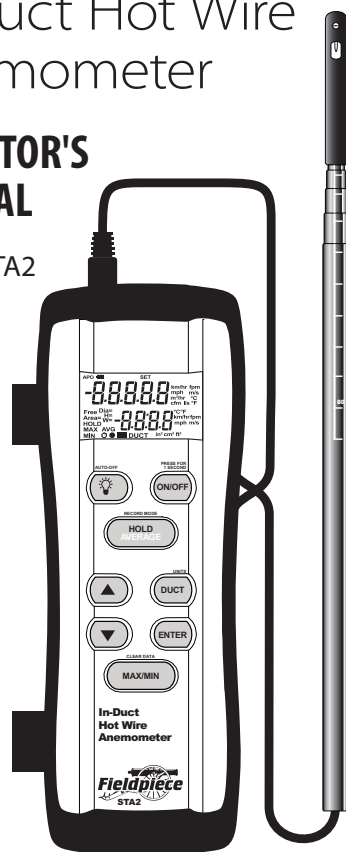


Fieldpiece

In-Duct Hot Wire Anemometer

OPERATOR'S MANUAL

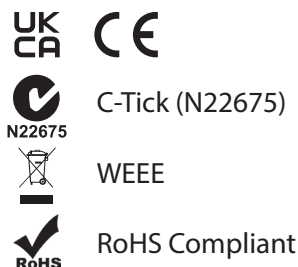
Model STA2



Quick Start

1. Power on your STA2 by holding the ON/OFF button for 1 second. There is a 5 second count down as the meter warms up.
2. Use the arrow buttons to cycle the display between air velocity, volumetric flow (CFM) and temperature.
3. Press the DUCT button to enter a duct size.
4. Press and hold the HOLD (Average) button to enter "Record Mode." Record flow, velocity and temperature values, over time or at specific points. Then average the recorded values.

Certifications



Description

Your STA2 is a portable, hand held, hot wire anemometer, designed for the HVAC/R technician.

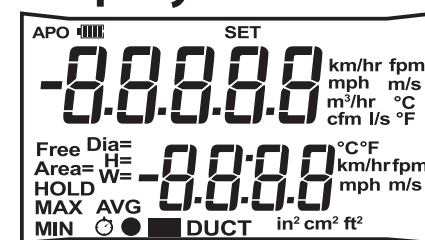
The compact probe tip makes directly measuring air velocity a breeze. The 38" (96cm) telescoping probe with laser etched ruling and flattened edges allows you to locate proper measurement points within a duct and ensures that your probe is properly aligned.

The STA2 calculates air flow (CFM) based off your inputs of duct dimensions or free area, making for quick and accurate readings, no matter the duct size or shape.

Use either of the averaging methods in Record Mode to counter turbulent spikes in air velocity.

The dual display with a bright backlight, and rugged rubber boot with probe clips, make sure the STA2 is ready for any job.

Display



- Battery Life
- APO Auto Power Off Enabled
- cfm Volumetric Flow (cubic feet/minute)
- l/s Volumetric Flow (liters/second)
- m³/hr Volumetric Flow (cubic meters/hour)
- fpm Velocity (feet/minute)
- m/s Velocity (meters/second)
- km/hr Velocity (kilometers/hour)
- mph Velocity (miles/hour)
- °F Temperature (Fahrenheit)
- °C Temperature (Celsius)
- in Length (inches)
- cm Length (centimeters)
- ft Length (feet)
- m Length (meters)

- Point Recording
- ⌚ Time Recording

- AVG Average Display
- HOLD Hold Display
- MAX Maximum Display
- MIN Minimum Display

Free Area= Free Area Input

- Duct Shapes

Dia= Dimension Input
H= (diameter, height, width)
W=

Controls

ON/OFF Hold 1 second to toggle power on/off.

Lightbulb icon Toggle backlight. (Hold while powering your STA2 on to disable APO.)

RECORD MODE
HOLD AVERAGE Toggle display Hold (displays average of recorded values while in record mode). Hold for 2 seconds or longer to enter/exit record mode.

Up arrow icon Scroll up or down. Cycles displayed measurement parameters (CFM, velocity, and temp.)

Down arrow icon

UNITS
DUCT Press for duct setup. Hold for 2 seconds for Units setup.

ENTER Confirm selection.

CLEAR DATA
MAX/MIN Displays Maximum or Minimum values. Hold for 1 second to exit and clear stored values.

Functions Backlight

1. Press the backlight button to toggle the backlight on/off at any time during the STA2's use.
Note: The backlight will automatically shut off after 1 minute to conserve battery life.

