



GPS Speedometer Module

Part # 9503 - All Yamaha Models except Cruiser, except VXR/VXS, and except 2015 & 2016 models with RiDE

Installation and Calibration Instructions

Thank you for purchasing the Candoopro GPS Speedometer Module! The GPS Speedometer Module replaces the inaccurate water paddle sender on your ski to provide super-accurate speed readings directly on your ski speedometer, info gauge or speedometer cluster assembly. It has been designed for quick and easy installation and calibration.

IMPORTANT: READ THIS FIRST!

WHEN YOU CALIBRATE THE GPS MODULE YOU MUST HAVE THE MAGNET IN PLACE BEFORE POWERING UP THE SKI! THE UNIT WILL NOT ENTER CALIBRATION MODE UNLESS THE MAGNET IS IN PLACE BEFORE POWER IS APPLIED TO THE UNIT!

Steps for Installing the GPS Speedometer Module

- 1. Find a good location to mount the GPS Module**
- 2. Determine location of speedometer connector**
- 3. Place GPS in general mounting location (not tied down yet!), and route wires to speedometer connector**
- 4. Disconnect speedometer connector, and plug in GPS Module connector**
- 6. Power up ski, note speedometer value, if not 50 MPH/80 KPH, calibrate GPS Module**
- 7. After calibration complete, tie GPS Module in place with zip tie.**

Finding a good location for mounting the GPS Module

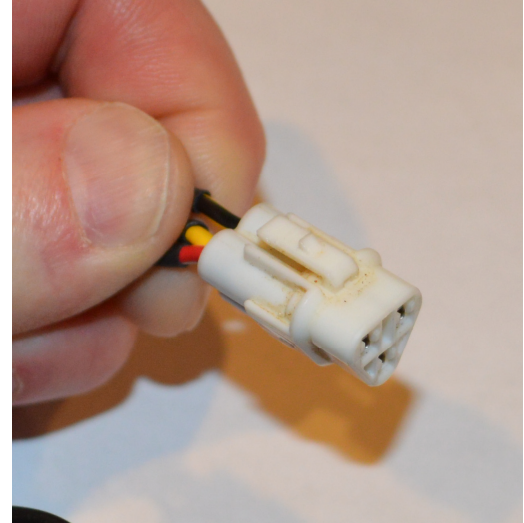
The CANDOOPRO GPS Speedometer Module contains a very sensitive GPS receiver that needs to be able to receive the GPS Satellite signals. Testing has shown that the unit will be able to receive satellite signals in almost any mounting location in the ski, but for optimum accuracy, it is recommended to mount the unit high up in the front of the ski up under the steering column area or front storage area, away from the metal mount of the steering column towards one of the sides.

The unit can easily "see" the satellites through fiberglass and plastic, but cannot see through metal.

Look for a place that has wires or hoses that you can zip tie the GPS Module to. Do not zip tie the GPS Module yet, first you must check the calibration of the unit. Once you have calibrated the unit, you can zip tie it into place. The sticker on the box must always face upward towards the sky.

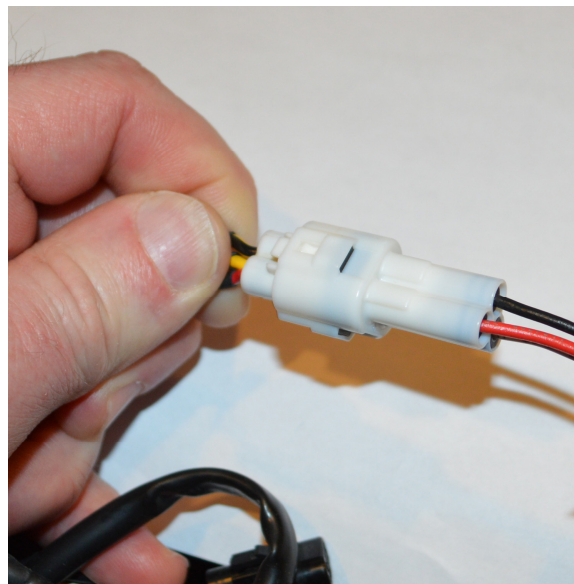
Determining location of speedometer connector

The typical speedo connector on Yamaha watercraft is a White three pin connector that looks like the connectors supplied with the GPS Module, and is usually located just behind the instrument cluster. It usually has a Red wire with White stripe, a Black wire with White stripe, and a Yellow wire :



Connecting GPS connector to Speedometer connector

Simply disconnect this connector by pressing the white tang in the middle, and pull the two mating halves apart. Insert the Candoopro GPS Module connector and push the connectors together until they click.





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Calibration

When the GPS Module is 1st powered up, it begins transmitting pulses to the speedometer that are designed to show 50 MPH on the speedometer. It continues to broadcast this 50 MPH/80 KPH pulse until the GPS receiver in the module locks on to the GPS satellites. Once it locks, the unit stops transmitting pulses, and is ready to operate. This 50 MPH/80 KPH pulse stream has a dual purpose:

1. It lets you know when the GPS Module has locked onto the GPS satellites and is ready to operate.
2. It shows you that the GPS module is accurately calibrated.

