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Instructions to Access Golf Car Program and Diagnostic Menu
Through Curtis 3140 Display

Please Read Procedures Thoroughly

SW Version: 1.10 and up

Disclaimer: Changes to the programming, through which this manual gives instructions on how to perform, are straightforward. Making changes to certain parameters can lead to a situation where the user can lose control of the vehicle, which can lead to injury or death. Care should be taken to read the instructions and understand them thoroughly before making any changes to the parameters.



CAUTION: DO NOT HANDLE THE ELECTRICAL CONNECTORS WHEN THE SYSTEM IS ENERGIZED. DOUBLE CHECK THE VOLTAGE POTENTIAL WITH A VOLTAGE METER PRIOR TO HANDLING. FAILURE TO DO SO WILL RESULT IN INJURY OR DEATH!

Golf Car Software Programming

Scope: The HPEVS golf car software package developed for the F-series Curtis AC motor controller utilizes the Curtis 3140 display in tandem with the golf street switch, forward/reverse switch, the menu button, and in certain conditions the throttle pedal. The motor kit when installed will be drivable, but the following instructions allow for tuning.

The following is a list of items that can be changed in Program Mode. These are the items in the order that will be displayed through the Curtis 3140 display:

1. Reset Throttle Parameters to Factory
2. Reset Volts Per Cell
3. Control Mode Select (Torque Mode or Speed Mode)
4. Brake Current (Torque Mode or Speed Mode)
5. Neutral Braking (Torque Mode ONLY)

PROCESS: To enter Program mode to change current settings/conditions in the F-series Curtis motor controller:

1. Turn off the golf car.
2. Put the golf car's forward/reverse switch in FORWARD.
3. With the golf car in forward, press and hold the menu button.
4. Turn on the golf car.

If the above process was done correctly, the 3140 Curtis display should be displaying the following:



5. Release the menu button.
6. Place the forward/reverse switch in NEUTRAL.

If the above display fails to show, shut off the vehicle and return step number two above in the Process section to attempt to enter program mode.

TOGGLING BETWEEN MENUS: To toggle between programming menus on the display, set the golf/street switch to golf mode. While in golf mode, press and release the menu button to toggle to the desired program menu.

MENUS:

RESET Throttle Parameters to Factory

Process: This parameter will reset the current throttle parameters to factory level. This procedure should be done if there is a throttle issue or a new throttle has been installed in the golf car.

1. Enter Program Mode as described earlier in this document.
2. Select Golf Mode on the Golf/Street switch.
3. Press the menu button once to get to the until "RST THROTL" is observed.



4. Select Street Mode on the Golf/Street switch.
5. Press the menu button to reset the throttle parameters.
6. After the throttle parameters have been reset, the display will instruct the user to turn off the car.



RESET VOLTS PER CELL SET UP

PROCESS: This parameter will set the Reset Volts Per Cell parameter. The reset voltage level is checked only once when KSI is first turned on. Note that the BDI Reset Percent parameter also influences the algorithm that determines whether BDI Percentage is reset to 100%. This parameter is used in conjunction with the internal BDI.

NOTE: Due to the number of LCD positions available on the upper portion of the Curtis 3140 displays, the display will show the LAST THREE DIGITS OF THE FULL NUMBER. So, if 2.120 volts is the desired parameter, the 3140 display will have to show 120 for the value of 2.120. When the user toggles to this parameter value in program mode, the current value will be displayed.

1. Enter Program Mode as described earlier in this document.
2. Toggle the menu items by setting the golf car in golf mode. Press the menu button until the display is showing the "RSTVPC" menu item shown below.



3. Place the golf/street switch to STREET mode.
4. To increase the Reset Volts Per Cell parameter, place the forward/reverse switch in FORWARD. Press the menu button until the desired value has been reached.
5. To decrease the Reset Volts Per Cell parameter, place the forward/reverse switch in REVERSE. Press the menu button until the desired value has been reached.
6. To save the value on the display, place the forward/reverse switch in NEUTRAL. Press the menu button. The lower portion of display will change to "SET".



