

# GE 353T4/5

This sheet is provided to aid in the installation of your remanufactured General Electric controller. Upon installation, you may encounter problems that may, or may not, be due to a faulty controller. The following steps must be taken to help diagnose a possible cart fault or faulty controller. An analog or digital volt ohm meter (VOM) will be needed to perform these checks.



## **WARRANTY WILL BE VOID** **If These Steps are Not Performed Before Installing The Control**

➔ STEPS TO PERFORM **BEFORE** CONTROL INSTALLATION ➔

### **CHECK MOTOR WINDINGS:**

- Set your VOM to RESISTANCE ( $\Omega$ ).
- To test the resistance of VOM leads, please touch the meter leads together. Subtract this measurement from each test below to get your true measurement.
- With your motor disconnected, measure A1 to A2. This should measure BETWEEN  $.3\Omega$  and  $1\Omega$ .
- With your motor disconnected, measure F1 to F2. This should measure BETWEEN  $1\Omega$  and  $2\Omega$ .
- With your motor disconnected, measure A1 to F1. This should measure OPEN.
- With your motor disconnected, measure F1 to motor case. This should measure greater than  $5M\Omega$ .

### **CHECK MAIN SOLENOID:**

- Disconnect all wires from the main solenoid.
- Set your VOM to RESISTANCE ( $\Omega$ ).
- Measure the solenoid coil. This should measure  $100\Omega$  -  $250\Omega$  (depending on solenoid type).
- Connect VOM leads to the main solenoid lugs.
- Attach jumpers from main battery positive and negative to the coil (small terminals).
- Meter should jump from infinity to LESS THAN  $.3\Omega$ .
- Remove jumpers and reconnect solenoid wiring from the harness. (If suppression diode is present, the non-banded side must go to the black/green wire – pin 17 from the controller. Be sure to check diode functionality with VOM prior to install.)

### **CHECK THE VEHICLE WIRE HARNESS:**

- Check the connectors on the wire harness for corrosion, loose, broken, burnt or missing pins.
- Repair or replace pins as necessary.

**IF ANY OF THE ABOVE ITEMS ARE NOT WITHIN THE SPECIFIED RANGES THE CONTROLLER WILL FAIL. THESE ITEMS MUST BE CORRECTED BEFORE THE CONTROLLER IS INSTALLED OR WARRANTY WILL BE VOID.**

It is recommended to replace your solenoid at the time of controller replacement. FSIP now stocks popular replacement White Rodgers solenoids for your convenience.

