

Field Temperature Instrumentation

UCCE 2022 North Coast Frost Protection Master Class

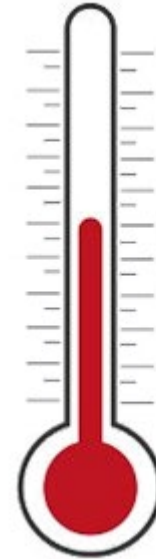
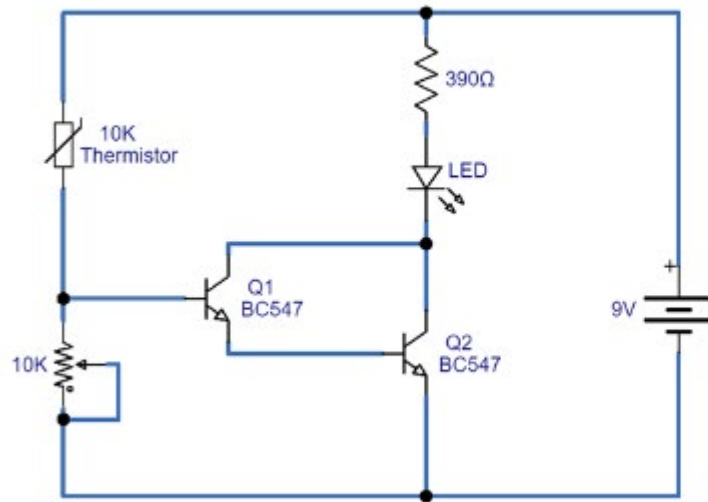
Terrence Jones, Director of Customer Support

