Anemometer SD Card Datalogger

850023

Instruction Manual

SPER
SCIENTIFIC   *Environmental Measurement Instruments*

Anemometer SD Card Datalogger 850023

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SPER SCIENTIFIC

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INTRODUCTION

The Sper Scientific Anemometer SD Card Datalogger (Model 850023) is an extremely accurate meter with fast response times that reads air temperature and velocity, and functions as a Type K/J thermocouple thermometer.

This meter features a real time SD memory card datalogger. Standard, portable SD memory cards provide unlimited data storage and upload pre-formatted data directly to Excel, eliminating the need for cables or software. Alternatively, manually record 99 readings for on-screen review or stream data directly to a computer using the optional software and cables. Each data set includes temperature, RH, time and date.

FEATURES

- Reads air velocity and temperature and functions as a Type K/J thermometer

- Low-friction ball vane wheels provide high accuracy in high and low velocities

- SD memory card datalogger

- Manual datalogger option

- Fast response time for air temperature

- Highly accurate microcomputer circuit

- RS232 or USB PC connection

- Direct upload of data to Excel

- Detachable probe for measuring flexibility

- Internal clock and calendar

- Touch-tone

- Tripod mounting screw

- Built-in tabletop stand

- Maximum and minimum

- Hold function

- Auto-power-off

- Low battery indicator

- Backlight

MATERIALS SUPPLIED

- Meter
- Probe
- SD Card
- 6 AA Batteries
- Instruction Manual
- Soft Carrying Case

POWER SUPPLY

This meter can be powered by six AA (1.5 V, UM3) batteries or an optional 9 Volt DC adapter. See page 22 for battery replacement instructions.

Plug the adaptor into the power port labeled "DC 9V," located on the side of the meter.

Note…
When using the adapter to run the meter, the meter will remain permanently **on** and the **POWER** button will be disabled.

METER COMPONENTS

Top of Meter

Type K/J
Thermometer
Socket

Anemometer Probe
Input Socket

Bottom of Meter

SD Card
Socket

Side of Meter

RS232 Output

RESET

DC 9V Adapter
Input Socket
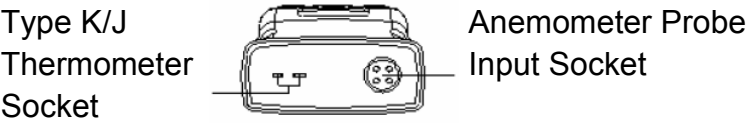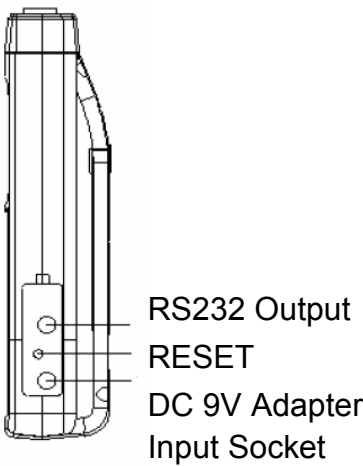
METER COMPONENTS

Back of Meter

Tripod
Mounting
Screw

Stand

Battery Cover
Screws

Battery
Compartment/
Cover

Probe

Probe Head

Probe
Handle

Probe
Plug

KEYPAD

LCD
Display

POWER
(ESC,
Backlight)

HOLD/NEXT/
FUNCTION

REC/ENTER/
UNIT

SET (▼,
TIME
CHECK)

