EXTECH® INSTRUMENTS

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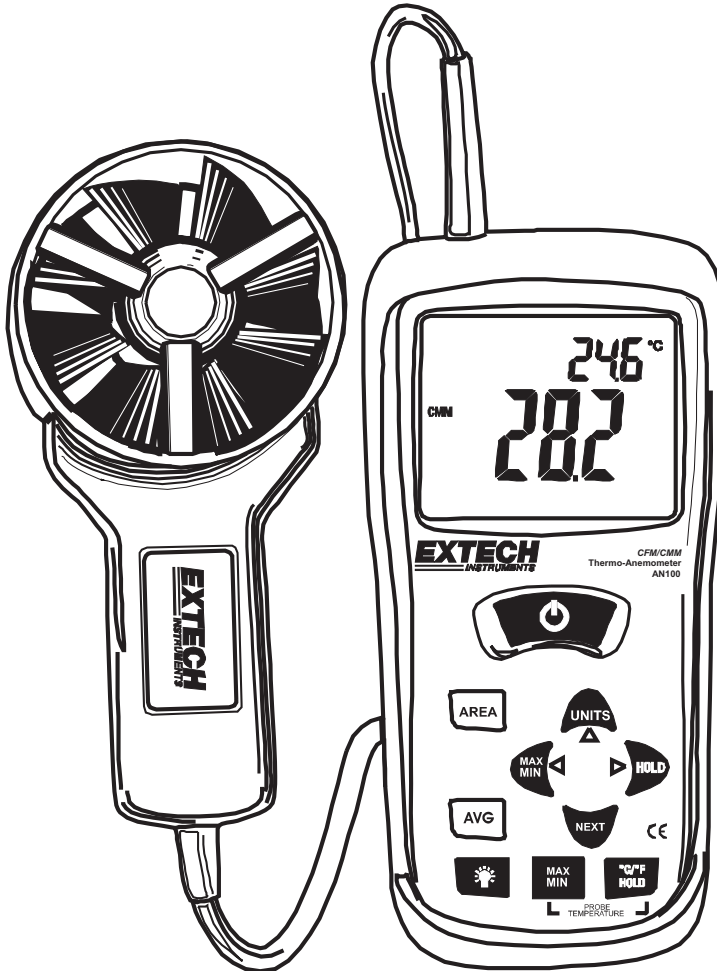
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CFM/CMM Thermo Anemometer

Model AN100

Introduction

Congratulations on your purchase of the Extech AN100 CFM/CMM Thermo Anemometer. This instrument measures Air Velocity, Air Flow (volume) and Temperature. The large, easy-to-read backlit LCD includes primary and secondary displays plus numerous status indicators. The meter is shipped fully tested and calibrated and with proper use will provide years of reliable service.

