# Datalogging CFM Anemometer

# 840001

Instruction Manual

SPER
SCIENTIFIC LTD.

EASTERN ENERGY

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## 1. INTRODUCTION

Automatically records up to 16,000 (!) data points in the field along with time and date. These can later be downloaded to a computer via the meter's RS232 port and the results viewed instantly on software which comes with the unit. The software also enables real time data logging directly from the meter to the computer.

Features

- air volume (CFM)
- air velocity
- min-max
- simultaneously displays air temperature in ºC or ºF
- reads type-K or J thermocouple probes
- calendar/clock
- selectable auto power off
- hold function
- detachable probe
- fold-out tripod
- large easy to read LCD

Comes ready to use in a protective foam lined carrying case complete with metal vane anemometer probe, software programs on two (2) CDs, RS232 computer connection cable, 4 AA batteries, and a 3V button cell battery.

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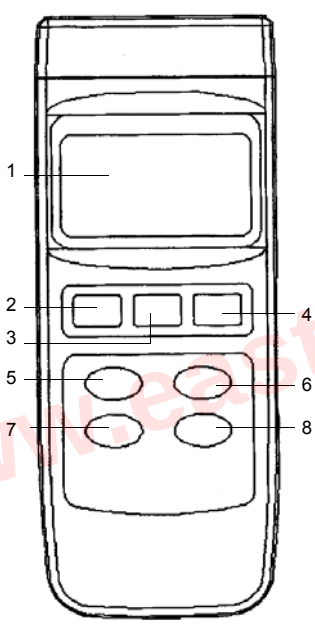
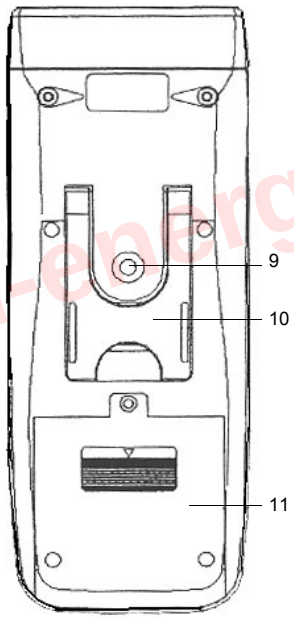
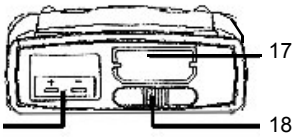
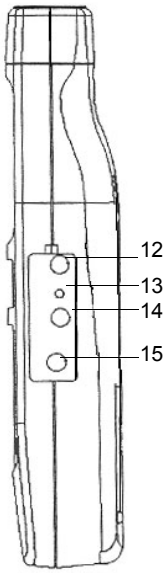
## 2. PANEL DESCRIPTION




1 DISPLAY
2 POWER button
3 HOLD / ESC button
4 REC / ENTER button
5 ▲(UP) button
6 FUNCTION / ▼(DOWN) button
7 CLOCK / SEND button
8 LOGGER / SET button
9 TRIPOD SCREW
10 STAND
11 BATTERY COMPARTMENT/COVER
12 LCD BRIGHTNESS ADJUSTMENT VR
13 SYSTEM RESET
14 RS232 OUTPUT TERMINAL
15 DC 9V POWER ADAPTOR SOCKET
16 TYPE K/J THERMOCOUPLE PROBE INPUT
17 PROBE INPUT SOCKET
18 PROBE LOCK SWITCH (◄LOCK ON/OFF)

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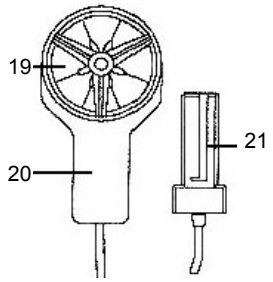


19 VANE
20 PROBE HANDLE
21 PROBE PLUG

## 3. MEASURING PROCEDURES

See "Advanced Adjustment Procedures" (pg 7) to set the default temperature scale (°C or °F), air velocity unit, (m/S, Ft/min, Km/h, Knots or Mile/h), air flow measurement (CMM or CMF), and area size (Meter^2 or Ft^2).

