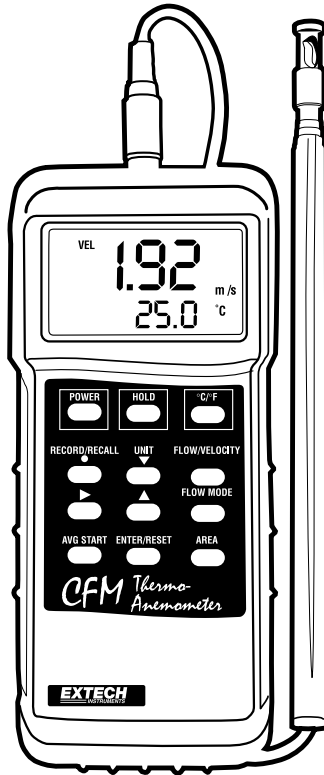


User's Guide



Heavy Duty Hot Wire CFM Thermo-Anemometer

Model 407119



Warranty

EXTECH INSTRUMENTS CORPORATION warrants this instrument to be free of defects in parts and workmanship for three years from date of shipment (a six month limited warranty applies on sensors and cables). If it should become necessary to return the instrument for service during or beyond the warranty period, contact the Customer Service Department at (781) 890-7440 ext. 210 for authorization or visit our website at www.extech.com (click on 'Contact Extech' and go to 'Service Department' to request an RA number). A Return Authorization (RA) number must be issued before any product is returned to Extech. The sender is responsible for shipping charges, freight, insurance and proper packaging to prevent damage in transit. This warranty does not apply to defects resulting from action of the user such as misuse, improper wiring, operation outside of specification, improper maintenance or repair, or unauthorized modification. Extech specifically disclaims any implied warranties or merchantability or fitness for a specific purpose and will not be liable for any direct, indirect, incidental or consequential damages. Extech's total liability is limited to repair or replacement of the product. The warranty set forth above is inclusive and no other warranty, whether written or oral, is expressed or implied.

Introduction

Congratulations on your purchase of the Extech 407119 Thermo-Anemometer. The 407119 utilizes a telescoping antenna with built-in air velocity and temperature measurement transducers. CFM (cubic feet per minute) measurements are displayed after manually entering the area of the duct and then taking an air velocity measurement. The 407119 includes a MIN/MAX display and a 20-point averaging feature. Careful use of this meter will provide years of reliable service.

Specifications

General Specifications

Display	Dual function 4-digit LCD
Measurement units	Air Velocity: m/s, km/h, ft/min, knots, mph; Air Flow: CMM (m ³ /min) and CFM (ft ³ /min);Temp: °C and °F
Data hold	Freezes displayed reading
Sampling rate	1 second approx.
Sensors	Air velocity sensor: Glass bead thermistor Temperature sensor: Thermistor
MAX/MIN Memory	Record and view Maximum and Minimum readings
Automatic Power off	Auto shut off after 15 minutes
Data Output	RS-232 PC serial interface with 16-bit data stream output
Operating Temperature	Meter: 32 to 122°F (0 to 50°C); Sensor: 32 to 176°F (0 to 80°C)
Operating Humidity	Max. 80% Relative Humidity
Power Supply	Six (6) 'AAA' 1.5V batteries
Power Current	Approx. DC 30mA
Weight (meter only)	0.78 lbs. (355g)
Dimensions	Main instrument: 7.1 x 2.8 x1.3" (180 x 72 x 33mm) Telescoping Sensor: 0.5" (12.7mm) diameter head; 37" (.94m) maximum antenna length with 78" (2m) cable

