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## **INSTALLATION INSTRUCTIONS**

### **Yamaha G19 Installation Notes**

**CURTIS 1234, 1236 OR 1238  
AC INDUCTION MOTOR/ CONTROLLER**

# Yamaha G 19 Installation Notes:

**1: Remove all Battery Cables**

**2: Remove original Motor, Controller and wiring harness. (Unplug all connectors, Do Not cut, most connectors will be reused.)**

**3: Install controller adapter plate in place of old controller. Use supplied 6mm flat head bolts.**

**4: Install new Motor. Top bolt of passenger side shock will need to be removed to install motor, after motor is installed, reinstall bolt. Shock reallocation is not necessary. Position motor so the Terminal block is rotated toward the front of the cart. Use 3 supplied 1/4-20 x 1" bolts.**

**5: Install new motor Controller. Main 35-pin connector faces the passenger side of the cart. Use supplied 1/4-20 x 1 1/4" bolts.**

**6: Mount the dash display. Some custom dashes will allow for a 2 1/16" hole to be drilled in dash for mounting. If there is not sufficient space in dash for mounting, use a standard gauge mounting bracket from an auto parts store, and mount under the dash. Drill hole and install the menu button near the dash display, double check the size needed, some are 3/8", others are 1/2". Cut hole and mount the Golf Street switch. Any SPST Switch can be used for the Golf Street Switch.**

**7: Install wiring harness. Route new harness the same as the original. Since this wiring harness will also work in the G22 Yamaha, you will need to coil up the extra length in the wires. Plug in the connectors to the main solenoid, Forward & Reverse Switch and the key switch. Connect the Menu Button to one of the Blue wires and the White/Red wire. Connect the Golf/Street Switch to the other Blue and the Brown wires.**

**8: Cut original connector from wires going to the Throttle Pot and Throttle switch. Connect wires color to color. Throttle switch wires can hook up either direction.**

**9: Mount supplied relay near the brake assembly. Also mount a factory Yamaha style Brake Switch in the normal location. Use of the Brake Switch is not optional, it must be installed for boosted Regen and programming features to work. The relay is optional, use only if the cart is equipped with Brake Lights. Connect wires as follows:**

**Orange to #85 on relay**

**Blue to #86 and one side of the brake switch**

**+ 12 volts to #30 on Relay**

**Brake lights to #87 on Relay**

**Purple wire to Brake Switch**

**In this installation, the Relay is what turns on the brake lights, not the Switch. The switch signal is used by the Motor Controller to not only turn on the Brake Lights, but also provide boosted Regen while braking. DO NOT use a timer to turn Off the brake lights, the controller automatically does this.**

**The Pink wire is used for the optional Battery Filling System Pump.**

**10: Connect the Motor to the Controller using the supplied 34" long cables. U to U, V to V, W to W. Plug in small gray cable coming from motor to mating plug on wiring harness.**

**11: Run the 15" Red cable from the solenoid and the stud labeled Fuse on the controller. Run the 13" Red cable from the + on the Batteries to the solenoid, with the wire with the 10 amp fuse. The 25" black cable runs from the Negative battery post and the B- post on the controller. Install all other Battery cables.**

**12: System is now ready to run. You can test run this system with the cart up on jack stands; no damage will come to the motor. After test running the motor, proceed to the throttle set up in the next pages.**

## **Operation:**

Dash Display - When your key is first turned to the ON position, you will be shown an hour meter. This will be actual hours your drive system has been in service and will default to your next position in approximately three seconds. You may use the button to the left of the display to show various other features.

The other features include:

1. Batt % or battery percentage. This will tell you the percentage of charge you have left in your batteries.
2. TOC or Time On Charge. This will tell you in minutes how long your car has run on this charge cycle.
3. VOLTS or Battery volts. This will tell you the voltage your batteries are running.
4. RPM or revolutions per minute. This will tell you the RPM of the motor while it is running.

