

# YELLOW JACKET®

## Anemometer/Thermometer

FPM, CFM and temperature readings with one hand-held instrument



### Operation and Maintenance

UPC No. 686800 **68915**



The YELLOW JACKET Anemometer / Thermometer 68915 is a versatile instrument that measures air velocity (FPM - feet per minute; or MPS - meters per second), air flow volume (CFM - cubic feet per minute; or CMS - cubic meters per second) and temperature. Temperature is read at the same time as velocity or flow measurements in your choice of °F or °C. The unit eliminates analog charts that are hard to read and calculate.

Features include:

- Microprocessor controller
- Minimum and maximum recordings
- Averaging of FPM, MPS or CMS multipoint readings
- “Hold” button to freeze LCD reading
- Switchable imperial to metric
- Automatic power shut-off after 20 minutes unless set for continuous operation in non-sleep mode
- RS-232 output

Specific applications in the HVAC industry include environmental paint booths, air balancing, and many others where measurement of air velocity, flow and temperature are essential.

Check for damage immediately.

Carton contents include:

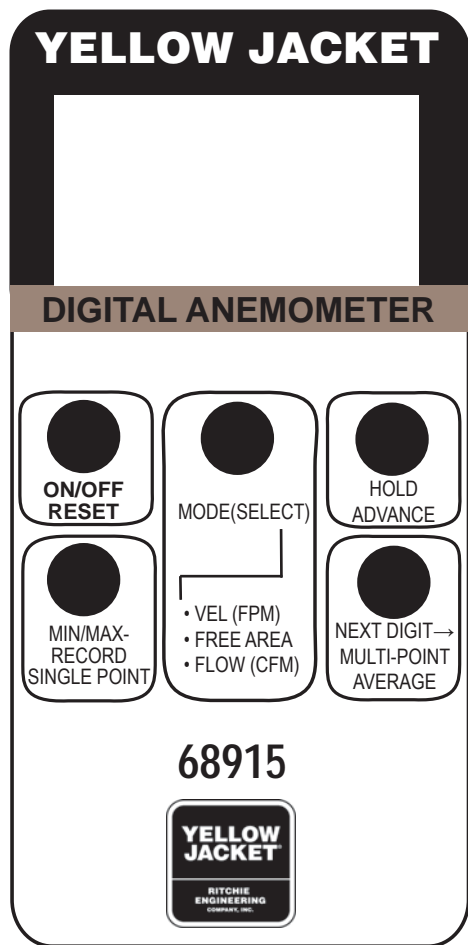
- 1 pc. hand-held instrument
- 1 pc. vane type probe head with cable
- 1 pc. 9-volt alkaline battery
- 1 pc. maintenance & operation instructions
- 1 pc. carrying case

## Before starting

1. Remove battery compartment screw and lid. Insert 9 volt alkaline battery.
2. Make sure the unit is off before attaching the probe. Align the probe connector key to the keyway in the unit and insert the connector.

NOTE: The unit must be off before replacing the battery.

## Button functions



When you turn on the unit, an “all functions” display (fig. 1) will appear on the LCD, and then automatically

change to the air velocity/ temperature display (fig. 2). Turning off the unit will erase any air velocity (FPM) or flow volume (CFM) readings. The unit will reset to 0000 velocity or flow volume. The “Free Area” number (see below) will not change from the four digit number you’ve entered and saved.

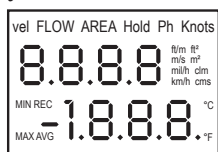


Fig. 1

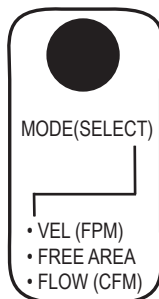


Fig. 2

Pressing this button changes the display from air velocity (FPM) to

“Free Area” number to flow volume (CFM), and back to velocity (FPM). Air velocity is the speed of air movement in FPM (ft/m) or MPS (m/s). Air

flow is the volume of air in CFM (ft³) or CMS (cm³). “Free Area” number is the open area in the duct or grill in square feet. When measuring through a diffuser you must subtract the amount of diffuser blockage. The “Free Area” default is 1.111 (ft²) which is equivalent to a 10” x 16” duct. You can change this number (see page 5) to different dimensions if necessary.