### 3-A. Air Velocity and Ambient Temperature Measurement

- Insert the **PROBE PLUG** (21) into the **PROBE INPUT SOCKET** (17).
- Slide the **PROBE LOCK SWITCH** (18) to the ◄LOCK position.
- Turn on the meter by pressing the **POWER** (2) button. The air velocity readings are displayed as m/S, Ft/min, Km/h, Knots or Mile/h. The ambient temperature is displayed in °C or °F.
- The yellow dot on the **VANE** (19) should face the air flow.
- To display the time (h-m-s) or date (y-m-d) during use, press the **CLOCK** (7) button.
- Press the **POWER** (2) button to turn the unit off.

### 3-B. Air Flow Measurement - CMM/CMF

- The procedures are the same as above (3-A).
- Press the **FUNCTION** (6) button to toggle between air velocity and air flow readings.
- The display shows the reading and the area size in meter^2 or ft^2.
- To display the time (h-m-s) or date (y-m-d) during use, press the **CLOCK** (7) button.
- Press the **POWER** (2) button to turn the unit off.

### 3-C. Type K, J Thermometer Measurement

- Unlock and remove the anemometer sensor from the meter and slide the **PROBE LOCK SWITCH** (18) to the ◄LOCK position.
- Insert the thermocouple probe in the **TYPE K/J PROBE INPUT** (16).
- Turn on the meter by pressing the **POWER** (2) button.
- Press the **FUNCTION** (6) button to switch between type K or J, "J type" or K type" will be displayed.



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### 3-D. Data Hold

- While measuring, press the **HOLD** (3) button to freeze the displayed value.
- "HOLD" and the measurement are displayed.
- Press the **HOLD** (3) button again to exit.

### 3-E. Maximum / Minimum

To record the maximum and minimum readings:

- Press the **REC** (4) button once. "REC" appears on the LCD.
- Press the **REC** (4) button again. "MAX", "REC" and the maximum measurement appear on the LCD.
- Press the **REC** (4) button again. "REC Min" and the minimum measurement appear on the LCD.
- To exit this function, press and hold the **REC** (4) button for at least 2 seconds, until the display reverts to the current reading.

### 3-F. Data Logger

The data logger function can save up to 16,000 data points along with the time (hour-min-sec) and date (year-month-day). When there are 16,000 data points in memory, the display indicates "FULL."

- To momentarily display sampling time, press the **LOGGER** (8) button once.
- To change the sampling time, see item 4-D on page 7.
- Press the **REC** (4) button once, "REC" will be displayed. Depending on your set sampling time, continue to step "a" or "b" (below).

**a. Auto Data Logger (sampling time can be set for 2 seconds to 8 hours, 59 minutes, 59 seconds):**

- Press the **LOGGER** (8) button once, "REC DATA" is displayed and "Recording. . . ." flashes at each preset interval.
- Press the **LOGGER** (8) button again to exit. "REC" is still displayed, but "DATA" is no longer shown.
- To resume data logging, simply press the **LOGGER** button (8) again.
- To exit the "REC" function, press and hold the **REC** button (4) for at least 2 seconds.

**b. Manual Data Logger (sampling time MUST be set to "0" zero):**

- Press the **LOGGER** (8) button once to save each data point.
- To exit this function, press and hold the **REC** button (4) for at least 2 seconds.

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## 4. ADVANCED AJUSTMENT PROCEDURES

Press the **SET** button (8) for at least two seconds to enter the advanced adjustment procedures. Press the **ESC** (3) button to exit.

> Before executing the advanced adjustment procedures, exit the HOLD and RECORD functions.

### 4-A. Check Remaining Available of Data Points

Press the **SET** button (8) at least 2 seconds until the lower display shows:

**"**XXXXX" is the number of free data points.

| XXXXX | Memory Space |
|---|---|

### 4-B. Clear Memory

| 107 | Clear Memory |
|---|---|
| | Esc:N Enter:Y |

- Press the **SET** (8) button as needed to reach the "clear memory" screen. The number of saved data points is displayed.
- To delete saved data from memory, press the **ENTER** (4) button once, then press **ENTER** (4) button again to confirm your action. The display shows: "0 Ok ESC:Quit".
- If you DO NOT want to clear the memory, press the **ESC** (3) button to exit, or press the **SET** (8) button to advance to the next option.

