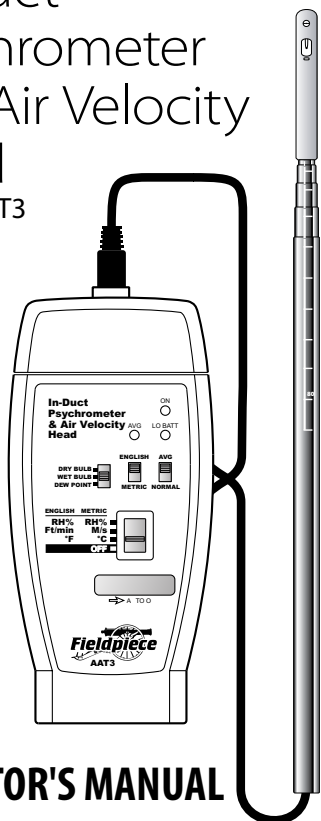


# Fieldpiece

## In-Duct Psychrometer and Air Velocity Head

Model AAT3

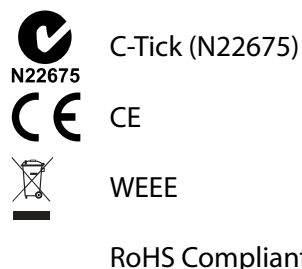


OPERATOR'S MANUAL

## Quick Start

1. Connect AAT3 to Fieldpiece meter.
2. Select mVDC range on meter.
3. Remove vinyl slip cover from the probe tip.
4. Select desired switch position on AAT3 for temperature, %RH, or air velocity.
5. Read your measurement directly on the display of the Fieldpiece meter.

## Certifications



## Description

Your AAT3 is a portable, psychrometer accessory head, with a built in hot wire anemometer.

The compact probe tip makes directly measuring in ducts a breeze. The 38"(96cm) telescopic probe with laser etched ruling and flattened edges allows you to locate proper measurement points within a duct and ensures that your probe is properly aligned for air velocity measurements.

The AAT3 can measure percent relative humidity, dry bulb, and air velocity and can calculate wet bulb and dew point.

The AAT3 snaps directly onto the Fieldpiece HS series DMMs. For other meters, use Fieldpiece ADLS2 test leads or AHDL1 handle adapter.

Use your AAT3 with the HVAC Guide to easily calculate in-duct CFM or to perform Target Evaporator Exit Temperature tests and get accurate Target Superheat calculations.

Go wireless with your AAT3 by using Fieldpiece wireless transmitters (ET2W/EH2W) to send measurements over-the-air to Fieldpiece wireless receivers (HG3, LT17AW, EH4W) anywhere on the jobsite.

AAT3 w/ ET2W transmitting wirelessly to HG3



## How to Use

### General Instructions

1. Remove sensor cap from the telescoping probe tip.
2. Connect directly onto any Fieldpiece HS multimeter, data logger or the HG3 HVAC guide. For most Fieldpiece SC and LT meters, use Fieldpiece ADLS2 test leads plugged into the COM and VΩ jacks.
3. Select mVDC range on multimeter.
4. Set switch position of AAT3 to °F and °C, Ft/min and M/s, or %RH.
  - a.) For temperature set temp type switch to DRY BULB, WET BULB or DEW POINT.
  - b.) For velocity measurements wait for 10 seconds as the AAT3 warms up.
5. Read the measurement directly on the multimeter display.

## What is Free Area? How Do I Get It?

Free Area is the total area through which air can flow on either a supply outlet or a return grille. Free area is also some times referred to as "effective area" or "see through area."

If there is no grille or restriction on the area through which air is flowing then the free area is equal to the actual area. This would be the case if you are performing an in-duct measurement or if you were to remove the grille from a supply or return.

If you are measuring airflow where there is an obstruction present then the free area is the total area minus area covered by the fins or grating.

Free Area is published by grille manufacturers and is the most accurate representation of the Free Area of a duct. Use manufacturer's data whenever available.