This button provides several functions:

- Freezes a reading in the LCD.
- Stores readings for minimum, maximum, and minimum/maximum averages for FPM.
- Increases the numerical value of each individual digit in the “Free Area” number. For example, pressing the button will change the number from 1.111 to 2.111; pressing again, 3.111. Each digit can be increased up to 9 before returning to “0.” To increase the value of the second or other digit, use the Record Single Point button (see below) to select the digit you want to change.
- Changes Baud Rate for RS-232 output.



This button provides several functions:

- Displays continuous moving average in FPM.
- Displays average, minimum, and maximum FPM readings for single and multipoint measurements.
- Saves changes made to “Free Area” number, imperial to metric switching, and Baud Rate.



NEXT DIGIT →  
MULTI-POINT  
AVERAGE

This button provides several functions:

- Selects individual digits in the “Free Area” number for which you want to change the value. For example, in 1.111, with this button you can select the second “1.” Using the HOLD / ADVANCE button, you can then change the second digit to 1.211 or higher (see HOLD / ADVANCE above).
- Displays multipoint averages for FPM, and the number of points measured.

### Auto Power Off

If powered and unused, the unit will turn off after 20 minutes to save the battery. Auto shut-off will be preceded by three beeps. To restart, simply press the ON button.

### Non-Sleep Mode

To bypass “Auto Power Off” for continuous operation follow these steps when turning the unit on:

1. Press the ON and HOLD buttons at the same time.
2. Release only the ON button.
3. After an “n” appears on the LCD, release the HOLD button.

The 68915 will remain on until the OFF button is pressed.

UPC#	Description
68915	Anemometer
68916	Replacement 2.75 (70mm) probe assembly

## Specifications

Air flow ranges:	125 - 4900 ft/min (0.7 - 25 m/sec)
Flow resolution:	1 (0.01)
Flow accuracy:	±2%
Temperature:	14 to 122°F (-10 to 50°C)
Temp. resolution:	.01 (0.1)
Temp. accuracy:	±1.0°F (±0.6°C)
Power:	9 volt/100 hour
Fan diameter:	2-7/8” (70mm)

## Measuring Air Velocity (FPM)

(See changing to metric on page 6)

### SINGLE POINT FPM

1. Turn unit on by pressing ON/OFF button.
2. Unit is ready when LCD shows “vel” in upper left and temperature at lower right (fig. 2).



3. Hold vane probe head in front of the air source for a measurement in FPM (fig. 3).



Fig. 3

## Continuous Moving Average

1. Turn unit on.
2. Place vane probe head in front of air flow source.
3. Press MIN/MAX RECORD button.  
The unit makes a reading once a second and displays a moving average for up to two hours.

## MIN/MAX/AVG

1. Turn unit on.
2. Place vane probe head in front of air flow source.
3. Press MIN/MAX button and the unit will begin recording.
4. Press HOLD button to store readings before moving the vane probe head away from the air flow source.
5. Press MIN/MAX once to see AVG velocity readings.
6. Press MIN/MAX again to see MIN velocity readings.
7. Press MIN/MAX again to see MAX velocity readings.
8. Press MIN/MAX again to return to the velocity reading you stored with the HOLD button.
9. Press ON/OFF RESET to clear the MIN/MAX average readings.

NOTE: At any time you can use MODE (SELECT) to switch from FPM velocity to CFM flow readings. Before switching, be sure the “Free Area” number matches the open square footage of the grill or duct you are measuring (see page 5 for “Setting Free Area Number”).

## Multipoint FPM

1. Turn unit on.
2. Place vane probe head at first point to be measured.
3. After you see the reading in the LCD, press HOLD/ADVANCE. Release the button when you hear a single beep. The LCD will show HOLD above the reading (fig. 4).

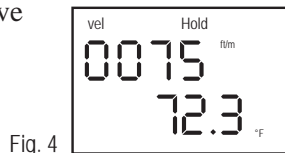


Fig. 4

4. Press MIN/MAX RECORD. Release the button when you hear a single beep. The LCD will show a number from 1-8 representing the reading point that was saved (fig. 5). The unit will return automatically to the “vel” display ready for the next reading.