Descriptions
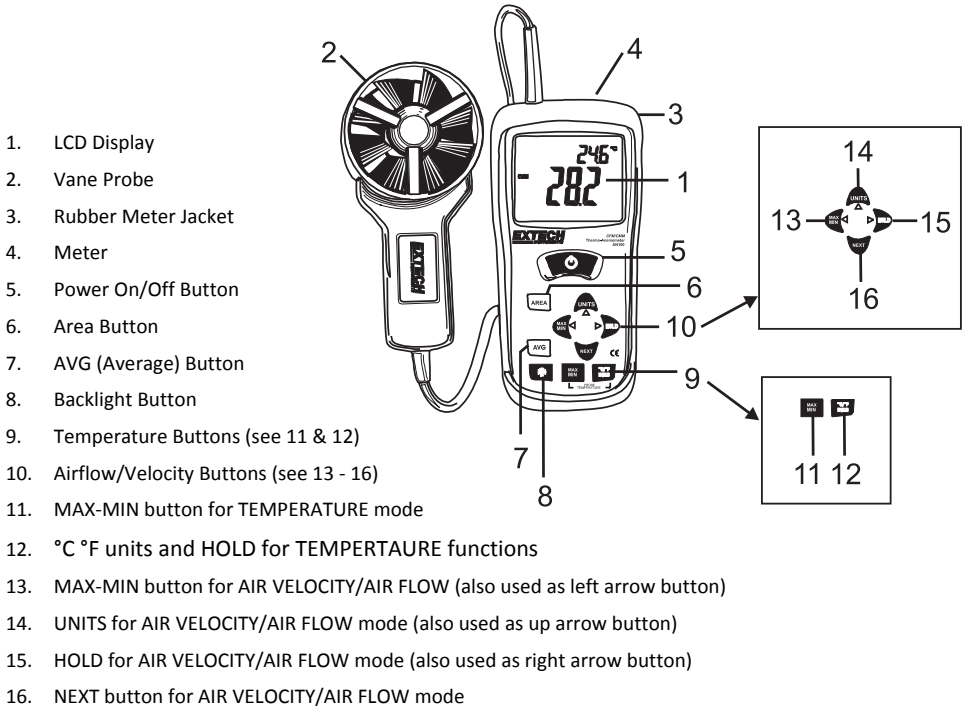
1. LCD Display
2. Vane Probe
3. Rubber Meter Jacket
4. Meter
5. Power On/Off Button
6. Area Button
7. AVG (Average) Button
8. Backlight Button
9. Temperature Buttons (see 11 & 12)
10. Airflow/Velocity Buttons (see 13 - 16)
11. MAX-MIN button for TEMPERATURE mode
12. °C °F units and HOLD for TEMPERTAURE functions
13. MAX-MIN button for AIR VELOCITY/AIR FLOW (also used as left arrow button)
14. UNITS for AIR VELOCITY/AIR FLOW mode (also used as up arrow button)
15. HOLD for AIR VELOCITY/AIR FLOW mode (also used as right arrow button)
16. NEXT button for AIR VELOCITY/AIR FLOW mode

- See next section for additional keypad description information.
- Battery compartment is located on rear of instrument, rubber meter jacket must be removed to access battery compartment

Keypad

- **AUTO POWER OFF** ⏻ Press to turn the meter ON or OFF
- **MAX/MIN** (for Airflow/Air Velocity) Used to record and store the highest, lowest and average airflow or velocity readings.

   ◄ (LEFT) also serves as change decimal point button in AREA mode

- **UNITS** Press to select the mode of operation. In FLOW mode, the meter displays air *volume*. In VELOCITY mode, the meter displays air *speed*.

   ▲ (UP) also serves as increase number button in AREA mode.

- **AVG** Used to Average multiple readings in FLOW or VELOCITY mode. Up to 20 readings can be averaged.
- **HOLD** Press to freeze the displayed reading. Press again to unlock display. This button also functions as the ►RIGHT scroll button in AREA mode and RECALL mode.
- **AREA** Press and hold to manually enter the area of a duct in CFM or CMM mode
- **NEXT** In AREA mode, used to select memory locations 1-8.
- ☼ Press to turn the backlight on/off
- **MAX/MIN (Temperature)** 🔲 Used to record and store the highest, lowest readings for air temperature.
- **°C °F HOLD (Temperature)** Press to freeze the displayed temperature reading. Press again to unlock the display. Press and hold for 3 seconds to switch between °C and °F. Meter will beep twice to indicate change.

The Battery compartment is located on the back of the instrument. The rubber protective jacket must be removed from the meter to access the compartment.