## Specifications

**Operating environment:**  
Air Velocity: -4°F to 140°F (-20°C to 60°C)  
Temperature: -4°F to 140°F (-20°C to 60°C)  
Relative humidity: 32°F to 131°F (0 to 55%)  
**Storage temp:** -4°F to 140°F (-20°C to 60°C) <80% R.H. (Batteries removed)  
**Output impedance:** approx. 1KΩ  
**Temperature coefficient:** 0.1 x (specified accuracy) per °C (<18°C or >28°C) (<64°F or >82°F)

### AIR VELOCITY

**Range:** 40-3940 ft/min (0.20-20.00 m/s)  
note: to use full range AAT3 must be connected to a DMM with a 4000 mVDC range or greater.  
**Accuracy:** ± (5%+1 dgt) reading or ± (1%+1dgt) full scale.

### RELATIVE HUMIDITY

**Range:** 0% to 100% RH  
**Accuracy:**  
±2.5% @ 73.4°F (23°C), 10% to 90% RH  
±5% @ 73.4°F (23°C), <10% RH, >90% RH  
**Sensor Response Time:** 60 seconds typical for 90% of total range.  
**Sensor Hysteresis:** ±1%RH typical

## TEMPERATURE

**Range:** -4°F to 140°F (-20°C to 60°C)  
**Accuracy:** ±1°F 32°F to 113°F  
±2°F -4°F to 32°F, 113°F to 140°F  
±0.5°C 0°C to 45°C  
±1°C -20°C to 0°C, 45°C to 60°C

**Sensor type:**  
**Air velocity:** Tiny glass bead thermistor.  
**Relative Humidity:** Capacitance polymer film.  
**Temperature:** Precision thermistor.  
**Battery:** 9V  
**Battery life:** 20 -35 hours typical  
**Battery indication:** Red Lo Batt LED  
**Auto Power off:** after 15 minutes of inactivity if APO is active.  
**Dimensions:** 144mm(H) x 67mm(W) x 32mm(D).  
**Weight:** approx. 240g including battery.

## Maintenance

Clean the exterior with a dry cloth. Do not use liquid.

## Battery Replacement

When Lo Batt LED lights up replace old battery with new 9V battery.

## Sensor Care

When not in use it is best to protect this sensors with the vinyl slip cover included with the AAT3.

Extreme conditions or exposure to solvent vapors may offset the RH% sensor. If this happens, place the sensor in a controlled environment of 75%RH and between 68°F - 86°F for a period of 24 hours.

To create a 75%RH environment moisten a small amount of table salt, in an open container such as a clean 2 liter bottle cap.

Place the container with the salt solution and the AAT3 probe in a sealable plastic bag, and leave the bag in a room temperature location where it will not be disturbed for 24 hours.

Note: It is important that the salt solution does not come in direct contact with the sensor, as this may permanently damage the sensor.

## Optional accessories



RCONE1 and AAT3 working with ET2W and HG3 to wirelessly log Wetbulb for target superheat testing.

## Limited Warranty

This meter is warranted against defects in material or workmanship for one year from date of purchase. Fieldpiece will replace or repair the defective unit, at its option, subject to verification of the defect.

This warranty does not apply to defects resulting from abuse, neglect, accident, unauthorized repair, alteration, or unreasonable use of the instrument.

Any implied warranties arising from the sale of a Fieldpiece product, including but not limited to implied warranties of merchantability and fitness for a particular purpose, are limited to the above. Fieldpiece shall not be liable for loss of use of the instrument or other incidental or consequential damages, expenses, or economic loss, or for any claim of such damage, expenses, or economic loss.

State laws vary. The above limitations or exclusions may not apply to you.

## For Service

In the USA, call Fieldpiece Instruments for one-price-fix-all out of warranty service pricing. Send check or money order for the amount quoted. Send the meter freight prepaid to Fieldpiece Instruments. Send proof of date and location of purchase for in-warranty service. The meter will be repaired or replaced, at the option of Fieldpiece, and returned via least cost transportation. Outside of the USA, please visit [www.fieldpiece.com](http://www.fieldpiece.com) for service contact information.