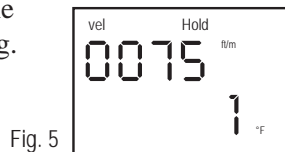


Fig. 5

5. Repeat steps 2-4 until you've measured and recorded all desired points up to 8.
6. Press NEXT DIGIT/MULTIPOINT button to view the average air velocity and the number of points measured (fig. 6).

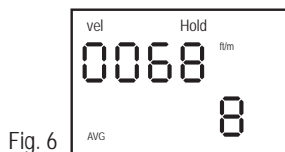


Fig. 6

# Measuring air flow (CFM) SETTING “FREE AREA” NUMBER

To measure CFM, the “Free Area” number in the unit is equal to the amount of open area in the duct or grill you are taking readings from. To calculate this number, go to Appendix A.

If you do not need to change the number, press MODE/(SELECT) to go into the CFM measurement mode (fig. 7).

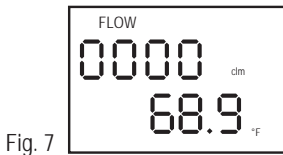


Fig. 7

To change the number, take the following steps:

1. Turn the unit on.
2. Press MODE SELECT once. You will hear one beep and see AREA and 1.111 with a flashing digit (fig. 8).

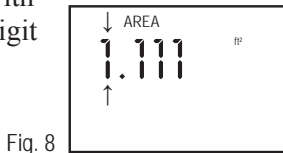


Fig. 8

3. To increase the value of the flashing digit from 1 to 2 or higher (up to 9), press HOLD/ADVANCE. Press once for each increase.
4. To make the next digit to the right flash, press the NEXT DIGIT button. When the next digit is flashing, repeat step 3.
5. Repeat steps 3 and 4 until all digits match the desired number.
6. Press MIN/MAX RECORD button.

7. When the flashing stops, press the HOLD button to save the changed “Free Area” number. The unit will go to the CFM measurement mode (fig. 9).

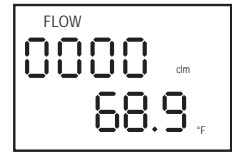
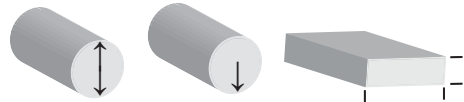


Fig. 9

## APPENDIX A VOLUME AIRFLOW CALCULATIONS

The “Free Area” is equal to the cross sectional area of the duct or diffuser, minus the amount of blockage. In rectangular duct work, this cross sectional area is the length times the width. In a round duct, the area is the radius squared times  $\pi$  (3.14).

i.e. ( $L \times W = \text{Area}$ ), ( $R \times R \times 3.14 = \text{Area}$ )



To convert square inches to square feet, divide by 144 inches / ft<sup>2</sup>.

### EXAMPLE:

If an air duct is rectangular and the height is 24 inches with a length of 12 inches, the air velocity reading in the duct was 450 FPM.

$$H \times L = A$$

$$A \text{ (ft}^2\text{)} \times \text{FPM} = \text{CFM}$$

$$24 \text{ inches} \times 12 \text{ inches} = 288 \text{ sq. in.}$$

$$288 \text{ sq. in.} \div 144 \text{ in. / ft}^2 =$$

$$2 \text{ square feet (ft}^2\text{)}$$

If grill blockage is 20%, then multiply 2 ft<sup>2</sup> times .9 to get a “FREE AREA” of 1.8 (ft<sup>2</sup>).

$$450 \text{ FPM} \times 1.8 \text{ “FREE AREA”} = 810 \text{ CFM}$$

EXAMPLE: An air duct is round and the diameter is 12 inches. The air velocity reading in the duct is 450 FPM:

$$\begin{aligned} R \times R \times 3.14 &= A \\ A \text{ (ft}^2\text{)} \times \text{FPM} &= \text{CFM} \end{aligned}$$

$$6 \text{ inches} \times 6 \text{ inches} \times 3.14 = 113 \text{ sq. in.}$$

$$\begin{aligned} 113 \text{ sq. in.} \div 144 \text{ inches} / \text{ft}^2 &= \\ 0.785 \text{ sq. ft. (ft}^2\text{)} & \end{aligned}$$