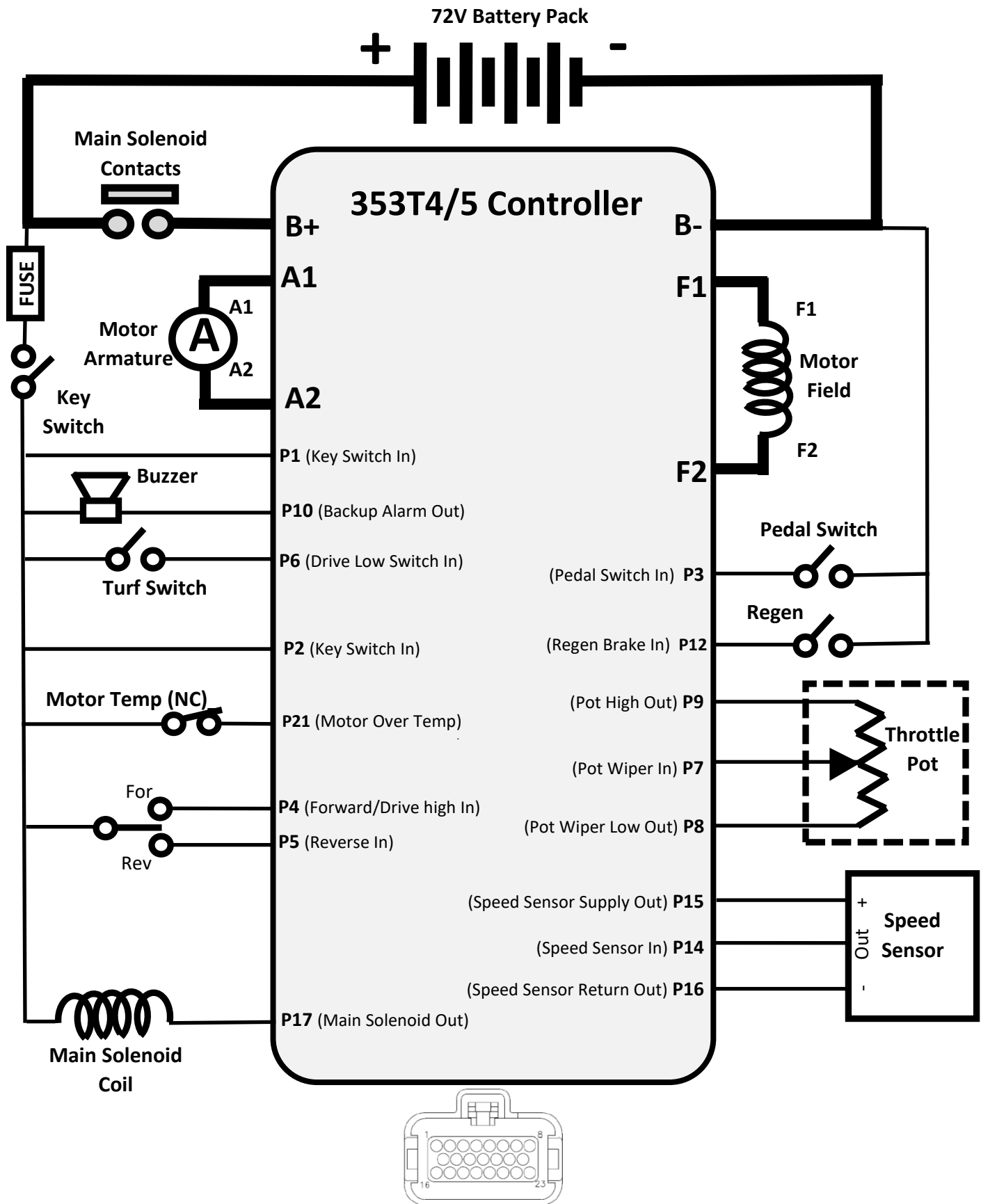


Diagram shows the back (wire) side of Connector

# Global GEM Car (353T4/5) Troubleshooting Sequence

**FOR SAFETY, ALWAYS LIFT THE DRIVE WHEELS OFF THE GROUND WHEN TROUBLESHOOTING!**

ALL TESTS ARE CONDUCTED WITH RUN-TOW/MAINTENANCE SWITCH IN THE RUN POSITION AND WITH A GOOD BATTERY PACK VOLTAGE MEASUREMENT. ALSO, THE CONNECTOR MUST BE ATTACHED TO THE CONTROLLER WHEN MAKING THESE CHECKS. YOU WILL NEED TO 'BACK PROBE' THE PINS FROM THE WIRE SIDE OF THE CONNECTOR. USE A PAPERCLIP IF NECESSARY.

Attach voltmeter negative (-) lead to main Battery Negative (-) for the following tests.

Use the following sequence when checking individual pins (don't skip steps). **If you find a fault, do not move on to the next step until the fault is corrected:**