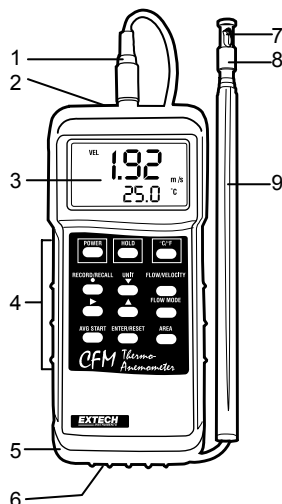
Range Specifications

Air Velocity	Range	Resolution	Accuracy (%reading + digits)
m/s (meters per second)	0.20 – 9.99 m/s	0.01	$\pm(5\% + x^*)$ or $\pm 1\%$ full scale whichever is greater *Where x = m/s (0.1) km/h (0.1) mph (0.1) knots (0.1) ft/min (10)
	10.0 to 20.0 m/s	0.1	
km/h (kilometers per hour)	0.7 – 72.0 km/h	0.1	
ft/min (feet per minute)	40 – 3940 ft/min	1	
mph (miles per hour)	0.5 – 44.7 mph	0.1	
knots (nautical miles per hour)	0.4 to 38.8 knots	0.1	
Air Flow Measurements	Range	Resolution	Area
CMM (cubic meters per minute)	0 - 999,900 m ³ /min	0.001 to 100	0 to 9,999m ²
CFM (cubic feet per minute)	0 - 999,900 ft ³ /min	0.001 to 100	0 to 9,999ft ²
Air Temperature	Range	Resolution	Accuracy
	32 to 176°F (0 to 80°C)	0.1°F/C	$\pm 1.5^\circ\text{F}$ (0.8°C)

Meter Description

1. Sensor input
2. RS-232 PC interface jack
3. LCD Display
4. Keypad
5. Rubber protective holster
6. Battery compartment (rear)
7. Air Velocity Sensor
8. Sliding sensor cover
9. Telescoping antenna

Note: To access the rear battery compartment first remove the meter's rubber protective holster.

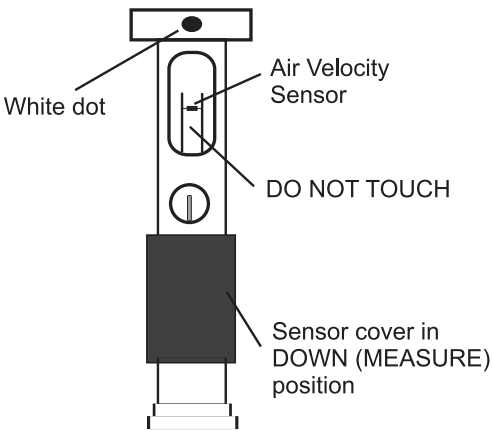


Operation

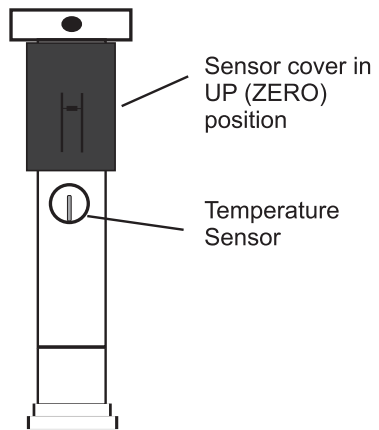
Initialization and Zero

The meter should always be zeroed at temperature before use. Do not rely on a zero display. The meter does not display negative numbers.

1. Connect the sensor to the input jack on top of the meter.
2. Turn on the meter using the Power button. The meter will perform a self-test during which the display will count down from 9999 to 0000.
3. Select the VELOCITY function using the FLOW/VELOCITY button. The LCD will display VEL when the velocity mode is selected.
4. Select the desired temperature units using the C/F select button. The LCD will reflect the selection.
5. Select the desired air velocity units using the UNIT button. The LCD will reflect the selection.
6. Place the sensor cover in the UP (ZERO) position.
7. Place the sensor in the area to be measured and allow a short time for it to reach temperature.
8. Press the ENTER/RESET button to zero the meter.



Measurement Position



Zero Position

Air Velocity Measurements

1. Open the antenna to the desired length.
2. Slide the air velocity sensor cover down.
3. Place the sensor in the air current to be measured. Have the air flow meet the sensor head in the direction of the white dot on the sensor head.
4. View the air velocity and temperature readings on the LCD Display. The large main LCD display shows the Air Velocity reading. The lower LCD sub-display shows the temperature reading.



Air Flow Measurements (CMM / CFM)

NOTE: Temperature is not displayed in the FLOW mode.