At the bottom of the display, the battery indicator will illuminate showing the amount of charge left in your Batteries. When you have reached the flashing red indicator or LOW BATT on the display, your car will go into LIMP mode and will cut back on top speed and allow you to travel home for a charge.

Forward/Reverse Control - The forward/reverse switch is located on the dash or below the front seat and is marked for direction. The switch is also for NEUTRAL. This is in the middle position on the switch. Your dash display will show MPH when you have selected FWD. The dash will show REVERSE when you have selected REV and will show NEUTRAL when in the middle position on the switch. The car will not move when in the NEUTRAL position. NOTE: In REVERSE, the car will operate at a reduced speed.

Street/Golf Mode- The Street/Golf Mode switch is located on the dash. Golf Mode is set at approximately 12 MPH on the top end. Street Mode is set for approximately 25 MPH on the top end. Both modes will allow for 1-MPH control or cruising speeds.

## Instructions for Throttle & Battery Filling Pump Set Up

For systems set up after August 20 2006 with Version 2.04D software

With Key **OFF**, Select Forward Direction, Release Parking Brake, Press and hold the “Menu” Button, then turn the Key “**ON**”. Hold Menu Button until “Program” appears on the Dash Display, then release.

### **If the car has a brake pedal switch:**

Use the Brake Pedal to cycle through the options. Have the Golf/Street Mode switch set to “Street Mode”, (MPH), to change parameters.

### **If the car does not have a brake pedal switch:**

Select “Golf Mode” and press the “Menu Button” to cycle through the options.

### **To change a parameter in any of the options:**

Select “Street Mode” and press the “Menu Button” to change a parameter or activate an option.

**Volts**: This sets the voltage applied to the Battery Filling System Pump. 12 or 24-volt pumps are normal.

**Time**: Sets the amount of time the Pump will run in seconds. Usually 25 to 30 seconds. The Filling System will now water the batteries every 5<sup>th</sup> time they are charged.

**BFS Test**: This allows testing of the Battery Filling System, after setting time and volts, press the “Menu” Button and the pump will run, and the display will show “Pump ON”.

**T Type**: This is the Throttle Pot Type Parameter. For 0-to-5k, 2-wire throttle pots, set to type 3. For 3-wire throttle pots or EZ Go with ITS converter box, set to Type 2. The default is Type 2.

**Throttle:** This allows the Throttle range to be calibrated. With “Throttle” on the Dash Display, select Street Mode, Press the Accelerator Pedal to the floor (Max Throttle), with the pedal pressed, press the “Menu” Button, the display will show “**HoldMenu**” with the Throttle and the Menu Button Pressed, wait until the display reads, “**Turn OFF**” now turn off the Key, DO NOT release the accelerator pedal or the Menu button before turning OFF the Key. The Throttle is now calibrated. Using this procedure will ensure full throttle range; if this procedure is not performed the calibration will be at to a default setting. Use this set up procedure for 2-wire, 0-to-5k, three wire throttle or EZ Go with ITS converter box types.

**Rst:** This is the BDI reset voltage per battery cell. Adjust only if there is a problem with the BDI resetting to 100% when the batteries are below 85% and have not been charged or not resetting after a charge. To increase the parameter, select “Forward” and “Street Mode”, then press the Menu button. To decrease, select “Reverse” and “Street Mode”, then press the Menu button. The default is 2.125 volts per cell; this should work fine in most applications.

### **Set up Continued;**

**Mode:** Sets the Motor Control Mode. Mode 1 is Speed Control. Speed Control means the accelerator pedal controls the actual speed of the vehicle. For example: In Speed Control Mode if you set the accelerator pedal to half, you will go half speed, uphill, downhill or on flat ground. Speed Mode is great if you are looking for controlled descents down hills and want to use the brakes a little as possible. It does however have more of a jerky feel when changing speeds with the accelerator pedal. Mode 2 is Torque Control Mode. Torque control is the same type of control method a DC motor has. The accelerator pedal controls the amount of torque the motor produces. This gives a much smoother feel when changing the accelerator position. Brakes will be used more in downhill descents.

