

## **SKYMATE:**

### ***OVERVIEW:***

The Skymate instrument is a wind speed and temperature measuring device. Utilizing these 2 measurements, it can also provide the user with the windchill index. Temperature is a measure of the thermal energy content of a living or non-living entity. Many biological processes are affected by temperature in a profound way.

The rate of heat loss from the surface of living and non-living entities is affected by the speed of air or water movement across its surface. Thus, a mammal or a rock loses heat to moving air or water at a faster rate than to air or water that is not moving. Wind represents moving air and a warm body loses heat at a faster rate during a windy day than during a day where there is no air movement. The faster the wind speed, the faster the loss of heat.

In addition, a warm surface exposed to cold air loses more heat than the warm surface exposed to warmer air. The greater the difference in temperature between the surface temperature and the air mass, the greater the heat loss. This heat loss to air surrounding a surface is called convective heat loss. **THE WIND CHILL INDEX IS A MEASURE OF THE RATE OF CONVECTIVE HEAT LOSS - TAKING INTO ACCOUNT AIR TEMPERATURE AND WIND SPEED. THE SKYMATE WIND CHILL INDEX IS CALIBRATED TO EXPRESS HEAT LOSS FROM THE HUMAN BODY.**

The following simple equation describes convective heat loss:

$$\text{CONVECTIVE HEAT LOSS} = h_c * (\text{Temp}_{\text{surface}} - \text{Temp}_{\text{air}})$$

- i. Where  $h_c$  is wind speed.
- ii. Where  $(\text{Temp}_{\text{surface}} - \text{Temp}_{\text{air}})$  is the difference in temperature between the surface temperature and the air temperature.

### ***INSTRUMENTATION:***

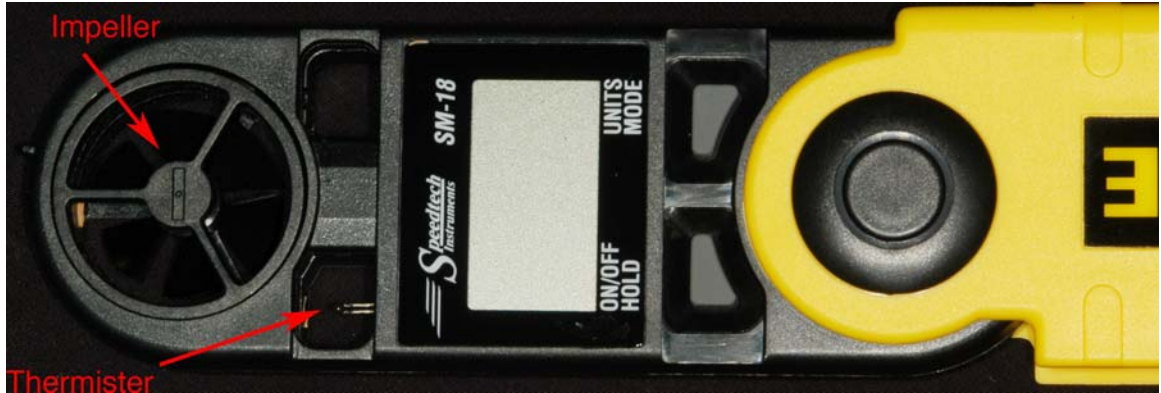
The temperature sensor in the Skymate consists of a thermistor protected by a plastic tunnel located on the left side of the instrument below the impeller blade. The thermistor is a resistor that changes resistance with changes in temperature ( $^{\circ}\text{C}$  and/or  $^{\circ}\text{F}$ ).

Air speed is measured by the impeller (propeller) blade. Rate of rotation is transformed into a voltage that is then displayed as air speed on the display.

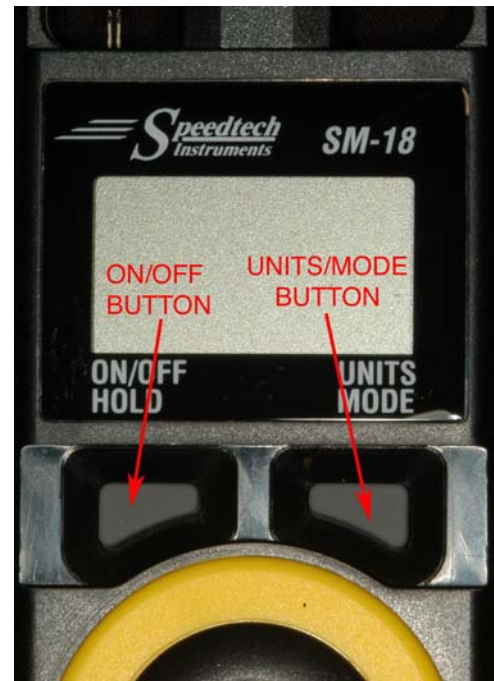
## INSTRUCTIONS:

To use the Skymate:

1. Rotate the black sensor body out of the rigid yellow plastic body to 180 degrees. [DO NOT TOUCH THE BLACK IMPELLER BLADE].



2. Set the Skymate to display the temperature and air speed units that you desire. Press the right button (UNITS MODE) to set the following units in sequence: KNT (knots) & °F ; KNT & °C; BF & °F; BF & °C; FPM (feet/min) & °F; MPH (miles/hr) & °F; MS (meters/sec) & °C; KPH (kilometers/hr) & °C. Stop at the units you desire. These units will be held in memory and will be the default units until you change the units in the future.
3. Turn on the unit by pressing the left button ON/OFF HOLD.
4. The display screen will continuously show the air temperature in the lower section of the screen. As an example if you set the default to MPH & °F , the temperature will be shown as °F.



Wind speed will be displayed as MPH. However, the wind speed can be displayed in a variety of ways (this information is displayed on the left side of screen). By pressing the UNITS MODE button (may require a firm press) you can display, in sequence, wind speed as MPH (blank left side of screen); average wind speed for 13 sec (AVG displayed on left side of screen); average wind speed over 5 sec (AVG 5); average wind speed over 10 sec (AVG 10); maximum wind speed (MAX) and wind chill index (WCI). WCI displays the air temperature that your body would “feel” as a result of the increased heat loss generated by movement of air across your skin. [Watch the screen and you will note that the temperature will drop as you increase the air speed across the impeller.]

5. If you wish to HOLD the current values in memory PRESS AND HOLD DOWN the left ON/Off HOLD button (DO NOT RELEASE). Record the values and then release the button. The unit will then turn itself off.