INSTRUCTION MANUAL

44212 and 44212EC Temperature Probes

December 2014

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Models 44212 and 44212EC Temperature Probes

1. Introduction

The Model 44212 (Air/Soil/Water) and 44212EC (Air) Temperature probes use thermistors to measure temperature. The probes contain a YSI 44212 thermilinear network.

The 44212 and 44212EC probes are designed to be housed in the 41303 six-plate Gill radiation shield or equivalent. The radiation shield is used to mount the 44212 and 44212EC probe and limit solar radiation loading. The 44212 temperature probe can be buried or submerged in water up to 50 feet (21psi).

A ten foot lead length is standard. Custom lead lengths are available up to 1000 feet. Do not extend the lead lengths by adding wire to the pigtail connection end, as measurement errors will result.

Any information specific to the 44212EC can be found in Appendix B.

2. Accuracy - Temperature Sensor

Refer to Appendix A for specifications of the YSI 44212 thermilinear network. Model 44212EC comes with a calibration record.

3. Installation and Wiring

The 44212 & 44212EC must be housed inside a radiation shield when used in the field for air temperature measurements. The 41303 radiation shield (see Figure 3-1) mounts to a CM6 or CM10 tripod. The CM200 series crossarms can be used to mount a 41303 with 44212 to a UT10, or UT30 tower (not shown).

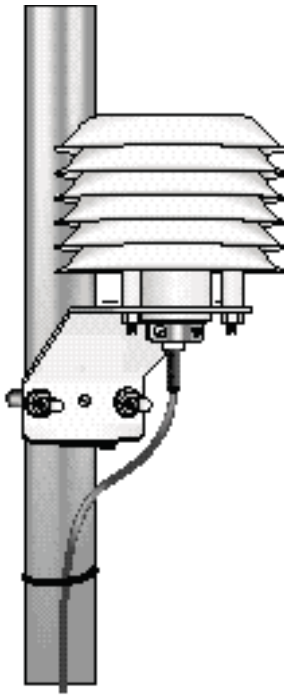

Figure 3-1. 44212/44212EC and 41303 Radiation Shield on a CM6/CM10 Tripod Mast

A cross section view of an on-site installed 44212 is shown in Figure 3-2. Water migrating down the cable may cause pooling around the sensor or erosion of the soil/sensor interface that will influence the temperature measurement. These effects can be minimized or removed by installing the sensing tip of the probe horizontally into the soil with a dew loop in the cable (see Figure 3-2).

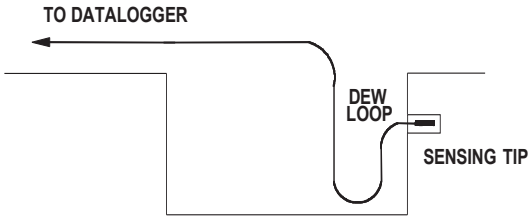

Figure 3-2. Installation of the 44212

Connections to the datalogger for the 44212 are shown in Figure 3-3. The probe requires one single ended analog input channel. The yellow signal lead can be inserted into any available single ended analog terminal. Please see Appendix B for wiring of the 44212EC.

Figure 3-3. 44212 Probe

44212 Datalogger Connections			
Description	Colour	CR23X/CR1000	CR10(X), CR510
Temperature	Yellow	Single-Ended Input	Single-Ended Input
Signal Reference	Purple	⏚	AG
Excitation	Black	Excitation Input	Excitation Input
Shield	Clear	⏚	AG

Table 3-1. 44212 Datalogger Connections
(See Appendix B for 44212EC connections)

The black thermistor excitation lead connects to any available excitation channel. The number of probes per excitation channel is physically limited by the number of lead wires that can be inserted into a single excitation terminal (approximately ten).

4. Programming

EXAMPLE 1. CR1000 example for 44212 and 44212EC Probes

This section is for users who write their own datalogger programs. The 44212 temperature signal is measured using a single-ended analog channel. The thermistor portion of the probe has a linear millivolt output over the -50 to +50 Celsius range. A multiplier of 178.75 and an offset of -72.789 provides output of temperature in Celsius.

```
'CR1000

'Declare Public Variables
Public Air_Temp

'Define Data Tables
DataTable (Table1,True,-1)
  DataInterval (0,60,Min,10)
  Average (1,Air_Temp,FP2,False)
EndTable

'\\\\\\\\\\\\\\\\\\\\\\\\\\\\ PROGRAM ////////////////////////////
BeginProg

  Scan(5,Sec, 3, 0)
    BrHalf(Air_Temp, 1, mV2500, 1, VX1, 1, 2500, False, 0, _60Hz, 178.75, -72.789)

'Call Data Table
Calltable (Table1)

  NextScan
EndProg
```

EXAMPLE 2. Sample CR10X Instruction for 44212 & 44212EC Probes

Program Instruction 4 is used to measure temperature.

Program Instruction 4 sets an excitation voltage for the thermistor bridge then makes a single ended voltage measurement. The thermistor portion of the probe has a linear millivolt output over the -50 to +50 Celsius range. A multiplier of 0.07154 and an offset of -72.789 provides output of temperature in Celsius.