Display
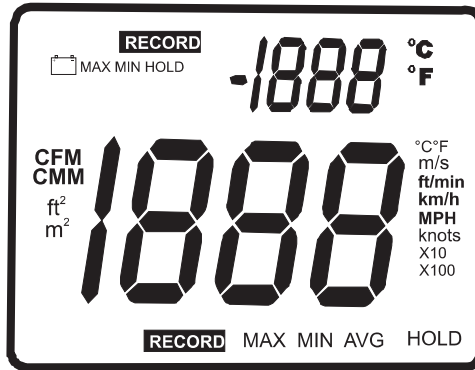
- **MAX** (top of LCD): Max Hold function engaged for the Air Temperature function
- **HOLD** (top of LCD): Data Hold function engaged for the Air Temperature function
- **VEL**: indicates that meter is in air velocity mode
- **FLOW**: indicates that meter is in air flow mode
- **MAX** (bottom of LCD): Max Hold for the IR Temperature and RH function
- **HOLD** (bottom of LCD): Data Hold for the IR Temperature function and RH function
- **^oC / ^oF**: Temperature units of measure
- **CFM/CMM**: airflow units of measure
- **Ft^2, m^2**: units for area dimensions
- **m/s, ft/min, km/h, MPH, knots:** air velocity units of measure
- **X10, X100:** multipliers for air flow readings
- **AVG:** air averaging mode
- **RECORD:** indicates that min/max function is running (top for temp, bottom for air)
- Large LCD digits at center of display for Relative Humidity and IR Temperature
- Smaller LCD digits at top, right of display for Probe Temperature
- ☐ : Low battery indicator

Operation

Connecting the Vane

1. The vane plug is inserted in the meter's sensor jack at the top of the meter. The plug and jack are keyed so that the plug can only fit in the jack one way.

2. Turn the plug carefully until it lines up with the jack and then firmly push the plug in place. Do not apply undue force or try to twist the plug side-to-side.

3. If the vane is not connected to the meter or if the sensor is defective, the LCD display will indicate **OL** in place of a Temperature reading.

Air Velocity Measurements (Single Point)

Side view of Vane

1. Turn on the meter using the ON/OFF ⏻ button.

2. Press **UNITS** button to select the desired unit of measure. **NOTE:** At power up the meter will display the last unit of measure previously entered.

Arrow

3. Place the sensor in the air stream. Ensure that the air enters the vane as indicated by the arrow sticker placed inside the vane.

airflow

4. View the readings on the LCD Display. The large main LCD display shows the Air Velocity reading. The upper right LCD sub-display shows the temperature reading.
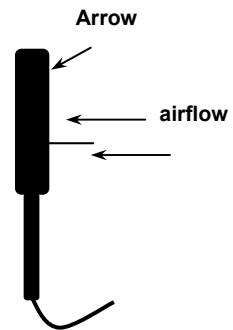
Air Velocity Averaging Mode

1. To enter 20 Point Averaging Mode, press and hold the **AVG** button until it beeps twice. The **AVG** icon will be displayed.

2. Take a measurement and press the **AVG** button. A single beep will sound and the **HOLD** icon will appear in the display.

3. The average reading will be displayed and number of readings measured will appear in the upper right hand corner of the display. After 5 seconds, the display will return to the current reading.

4. Repeat steps 2 - 3 until the desired number of points have been measured.

5. To return to standard velocity measuring mode press and hold **AVG** button until meter beeps twice.

Note: In the standard velocity measuring mode, press the **AVG** button once to recall the previous average. The average will be cleared when you enter the Averaging Mode again.

Air Flow Measurements (CMM / CFM)

1. Turn on the meter using the ⏻ ON/OFF button

2. Press the **UNITS** button to select the desired air flow units: CMM (cubic meters per minute) or CFM (cubic feet per minute). **NOTE:** At power up the meter will display the last unit of measure previously entered.

3. To begin entering the area in m^2 or ft^2, press and hold the **AREA** button until it beeps twice. The leftmost digit of the bottom display will begin to flash.

4. Use the ▲ (UP) button to change the flashing digit

   Use the ◄ (LEFT) button to move the decimal

   Use ► (RIGHT) button to select the other digits.

   After all of the digits are entered, press and hold the **AREA** button (until meter beeps twice) to save the area into memory and return to CFM or CMM measuring mode.