6. Lastly, 2 seconds later, the lower display will display “TRNOFF” instructing the user to turn off the vehicle. This action will save the new parameter values into the motor controller’s memory.



CONTROL MODE SELECT SET UP

PROCESS: This parameter determines which motor control method will be in effect when controlling the motor.

NOTE: When the user toggles to this parameter value in program mode, the current mode will be displayed.

1. Enter Program Mode as described earlier in this document.
2. Toggle the menu items by setting the golf car in golf mode. Press the menu button until the display is showing the “MODE” menu item shown below.



3. Place the golf/street switch to STREET mode.

4. To toggle between torque mode "TRQ" and speed mode "SPD", place the forward/reverse switch in FORWARD. Then press the menu button to toggle between the two settings.
5. Once the desired selection is displayed, place the forward/reverse switch in NEUTRAL.
6. To set the displayed parameter, press the menu button. The bottom line of the display will change from "MODE" to "SET".



7. Lastly, 2 seconds later, the lower display will display "TRNOFF" instructing the user to turn off the vehicle. This action will save the new parameter values into the motor controller's memory.



BRAKE CURRENT SET UP

PROCESS: This parameter sets the maximum RMS regen current during braking when a brake command is given as a percentage of the controller's full rated current.

NOTE: Typically, the brake current limit is set equal to the regen current limit. The brake current limit overrides the regen current limit when the brake input is active.

NOTE: This parameter will be visible to program for both Torque Control Mode (Control Mode Select = TRQ through 3140 Display or 2 through the 1313 handheld programmer) and Speed Mode (Control Mode Select = SPD through 3140 Display or 0 through the 1313 handheld programmer).

1. Enter Program Mode as described earlier in this document.
2. Toggle the menu items by setting the golf car in golf mode. Press the menu button until the display is showing the "BRAKE %" menu item shown below.



3. Place the golf/street switch to STREET mode.
4. To increase the Brake Current parameter, place the forward/reverse switch in FORWARD. Press the menu button until the desired value has been reached.
5. To decrease the Brake Current parameter, place the forward/reverse switch in REVERSE. Press the menu button until the desired value has been reached.
6. To save the value on the display, place the forward/reverse switch in NEUTRAL. Press the menu button. The lower portion of display will change to "SET".



7. Lastly, 2 seconds later, the lower display will display “TRNOFF” instructing the user to turn off the vehicle. This action will save the new parameter values into the motor controller’s memory.



NEUTRAL BRAKING SET UP

PROCESS: Neutral braking occurs progressively when the throttle is reduced toward the neutral position or when no direction is selected.

NOTE: This parameter menu item will show **ONLY** if the vehicle's Control Mode Select parameter is set to (Torque Mode).

1. Enter Program Mode as described earlier in this document.
2. Toggle the menu items by setting the golf car in golf mode. Press the menu button until the display is showing the "NEUBRK" menu item shown below.



3. Place the golf/street switch to STREET mode.
4. To increase the Neutral Braking parameter, place the forward/reverse switch in FORWARD. Press the menu button until the desired value has been reached.
5. To decrease the Neutral Braking parameter, place the forward/reverse switch in REVERSE. Press the menu button until the desired value has been reached.
6. To save the value on the display, place the forward/reverse switch in NEUTRAL. Press the menu button. The lower portion of display will change to "SET".



7. Lastly, 2 seconds later, the lower display will display “TRNOFF” instructing the user to turn off the vehicle. This action will save the new parameter values into the motor controller’s memory.



Golf Car Diagnostics

Scope: The golf car software package for the new F-Series motor controller from Curtis Instruments allows for viewing and verify functionality of the drive system. Using the Curtis 3140 display and the menu button, the current parameter settings for the throttle, brake switch, capacitor voltage, the current running state of the motor controller, and the software version that the Curtis controller can be displayed utilizing the Curtis 3140 display.

