Thank you for purchasing the Velocitek S5 GPS Race Computer!

The S5 can provide you with the following information:

- Current speed in knots
- Upwind and downwind velocity made good (VMG) in knots
- Absolute maximum speed in knots
- Fastest 10 second average speed in knots

Turning the S5 on for the first time

1. Open the waterproof case and turn on the S5 using the black plastic switch. Make sure that you are looking at the LCD display when you activate the switch.

   When you first activate the switch, the display will show a number between 0 and 99 for about 3 seconds. This represents the amount of energy left in the device's batteries. 99 represents fresh batteries and 0 represents dead ones.

2. The display will then switch to showing the letters "rE" for reset. Wait for 3 seconds and the display will start flashing "00"

3. Place the device outdoors with a clear view of the sky for 15 minutes. This allows the device to download the information it needs to operate from Global Positioning System (GPS) satellites. While the information is being downloaded the display will blink "00". After the initial download, this procedure only needs to be repeated when the batteries are changed. This device will not work indoors, in built-up urban areas or

dense forest, due to a very weak non-existent GPS signal in these areas. When the device has acquired a GPS solution, the display will stop flashing.

Operating Modes

The S5 has two operating modes: speedometer mode and VMG mode. The decimal point after the second digit in the display is used to indicate which mode the device is in. For example the number 2.3 will be shown as "2 . 3" in speedometer mode and "2 . 3 . " in VMG mode.

To change modes:

1. Hold your thumbs over both the "MAX/U" and "10 SEC/D" buttons.
2. Watch the display countdown "55, 44, 33, 22, 11".
3. When the countdown has finished, the display will read "rL" for "release". At this point release both buttons.
4. The device has now changed modes. Notice the change in the status of the decimal point after the second digit.

Speedometer Mode Operation

In speedometer mode the device will show your speed in knots, updated every second. The device also records your maximum speed and your best 10 second average speed. To recall these records:

1. Touch and hold your thumb over the "MAX" button to display your maximum speed.
2. Touch and hold your thumb over the "10 SECOND" button to display your best 10 second average speed.

Note: If your maximum speed is greater than 10 knots the display will blink back and forth between the whole number and decimal portions of your maximum speed. For example if your maximum speed was 47.8 knots the display would blink back and forth between "47" and " .8".

To reset the maximums, switch the black power switch inside the case to the "OFF" position. Switch it back on while looking at the LCD. As soon as the prompt "rE" appears, switch it off again. When you turn the device on after going through this process the maximums will be reset to zero.

VMG Mode Operation

1. Once you are on the water and in the area you are going to be racing or training in pick a mark to be your downwind reference. Sail to this reference point. When you are near the reference point hold your thumb over the "10 SEC / D" button for five seconds. While you are doing this the display will show a countdown: "5", "4", "3", etc… At the end of the countdown the display will show "rL" for "Release". When you see "rL" release the button and the display will show "88" for about 1 second. This is your confirmation that the downwind reference point has been stored successfully. If you do not see "88" the mark location has not been stored and you must repeat the above procedure.

2. After you have stored the location of the downwind reference point, sail at least 75 m (75 yards) upwind. Line yourself up so that you sight the downwind reference point straight downwind from your current location. When you are lined up properly hold your thumb over the "MAX / U" button to store your location. You have now given the device two reference points that define the wind direction. The device

has stored the geographical coordinates of the two reference points and assumes that the wind direction is the same as the heading from the downwind point to the upwind point. These points only serve to tell the device the wind direction. They could be anywhere; on the beach, in the parking lot or on the water. The only thing that matters is that one point at least 75m or more directly upwind of the other.

It is possible to set the reference points in the opposite order, i.e. upwind first, then downwind. Also, the reference points can be reset independently. That is to say you could change the upwind reference point while keeping the same downwind point.

Reference points are stored in non-volatile memory so they are not lost when the device is switched off. If you often sail somewhere where there is a consistent seabreeze you don't need to program in a new wind direction every time you train with the S5.

3. After you have stored the locations of the two reference points, the S5 will indicate both your upwind and downwind VMG in real time. This will always be a positive number. When you are pointing higher than a beam reach this will be your VMG upwind, if you are sailing lower than a beam reach it will be your VMG downwind. If you sail on a beam reach the device will display a very small number no matter how fast you are going.

Tip for Windsurfers:

Twist the S5 around your boom so that it faces your sail before you tack. You will then be able to read the display (now upside down) through your sail window on the new tack.