**Fieldpiece**  
Designed in USA  
MADE IN TAIWAN

[www.fieldpiece.com](http://www.fieldpiece.com)  
©Fieldpiece Instruments, Inc 2011;v12

# Diagnostic Tests

## Wireless Return Wet Bulb for Target Superheat

The AAT3 with a wireless transmitter (ET2W, EH4W, or LT17AW) allows you to monitor the return wet bulb while you are at the condenser. Send this real-time WB measurement wirelessly to the INPUT FORM of the HVAC Guide (HG3) to calculate a real-time target superheat.

1. Sync your transmitter with AAT3 to the Return WB INPUT line in Superheat Test of the HG3.
2. Punch or drill a small 3/8" hole in the return plenum to insert AAT3 probe. Press ENTER on the HG3 to lock reading.
3. Input an outdoor dry bulb manually or with an ATH4 at the condenser into the OD Dry Bulb INPUT line in the Superheat Test of the HG3.
4. Press OUTPUT on HG3 to see your target superheat calculations.

# Target Evaporator Exit Temp with the HVACGuide

The AAT3 with Fieldpiece HVAC Guide, allows you to easily perform a Target Evaporator Exit Temperature (TEET) test to determine if the evaporator is getting the optimum airflow.

1. Slide AAT3 onto the top of the HVAC Guide. Select TEET switch position.
2. In the INPUT FORM, highlight Return DB. Set the AAT3 to the Temperature switch position and select dry bulb. Press ENTER to measure air temperature going into the evaporator. Drill a small 3/8" hole in the return plenum and insert the AAT3 probe. Press ENTER to lock reading. Take measurements as close to the air handler as possible.
3. In the INPUT FORM, highlight Return WB. Press ENTER to measure wet bulb temperature going into the evaporator by inserting AAT3 probe through the same hole at the

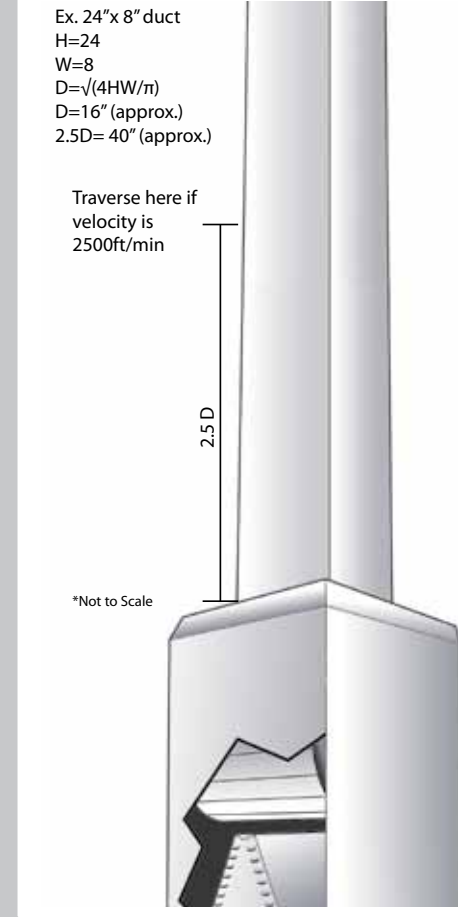
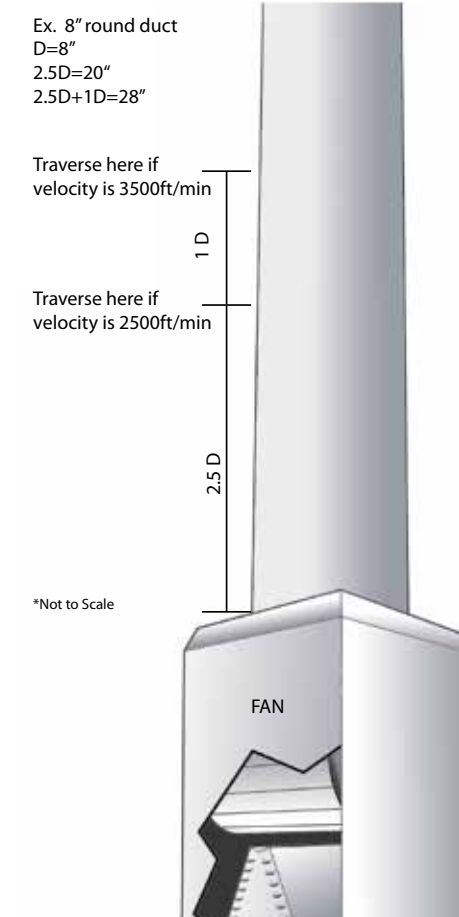
return and selecting the appropriate switch position on the AAT3. Press ENTER to lock reading.

