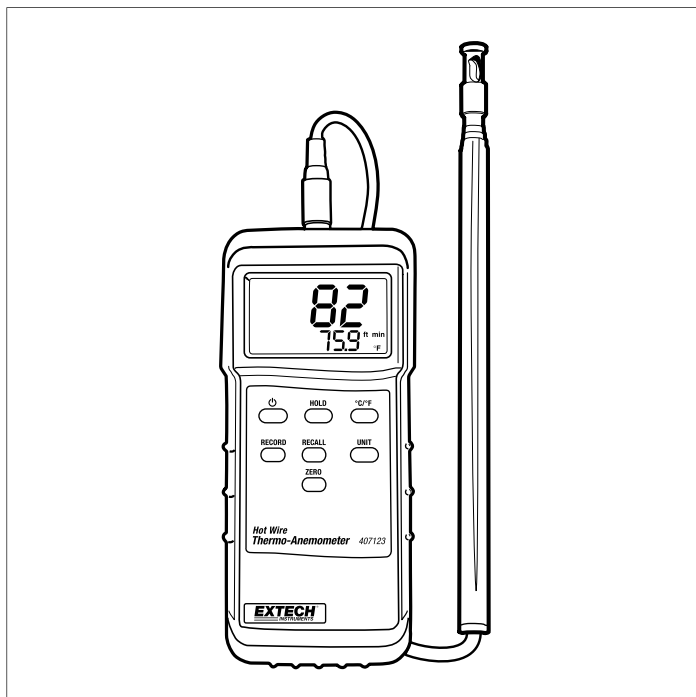# EXTECH®

USER MANUAL

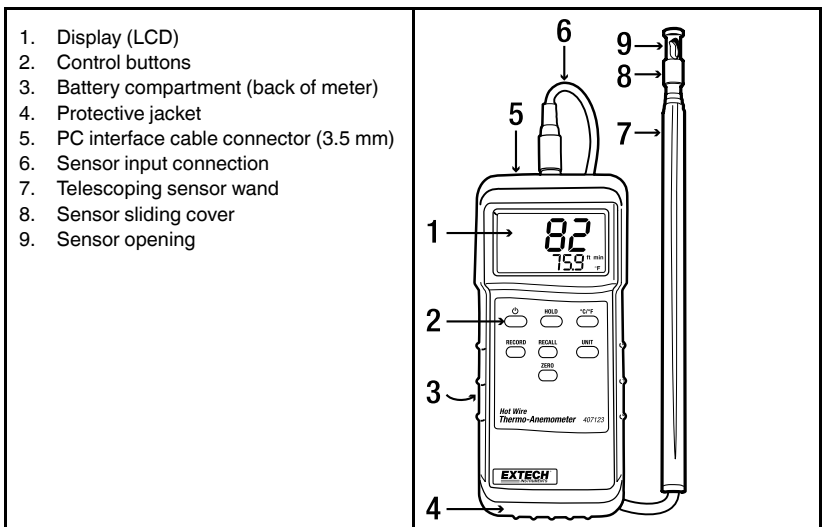## Hot Wire Thermo-Anemometer

MODEL 407123

Introduction

Congratulations on your purchase of the Extech Hot Wire Thermo-Anemometer. This instrument measures air velocity and temperature in airways such as ducts and vents. The sensors are mounted at the tip of the telescoping wand. A sliding cover is provided to protect the sensors when not in use.

The meter includes an RS-232 PC interface for use with the optional data acquisition software and cable kit. This meter is shipped fully tested and calibrated and, with proper use, will provide years of reliable service.
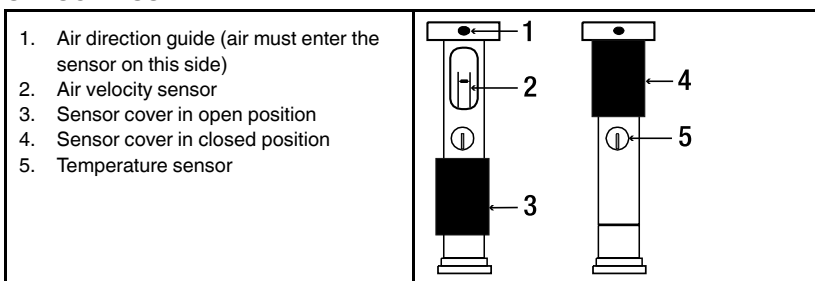
Description