Hold

1. The HOLD button toggles the Hold Function on/off. The Hold function will pause the measured values on the upper and lower displays until cancelled.
2. Pressing the HOLD button for longer than 2 seconds will take the STA2 into "Record Mode." (Please see the Record Mode section for more information.)

Maximum/Minimum

1. Pressing the MAX/MIN button activates the Max-Min function, holding the maximum and minimum values measured until cleared.
2. Once the Max-Min function has been enabled, pressing MAX/MIN cycles between displaying maximum (MAX), minimum (MIN) and real time values (MAX MIN).

Clear Data

1. Press and hold the MAX/MIN button for 2 seconds to CLEAR DATA, this erases all stored data points and resets the Record Mode counter to zero.

Display Scrolling

1. At any point during operation the arrow keys may be used to change the display(s) on your STA2 to show velocity, flow and temperature measurements.

Duct Setup

1. Enables the STA2 to calculate volumetric flow based on user entered information specific to the equipment being worked on. Pressing the DUCT button will lead you through the duct setup. (See the "Set up your STA2" section for detailed use of this function.)

Units Setup

1. To enter the Units setup mode hold down the DUCT button for 2 seconds.
2. Use the Arrow and ENTER buttons to select air velocity, flow, temperature and length units.
Note: Length units will also be used as area units for Free Area inputs during Duct setup.
3. Once all units are selected you will be returned to the main display screen.

Record Mode

Record Mode allows you to find the Average, Maximum and Minimum of recorded measurements taken over a length of time, or in different positions.

1. Enter the Record Mode and select either time or point recording. Time recording ⌚ will be continuous, a point recording ● will only record at entered points. Use the Arrow buttons to choose between time and point recording and press ENTER to lock in your selection.
2. a.) Time Recording: Use the ENTER button to start and pause recording. The lower display shows the total time recorded.
b.) Point Recording: Press the ENTER button to take a measurement at a specific point. The lower display shows the total number of measurements recorded.
3. Press the AVERAGE button to display the average of recorded values. Press the MAX/MIN button to display the maximum and minimum measurements taken. These functions can be used while still recording.
Note: Average replaces Hold while in Record Mode.

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 sometimes 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 were measuring air flow in the middle of a duct, or if you were to remove the grille from a supply or return.

If you are measuring airflow where there is a restriction present, then the free area is the total area minus the 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.

How to Measure Accurate Airflow Find a Suitable Location for a Traverse

1. The cross sectional area at, before, and after the traverse location should be 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 2500ft/min or less and add 1 duct diameter for each additional 1000ft/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.

Set Up Your STA2

Press the DUCT button to enter Duct setup mode and choose to input either duct dimensions or Free Area.

1. **Duct dimensions:** Use this option if measuring in a duct or at an obstruction-free Supply/Return.
2. Use the arrow and ENTER buttons to select the Duct dimensions icon.
3. Use the arrow and ENTER buttons to select the shape of the Duct.
4. Use the arrow and ENTER buttons to enter either the Height (H=) and Width (W=) of the duct (for rectangular ducts) or the Diameter (D=) (for round ducts).
1. **Free Area:** Use this option if measuring at a Supply/Return with an obstruction such as a grille and the free area is known.
2. Use the arrow and ENTER buttons to select the Free Area icon.
3. Use the arrow and ENTER buttons to enter the manufacturer specified Free Area.

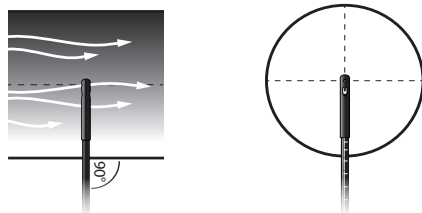
After the appropriate information is input you will be returned to the main display screen.

When you are ready to execute the traverse you will want to put the STA2 into RECORD mode and select time recording. Use the ENTER button to start and stop recording at each of the points along your traverse. How long you record at each point depends on how much variance you see while measuring.

Continued on reverse...

Execute the Traverse

- 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.
- Insert the probe of the STA2 into the duct and use the flat edges of the probe to position the probe tip so air flows directly past the sensor. Check that the direction of airflow is at 90° to the probe by making sure that the wand itself is at a right angle to the side of the duct.
- 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.
- Press the ENTER button to record a point measurement at each of the locations determined in step 1.
- Press the Average button to display the calculated average of all recorded points. Then use the arrow buttons to cycle display between, average temperature, velocity and airflow.