4. In the INPUT FORM, highlight Supply DB. Press ENTER to measure air temperature coming out of the evaporator. Punch or drill a small 3/8" hole in the supply plenum and insert ARH5 wand in the center of the plenum to take measurement. Press ENTER to lock reading.
5. Press OUTPUT to view results.

# Measuring Accurate Airflow

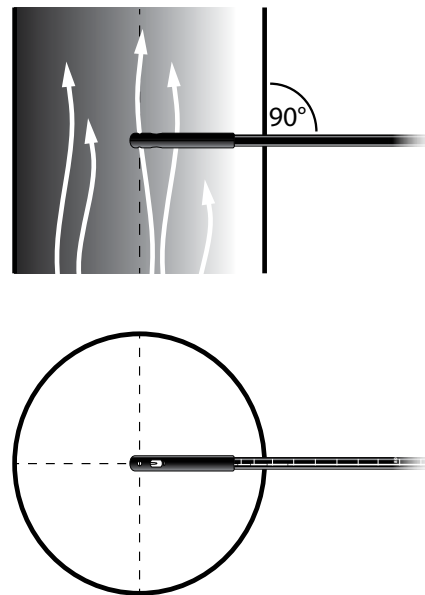
Find a Suitable Location for a Traverse

1. The cross sectional area at, before and after the traverse location should be a either rectangular or round.
2. Make sure you have sufficient access around the traverse location so that the duct may be traversed at multiple angles.
3. The traverse location should be chosen so as to minimize the effects of leaks in the portion of the system between the fan and the traverse location.
4. The traverse location should be located far enough downstream of the fan to allow the airflow to come to a uniform distribution. To determine an effective length, assume a minimum of 2.5 duct diameters for 2500 ft/min or less and add 1 duct diameter for each additional 1000 ft/min measured. (For a rectangular duct the equivalent diameter can be calculated as  $D = \sqrt{(4hw/\pi)}$  where "h" is the height of the duct and "w" is the width.)
5. Locations directly downstream from obstructions, bends or sudden changes in the duct are not good locations for a traverse.