### 4-C. Date/Time Setting

| 06:01:03 | Date/Time Set |
|---|---|
| y-m-d | ^, v ENTER(→) |

- Press the **SET** button (8) as needed to reach the "date/time set" screen.
- Use the **▲UP** (5), **▼ DOWN** (6), and **ENTER** (4) buttons to select the year, month, date, hours, minutes and seconds.
- Press the **ENTER** (4) button to save the settings.
- Press the **SET** (8) button to advance to the next option, or press the **ESC** (3) button to exit.

### 4-D. Sample Time Setting

| 00:00:02 | Sample Time |
|---|---|
| h-m-s | ^, v ENTER(→) |

- Press the **SET** (8) button as needed to reach the "sample time" screen.
- Use the **▲** (5), **▼** (6), and **ENTER** (4) buttons to select the sample time (hour-min-sec).
- Press the **ENTER** (4) button to save the settings.
- Press the **SET** (8) button to advance to the next option, or press the **ESC** (3) button to exit.

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### 4-E. Auto Power Off Default Setting

| |
|---|
| 1 = Auto Power Off - Enabled<br>0 = Auto Power Off - Disabled |

The meter will automatic shut off after about 10 minutes without activity.

- Press the **SET** (8) button as needed to reach the "auto power off" screen.
- Use the ▲ (5) or ▼ (6) buttons to enable / disable this feature.
- Press the **ENTER** (4) button to save the settings.
- Press the **SET** (8) button to advance to the next option, or press the **ESC** (3) button to exit.

### 4-F. Temp Unit Default Setting

| |
|---|
| 1 = °F<br>0 = °C |

- Press the **SET** button (8) as needed to reach the "temp. unit" screen.
- Use the ▲**UP** (5) and ▼ **DOWN** (6) buttons to switch between °F and °C.
- Press the **ENTER** (4) button to save the settings.
- Press the **SET** (8) button to advance to the next option, or press the **ESC** (3) button to exit.

### 4-G. Air Velocity Unit Default Setting

| |
|---|
| 0 = m/S<br>1 = Km/h<br>2 = Ft/min<br>3 = Mile/h<br>4 = knot |

- Press the **SET** (8) button as needed to reach the "default vel." screen.
- Use the ▲**UP** (5) and ▼ **DOWN** (6) buttons to switch between m/S, Ft/min, Km/h, Knots, Mile/h.
- Press the **ENTER** (4) button to save the settings.
- Press the **SET** (8) button to advance to the next option, or press the **ESC** (3) button to exit.

### 4-H. Air Flow Unit Default Setting

| |
|---|
| 1 = CFM<br>0 = CMM |

- Press the **SET** (8) button as needed to reach the "CFM/CMM" screen.
- Use the ▲**UP** (5) and ▼ **DOWN** (6) buttons to switch between CMM (cubic meter per minute) and CFM (cubic feet per minute).
- Press the **ENTER** (4) button to save the settings.
- Press the **SET** (8) button to advance to the next option, or press the **ESC** (3) button to exit.

### 4-I. Area Size (Air Flow) Default Setting

- Press the **SET** (8) button as needed to reach the "area:meter^2" screen.
- **CMM**: Use the ▲**UP** (5), ▼ **DOWN** (6), and **SEND** (7) buttons to enter an area size from 0.001 to 30.000 square meters.
- **CFM**: Use the ▲**UP** (5), ▼ **DOWN** (6), and **SEND** (7) buttons to enter an area size from 0.01 to 322.91 square feet.



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- Press the **ENTER** (4) button, then press the **ESC** (3) button to save the setting and exit this function.