LOGGER (▲,
SAMPLING
TIME
CHECK)
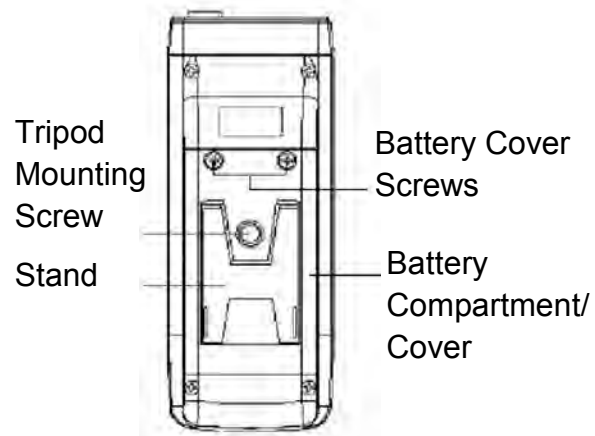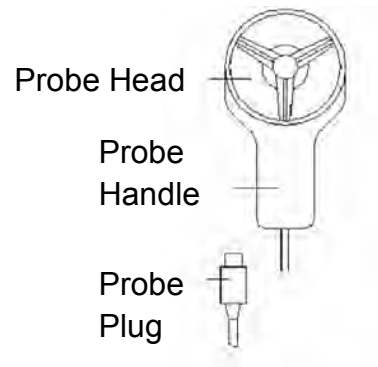
SETUP MODE

The advanced Setup Mode allows you to customize the following meter preferences and defaults:

- Real Time Clock

- Decimal Type

- Auto Power Off

- Touch-Tone

- Thermometer Type K/J

- Temperature Units

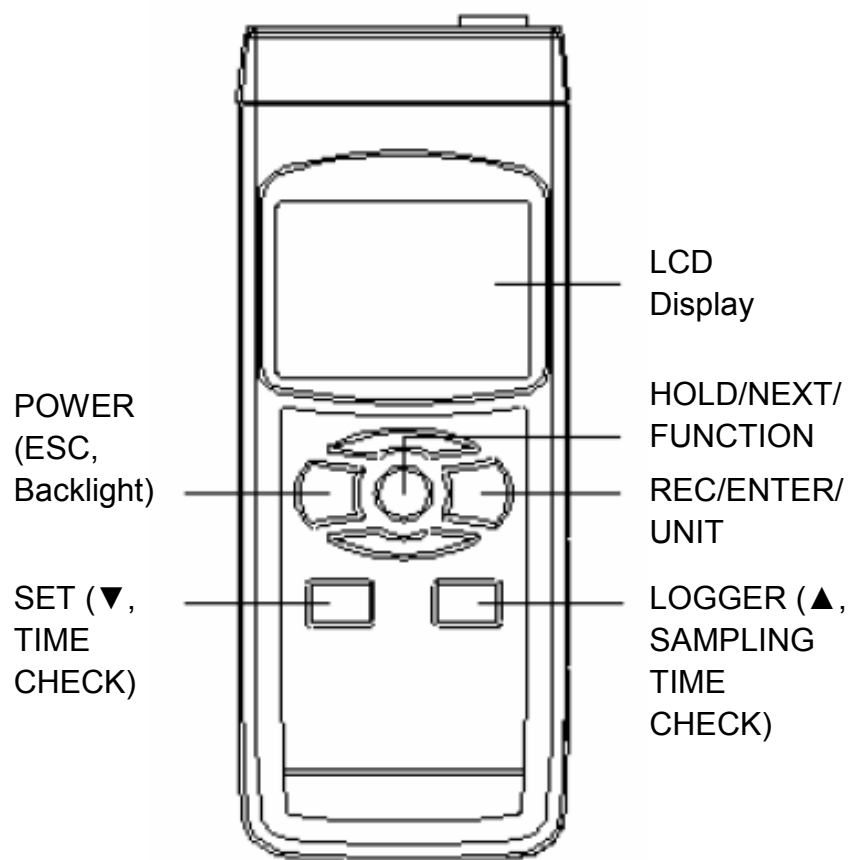- Sampling Time

- SD Memory Card Format

Note…
The setup functions can be performed under any parameter but not while utilizing the datalogger function. Once selections are saved, the meter will default to the selected preferences when the meter is turned **off** and **on** again. Once a selection is saved, the meter automatically advances to the next setup function (i.e., after setting the real time clock, the meter will automatically enter the decimal type setup function).

1. Press **POWER** to turn the meter **on**.

2. Press **SET** for 2 seconds or longer to enter Setup Mode.

3. Press **NEXT** to cycle through the setup functions.

SETUP MODE

Note…
Press **ESC** to exit Setup Mode. The meter will return to Normal Mode.