Example 2 shows the use of Instruction 4.

```
1:  Excite, Delay, Volt (SE) (P4)
 1: 1        Reps
 2: 25       2500 mV 60 Hz Rejection Range;   CR510 (2500mV), CR23X (1000mV)
 3: 1   *    SE Channel; Yellow Wire (SE1), Purple Wire (AG)
 4: 1   *    Excite all reps w/Exchan 1
 5: 0        Delay (0.01 sec units)
 6: 2500     mV Excitation
 7: 1   *    Loc [ Air_Temp  ]
 8: 0.07154  Multiplier
 9: -72.789  Offset
```

* Proper entries will vary with program, datalogger channel and input location assignments.

5. Maintenance

The 44212 and 44212EC probes require minimal maintenance. Check to make sure the radiation shield is free from debris. For most applications it is unnecessary to calibrate either of the probes to eliminate the thermistor offset. However, for those users that are interested, the following briefly describes the procedure.

A single point calibration can be performed to determine the temperature offset (thermistor interchangeability). For example, the probe is placed in a calibration chamber that is at 0°C and the probe outputs 0.05°C. The offset would be –0.05 °C. This offset can be entered into datalogger measurement instruction.

Appendix A. Specifications

YSI Thermilinear Network Specifications

44212 and 44212EC	**Linear Range**	**Linearity Deviation**
	-50 to +50°C	±0.09°C
44212EC	**Materials**	**Dimension**
	Stainless steel	¼ inch diameter

YSI Components Used in 44212 and 44212EC Network

44020 Thermistor	**Maximum Operating Temperature**	**Accuracy and Interchangeability**
T_1=2,000 Ω @ 25°C	55°C (131°F)	±0.1°C
T_2=15,000 Ω @ 25°C		
T_3=45,000 Ω @ 25°C		

44312 Resistor Set	**Resistor Error**
R_1 = 23,100 Ω	±0.15°C @ -50°C, ±0.03°C @ +50°C
R_2 = 88,200 Ω	
R_3 = 38,000 Ω	

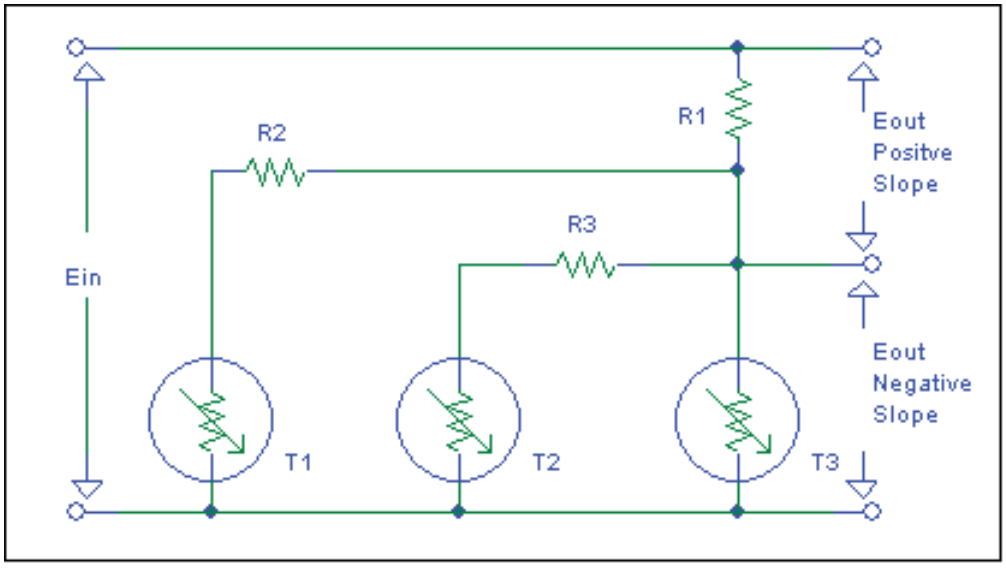

Figure A-1. YSI 44212 and 44212EC Thermilinear Network

Appendix B. 44212EC Wiring Diagram

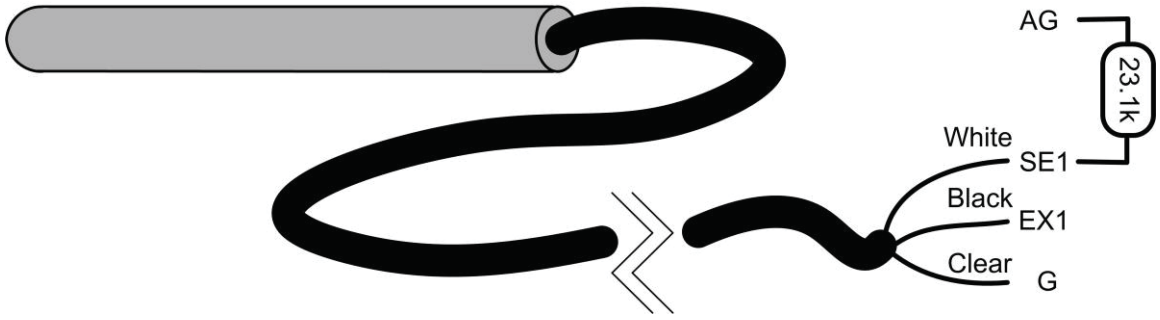

Figure B-1. 44212EC Wiring Diagram

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