5. Place the sensor in the air stream. Ensure that the air enters the vane as indicated by the arrow sticker placed inside the vane. Refer to the diagram. The large main LCD display shows the Air Velocity reading. The upper right LCD sub-display shows the temperature reading.
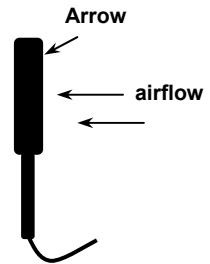
The meter has 16 memory locations (8 for CFM and 8 for CMM) that can be used to store commonly used area sizes that you can recall at anytime.

1. Press the **AREA** button until meter beeps twice. A memory location number will appear in the top right of the display indicating the memory location.

2. Push the **NEXT** button to scroll thru and select the desired location. Once you have selected the desired memory location enter your dimension

   Use the ▲ (UP) button to change the flashing digit

   Use the ◄ (LEFT) button to move the decimal

   Use ► (RIGHT) button to select the other digits. After all of the digits are entered, press and hold the **AREA** button (until it beeps twice) to save the area into memory and return to CFM or CMM measuring mode.

To select and use a previously stored dimension, press and hold the **AREA** button until it beeps twice.

Press **NEXT** to scroll thru the 8 memory locations. Press and hold the **AREA** button until it beeps twice to return to CFM or CMM measuring mode.

Side view of Vane

Arrow

airflow

Air Flow Averaging Mode

1. To enter 20 Point Averaging Mode, press and hold the **AVG** button until it beeps twice. The **AVG** icon will be displayed.

2. Take a measurement and press the **AVG** button. A single beep will sound and the **HOLD** icon will appear in the display.

3. The average reading will be displayed and number of readings measured will appear in the upper right hand corner of the display. After 5 seconds, the display will return to the current reading.

4. Repeat steps 2 - 3 until the desired number of points have been measured.

5. To return to standard airflow measuring mode press and hold **AVG** button until meter beeps twice.

Note: In the standard velocity measuring mode, press the **AVG** button once to recall the previous average. The average will be cleared when you enter the Averaging Mode again.

Data Hold (Air Velocity/Air Flow)

1. While taking measurements, press the **HOLD** button to freeze the air velocity/air flow reading.

2. The **HOLD** indicator will appear in the bottom of the LCD display.

3. Press **HOLD** again to return to normal operation.

MAX/MIN/AVG Record (Air Velocity/Air Flow)

This allows the user to record and view the highest (MAX), lowest (MIN) and average (AVG) readings.

1. Press the Airflow/Velocity **MAX/MIN** button. The **MAX** indicator and **RECORD** indicator along with the Max reading will appear on the LCD display and the meter will begin keeping track of the MAX, MIN and Average values.

2. Press the **MAX/MIN** button again to view the minimum reading. The **MIN** indicator along with the minimum reading will appear on the LCD display.

3. Press the **MAX/MIN** button again to view the average reading. The AVG indicator along with the average reading will appear on the LCD display.

4. Press the **MAX/MIN** button again to display current readings. **NOTE:** the meter will keep recording MAX/MIN/AVG readings.

5. To clear and stop MAX/MIN/AVG recording and return to normal operation, press and hold the **MAX/MIN** button until the meter beeps twice.

Automatic Power OFF

The meter automatically turns off after 20 minutes. To defeat this feature:

1. Turn the meter OFF.

2. Press and hold the ☼(Backlight) key while turning the meter ON.

3. "dis APO" will appear in the display. The AUTO POWER OFF feature will now be disabled.

4. Note that AUTO POWER OFF is re-enabled each time the meter is turned on.

5. Also note that AUTO POWER OFF is disabled in CFM/CMM or Average mode.

Battery Replacement

When ⊡ appears on the LCD, the 9V battery must be replaced.