Real Time Clock

1. Enter the clock function from Setup Mode (see page 11). "dAtE" appears on the LCD.

2. Press **ENTER**. The year will appear on the LCD.

3. Press ▲ or ▼ to adjust the value. Press **ENTER** to save the value.

4. Repeat Step 3 to adjust the month, date, hour, minute and second.

Note…
This procedure adjusts the meter's internal clock. The internal clock will function when the meter is turned **off** but only when the batteries have adequate power (not with low battery power.)

Decimal Type

Although the decimal is commonly expressed as the "." symbol (such as 20.6 or 1000.53), some (European) countries use a "," symbol to represent the decimal (such as 20,6 or 1000,53). The meter defaults to the period symbol. To adjust:

1. Enter the decimal type function from Setup Mode (see page 11). "dEC" appears on the LCD.

SETUP MODE

2. Press ▲ or ▼ to select Basic (.) or Euro (,). Press **ENTER** to save the selection.

Auto Power Off

The meter automatically turns **off** after 10 minutes of inactivity, however this function can be disabled.

1. Enter the auto power off function from Setup Mode (see page 11). "PoFF" appears on the LCD.

2. Press ▲ or ▼ to select yes (auto power off enabled) or no (auto power off disabled). Press **ENTER** to save the selection.

Touch-Tone

1. Enter the touch-tone function from Setup Mode (see page 11). "bEEP" appears on the LCD.

2. Press ▲ or ▼ to select yes (touch-tone enabled) or no (touch-tone disabled). Press **ENTER** to save the selection.

Thermometer Type K/J

1. Enter the thermometer type function from Setup Mode (see page 11). "tYPE" appears on the LCD.

2. Press ▲ or ▼ to select K or J. Press **ENTER** to save the selection.

Temperature Units

1. Enter the temperature units function from Setup Mode

SETUP MODE

(see page 11). "t-CF" appears on the LCD.

2. Press ▲ or ▼ to select C (degrees Celcius) or F (degrees Farhenheit). Press **ENTER** to save the selection.

Sampling Time

The sampling time is the time allotted between successive measurements. To adjust the sampling time (in seconds):

1. Enter the sampling time function from Setup Mode (see page 11). "SP-t" appears on the LCD.

2. Press ▲ or ▼ to adjust the value (0, 1, 2, 5, 10, 30, 60, 120, 300, 600, 800, 1800, 3600 seconds). Press **ENTER** to save the value.

SD Memory Card Format

Enabling this function will format the SD memory card to work specifically with your meter. Formatting the SD card will erase any previous memory on the card. New SD cards should be formatted to work with your meter.

1. Enter the SD memory card format function from Setup Mode (see page 11). "Sd F" appears on the LCD.

2. Press ▲ or ▼ to select yes (format the SD memory card) or no (do not format the SD memory card). Press **ENTER** to confirm your selection. If selecting yes, "YES Enter" will appear on the LCD, press **ENTER** again and the meter will format the SD card.

MEASUREMENT PROCEDURES

Turning the Unit On/Off

1. Press **POWER** to turn the meter **on.**

2. Press and hold **POWER** for 2 seconds to turn the meter **off**.

Selecting the Function

1. Press and hold **FUNC** to cycle through the options listed below. Release **FUNC** when you reach the desired function.

- Air velocity/temperature
  "An" appears on the LCD.

- Type K/J thermometer
  "tP" appears on the LCD.

Note…
The meter will default to the last function setting used when it is turned **off** and **on** again.

Selecting the Air Velocity Unit

1. To select the air velocity unit, press and hold **UNIT**. The meter will cycle through m/S, Km/h, mph, Knot, FPM in sequence.

2. Release **UNIT** when the desired unit appears on the LCD.

Note…
To change the temperature unit, see page 13.

MEASUREMENT PROCEDURES

Air Velocity and Air Temperature

1. Press **POWER** to turn the meter **on.**

2. Plug the anemometer probe plug into the anemometer probe input socket.

3. Press and hold **FUNC** to cycle through the options until "An" appears on the LCD. Release the **FUNC** button.

4. Hold the probe handle and point the probe head toward the air flow. The air velocity value appears on the upper display and the air temperature value appears on the lower display.