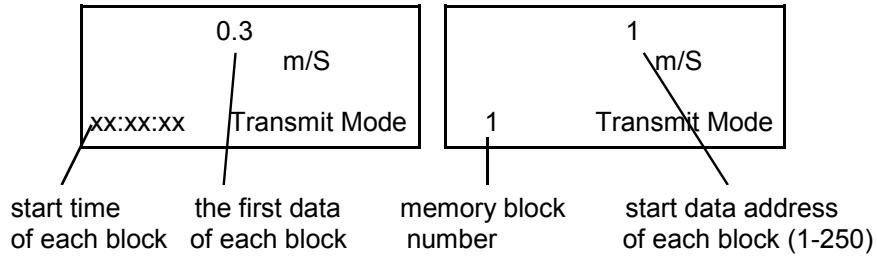
### 4-J. Escape from Advanced Adjustments

For the above procedures (B through F), press the **ESC** (3) button before pressing the **ENTER** (4) button to exit advanced adjustments without saving the changes.

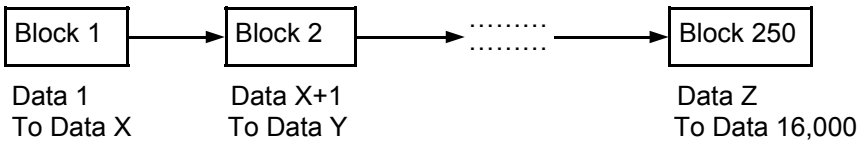
## 5. UPLOADING DATA FROM THE METER

To upload the data to a computer, connect the RS232 cable and run the software (pg 11). You can only send one memory block at a time.

- First, cancel the HOLD and RECORD functions if they are activated.
- Press the **SEND** (7) button for at least 2 seconds until the bottom right display shows "Transmit mode."
- Release the button.
- The following screens flash alternately:




The meter can record up to 16,000 data points, stored in a maximum of 250 memory blocks. All data points saved during one data logging session are stored in one memory block.




- Use the ▲**UP** (5) and ▼ **DOWN** (6) buttons to select the desired memory block number (1 to 250) and push the **SEND** (7) button once.
- The bottom right of the display shows "Sending Data!".
- When the process has finished, "Transmit mode" is displayed.
- Push the **ESC** (3) button to exit this function.



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## 6. RS232 PC SERIAL INTERFACE

The instrument features a 3.5 mm **RS232 OUTPUT TERMINAL** (14). The signal output is a 16-digit data stream that can be adapted to user-defined applications. A RS232 lead with the following connection is required to link the instrument with the PC serial interface.

| Meter (3.5 mm jack plug) | PC (9W 'D" Connector) | |
|---|---|---|
| Center Pin ..... | Pin 4 | Pin 2 ┐ 2.2 K |
| Ground/shield ..... | Pin 2 | Pin 5 ┘ resistor |

The 16 digits data stream will be displayed in the following format:

| D15 | D14 | D13 | D12 | D11 | D10 | D9 | D8 | D7 | D6 | D5 | D4 | D3 | D2 | D1 | D0 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Each digit indicates the following status:

| | | | |
|---|---|---|---|
| D0 | End Word = 0D | | |
| D1 & D8 | Display reading, Dl = LSD, D8 = MSD<br>(If the display reading is 1234, then D8 to D1 is: 00001234) | | |
| D9 | Decimal Point (DP), position from right to the left | | |
| D10 | Polarity: 0 = Positive 1 = Negative | | |
| D11 & D12 | Annunciator for Display | | |
| | °C = 01 | Knot = 90 | mile/h = 12 |
| | °F = 02 | Km/h = 10 | CMM = 84 |
| | m/S = 08 | ft/min = 11 | CFM = 85 |
| D13 | The upper display data = 1, The lower display data = 2 | | |
| D14 | 4 | | |
| D15 | Start Word = 02 | | |
| RS232 Com Port Setting: 9600, No parity, 8 Data bits, 1 Stop bit | | | |

## 7. BATTERY REPLACEMENT

When the left corner of the LCD displays the low battery icon install 4 new AA 1.5V batteries. Slide the **BATTERY COVER** (10) away from the instrument to remove the old batteries. When the clock is no longer accurate, replace the 3V button cell battery located in the compartment behind the AA's. Re-attach the battery cover when you have finished. In-spec measurements may be made for several hours after the low battery indicator appears.