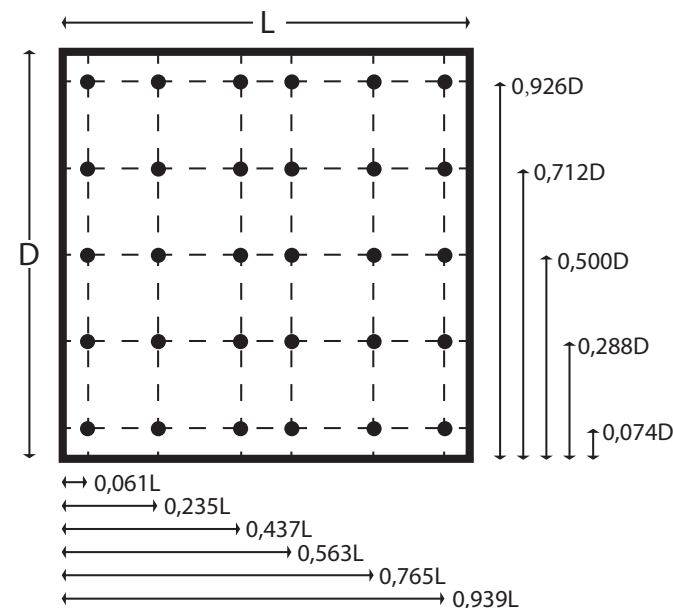


- If the above steps were followed, the average flow number on your STA2 will be an accurate representation of the airflow through the traverse location you selected.
- (Optional) More is better. If the traverse location you have selected is not ideal for any of the reasons listed above, it may be beneficial to conduct multiple traverses at different locations.

Circular Area Conversion

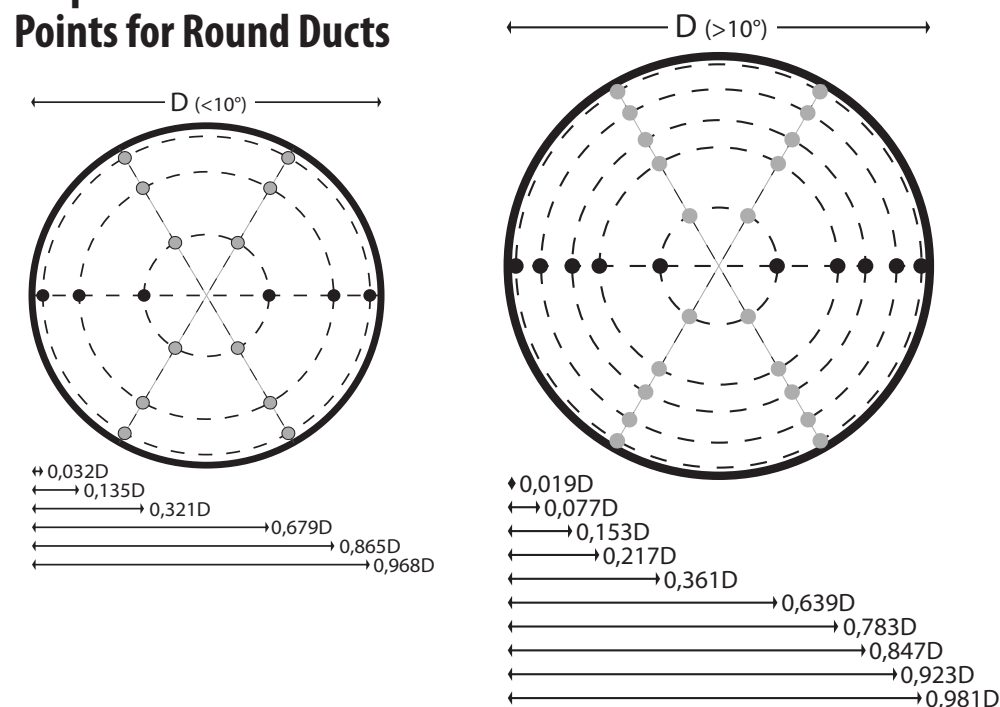
Dia. (in)	Area (in ²)	Area (ft ²)	Dia. (mm)	Area (mm ²)
3	7.07	0.05	70	3848
4	12.56	0.09	80	5027
5	19.63	0.14	90	6362
6	28.27	0.20	100	7854
7	38.48	0.27	120	11310
8	50.27	0.35	140	15394
9	63.62	0.44	160	20106
10	78.54	0.55	180	25447
12	113.10	0.79	200	31416
14	153.94	1.07	250	49087
16	201.06	1.40	300	70686
18	254.47	1.77	350	96211
20	314.16	2.18	400	125664
25	490.87	3.41	450	159043
30	706.86	4.91	500	196350
35	962.11	6.68	Dia. (m)	Area (m ²)
40	1256.64	8.72	0.6	0.283
45	1590.43	11.04	0.7	0.385
50	1963.50	13.63	0.8	0.502
60	2827.43	19.63	0.9	0.636
70	3848.45	26.73	1.0	0.785
80	5026.55	34.91	1.1	0.950
90	6361.73	44.18	1.2	1.130