METER

1. Display (LCD)
2. Control buttons
3. Battery compartment (back of meter)
4. Protective jacket
5. PC interface cable connector (3.5 mm)
6. Sensor input connection
7. Telescoping sensor wand
8. Sensor sliding cover
9. Sensor opening

CONTROL BUTTONS

⏻	Press to switch meter ON-OFF
HOLD	Press to freeze/unfreeze displayed readings
℃/℉	Press to toggle temperature units (℃/℉)
RECORD	Press to track minimum (MIN) and maximum readings (MAX). Press again to exit this mode.
RECALL	Press to recall MIN-MAX readings
UNIT	Press to scroll through air velocity units of measure
ZERO	Press to zero the display (with sensor cover closed)

SENSOR ASSEMBLY

1. Air direction guide (air must enter the sensor on this side)
2. Air velocity sensor
3. Sensor cover in open position
4. Sensor cover in closed position
5. Temperature sensor

Operation

GETTING STARTED

Keep the sensor protective cover in the **closed** position (slide the cover up), while performing all the steps in this section.

1. Connect the sensor plug to the jack at the top of the meter.
2. Press the power button to switch ON the meter. The meter will perform a self-test while the display counts down from **9** to **0**.
3. Select the temperature units with the °C/°F button.
4. Select the air velocity units with the UNIT button.
5. Open the telescoping wand to the desired length.
6. Place the sensor in the flow of air. Allow some time for the sensor to acclimate to the temperature of the air before performing the next step.
7. Press the ZERO button to null the displayed reading. Note that the display does not indicate negative numbers.

TAKING MEASUREMENTS

1. Slide the sensor cover down to expose the sensors.
2. Place the sensor in the air flow. The air must enter the sensor opening on the side of the sensor showing the air flow guide marking (see diagram).
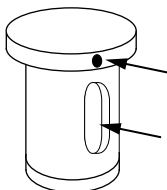
3. See diagram below. The upper display digits (1) indicate the air velocity reading. The lower digits (2), indicate the temperature reading. Air velocity (3) and temperature (4) units are shown to the right of the readings.
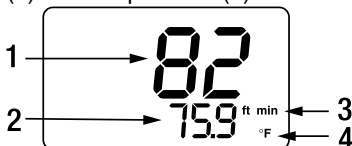
MINIMUM AND MAXIMUM READING MEMORY

The meter remembers the lowest (MIN) and highest (MAX) readings. These readings can be recalled at any time.

1. Press the RECORD button to start recording (**REC** will appear).
2. Take measurements.
3. Press the RECALL button to view the maximum reading (**MAX** will appear). Press again to view the minimum reading (**MIN** will appear).
4. Press the RECORD button to exit, clear the readings, and return to normal operation. The **MIN** and **MAX** icons will disappear.

DATA HOLD

To freeze a reading on the display, press the HOLD button (**DH** will appear). Press the HOLD button again to release the display (**DH** will disappear).

Calculating Air Volume

OVERVIEW

The volume of air flowing through a duct or vent can be calculated by measuring the area of the duct and multiplying the result by the measured linear air velocity.

MEASURING DUCT AREA

To measure the area of a rectangular or square duct, multiply the height by the width (H x W).

To measure the area of a circular duct, measure the radius (r), square the radius (r x r), and multiply by pi π (3.14). See diagrams below.

VOLUME CALCULATIONS

Cubic feet per minute (CFM) ft^3/min = air velocity (ft/min) x area (ft^2)

Cubic meters per minute (CMM) m^3/min = air velocity (m/s) x area (m^2) x 60

Note: Measurements made in centimeters or inches must be converted to meters or feet before using these calculations. Metric measurements must be multiplied by 60 to convert cubic meters per second to cubic meters per minute.

EXAMPLE 1: METRIC UNITS

In this example, the duct is 8 x 12 centimeters and the measured linear air velocity is 10 m/s.