Note…
Point the yellow dot indicator on the probe head toward the air flow.

Type K/J Thermometer

1. Press **POWER** to turn the meter **on**.

2. Press and hold **FUNC** to cycle through the options until "tP" appears on the LCD. Release the **FUNC** button.

3. The anemometer probe must be disconnected from the meter to obtain accurate Type K/J readings.

4. Plug a thermocouple temperature probe (type K or J) into the type K/J thermometer socket. The LCD will display the measurement value from the temperature probe.

MEASUREMENT PROCEDURES

5. "K" or "J" appear on the LCD to indicate the type of thermometer.

Note…
When using the meter for the first time, the meter will default to K type thermocouple. See page 13 for instructions on selecting the thermocouple type.

Hold Function

1. When measuring any parameter, press **HOLD** to freeze the reading on the display. "HOLD" will appear on the LCD.

2. Press **HOLD** again to release the hold function. "HOLD" will disappear from the LCD.

Maximum and Minimum

To record maximum and minimum readings:

1. When measuring any parameter, press **REC** to begin recording the maximum and minimum values. "REC" appears on the LCD.

2. Press **REC**. The maximum value and "REC MAX" will appear on the LCD.

3. Press **REC**. The minimum value and "REC MIN" will appear on the LCD.

4. To delete the maximum or minimum value, press **HOLD**. "REC" appears on the LCD and the meter will begin recording the maximum and minimum values again.

MEASUREMENT PROCEDURES

5. To exit the min/max function, press and hold **REC** for 2 seconds or longer. The meter will return to Normal Mode.

Note…
The meter cannot be turned **off** from the memory record function. Exit the function, then press and hold **POWER** to turn the meter **off**.

Backlight

1. The backlight turns **on** automatically when the meter is turned **on**.

2. Press ☼ to turn the backlight off.

3. Press ☼ to turn the backlight on.

View Real Time Clock

To view the time function during normal measurement (not during datalogging):

1. Press **TIME CHECK**. The time information (Year, Month/Date, Hour/Minute) will appear on the lower display of the LCD.

View Sampling Time

To view the sampling time function during normal measurement (not during datalogging):

1. Press **SAMPLING CHECK**. The sampling time (in seconds) will appear on the lower display of the LCD.

DATALOGGER

Preparing the Datalogger

1. Insert the SD card into the SD card socket on the bottom of the meter, ensuring that the front of the SD card faces the back of the meter.

2. Format the SD card as needed (see page 14).

3. Set the real time clock if using the meter for the first time (see page 12).

4. Set the decimal type if using the meter for the first time (see page 12.)

Auto Datalogging

1. Set the sampling time to ≥ 1 second. Refer to page 14.

2. Press **REC**. "REC" will appear on the LCD.

3. Press **LOGGER**. "REC" will flash on the LCD and the alarm will sound while the measurement data and time information are saved to memory.

4. To pause datalogging, press **LOGGER**. The meter will temporarily stop recording and "REC" will stop flashing on the LCD. Press **LOGGER** again to resume datalogging. "REC" will flash on the LCD.

5. To finish datalogging, while the datalogger is paused, press **REC** for 2 seconds or longer. "REC" will disappear from the LCD to indicate that datalogging has ended.

DATALOGGER

Note…
To enable/disable the touch-tone feature, see page 13.

Manual Datalogging

1. Set the sampling time to 0 seconds. Refer to page 14.

2. Press **REC**. "REC will appear on the LCD.

3. Press **LOGGER**. "REC" will flash on the LCD and the alarm will sound while the measurement data and time information are saved to memory. The position (location) number will appear on the bottom of the LCD and will also be recorded on the SD card.

Note…

To enable/disable the touch-tone feature, see page 13. To change the position number, press ▼. The position number will flash on the LCD. Press ▲ or ▼ to set the position number (from 1 to 99). To indicate the position location, P x (x = 1 to 99) will appear on the lower display. After selecting the position number, press **ENTER** to confirm.

4. To finish datalogging, press **REC** for longer than 2 seconds. "REC" will disappear from the LCD to indicate that datalogging has ended.

