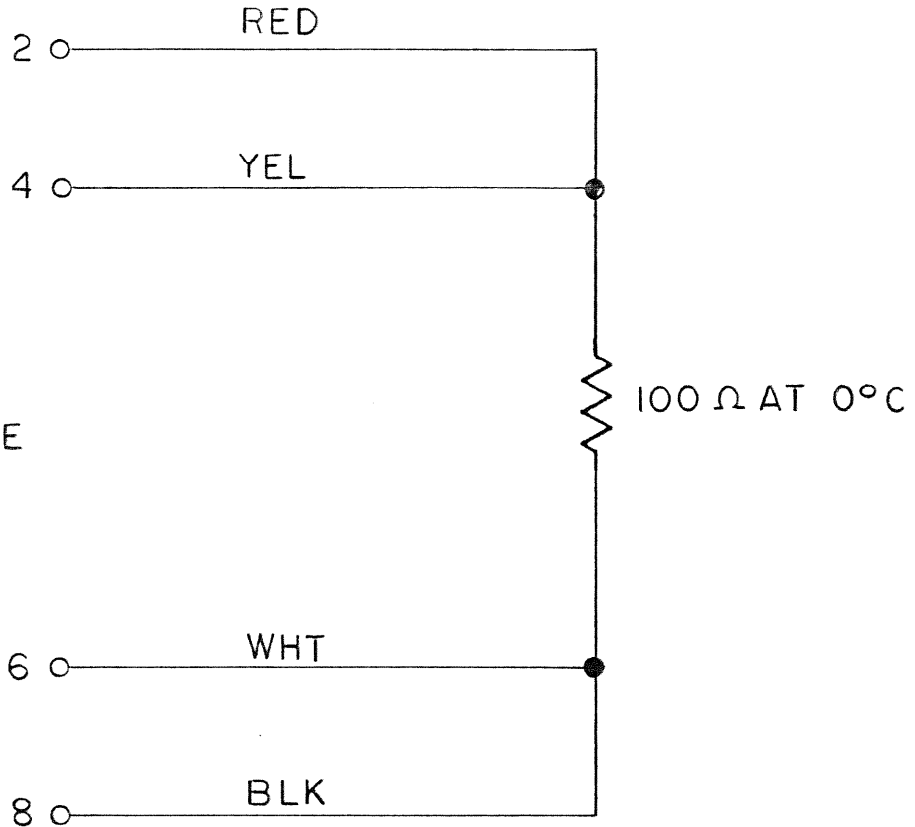
# Reference Drawings

The following pages include reference drawings to assist in installation and maintenance of this instrument.



<p>WEATHERMEASURE / WEATHERTRONICS Instruments and Systems Division 3213 Orange Grove Avenue Sacramento, California 95660 U.S.A.</p>		<p><b>QUALIMETRICS, Inc.</b></p>		<p>NOMENCLATURE OUTLINE PLATINUM TEMPERATURE PROBE</p>		<p>MOD. USAGE 4470</p>		<p>SHEET 1 OF 1</p>	
<p>TOLERANCES UNLESS OTHERWISE NOTED: XXX = ± .005 XX = ± .010 FRACTIONS = ± .02 ANGLES ± 1/2° CONCENTRICITY = .003 TIR</p>		<p>MATL</p>		<p>FINISH</p>		<p>BY GT</p>		<p>SCALE</p>	
REV	ECN	DATED	QTY	NEXT	ASM	ENGR	DT	DT	DT
<p>DWG NO. 4470-A05</p>		<p>DT 8-22-83</p>		<p>Ø</p>		<p>DT 8-22-83</p>		<p>DT 8-22-83</p>	

MOD 1420-A  
TEMP MODULE



REV	ECN	DATED	QTY	NEXT	ASM	<div style="border: 1px solid black; padding: 2px; display: inline-block;"> <b>QUALIMETRICS, Inc.</b> </div> <small>WEATHERMEASURE / WEATHERTRONICS Instruments and Systems Division 3213 Orange Grove Avenue Sacramento, California 95660 U.S.A</small>	
B		11-17-82				NOMENCLATURE SCHEMATIC PLATINUM TEMP PROBE	
						MOD. USAGE 4470-A	SHEET 1 OF 1
						BY GT	SCALE $\emptyset$ DWG NO. 4470-A04
						DT 11-82	



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4470-A01  
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