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407123 CALIBRATION PROCEDURE

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Revision Log

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Initial	April 2006	All	Initial Release

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1.0. INTRODUCTION

1.1. Purpose

The purpose of this procedure is to provide detailed instructions on how to test and/or adjust Extech Instruments Model 407123.

1.2. Policy

This procedure will be used as a guideline for instructions needed to properly calibrate Extech Instruments Model 407123.

1.3. Scope / Field of Application

This procedure will be used by Extech Instruments Calibration Laboratory for detailed instructions on how to test and/or adjust Extech Instruments Model 407123.

1.4. Document Security

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1.5. Document References

- Model 407123 "Thermo-Anemometer with Hot Wire Sensor" Checking Procedure.
- 407123 Data Sheet – EICDS-407123.

1.6. Special Terms / Definitions

- National Institute of Standards and Technology (NIST) – Is the internationally recognized body in which all calibrations are traceable through.

2. REQUIRED EQUIPMENT

The following equipment will be needed to properly calibrate the instrument.

- (1) Calibrated Air Flow Anemometer (Model: TA-5) or equivalent.
- (1) Calibrated Vaisala Humidity / Temperature Meter (Model: MI70/HMP75) or equivalent.
- (1) Aerolab Open Circuit Wind Tunnel (Model: 01-02) or equivalent.
- (1) ETS Environmentally Controlled Chamber (Model: 518) or equivalent.
- (1) Calibrated Hewlett Packard Digital Multimeter (Model: 34401A) or equivalent.

3. 407123 ACCURACY TEST

3.1. Install six "AAA" batteries into the instrument.
3.2. Connect the probe to the input slot on the top of the instrument.

3.3. Place the TA-5's probe into the wind tunnel.
3.4. Power up the TA-5 and set it to read "m/s".
3.5. Adjust the wind tunnel until the TA-5 displays a value of 5.0m/s.
3.6. Remove the TA-5 from the wind tunnel, and place the probe of the 407123 in the wind tunnel.
3.7. Power up the 407123 and set it to "m/s".

NOTE: The 407123 should read 5.0 ± 0.5 m/s

3.8. Record the reading on the proper data sheet. (EICDS-407123)
3.9. For the remaining test points refer to the "Model 407123 – Checking Procedure" listed in Appendix: A.

NOTE: For instruments coming in under a RMA number, record all of the readings on the proper data sheet, even if they are not within the specified tolerance. If the instrument is new and out of the specified tolerances, proceed to Section: 4. There is no need to record "Out of Tolerance" conditions for new instruments.

3.10. If any of the readings were outside of the specified tolerances, proceed to Section: 4.
3.11. If all of the readings were within the specified tolerances, the instrument is now complete.

4. 407123 CALIBRATION ADJUSTMENTS

NOTE: To perform the following adjustments, the same equipment is required as indicated on Section: 2.0. To access the adjustment potentiometers, remove the four screws located on the back of the unit, then remove the front case.

4.1.0. Temperature Adjustment

4.1.1. Power up the 407123.
4.1.2. Place the probe of the 407123 inside the ETS Environmental Controlled Chamber.
4.1.3. Place the Vaisala HM70 probe inside the ETS Environmental Controlled Chamber.

NOTE: Allow the instrument to stabilize for approximately 30 minutes.

4.1.4. Adjust "VR2" until the 407123 displays the same value that the Vaisala HM70 reads.

4.2.0. 100mVDC Adjustment

4.2.1. Power up the 407123.
4.2.2. Set the 407123 to the m/s range.
4.2.3. Set the Agilent multimeter to the mVDC input range.
4.2.4. Measure the voltage by connecting the test leads to the "Center Port" and the "COM" on the "VR1" potentiometer.
4.2.5. Adjust the "VR1" potentiometer until the Agilent Multimeter displays a value of 100mVDC.

4.3.0. Zero Wind Speed Adjustment

4.3.1. Disconnect the probe from the 407123.
4.3.2. Turn off the 407123.
4.3.3. Press and hold the "C/F" key, then power on the 407123.

NOTE: The unit will now execute "mV" calibration process.

4.3.4. Connect the probe to the 407123, and slide the cover to the "UP" position.
4.3.5. Adjust "VR3" until the 407123 displays a value of 0.0 mV.
4.3.6. Turn the 407123 off.

4.4.0. Wind Speed Adjustment

4.4.1. Place the TA-5 in the wind tunnel.
4.4.2. Power up the TA-5 and set it to "m/s".
4.4.3. Power up the wind tunnel, and adjust the knob on it until the TA-5 displays a value of 10.00 m/s.
4.4.4. Remove the TA-5 from the wind tunnel.
4.4.5. Place the probe of the 407123 in the wind tunnel.
4.4.6. Adjust "VR4" until the 407123 displays a value of 10.0 m/s.

NOTE: After the adjustment has been made, proceed to Section: 3 to retest the instrument. Record the data from Section: 3 as the "Final Reading" of the instrument. If the instrument is new, record the data as the "Calibration Data".

Appendix: A

CHECKING PROCEDURE
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Model # 407123
Heavy Duty Thermo-Anemometer with Hot Wire Sensor

1.) VISUAL – Check for cosmetic problems, scratches, wrong or loose labels, etc.
2.) NOTE: DO NOT SEPARATE THE "VANE PROBE" FROM THE MAIN UNIT. THEY ARE CALIBRATED AS A UNIT.
3.) Insert 6ea AAA batteries and observe correct polarity.
4.) Power ON the unit and verify a display "self test", then a default setting of "0.0","m/s" and "°C".
5.) Press the "°C/°F" function and note the display changes to "°F".
6.) Press the "Unit" button once and note the display changes to "Km/h". Press again and note the display changes to "0" and "ft/min". Also note the following changes, "0.0" and "Knot", "mile/h" and finally back again to "m/s".
7.) Press the "RECORD" function and note the "REC" icon appears.
8.) Power ON an adjustable air velocity source and set the air velocity for a reading of 10.0 m/s. Allow the source to stabilize for a minimum of 5 minutes, then use a calibrated vane or hot wire type anemometer to verify the air flow is at 10.0m/s.
9.) Test the 407123 according to the tolerance listed below. (Turn off "REC" to change units)

STANDARD	TOLERANCE	ALLOWABLE
10.0 m/s air velocity	+/- (3%rdg+0.3m/s)	9.4 - 10.6
2000 ft/min air velocity	+/- (3%rdg+59ft/min)	1881 - 2119
35.0 mile/h air velocity	+/- (3%rdg+0.67MPH)	33.2 – 36.8
*optional		

10.) If "REC" was ON during the last test, press "RECALL" to view the "Max", and "Min" readings. If not, activate "REC" and check this function.
11.) Press the "HOLD" function and verify that the unit displays "D.H." and holds the last reading taken. Press "HOLD" again to return to normal operation.

12.) Test the 407123 temperature function according to the tolerance listed below.

STANDARD	TOLERANCE	ALLOWABLE
71.00 °F (ambient)	+/-0.8 °C or 1.5 °F	69.5 - 72.5
90.00 °F	+/-0.8 °C or 1.5 °F	88.5 - 91.5 *optional

13.) Power OFF the meter and re-pack the probe with the same meter and transfer to stock.