ModiFry Products Yellow Jacket Operation manual

This document has abbreviated installation instructions only. Detailed installation instructions with photos for your specific model year S2000 are available at **www.modifry.com** on the Yellow Jacket page.

Generic wiring instructions:

- The Yellow Jacket Module has only 4 wires:
    a. **Yellow** – +5v Power, connects to +5v sensor power available at the ECM or speed sensor. Do NOT connect the Yellow Jacket module to +12v or it will be permanently damaged.
    b. **Black** – chassis ground, available at the hood latch bolt or other suitable ground
    c. **White** – VSS In, connects to the signal (VSS) generated by the speed sensor on the transmission. You must intercept the VSS after it leaves the speed sensor and before it goes to any electrical device in the car.
    d. **Blue** – VSS Out, connects to the speedometer and ECM, sending the corrected speed signal to these devices in place of the original speed signal. Make sure you connect the output of the Yellow Jacket to the ECM in addition to the speedometer, otherwise the ECM and Power Steering will be receiving erroneous speed information which could affect the performance of the vehicle.

Failure to install the module correctly can damage not only the module but also your car's electrical system. Be careful! The most common mistake is to connect the Yellow Jacket module to +12v power instead of +5v sensor power. Connecting to +12v will instantly fry the Yellow Jacket module so double-check this connection.

Testing the Installation

1. Once the Yellow Jacket module is wired into the vehicle, position the car on a level surface out of the way of other obstacles and where you can open the driver's door and easily push the car a few inches.
2. Temporarily set the dials on the Yellow Jacket module to "05". Then plug the module into the wire harness and position it where you can view the diagnostic LED.
3. Turn the ignition ON (do not start the car) and verify the LED comes on steady for 5 seconds. This verifies power is good, and the connection to the ECM is good.
    a. If the LED does not come on, you have a bad connection to either the +5v power (yellow wire to yellow/blue wire) or the ground terminal. Check those connections.
    b. If the LED flashes rapidly, you have power but the connection to the ECM is not good. Check the connection from the Yellow Jacket blue wire to the blue/white wire, making sure you've connected it to the end of the blue/white going towards the hood latch.
4. Immediately after the diagnostic LED lights for 5 seconds it will go out for one second, then watch closely and count the number of times it blinks. If you weren't paying attention and missed it, just turn the ignition off and back on. After the 5 second delay it should blink twice, then make a real short blink.
    a. The dial setting of 05 is equivalent to 2-½% speedometer correction (the correction is always half the dial setting). On every power-up sequence, after a 5-second delay the LED will blink out the correction factor. It will blink once for each whole percent, and will make a quick blink at the end for a ½%. So 2-½% is displayed as "blink, blink, quick-blink".
5. Now put the car in neutral and release the hand brake. If the car does not move a few inches by itself, give it a little push. As soon as the car moves (only takes about ½") the diagnostic LED will start flashing slow. When the car stops, the blinking will stop.
    a. This test confirms a good connection to the speedometer sensor wire. If the LED does not flash, check the connection from the Yellow Jacket white wire to the car's blue/white wire. It must be connected to the end of the blue/white wire coming from C101.
6. With the car stopped, wiggle all the wiring connections while watching the diagnostic LED. Make sure the LED never flashes. Any loose wires or poor connections will cause the LED to light in one of these modes:
    a. Fast blink – check for a loose connection on the Yellow Jacket blue wire
    b. Slow blink – check for a loose connection on the Yellow Jacket white wire
    c. Light steady for 5 seconds - check for a loose connection on the Yellow Jacket yellow or black wires

Note: The module does the diagnostic test and blinks the correction factor every time you start the car, but will immediately abort the test as soon as the car moves. So if you're trying to verify your dial settings make sure the car does not move, as it only takes half an inch of movement to trigger the module and end the diagnostic mode.

Trouble getting your Yellow Jacket to work? Check the FAQ on our web site – www.modifry.com/yj_faq

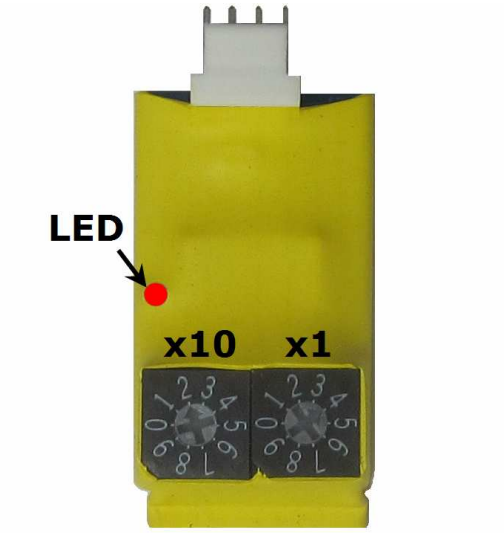
There's not much to troubleshoot with this product. If it doesn't perform the self-test correctly verify your wiring. If it appears to self-test OK but the speedometer doesn't work, check the LED to see if it blinks when the car moves. If it doesn't, check the YJ white wire for a good connection to the speed signal wire. If you're still having trouble, email me at bob@modifry.com. Do not return products without prior authorization – credit will NOT be issued.

Calibration and Use of the Yellow Jacket Module

The Yellow Jacket module works by reducing the number of speed pulses sent to the ECM and instrument cluster. The amount of reduction is called the "correction factor" and is expressed as a percentage. The dial settings correspond to exactly twice the correction factor. For example, a dial setting of "10" indicates a correction factor of 5 and reduces the speedometer/odometer reading by 5%. A setting of 13 would reduce the readings by 6-½%. Remember - the correction factor is always half the dial setting.