1. Disconnect the sensor.
2. Remove the meter's rubber protective jacket
3. Use a Phillips screwdriver to open the rear battery compartment
4. Replace the 9V battery
5. Close the battery compartment and replace the meter's protective jacket

Battery Safety Reminders

- o Please dispose of batteries responsibly; observe local, state, and federal regulations.
- o Never dispose of batteries in a fire; batteries may explode or leak.
- o Never mix battery types; install new batteries of the same type.

WARNING: To avoid electric shock, do not operate the meter until the battery cover is in place and fastened securely.

Specifications

Air Velocity	Range	Resolution	Accuracy (% of reading)
m/s (meters per sec)	0.40 - 30.00 m/s	0.01 m/s	± (3%rdg + 0.20 m/s)
km/h (kilometers/hour)	1.4 - 108.0 km/h	0.1 km/h	± (3%rdg + 0.8 km/hr)
ft/min (feet per minute)	80 – 5900 ft/min	1 ft/min	± (3%rdg + 40 ft/m)
mph (miles per hour)	0.9 – 67.0 mph	0.1 mph	± (3%rdg + 0.4 MPH)
knots (nautical MPH)	0.8 to 58.0 knots	0.1 knots	± (3%rdg + 0.4 knots)
Air Flow	**Range**	**Resolution**	**Area**
CMM (cubic meters/min)	0-9999 m^3/min	1	0 to $9.999m^2$
CFM (cubic ft/min)	0-9999 ft^3/min	1	0 to $9.999ft^2$
Air Temperature	**Range**	**Resolution**	**Accuracy**
	14 - 140^oF (-10 - 60^oC)	$0.1^oF/C$	$±4.0^oF$ (2.0^oC)

Circuit	Custom LSI microprocessor circuit
Display	Dual function 0.5" (13 mm) 4-digit LCD
Sampling rate	1 reading per second approx.
Sensors	Air velocity/flow sensor: Conventional angled vane arms with low-friction ball bearing
	Temperature sensor: NTC-type precision thermistor
Automatic Power off	Auto shut off after 20 minutes to preserve battery life
Operating Temperature	32°F to 122°F (0°C to 50°C)
Storage Temperature	14 to 140^oF (-10 to 60^oC)
Operating Humidity	<80% RH
Storage Humidity	<80% RH
Operating Altitude	7000ft (2000 meters) maximum
Battery	One 9 volt (NEDA 1604) battery
Battery life	80 hours approx. (if the Backlight is used continuously, battery life will be reduced significantly)
Power Consumption	8.3 mA DC approx.
Weight	1.6 lbs (725g) including battery & probe
Dimensions	Main instrument: 7.0 x 2.9 x1.2" (178 x 74 x 33mm)
	Sensor Head: 2.75" (70mm) Diameter

Warranty

FLIR Systems, Inc. warrants this Extech Instruments brand device *to be free of defects in parts and workmanship for* ***one year*** *from date of shipment (a six month limited warranty applies to 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 for authorization. Visit the website www.extech.com for contact information. A Return Authorization (RA) number must be issued before any product is returned. 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. FLIR Systems, Inc. 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. FLIR'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.*

Calibration, Repair, and Customer Care Services

FLIR Systems, Inc. offers repair and calibration services for the Extech Instruments products we sell. NIST certification for most products is also provided. Call the Customer Service Department for information on calibration services available for this product. Annual calibrations should be performed to verify meter performance and accuracy. Technical support and general customer service is also provided, refer to the contact information provided below.

Useful Equations and Conversions
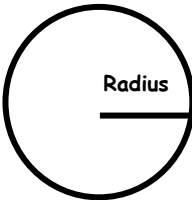
Area equation for rectangular or square ducts

Height (H)

Area (A) = Width (W) × Height (H)

Width (W)

Area equation for circular ducts

Radius

Area (A) = ⑥ × r²
Where ⑥ = 3.14 and r² = radius × radius

Cubic equations

> CFM (ft³/min) = Air Velocity (ft/min) x Area (ft²)
> CMM (m³/min) = Air Velocity (m/sec) x Area (m²) x 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