1. Perform the Initialization and Zero described earlier.
2. Select the FLOW mode using the FLOW/VELOCITY button. The LCD will display FLOW when the flow function has been selected.
3. Select the desired air flow units: CMM (cubic meters per minute) or CFM (cubic feet per minute) using the UNIT button. The LCD will reflect the selection.
4. Calculate the area of the duct or vent in square feet (not inches) or meters.
5. Press the AREA button to begin entering the area in m^2 or ft^2 . The left digit will begin flashing.
Use the ► button to select the digit to set.
Use the ▲ button increase the value of the flashing digit
Use the ▼ button to decrease the value of the flashing digit
Use the ● RECORD/RECALL button to set the decimal point.
Press the ENTER/RESET button to save the area.
When the area has been entered, the bottom display will indicate the area entered in ft^2 or m^2 .
6. Insert the probe into the area to be measured and the display will display the airflow. The main LCD displays the air flow in CFM or CMM.

Flow Modes

For air flow measurements, three modes apply: Press the FLOW MODE button to select one of the modes

NORMAL MODE, default mode, where the actual flow is indicated.

2/3V MAX MODE: LCD displays 2/3 the measured value.

AVG MODE: Up to 20 readings can be taken separately and averaged. Select the AVG mode via the FLOW MODE button and then press the AVG START button to take a reading. Up to 20 readings can be taken and averaged. The lower LCD display provides a 1 to 20 counter that increments each time a reading is taken. The main LCD displays the averaged air flow.

Data Hold Feature

1. While taking measurements, press the HOLD button to freeze a reading.
2. The HOLD indicator will appear on the LCD when the display is in Data Hold mode.
3. Press HOLD again to return to normal operation.

Maximum and Minimum Recording

The RECORD/RECALL feature allows the user to record and view the highest (MAX) and lowest (MIN) readings.

1. Press the RECORD/RECALL button once. The REC indicator will appear on the display and the meter will begin keeping track of the MAX and MIN values.
2. To view the MAX reading, press RECORD/RECALL again. The MAX indicator along with the maximum reading will appear on the LCD display.
3. Press RECORD/RECALL again to view the minimum value, the MIN indicator along with the minimum reading will appear on the LCD display.
4. To return to normal operation, press and hold the RECORD/RECALL button for approx. 3 seconds. The display indicators REC, MAX, and MIN will disappear.

Note: Auto Power Off is disabled in the RECORD mode.

Auto Power Off

To save battery life, the meter will automatically shut off after approximately 15 minutes of operation. To disable this feature, press the RECORD/RECALL button and enter the RECORD mode.

PC Interface

The 407119 is equipped with a 3.5mm jack (meter top) for connection to a PC for data acquisition purposes. To obtain PC interface cabling and Windows™ data acquisition software, contact Extech Instruments. Instructions for use are provided with the optional data acquisition kits.

Battery Replacement

When the **LBT** icon appears on the LCD, the 9V battery must be replaced.

1. Remove the rubber holster that surrounds the entire meter
2. Slide off the rear battery compartment
3. Replace the 9V battery
4. Affix the battery compartment cover and the meter holster

Calibration and Repair Services

Extech offers repair and calibration services for the products we sell. Extech also provides NIST certification for most products. Call the Customer Service Department for information on calibration services available for this product. Extech recommends that annual calibrations be performed to verify meter performance and accuracy.

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Support Hotline (781) 890-7440

Tech support: Ext. 200; Email: support@extech.com

Repair>Returns: Ext. 210; Email: repair@extech.com

Website: www.extech.com

Useful Equations and Conversions

Area equation for rectangular or square ducts

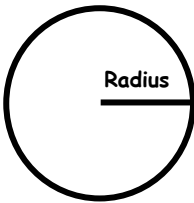


Height (H)

Width (W)

$$\text{Area (A)} = \text{Width (W)} \times \text{Height (H)}$$

Area equation for circular ducts



$$\text{Area (A)} = \pi \times r^2$$

Where $\pi = 3.14$ and $r^2 = \text{radius} \times \text{radius}$

Cubic equations

$$\text{CFM (ft}^3/\text{min)} = \text{Air Velocity (ft/min)} \times \text{Area (ft}^2\text{)}$$

$$\text{CMM (m}^3/\text{min)} = \text{Air Velocity (m/sec)} \times \text{Area (m}^2\text{)} \times 60$$

NOTE: Measurements made in *inches* must be converted to *feet* or *meters* before using the above formulae.

Unit of Measure Conversion Table

	m/s	ft/min	knots	km/h	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/h	0.2778	54.69	0.54	1	0.6222
1 MPH	0.4464	87.89	0.8679	1.6071	1