The dial on the left represents the "tens" digit; the right is the "ones" digit. Notice the "arrow" in the adjustment screw and be sure you adjust the switch so the arrow points to the number you want.

The Yellow Jacket module provides correction factors in ½% increments, which allows you to choose a setting that will adjust your speedometer/odometer to within .25% accuracy. For example, if you determine your speedometer needs a correction factor of 3.2%, setting the dials to 06 will provide a correction of 3%, for an error of only .2%. Setting the dials to 07 would provide 3.5% correction, for an error of .3%. So in this example the setting of 06 gives the best accuracy.



Notes:

- Dial settings over 50 (25% correction) are not valid and the module will not operate correctly.
- The car's speedometer and odometer are internally "locked together" so the corrected signal affects them equally.

Correcting for speedometer/odometer error:

Many S2000 owners report significant speedometer/odometer error, some as high as 5 or 6%. My own car exhibits an error of up to 3% depending on tire wear. To determine your speedometer error you will need to use a GPS unit or make a run on measured course. The GPS method is the simplest, but the measured run is the most accurate.

Easiest method – using a GPS receiver

This is the simplest way to calibrate your speedometer and works best if you can arrange the Yellow Jacket module where you can adjust the dials without interfering with driving. In most cases the Yellow Jacket will correct the speedometer pulses as soon as you turn the dials, so you'll immediately see the results of each setting change. It does not need to be power-cycled to use the new settings, unlike some other units on the market. If you are unable to position the module where it can be easily and safely adjusted, you'll have to pull over to make each adjustment, but there is no need to turn the engine off and back on after changing the dials.

Start with the dials set to 00, or no correction. With the GPS in the car find a stretch of open road where you can safely drive at the highest legal speed (higher speed means better accuracy). Observe the readings on the GPS and speedometer, and then make a correction to the dials. Let the speedometer settle, compare it to the GPS again, and make additional adjustments until the speedometer matches the GPS. If you want better accuracy than you get at 70 mph (1.5%) you'll need to drive a measured course as described on the next page. This takes more time but you can calibrate your speedometer/odometer to within ¼%.

Note: Sometimes after you adjust the dials you may see the speedometer return to an "uncorrected" speed. Don't worry, you just happened to be turning the dial at the same time the module tried to read it and it saw conflicting settings. In that case it returns to a zero correction for 10-15 seconds, and then will re-read the dials and display the correct speed.

Most accurate method – driving a measured course

You can do the measured course run before the Yellow Jacket is installed in the car, or with it set to 00 after it's installed. Find a stretch of Interstate that has mileage markers every 1/10 of a mile and where traffic is light. Pull to the shoulder of the road and stop directly next to a mileage marker, then reset your trip odometer and pull back onto the highway when safe to do so.

Drive exactly 10 miles (according to the mileage markers, not your speedometer) and pull over next to the 10 mile marker. Now drive another 250 feet and stop (this is slightly less than ½ the distance to the next 1/10 mile marker). Make a note of the odometer reading, which should be slightly more than 10 miles. If your odometer indicates less than 10 miles, you either miscounted the miles or have installed seriously over-sized tires on your car, in which case you can't use the Yellow Jacket module to correct your speedometer.

Divide the speedometer reading by the actual distance driven. Now take the remainder (the part to the right of the decimal) and divide it by the speedometer reading. This result is the correction factor.

Here's an example assuming your speedometer indicated 10.3 miles after driving a 10 mile measured course:

$$\frac{\text{trip odometer reading}}{\text{actual distance driven}} = \frac{10.3}{10.0} = 1.03 \qquad \frac{.03}{1.03} = .029 \text{ or } 2.9\% \qquad 2.9 \times 2 = 5.8 \ (\text{dial setting of "06"})$$

Determining the correction factor for a new differential ratio:

If you've installed a differential with a ratio different than stock you will need to calculate the correction factor. Start by dividing the new ratio by the stock ratio. Let's say you installed a 4.77 diff. You would divide 4.77 by 4.10, yielding a result of 1.163. That means that the new diff will create 1.163 pulses where the original diff only made one pulse. Put another way, you'll get 1163 speed pulses where the old diff only generated 1000. So we need to get rid of those extra 163 pulses.

At first glance you may think "It's about 16% high, so I'll use a correction factor of 16%". But that would not be the right number to use. The part to remember is that we need to "lose" 163 pulses for every 1163 that are generated, so the speedometer sees what's left over (the original 1000 pulses). The actual math calculation is similar to the measured course math, which in this case is .163 divided by 1.163, which yields .140 or 14%. Setting the Yellow Jacket dials to 28 (2 x 14%) will do the trick.

Here's the math again, from beginning to end:

$$\frac{\text{new diff ratio}}{4.10} = \frac{4.77}{4.10} = 1.163 \qquad \frac{.163}{1.163} = .140 \text{ or } 14\% \qquad 14 \times 2 = 28 \text{ (dial setting)}$$

You may have some factory speedometer error on top of the differential error, so you may want to make a "measured course" run once you have the Yellow Jacket module installed. If you do, make the run with the differential correction factor set on the module, then add any additional correction as determined by the "measured course" instructions. For example, if your measured course test indicates a correction factor of 1 ½% is needed, increase the dial settings by 3 (1.5% x 2 = 3), for a final dial setting of 31.

Here are some common differential ratios and the corresponding correction factor, before adjusting for speedometer error:

Differential ratio	Correction Percentage	Yellow Jacket Dial Setting
4.77	14.0	28
4.57	10.3	21
4.44	7.6	15