**Brk%:** Only available if the Mode is set to “2”. This sets the amount of Regen when the Brake Pedal is pressed. To increase the parameter, select “Forward” and “Street Mode”, then press the Menu button. To decrease, select “Reverse” and “Street Mode”, then press the Menu button. If the default braking level is desired, leave this set to Zero. The Default is 40%. So, setting to 1% would be the lowest setting and give almost no Regen.

## Instructions for using On Board Diagnostics

With the Key **OFF**, Select Reverse Direction, Press and hold the “Menu” Button. Turn Key the “**ON**”, hold Menu Button until “Diagnose” appears on the Dash Display, then release the Menu Button. Pressing and releasing the menu button will scroll through the Diagnostic options. The cart can be driven during diagnostic checks.

**TSw:** This monitors the state of the Throttle Switch. With the pedal in the idle position the display should read “**OFF**”, when the pedal is pressed the display should change to “**ON**”. If “**OFF**” is always displayed there is a problem with the switch on the throttle pedal. This test can be performed in “Neutral” or with either direction selected.

**TPV:** This is the raw Throttle pot voltage. This test should be performed with the car in “Neutral”. .2 volts is normal for idle position, at full throttle, 3.5 volts for 2 wire pots, and 5.0 volts for 3 wire pots.

**T Max:** This is what the Max Throttle Voltage Parameter is set at. For example: If the Parameter is set at 4.5, then the TPV will need to reach 4.5 for full speed to be obtained. Use the Throttle calibration procedure if adjustments are necessary.

**Req %:** This is the amount of throttle being requested of the controller. This should be a number from 0 to 100% when the car is being driven.

**Brk:** On or Off. Checks to ensure brake switch signal input to the controller. Should be ON when the brake pedal is pressed and OFF when the brake pedal is released.

**CapV:** This is the voltage on the Capacitor Bank inside the controller. This voltage should be at or near the voltage of the Batteries. When the Throttle is pressed, this sends a signal to the controller to pre-charge the Capacitor Bank and turn the Main Solenoid ON. If this voltage is low or at 0, this means there is probably a failure in the Pre-Charge circuit and the controller will need to be repaired or replaced.

## Diagnostics continued

**EncA & EncB:** These are the Motor Encoder signals shown in RPM. This can be used to troubleshoot either an Encoder failure, or a problem in the Encoder wiring. If the motor turns slow and in the proper direction, check the RPM of both signals. If EncA has no signal, the Display will read Zero. The same applies to EncB. EncA involves with White, (sometimes Brown), wire on the encoder connector, EncB is the Green wire. On an EZGO, these colors are reversed.

**Main:** This is the state of the Main Solenoid, see table below:

0 = Open, Solenoid not turned on.

1 = Pre-charge.

2 = Weld check, the controller is checking for welded contacts.

3 = Closing Delay

5 = Closed, the Solenoid coil is energized and the contacts should be closed.

6 = Open Delay, after the cart is stopped there is a delay of about 5 seconds for the Solenoid to open.

**OS:** This is the Version of the Operating System in the controller.

**Build:** This is the Build number of the Operating System.

**Ver:** This is the VCL (vehicle control language) version number

**D/C:** This is the date when the controller was manufactured. 6123=the 123<sup>rd</sup> day of 2006.

**S/N:** This is the unique serial number of the controller.

**Faults:** If any, will be displayed.

## **Fault Codes:**

Fault codes will display on the Dash Display when they happen, the “Wrench” on the display will also light up.

Code 12, Controller Over Current

Code 13, Current sensor fault

Code 14, Precharge Failure

Code 16, Controller Over Temperature

Code 17, Severe Undervoltage

Code 18, Severe Overvoltage

Code 25, 5-volt power supply failure

Code 36, Encoder Fault, see diagnose, EncA & EncB.

Code 37, Motor Open or Open Phase on controller fault

Code 38, Main Solenoid welded

Code 39, Main Solenoid not closing

Code 73, Stall detected, No encoder signal, see diagnose, EncA & EncB.