1. Convert 8 x 12 centimeters to metres (divide by 100). 8 x 12 cm = 0.08 x 0.12 m
2. Multiply 0.08 x 0.12 to calculate the area in square metres (0.0096 m^2).
3. Multiply 0.0096 by the measured linear air velocity (10 m/s in this example) to calculate the volume in cubic meters per second (0.096 m^3/second).
4. Multiply 0.096 x 60 to calculate the air volume in cubic meters per minute = 5.72 m^3/minute.

EXAMPLE 2: IMPERIAL UNITS

In this example, the duct is 8 x 12 inches and the measured linear air velocity is 400 ft/min.

1. Convert 8 x 12 inches to feet (divide each dimension by 12). 8 x 12 in. = 0.66 x 1 ft.
2. Multiply 0.66 x 1 to calculate the area in square feet (0.66 ft^2).
3. Multiply 0.66 by the measured linear air velocity (400 ft/min in this example).
4. The volume of air (cubic feet per minute [CFM]) is 266.66 ft^3/minute.

CONVERSION TABLE

	m/s	ft/min	knots	km/hr	MPH
1 m/s	1	196.87	1.944	3.6	2.24
1 ft/min	0.00508	1	0.00987	0.01829	0.01138
1 knot	0.5144	101.27	1	1.8519	1.1523
1 km/hr	0.2778	54.69	0.54	1	0.6222
1 MPH	0.4464	87.89	0.8679	1.6071	1

PC Interface

To stream data from the meter to a PC, the optional **407001-USB** cable is required. The **407001-PRO** software is also required and can be downloaded from the link below. The software includes instructions for use.

www.flir.com/support-center/Instruments/extech-software-downloads/

Maintenance

BATTERY REPLACEMENT

When the low battery indicator (**LBT**) appears, or if the meter does not switch ON, replace the batteries.

1. Carefully remove the meter's protective rubber jacket by pulling and stretching it over and away from the meter housing. If the jacket is not removed, the battery compartment cannot be accessed.
2. Open the rear battery compartment by removing the compartment cover with a flat head screwdriver or coin.
3. Replace the six (6) 'AAA' 1.5 V batteries, observing correct polarity.
4. Replace the compartment cover and protective jacket before use.

Do not dispose of used batteries or rechargeable batteries in household waste.

CLEANING AND STORAGE

With the meter OFF, wipe the meter housing and telescoping wand with a lightly dampened cloth. A mild detergent may be used. Do not use solvents or abrasives. Do not allow moisture to enter the buttons, connectors, or battery compartment.

The sensor area should not need cleaning if its protective cover is closed after each use. If debris is caught in the sensor area, short bursts of compressed air can be used.

To store the meter, first remove the batteries and store them separately, and then place the meter in its original packaging or other protective case.

Specifications

GENERAL SPECIFICATIONS

Display	3.5 digit (1999 count) LCD
Display update rate	0.5 seconds (two updates per second)
Units of measure (air velocity)	m/s (meters per second), km/h (kilometers per hour), ft/min (feet per minute), knots (nautical miles per hour), MPH (miles per hour)
Units of measure (temperature)	℃/℉
Sensor types	Air velocity: Glass bead thermistor Temperature: Precision thermistor
Operating temperature	32 to 122℉ (0 to 50℃)
Operating humidity	80% maximum
Power supply	Six (6) 1.5 V 'AAA' batteries

Power consumption	30 mA DC, approximately
Dimensions	Meter: 7.1 x 2.8 x 1.3 in. (180 x 72 x 32 mm)
	Sensor: 0.5 in. (12 mm) diameter
	Telescoping wand: 7 ft. (2.1 m) maximum length with cable
Weight	0.78 lbs. (355 g) including batteries and probe

MEASUREMENT SPECIFICATIONS

MEASUREMENTS	RANGE/RESOLUTION	ACCURACY
Meters per second	0.2 to 20.0	± (3.0% rdg + 0.3 m/s) *
Kilometers per hour	0.7 to 72.0	± (3.0% rdg + 1.1 km/h) *
Feet per minute	40 to 3940	± (3.0% rdg + 59 ft/min) *
Miles per hour	0.5 to 45.0	± (3.0% rdg + 0.67 mph) *
Knots	0.4 to 38.8	± (3.0% rdg + 0.58 knots) *
Temperature	0.0 to 50.0℃ (32.0 to 122.0℉)	2.0℃ (3.6℉)

or ± (1.0% full scale + 3 digits), whichever is greater.

Customer Support

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