SD Card Data Structure

1. The first time a SD card is used in this meter, a folder AMA01 will be generated.

DATALOGGER

2. If the datalogger is being used for the first time, a new file AMA01001.XLS will be generated under the route AMA01\. After exiting the datalogger and executing the function again, the data is saved to the AMA01001.XLS file until the data reach 30,000 data columns. A new file will then be generated (i.e., AMA01002.XLS).

3. The folder AMA01\ will hold 99 files. A new route (i.e., AMA02\) will be generated when exceeding 99 files.

4. The file's route structure:

AMA01\
      AMA01001.XLS
      AMA01002.XLS
      …………………
      AMA01099.XLS
AMA02\
      AMA02001.XLS
      AMA02002.XLS
      …………………
      AMA02099.XLS
AMAXX\
      …………………
      …………………

Note…
XX: Maximum value is 10.

BATTERY REPLACEMENT

This meter uses six AA (1.5 V, UM3) batteries. When the low battery indicator appears on the LCD, battery replacement is needed. After the icon appears on the LCD, in-spec measurement can still be made for several hours before becoming inaccurate.

1. Press **POWER** to turn the meter **off**.

2. Unscrew the battery cover and remove from the meter.

3. Remove the old batteries and replace with six new AA batteries, ensuring correct polarity.

4. Replace the battery cover. Tighten the screws on the battery cover to secure to the meter.

TROUBLESHOOTING

System Reset

If the meter is not functioning properly (i.e., the system is frozen and the keypad is non-operational), reset the meter:

1. Press **POWER** to turn the meter **on**.

2. Use a small tool (such as a disassembled paperclip or a pin) to press the **RESET** button (located on the right side of the meter under the protective black cover). Wait a few seconds for the meter to restart.

PC CONNECTION

To save data from the SD card to a PC (using Excel software):

1. After datalogging is complete, remove the SD card from the meter's SD card socket.

2. Insert the SD card into the computer's SD card slot (if built into the computer) or into a SD card adapter (ensuring that the adapter is connected to the computer).

3. Turn the computer **on** and run the Excel program.

4. Download the saved data file (i.e., AMA01001.XLS, AMA01002.XLS) from the SD card to the computer. The saved data will appear in the Excel software screen. The data can then be used in Excel to create graphs, etc.