Ranch Systems 2022



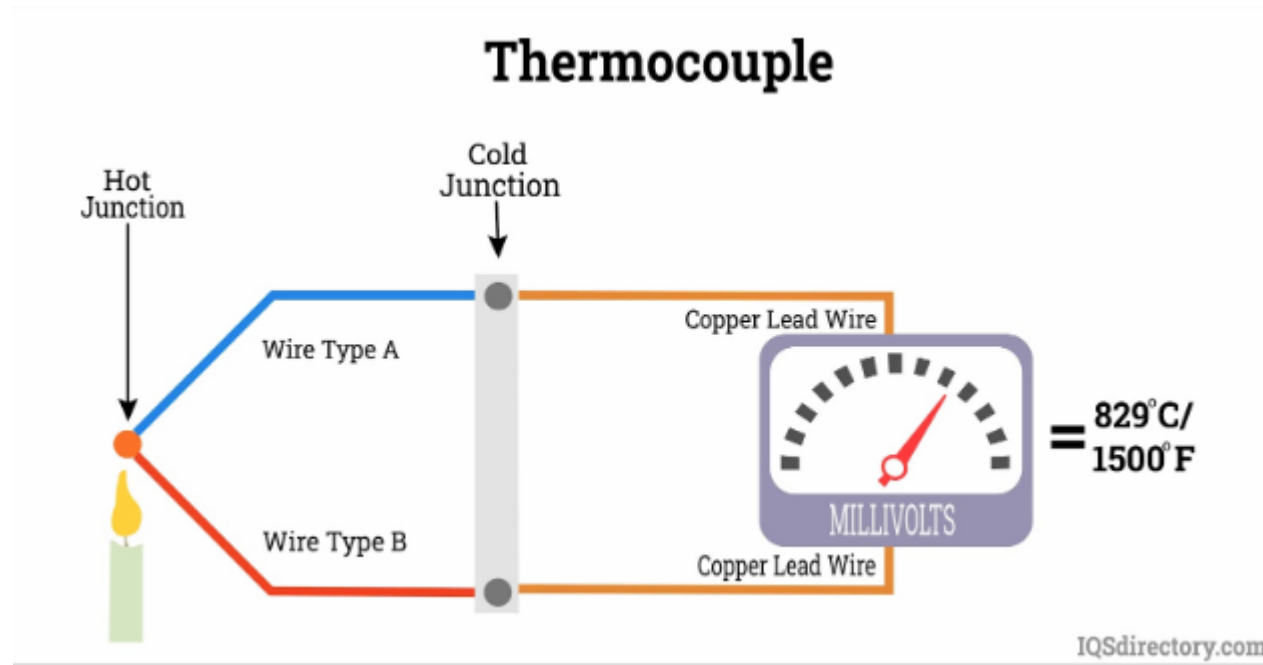
Air Temperature Measurement

- ▶ Sensor Types
 - ▶ Thermistor / RTD



Air Temperature Measurement

- ▶ Sensor Types
 - ▶ Thermocouple



Air Temperature Measurement

- ▶ Sensor Types
 - ▶ Digital



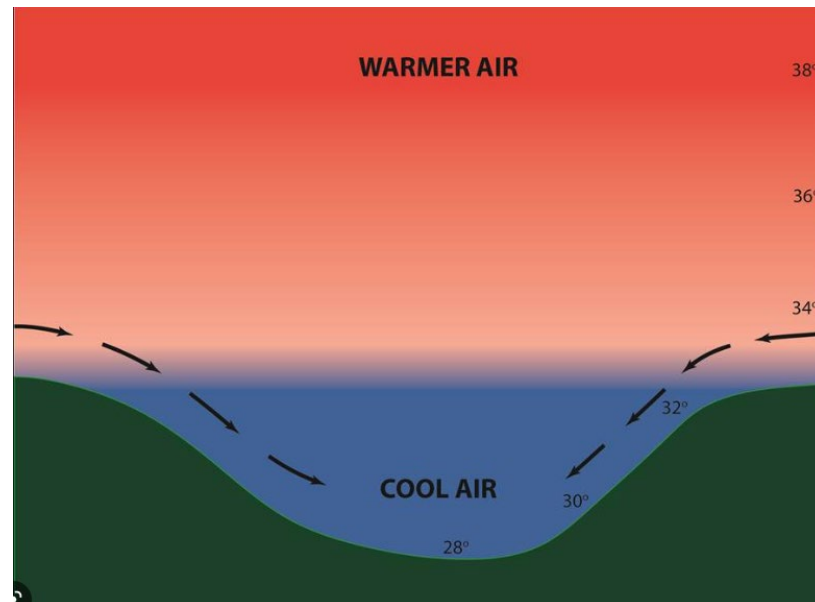
Air Temperature Measurement

- ▶ Transmitter
 - ▶ Interface for sensor which sets scale of data
 - ▶ Precision Resistor Circuit (Wheatstone Bridge)
 - ▶ ADC
 - ▶ Direct digital transmission



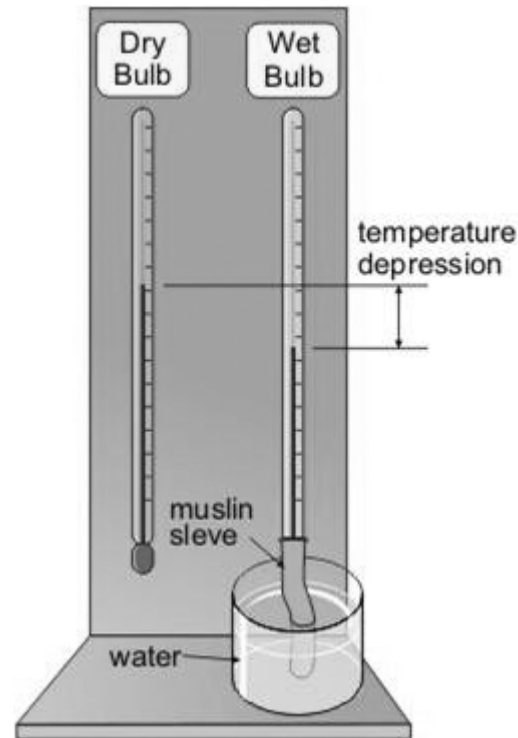
Air Temperature Measurement

- ▶ Physical Shielding – “Rad Shield”
- ▶ Measurement of multiple temperatures
 - ▶ Inversion layer



Temperature Data Analysis

- ▶ Calculated Values
 - ▶ Dewpoint
 - ▶ Wet Bulb



DBT	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
DBT	50%	55%	60%	65%	70%	75%	80%	85%	90%	95%
0°F	-10°F	-10°F	-12°F	-12°F	-13°F	-13°F	-14°F	-14°F	-15°F	-15°F
10°F	-5°F	-5°F	-7°F	-7°F	-8°F	-8°F	-9°F	-9°F	-10°F	-10°F
20°F	0°F	0°F	1°F	1°F	2°F	2°F	3°F	3°F	4°F	4°F
30°F	5°F	5°F	7°F	7°F	9°F	9°F	11°F	11°F	13°F	13°F
40°F	10°F	10°F	13°F	13°F	16°F	16°F	19°F	19°F	23°F	23°F
50°F	15°F	15°F	19°F	19°F	23°F	23°F	27°F	27°F	32°F	32°F
60°F	20°F	20°F	25°F	25°F	30°F	30°F	35°F	35°F	41°F	41°F
70°F	25°F	25°F	31°F	31°F	37°F	37°F	43°F	43°F	50°F	50°F
80°F	30°F	30°F	37°F	37°F	44°F	44°F	51°F	51°F	59°F	59°F
90°F	35°F	35°F	43°F	43°F	51°F	51°F	59°F	59°F	68°F	68°F
100°F	40°F	40°F	49°F	49°F	58°F	58°F	67°F	67°F	77°F	77°F
110°F	45°F	45°F	55°F	55°F	65°F	65°F	75°F	75°F	85°F	85°F
120°F	50°F	50°F	61°F	61°F	72°F	72°F	83°F	83°F	94°F	94°F
130°F	55°F	55°F	67°F	67°F	79°F	79°F	91°F	91°F	102°F	102°F
140°F	60°F	60°F	73°F	73°F	86°F	86°F	99°F	99°F	111°F	111°F
150°F	65°F	65°F	79°F	79°F	93°F	93°F	107°F	107°F	121°F	121°F
160°F	70°F	70°F	85°F	85°F	100°F	100°F	115°F	115°F	131°F	131°F
170°F	75°F	75°F	91°F	91°F	107°F	107°F	123°F	123°F	141°F	141°F
180°F	80°F	80°F	97°F	97°F	114°F	114°F	131°F	131°F	151°F	151°F
190°F	85°F	85°F	103°F	103°F	121°F	121°F	140°F	140°F	161°F	161°F
200°F	90°F	90°F	109°F	109°F	128°F	128°F	149°F	149°F	171°F	171°F

Temperature Data Analysis

- ▶ Custom Calculations
 - ▶ Virtual sensor
 - ▶ Temperature Models
 - ▶ Differential



Frost Mitigation Methods

- ▶ Frost Fans
 - ▶ Required Inversion layer
- ▶ Overhead Sprinklers
- ▶ Aircraft



Alerting those who take action

- ▶ Staff to operate mitigation method
- ▶ Phone call with Repeat
- ▶ Health Status & Overdue Alert



Q & A

Thank you