Frequently Asked Questions

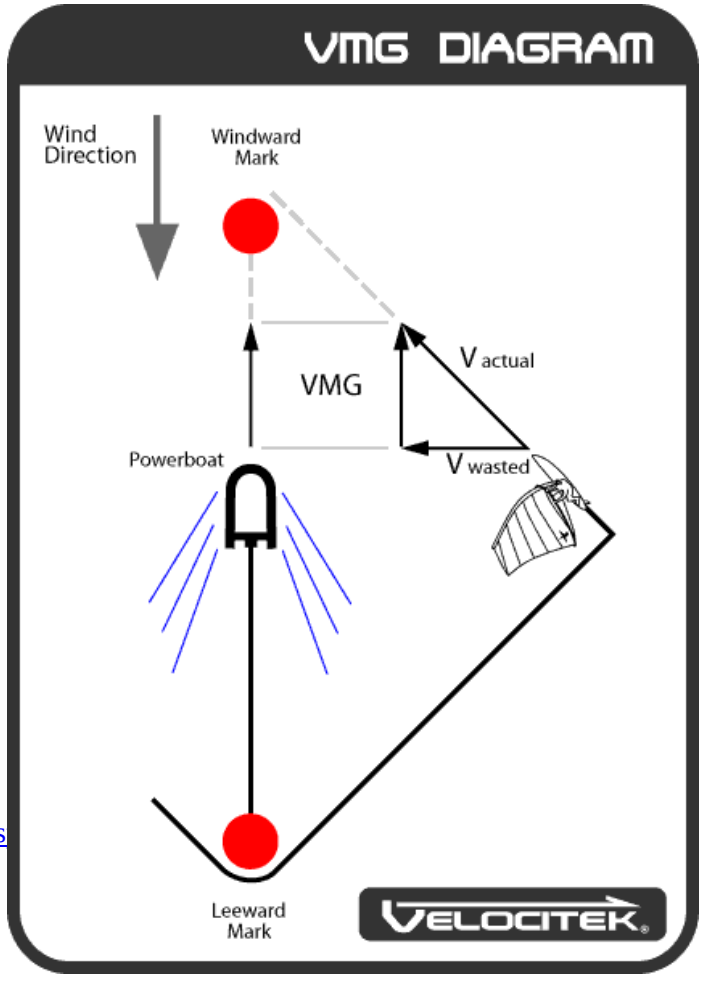
What is VMG?

A good way to understand Velocity Made Good (VMG) is to imagine a power boat and a windsurfer traveling from a leeward (downwind) mark to a windward (upwind) mark together. The powerboat travels along a straight line between the marks while the sailor tacks back and forth to get upwind.

Now imagine that the driver of the powerboat controls the powerboat's speed to keep the windsurfer directly abeam of the powerboat and not ahead of or behind it. The speed that the powerboat must travel to keep even with the windsurfer is the windsurfer's VMG.

As shown in the diagram, the actual speed of the windsurfer can be broken up into two perpendicular components: useful speed (VMG) and wasted speed that does not help the windsurfer get upwind.

All this also applies to a windsurfer jibing back and forth to get downwind. In this case VMG represents how fast the windsurfer is getting downwind.



Optimizing VMG is far more important than just going fast. In an upwind/downwind race VMG is the "bottom line". Plain speed is only important in the context of how it affects your VMG. For example, if you sail on a beam reach, perpendicular to the wind, you will go really fast but you won't get any closer to the windward mark and your VMG will be zero. On the other hand, if you point straight upwind you won't go anywhere, so your VMG will again be zero. Somewhere in between head-to-wind and a beam reach lies a "magic angle" that will optimize your upwind speed and make you a champ. Unfortunately, this elusive angle depends heavily on your gear, the prevailing conditions, your size and your sailing style.

How Does The S5 Calculate VMG?

The S5 calculates the heading from the downwind reference point to the upwind reference point. This heading is assumed to be the wind direction. Since the only information derived from the reference points is this heading, the position of the reference points in absolute terms does not matter. The only thing that matters is the position of the upwind point relative to the position of the downwind point.

The S5 takes GPS readings every second to get your actual speed as well as the heading of your course. The device then multiplies your speed with the cosine of the angle between your heading and the wind direction to extract the component of your speed that is aligned with the wind direction. This process is repeated every second. Some averaging is then performed to make the output smoother and easier to interpret. The results are displayed on the LCD screen.

How accurate is the S5?

In speedometer mode the accuracy of the S5 is better than +/- 0.2 knots (0.36 km/h). In VMG mode accuracy of the S5 depends on what angle to the wind you are sailing but is generally better than +/- 1 knot (normally closer to +/- .3 knots).

How long do the batteries last?

Rechargeable Nickel Metal Hydride AAA batteries will last longer than 10 hours. Disposable batteries will last just under 10 hours.