Proper Measurement Points for Rectangular/Square Ducts



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%
30-63in (76-160cm)	6	6.1%, 23.5%, 43.7%, 56.3%, 76.5%, 93.9%
>63in (160cm)	7	5.3%, 20.3%, 36.6%, 50%, 63.4%, 79.9%, 94.7%

Proper Measurement Points for Round Ducts



Diameter	# of points per diameter	Distance from inner wall in % of diameter
<10in (25.4cm)	6	3.2%, 13.5%, 32.1%, 67.9%, 86.5%, 96.8%
≥ 10in (25.4cm)	10	1.9%, 7.7%, 15.3%, 21.7%, 36.1%, 63.9%

Specifications

Accuracy: Stated accuracy @ 73°F±9°F (23°C±5°C), <90%RH

Temperature coefficient: 0.1 x (specified accuracy) per °C for 0°C to 18°C, 28°C to 50°C (32°F to 64°F, 82°F to 122°F)

Operating environment: -4°F to 122°F (-20°C to 50°C) at <75%RH

Storage temperature: -4°F to 140°F (-20°C to 60°C), 0 to 80% RH (with battery removed)

Battery: 9V

Battery life: 20-35 hours approx. (alkaline)

Battery indication: is displayed when the battery voltage drops below the operating level.

Auto Power off: after 15 minutes of inactivity if APO is active.

Over range: "OL" or "-OL" is displayed

Dimensions: 7.2 in (H) x 2.5 in (W) x 1.3 in (D) [185mm (H) x 65mm (W) x 35mm (D)]

Weight: 12 oz. (340g) including battery

Velocity

Sensor type: Micro-glass bead thermistor.

Resolution: 1 fpm (0.01 m/s)

Range: 40-3960 fpm (0.20-20.00 m/s)

Accuracy: ± (5%+1 dgt) reading or ± (1%+1dgt) full scale

Units: fpm, m/s, km/hr, mph

Temperature

Sensor type: Thermistor

Range: -4°F to 140°F (-20°C to 60°C)

Resolution: 0.1°C, 0.1°F

Accuracy:
±1.0°F for 32°F to 113°F
±2.0°F for -4°F to 32°F, 113°F to 140°F
±0.5°C for 0°C to 45°C
±1.0°C for -20°C to 0°C, 45°C to 60°C

Maintenance

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

Battery Replacement

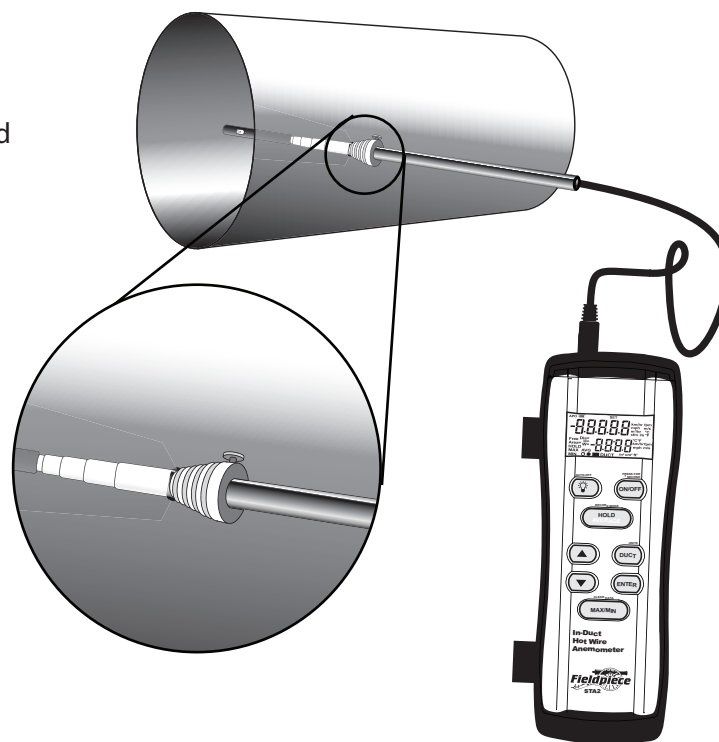
When the meter displays the battery should be replaced. Turn your STA2 off and replace with 9V battery.

Protecting the Sensor

The STA2 uses a delicate glass bead thermistor sensor. When not in use it is best to protect this sensor with the vinyl slip cover included with the STA2 and keep it stored in the provided blow molded case.

Optional Accessory

RCONE1 being used to hold the STA2 probe in place in round duct.



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 for service contact information.

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