If grill blockage is 35%, then multiply 0.785 ft<sup>2</sup> times .65 to get a “FREE AREA” of .510 (ft<sup>2</sup>).

$$450 \text{ FPM} \times .510 \text{ “FREE AREA”} = 229.5 \text{ CFM}$$

### Efficiency Tip

You do not need the correct “Free Area” number in the 68915 to measure air velocity (FPM). But by setting the “Free Area” number before measuring (FPM), you can increase efficiency. With the number set as the first step in the measurement process, you can change back and forth from FPM to CFM by simply press the MODE (SELECT) button during any function.

## SINGLE AND MULTIPOINT CFM

With the unit in CFM mode, operation for single and multipoint readings and averages is the same as for FPM (see page 4).

### Changing from Imperial to Metric

To change unit readings from feet/min and °F to meters/sec and °C, follow these steps:

1. Turn the unit on by pressing the ON/OFF and NEXT DIGIT / AVERAGE buttons at the same time.
2. Release the ON button first.
3. When the LCD shows a small ft/m, m/s, °F and °C, release the AVERAGE button. A small ft/m and °F will remain on the LCD.
4. Press HOLD to change to m/s and °C.
5. Press RECORD button and a “5” will appear on the LCD.
6. Press HOLD/ADVANCE and a Baud Rate of 1200 or 2400 will appear (see section for changing Baud Rate).
7. Press RECORD and a “5” will appear on the LCD.
8. Press HOLD to save setting and hold until the “vel” display appears and the unit is ready for m/s and °C reading.

## Changing from Metric to Imperial

To change unit readings from meters/sec and °C to feet/min and °F, follow these steps:

1. Turn the unit on by pressing the ON/OFF and NEXT DIGIT/AVERAGE buttons at the same time.
2. Release the ON button first.
3. When the LCD shows a small ft/m, m/s, °F and °C, release the NEXT DIGIT/AVERAGE button. A small m/s and °C will remain on the LCD.
4. Press the NEXT DIGIT to change to ft/m and °F.
5. Press RECORD button and a “5” will appear on the LCD.
6. Press HOLD/ADVANCE and a Baud Rate of 1200 or 2400 will appear (see section for changing Baud Rate.)
7. Press RECORD and a “5” will appear on the LCD.
8. Press HOLD to save settings and hold until the “vel” display appears and the unit is ready for ft/m and °F reading.

## Changing Baud Rate for RS-232 Output

1. Turn the unit on by pressing the ON/OFF and NEXT DIGIT/AVERAGE buttons at the same time.
2. Release the ON button first.

3. When the LCD shows a small ft/m, m/s, °F and °C, release the NEXT DIGIT/AVERAGE button. A small fm/s and °C or ft/m and °F will remain on the LCD.
4. Press RECORD button and a “5” will appear on the LCD.
5. Press HOLD/ADVANCE and a Baud Rate of 1200 or 2400 will appear. To change from 1200 to 2400, press NEXT DIGIT. To change from 2400 to 1200 press HOLD/ADVANCE.
6. Press RECORD and a “5” will appear on the LCD.
7. Press HOLD to save settings and hold until the “vel” display appears and the unit is ready for a reading.
8. Press NEXT DIGIT to return to the “vel” display ready for a reading.

## Troubleshooting

### LOW BATTERY

When you see the low battery indicator, turn off the unit and replace the 9 volt alkaline battery. **Do not replace the batter when the unit is on.**

### E6

When you see E6 in the LCD, the probe cable is improperly connected or disconnected from the meter body.

## Warranty

YELLOW JACKET® products from Ritchie Engineering Company, Inc. are guaranteed to be free from material and workmanship defects for a period of one year. This guarantee does not cover products that have been altered, abused, misused or improperly maintained.

All returns **MUST** have an RGA number and proof of purchase/copy of invoice. Please obtain an RGA number from Ritchie Engineering Customer Service by calling (800)769-8370. All electronic products **must be** returned to Ritchie Engineering **prepaid**.

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Some specialty products are not stocked and thus not eligible for return. If the product is found to be defective, Ritchie Engineering will repair, replace or issue a credit at our discretion.