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## 8. TROUBLESHOOTING

- To reset the system, slide the **PROBE LOCK SWITCH** (18) between the "On" and "Off" positions once or twice.
- Or, gently insert a pin or small object into the **SYSTEM RESET** (13) while turning on the meter.

## 9. OPTIONAL ACCESSORIES

840090 Water Resistant Instrument Pouch
840092 Bench-Top Tripod
840093 Field Tripod
840094 USB RS232 Serial Adapter
840097 AC to DC 9V Adapter
Type K and Type J Probes

## 10. SOFTWARE

The software CDs feature auto-installation. To use the programs, simply install and follow the on-screen instructions.

850080 - Provides real-time data acquisition of multiple sensors, data logging, text display, angular display, chart display, data recorder high/low limit, data query, text report, chart report. The ".mdb" data file can be retrieved in MS Excel, MS Access and other applications.

850090 - Used to download the data log from the meter to the computer. The standard text data file ".dat" may be converted with MS Excel, MS Access and other applications to ".mdb" format.

## 11. SPECIFICATIONS

| **Air Volume** | **Range** | **Res.** | **Accuracy** |
|---|---|---|---|
| CMM (m3/min) | 0 ~ 54,000 | 0.001 ~ 1 | 0.001 ~ 30.0 |
| CFM (ft3/min) | 0 ~ 1,908,300 | 0.01 ~ 100 | 0.01 ~ 322.91 |
| **Air Velocity** | **Range** | **Res.** | **Accuracy** |
| M/s | 0.4 ~ 25.0 | 0.1 | ±(2%+ 0.2d) |
| Km/h | 1.4 ~ 90.0 | | |
| Mile/h | 0.9 ~ 55.9 | | |
| Knots | 0.8 ~ 48.6 | | |
| Ft/min | 80 ~ 4921 | 1 | ±(2%+ 20 ft/min) |
| **Air Temp.** | **Range** | **Res.** | **Accuracy** |
| Temp ºC | 0 ~ 50ºC | 0.1º | 0.8ºC |
| Temp ºF | 32 ~ 122ºF | | 1.5ºF |



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| Thermocouple | Range | Res. | Accuracy |
|---|---|---|---|
| Type K | -58~2372ºF<br>-50~1300ºC | 0.1º | ±(0.2% + 1ºF)<br>±(0.2% + 0.5ºC) |
| Type J | -58~2012ºF<br>-100~1100ºC | | ±(0.2% + 1.8ºF)<br>±(0.2% + 1ºC ) |
| Type K/J specification tests under the environment RF Field Strength less than 3 V/M and frequency less than 30 MHz. | | | |
| Temp. Compensation | | Automatic for K/J thermometers. | |

| Misc. | |
|---|---|
| Operating Conditions | 0 to 50°C, Less than 80% RH. |
| Display Sampling Time | Approximately 1 second. |
| Power Drain | Approximately DC 21.5 mA for the meter. DC 27.5mA for the meter and anemometer probe. |
| Dimensions | Meter 7 ¾" x 3" x 1½" (200 x 76 x 37 mm)<br>Sensor head diameter: 2 ¾" (70 mm)<br>Cable length (max. stretched): 60" (1524 mm)<br>Probe length: 5 1/2" (140 mm) |
| Weight: | 31 oz (515 g) |

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## WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of one (1) years from the date of purchase, and agrees to repair or replace any defective unit without charge. If your model has since been discontinued, an equivalent Sper Scientific product will be substituted if available. This warranty does not cover probes, batteries, or damage resulting from accident, misuse, or abuse of the product. In order to obtain warranty service, simply ship the unit postage prepaid to:

SPER SCIENTIFIC LTD.
7720 East Redfield, Suite 7, Scottsdale, Arizona 85260
(480) 948-4448, www.sperscientific.com, info@sperscientific.com

Please Note: The defective unit must be accompanied by a description of the problem and your return address.



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