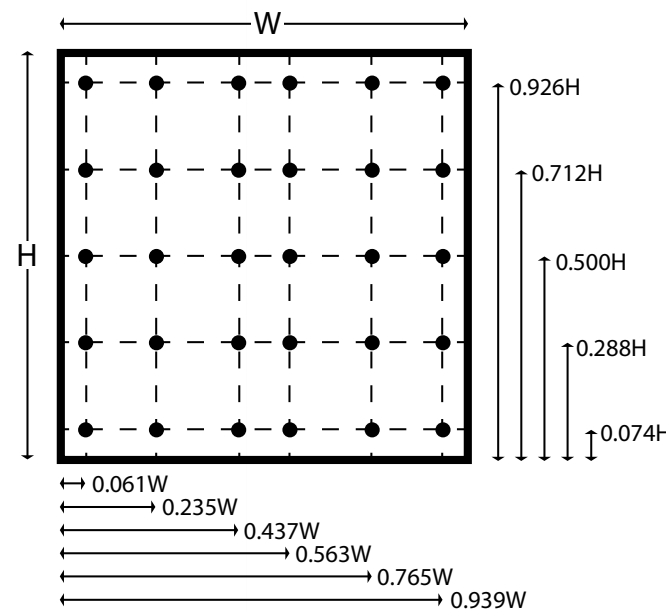


# Execute the Traverse

1. Determine the appropriate measurement points by measuring either the diameter of the duct or the width and height. Then use the appropriate table (See table 1 and 2) to calculate the insertion depth where each of the point measurements should be recorded.
2. Set the average switch on the AAT3 to AVG to display a 16 second running average.
3. Insert the probe tip of the AAT3 into the duct and use the flat edges of the probe to align the sensor with the airflow direction. Check that the direction of airflow is at 90° to the probe by making sure that the probe is at a right angle to the side of the duct.
4. Use the laser etched ruler on the side of the probe to measure the insertion depth and find the locations you determined in step 1.
5. Record a point measurement (Either manually or by using the Fieldpiece HG3, or DL3) at each of the locations determined in step 1.
6. Use the recorded velocity measurements to calculate the airflow by first determining the average velocity of the traverse and then multiplying by the free area of the duct.

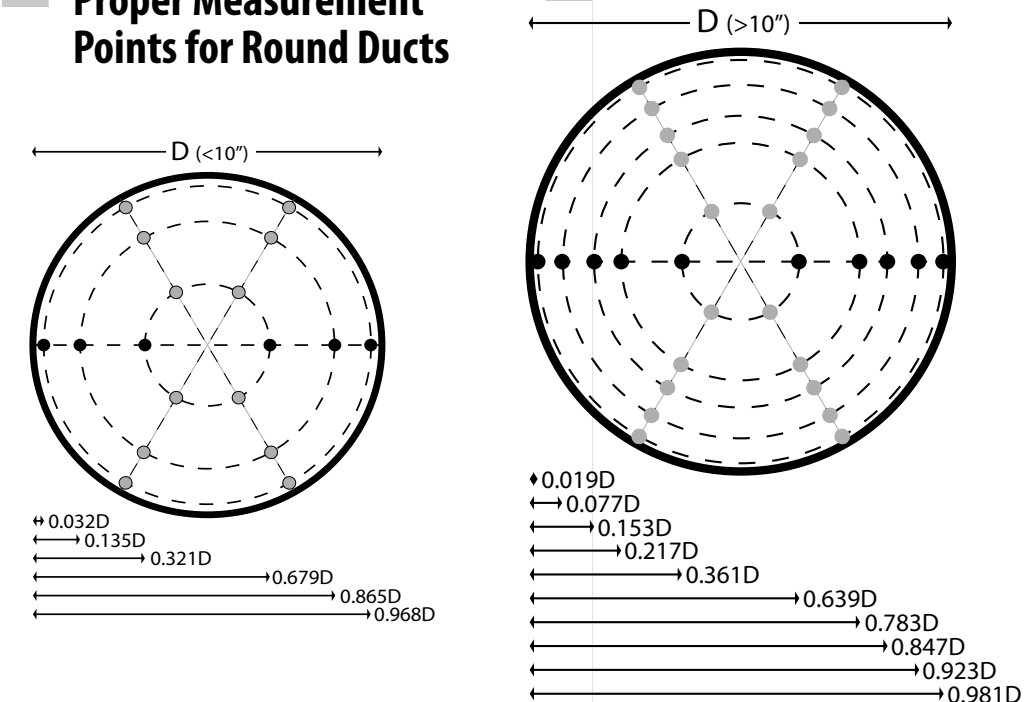


# Proper Measurement Points for Rectangular/Square Ducts



Traverse locations using log-Tchebycheff rule in a rectangular duct		
Length of Side	# of Traverse Lines	Distance from Inner Wall in % of Length of Side
< 30 in (76 cm)	5	7.4%, 28.8%, 50%, 71.2%, 92.6%
30-63 in (76-160cm)	6	6.1%, 23.5%, 43.7%, 56.3%, 76.5%, 93.9%
>63 in (160cm)	7	5.3%, 20.3%, 36.6%, 50%, 63.4%, 79.9%, 94.7%

# Proper Measurement Points for Round Ducts



Log linear rule for traverse points on two diameter for a round duct		
Diameter	# of points per diameter	Distance from inner wall in % of diameter
< 10 in (25.4cm)	6	3.2%, 13.5%, 32.1%, 67.9%, 86.5%, 96.8%
≥ 10 in (25.4cm)	10	1.9%, 7.7%, 15.3%, 21.7%, 36.1%, 63.9%