The following is a list of menu items that will be displayed in Diagnostic Mode:

1. Throttle Switch
2. Throttle Pot Voltage
3. Throttle Pot Percentage (%)
4. Throttle Dead band
5. Throttle Pot Max
6. Throttle Command Percentage (%)
7. Brake Switch
8. Capacitor Voltage
9. Motor Controller Operational State
10. Motor Controller Software Version

PROCESS: To enter Diagnostic mode to observe current settings/conditions in the F-Series Curtis motor controller:

1. Turn off the golf car.
2. Put the golf car's forward/reverse switch in REVERSE.
3. With the golf car in reverse, press and hold the menu button.
4. Turn on the golf car.

If the above process was done correctly, the 3140 Curtis display should be displaying the following:



5. Release the menu button.
6. Place the forward/reverse switch in NEUTRAL.

If the above display fails to show, shut off the vehicle and return step number two above to attempt to enter diagnose mode.

TOGGLING BETWEEN MENUS: To toggle through each menu item to observe the stored or current parameters, press the menu button.

THROTTLE SWITCH

1. Pressing the menu button once will toggle to the menu item for the **Throttle Switch (T SWCH)**. While this menu item is displayed press the accelerator pedal to toggle the throttle switch. If the throttle switch is working correctly, the display will toggle between an on/off condition.

Displayed with the throttle switch on:



and the throttle switch off will display:



THROTTLE POT VOLTAGE

2. Press the menu button to advance to the next menu item: **Throttle Pot Voltage (TP VLT)**. This value is the voltage going through the throttle pot. **NOTE:** The display does not show decimal points on the larger (upper) display. Interpret the values displayed as if there is a decimal to the left of the number on the right-side of the display:



This is 2.5 volts



This is 0.1 volts

THROTTLE POT PERCENTAGE

3. Press the menu button to advance to the next menu item: **Throttle Pot Percentage (T POT%)**. This value is the percentage of throttle pot voltage measured at the wiper of the throttle switch.



DEADBAND (THROTTLE)

4. Press the menu button to advance to the next menu item: **Dedband**. This parameter defines the wiper voltage at the throttle deadband threshold where the throttle switch is tripped. This value is displayed as a percentage. Increasing the percentage means increasing the neutral range.



THROTTLE POT MAX

5. Press the menu button to advance to the next menu item: **Throttle Pot Max (T MAX)**. This parameter defines the wiper voltage required to produce 100% controller output. Decreasing the throttle max setting reduces the wiper voltage and therefore the full stroke necessary to produce full controller output.



THROTTLE COMMAND

6. Press the menu button to advance to the next menu item: **Throttle Command (CMD%)**.
NOTE: To view the functionality of this parameter, a direction will have to be selected and throttle will have to be applied. Make sure that there is nothing in the way of the golf car in case of movement.



BRAKE SWITCH

7. Press the menu button to advance to the next menu item: **Brake Switch (BRAKE)**. Pressing the brake will trip the brake switch; IF INSTALLED, and the display should show the change from off to on.



CAPACITOR VOLTAGE

8. Press the menu button to advance to the next menu item: **Capacitor Voltage (CAPVLT)**. Voltage of controller's internal capacitor bank at B+ terminal is displayed with this selection.

NOTE: Just like Throttle Pot Voltage, the display does not show decimal points on the larger (upper) display. Interpret the values displayed as if there is a decimal to the left of the far right number on the display.



(EXAMPLE ABOVE = 44.4 volts)

MAIN STATE

9. Press the menu button to advance to the next menu item: **Main State (MAIN)**. The information provided on the display describes the main contactor state. The following list describes what each number means referring to the state of the contactor.



- 0) Open
- 1) Precharge
- 2) Weld check
- 3) Closing delay
- 4) Missing check
- 5) Closed (when Main Enable = On)
- 6) Delay
- 7) Arc check
- 8) Open delay
- 9) Fault
- 10) Closed (when Main Enable = Off)

SOFTWARE VERSION

10. Press the menu button to advance to the next menu item: **Version (VERSION)**. The information displayed when this menu item is selected shows the version number of the software package that is installed in the F-Series Curtis motor controller. This information will be needed if the personnel at HPEVS asks for it.