- Measure the voltage at the main battery positive post (let's call it Pack Voltage)
- Pin 1 & 2 With Key Switch Off**, must equal 0 volts
  - If not 0 volts, check wiring and Key Switch/Relay for a shorted condition
- Pin 1 & 2 With Key Switch On**, must equal pack voltage
  - If not pack voltage, check wiring, Key Switch/Relay for an open condition
- Pin 6 With Turf Switch Off**, must equal 0 volts
  - If not 0 volts, check wiring and Turf Switch for a shorted condition
- Pin 6 With Turf Switch On**, must equal pack voltage
  - If not pack voltage, check wiring and Turf Switch for an open condition
- Pin 4 With F/R Switch in Reverse**, must equal 0 volts
  - If not 0 volts, check wiring and F/R Switch for a shorted condition
- Pin 4 With F/R Switch in Forward**, must equal Pack Voltage
  - If not Pack Voltage, check wiring and F/R Switch for an open condition
- Pin 5 With F/R Switch in Forward**, must equal 0 volts
  - If not 0 volts, check wiring and F/R Switch for a shorted condition
- Pin 5 With F/R Switch in Reverse**, must equal Pack Voltage
  - If not Pack Voltage, check wiring and F/R Switch for an open condition
- Pin 3 Pedal Up**, should read approximately 5 volts
  - If not 5 volts, check wiring and Pedal Switch for a shorted condition
- Pin 3 Pedal Down**, must equal 0 volts
  - If not 0 volts, check wiring and Pedal Switch for an open condition
- Pin 10 With Direction Switch in Neutral/Forward**, must equal Pack Voltage
  - If not Pack Voltage, check wiring and make sure beeper is present and connected
- Pin 10 With Direction Switch in Reverse**, must equal approximately 0 volts (and beeper sounds)
  - If not approximately 0 volts, check connector and wire terminal for being burnt/corroded. If terminal is clean, controller may be defective
- Pin 8 Must equal 0 volts**
  - If not 0 volts, check connector and wire terminal for being burnt/corroded. If terminal is clean, controller may be defective
- Pin 9 Must equal approximately 4 volts**
  - If not approximately 4 volts, check connector and wire terminal for being burnt/corroded. If terminal is clean, controller may be defective
- Pin 7 With Pedal Up**, should read approximately .5 volts
  - If not approximately .5 volts, check wiring and throttle pot for shorted condition
- Pin 7 With Pedal Fully Down**, must equal approximately 3.5 volts
  - If not approximately 3.5 volts, check wiring and throttle pot for open condition

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- **Pin 15 Must equal approximately 12 volts**
  - If not approximately 12 volts, remove speed sensor to see if voltage recovers. If it does return replace speed sensor, if it does not return, check wiring.
- **Pin 16 Must equal approximately 0 volts**
  - If not approximately 0 volts, check terminal for being burnt/corroded. If terminal is clean, controller may be defective.
- **Pin 14 While slowly turning the drive wheel**, must toggle between 0 volts and approximately 4.5 volts
  - If not toggling, check wiring and if necessary replace Speed Sensor and magnet
- **Pin 21 Should read Pack Volts**
  - If not pack volts, check motor temp sensor for faulty temp switch, open wire or motor overheated.
- **Pin 17 With Pedal Up (Contactor not energized)**, must equal approximately pack voltage
  - If not approximately pack voltage, check solenoid coil and wiring for an open condition
- **Pin 17 With Pedal Down (Contactor energized)**, must equal approximately 0 volts
  - If not approximately 0 volts, check terminal for being burnt/corroded. If terminal is clean, controller may be defective.

## Helpful Hints

- FOR A FULL LIST OF FAULT CODES, CHECK HERE ... [www.shop.fsip.biz/en/content/technical-documents](http://www.shop.fsip.biz/en/content/technical-documents)
- DO NOT UNDER ESTIMATE THE IMPORTANCE OF MOTOR RESISTANCE CHECKS AND MAIN SOLENOID CHECKS. MANY CART ISSUES ARE CAUSED BY BURNT/DAMAGED BRUSHES THAT WILL BE FOUND AS PART OF THE ARMATURE RESISTANCE CHECK. ALSO A SHORTED ARMATURE AND FIELD WITHIN THE MOTOR WILL DAMAGE THIS CONTROLLER.

Flight Systems Industrial Products also offers the following Technical Support options ...



Troubleshooting Manuals / Codes  
[www.shop.fsip.biz/en/content/technical-documents](http://www.shop.fsip.biz/en/content/technical-documents)



Live Tech Support Chat  
[www.fsip.biz](http://www.fsip.biz)



Technical Support Forum  
[fsip.websitetoolbox.com](http://fsip.websitetoolbox.com)

Phone Support  
 1-800-333-1194 (Option 4)

**PRE-INSTALLATION  
 INSTRUCTIONS MUST BE  
 FOLLOWED OR WARRANTY  
 WILL BE VOID  
 IMPORTANT!  
 GLOBAL GEM 353T4/5  
 TROUBLESHOOTING INFORMATION  
 INCLUDED IN THIS PACKET**