The first time the GPS unit is powered up, it takes approximately 35 seconds for the module to find and lock on to the GPS satellites. The GPS Module contains a Supercapacitor that powers the memory storage that remembers the GPS satellite locations for 3-5 hours after you power down the ski. If you start the ski within the 3-5 hour period since it was last run, the GPS module will lock in 3 to 5 seconds.

Yamaha speedometers all contain an internal clock, but they never made this clock very accurate, since the paddle wheel sender is not accurate. For example, when you first power up the GPS module, you may notice that your speedometer/cluster reads 49 MPH/78 KPH, 45 MPH/74 KPH, 52 MPH/84 KPH, and so on.

The CANDOOPro GPS Module has a special Patent Applied For method for calibrating the module to compensate to the speedometer. Calibrating GPS Modules is nothing new, but other modules have switches to perform the calibration, or wires you need to short or switch. These switches are not good for a marine environment, even if sealed. The CANDOOPro GPS Module contains two magnetic sensors to perform the calibration, and these sensors are safely sealed within the case, protected from water and moisture.

Checking Calibration:

To check if the module is accurately calibrated, simply power up the ski, , and observe the reading on the cluster. If the reading on the cluster is 50MPH/80 KPH the system is properly and accurately calibrated, and you do not need to calibrate the unit. However, it is more likely that the reading is either higher or lower than 50 MPH/80 KPH, and you need to calibrate the module to read 50 MPH /80 KPH on the cluster. Remember the reading on the cluster (is it high or low?) and proceed to Calibrating the GPS Module

Calibrating the GPS Module

Shut off power to the ski by removing the lanyard, and wait until the cluster turns off. The GPS Module contains a special Calibration Mode. You enter Calibration Mode by powering up the system (either pressing the start switch momentarily or starting the ski) while you have a magnet placed over one of the magnetic sensors in the GPS Module. (the "UP" or "DOWN" rings on the GPS Module sticker)

NOTE: YOU MUST HAVE THE MAGNET IN PLACE BEFORE POWERING UP THE SKI! THE UNIT WILL NOT ENTER CALIBRATION MODE UNLESS THE MAGNET IS IN PLACE BEFORE POWER IS APPLIED TO THE UNIT!



When you place the magnet over one of the "UP" or "DOWN" locations on the module and power up the ski, the speedometer will start increasing the speed value shown on the speedometer if you placed the magnet over the "UP" location, and decreasing the shown value if you placed it over the "DOWN" location, approximately one MPH per second. If you overshoot the target 50 MPH/80 KPH value, you can quickly move the magnet to the opposite location, and the speedometer will start changing the shown speed in the other direction. Once you hit 50 MPH/80 KPH, you simply pull the magnet away. After 3 seconds, the GPS Module automatically leaves Calibration Mode, and begins to look for the GPS satellites and enters normal operation mode. The internal memory of the GPS retains this calibration permanently, even if you disconnect the GPS module from the ski.

Please note that many Yamaha clusters have some "lag" or smoothing action built into the cluster, and some have much more smoothing than others. This lag can make the calibration process more tricky to zero onto the desired 50 MPH/80 KPH number. As an example, you may find that when you pull the magnet away after it hits 50 MPH, the number may continue to increase or decrease in value. If this happens, simply let the ski power down, and start over. The next time, pull the magnet away when the cluster reads 1 or 2 MPH/KPH away from 50 MPH/80 KPH, which allows the cluster to "catch up" to the actual pulses.

On most skis, calibration only needs to be done once. The Yamaha speedometer's internal clock may not be accurate, but once it is calibrated it tends to stay locked onto the right reading. If you find in several months that when you power up the ski, it has drifted one MPH up or down, simply perform the calibration again.

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Mounting the GPS Module

After calibration is done, mount the GPS Module by using a zip tie to attach the module to existing wires, hoses, or secure mounting clips in your chosen location. **The side of the module with the sticker must face upward.**

Operation

When your ski is first powered up after sitting for several hours, the GPS module will take approximately 30-35 seconds to find and "lock" onto the GPS satellites and begin to report the proper GPS pulses to the cluster. During this start up period, the GPS module sends pulses equivalent to 50 MPH/80 KPH to the cluster. This has a dual role:

1. It informs you that the GPS module has not yet locked onto the satellites and is not ready to operate.
2. It shows you the proper calibration of the module to your cluster.

Once the GPS module locks, the speed on the cluster will drop to zero, telling you the module is ready to operate. It will not hurt anything if you operate the ski before the GPS unit locks, it just will not report speed properly until it does.

When you shut off the ski, the GPS module has a powerful storage capacitor that stores the GPS lock information in memory for 3-5 hours. If you start the ski back up during this period, the GPS module typically locks and is ready to operate in 3-5 seconds.

Note: during the lock period, if you notice the reading is not exactly 50 MPH/80KPH, then simply perform the Calibration routine as described earlier in this document.

Questions? Email us at Sales@candopro.com, or call us at 1-218-422-6366.