Excel Graphic Screen
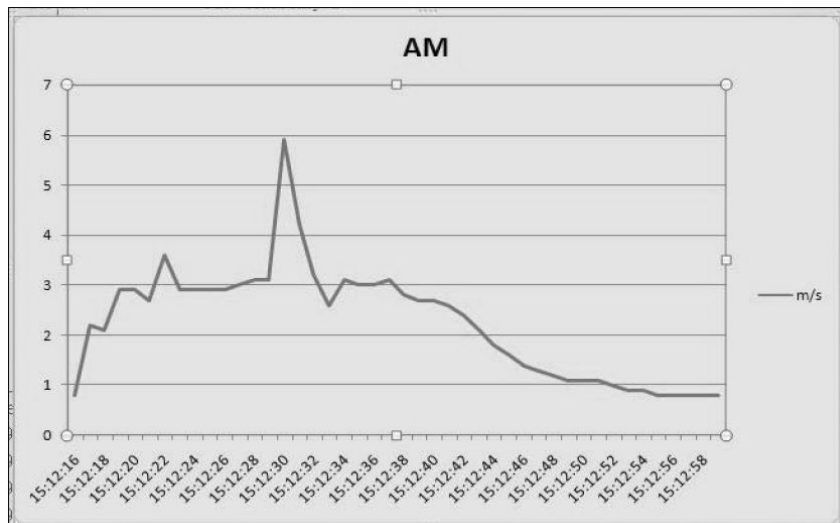
PC CONNECTION

Excel Data Screen

|	A	B	C	D	E	F	G	H	I	J
			G54		fx					
1	Place	Date	Time	Value	Unit	Value	Unit			
2	1	2009/6/8	15:12:16	0.8	m/S	28.8	AMTemp C			
3	2	2009/6/8	15:12:17	2.2	m/S	28.8	AMTemp C			
4	3	2009/6/8	15:12:18	2.1	m/S	28.8	AMTemp C			
5	4	2009/6/8	15:12:19	2.9	m/S	28.9	AMTemp C			
6	5	2009/6/8	15:12:20	2.9	m/S	28.8	AMTemp C			
7	6	2009/6/8	15:12:21	2.7	m/S	28.8	AMTemp C			
8	7	2009/6/8	15:12:22	3.6	m/S	28.8	AMTemp C			
9	8	2009/6/8	15:12:23	2.9	m/S	28.8	AMTemp C			
10	9	2009/6/8	15:12:24	2.9	m/S	28.8	AMTemp C			
11	10	2009/6/8	15:12:25	2.9	m/S	28.8	AMTemp C			
12	11	2009/6/8	15:12:26	2.9	m/S	28.9	AMTemp C			
13	12	2009/6/8	15:12:27	3	m/S	28.8	AMTemp C			
14	13	2009/6/8	15:12:28	3.1	m/S	28.8	AMTemp C			
15	14	2009/6/8	15:12:29	3.1	m/S	28.7	AMTemp C			
16	15	2009/6/8	15:12:30	5.9	m/S	29.1	AMTemp C			
17	16	2009/6/8	15:12:31	4.2	m/S	29	AMTemp C			
18	17	2009/6/8	15:12:32	3.2	m/S	28.9	AMTemp C			
19	18	2009/6/8	15:12:33	2.6	m/S	28.6	AMTemp C			
20	19	2009/6/8	15:12:34	3.1	m/S	28.7	AMTemp C			
21	20	2009/6/8	15:12:35	3	m/S	28.7	AMTemp C			
22	21	2009/6/8	15:12:36	3	m/S	28.9	AMTemp C			
23	22	2009/6/8	15:12:37	3.1	m/S	28.9	AMTemp C			
24	23	2009/6/8	15:12:38	2.8	m/S	28.9	AMTemp C			

RS232 PC Serial Interface

This meter has a RS232 PC serial interface via a 3.5 mm terminal.

The data output is a 16 digit stream that can be utilized for the user's specific application.

A RS232 lead with the following connection will be required to link the meter with the PC serial port:

PC CONNECTION
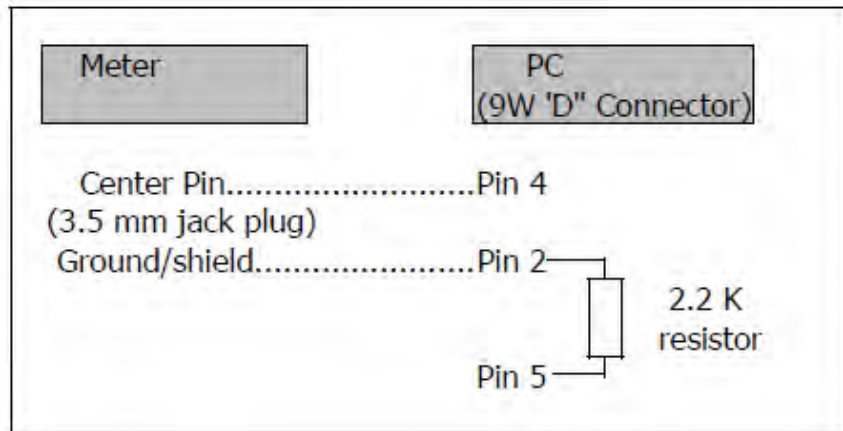
The 16 digit data stream will display in the following format:

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

Each digit indicates the following status:

DO	End word
D1 & D8	Display reading, D1 = LSD, D8 = MSD

For example: If the display reading is 1234, then D8 to D1 is 00001234 |
| D9 | Decimal point (DP) position from right to left

0 = No DP, 1 = 1 DP, 2 = 2 DP, 3 = 3DP |
| D10 | Polarity, 0 = Positive, 1 = Negative |

PC CONNECTION

D11 & D12	Annunciator for Display		
	°C = 01	Knot = 09	mile/h = 12
	°F = 02	Km/h = 10	
	m/S = 08	ft/min = 11	
D13	When send the upper display data = 1 When send the lower display data = 2		
D14	4		
D15	Start word		

RS232 Format: 9600, N, 8, 1

Baud rate	9600
Parity	No parity
Data bit no.	8 Data bits
Stop bit	1 Stop bit

OPTIONAL ACCESSORIES

800060~77 Type K Thermocouple Probes

840057   RS232 Computer Cable

840059   2GB SD Card

840090   Water Resistant Instrument Pouch

840093   Field Tripod

840094   USB Computer Cable

840097   AC Adaptor

850080   Software

SPECIFICATIONS

General

Circuit	Custom one-chip of microprocessor LSI circuit
Display	LCD size: 52 mm x 38 mm Backlight function
Measurement Unit	Air Velocity: m/S (meters per second) Km/h (kilometers per hour) Ft/min (FPM, feet per minute) Knots (nautical miles per hour) Mile/h (mph, miles per hour)
	Air Temperature: °C, °F
	Type K/J Thermometer: °C, °F
Temperature Compensation	Automatic temperature compensation for the anemometer function and the type K/J thermometer
Sampling Time of Display	Approximately 1 second
Data Output	RS232/USB PC computer interface
Memory Card	SD card 1 GB to 16 GB

SPECIFICATIONS

Operating Temperature	0 ~ 50°C
Operating Humidity	< 85% RH
Power Supply	Alkaline or heavy duty DC 1.5 V battery (UM3, AA) x 6 pieces
	DC 9V adapter input (AC/DC power adapter is optional)
Power Current	Normal Operation (without use of the datalogger or backlight): Approximately DC 15 mA
	Datalogger Operation (backlight is off): Approximately DC 28 mA
	If the backlight is on, the power consumption will increase by approximately 36 mA.
Dimensions	Meter: 203 x 76 x 38 mm 8 x 3 x 1 ½" Anemometer Probe Head: Round, 72 mm diameter
Weight	515 g (1.13 lb)

SPECIFICATIONS

Air Velocity

Measurement	Range	Resolution	Accuracy
m/S	0.4 ~ 30.0 m/S	0.1 m/S	± (2% reading + 0.2 m/S)
Km/h	1.4 ~ 126.0 Km/h	0.1 Km/h	± (2% reading + 0.8 Km/h)
mph (Mile/h)	0.9 ~ 78.3 mph	0.1 mph	± (2% reading + 0.4 mph)
Knots	0.8 ~ 68.0 Knots	0.1 Knots	± (2% reading + 0.4 knots)
FPM (Ft/min)	79 ~ 6890 FPM	1 FPM	± (2% reading + 40 FPM)

Air Temperature

Range	0 ~ 50°C (32 ~ 122°F)
Resolution	0.1°C (0.1°F)
Accuracy	± 0.8°C (± 1.5°F)

SPECIFICATIONS

Type K/J Thermometer

Sensor Type	Range	Resolution	Accuracy
Type K	-50.0 ~ 1300.0°C -50.1 ~ -100.0°C	0.1°C	± (0.4% reading + 0.5°C) ± (0.4% reading + 1°C)
	-58.0 ~ 2372.0°F -58.1 ~ -148.0°F	0.1°F	± (0.4% reading + 1°F) ± (0.4% reading + 1.8°F)
Type J	-50.0 ~ 1200.0°C -50.1 ~ -100.0°C	0.1°C	± (0.4% reading + 0.5°C) ± (0.4% reading + 1°C)
	-58.0 ~ 2192.0°F -58.1 ~ -148.0°F	0.1°F	± (0.4% reading + 1°F) ± (0.4% reading + 1.8°F)

WARRANTY

Sper Scientific warrants this product against defects in materials and workmanship for a period of **five (5) 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, battery leakage, or damage resulting from accident, tampering, misuse, or abuse of the product. Opening the meter to expose its electronics will void the warranty. To obtain warranty service, ship the unit postage prepaid to:

SPER SCIENTIFIC LTD
7720 E Redfield Rd, Suite 7
Scottsdale, AZ 85260

The defective unit must be accompanied by a description of the problem and your return address. Register your product online at www.sperscientific.com, or return your warranty card within 10 days of purchase.

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