



**C3**

## **DIAGNOSTIC GUIDE**

If the Programmer displays **Unrecognized Error**, this is probably because the Programmer software needs upgrading to include the Help Text for that Error Code. Please refer to the Programmer's documentation for details of how to upgrade to the latest software.

## **Diagnostic Warning**

**Diagnostics should only be conducted by electronic service professionals with in-depth knowledge of PG Drives Technology electronic controllers. An incorrect or badly effected repair could result in an unsafe set-up of a vehicle.**

**PG Drives Technology accepts no liability for losses of any kind arising from an incorrect or badly effected repair.**

**PG Drives Technology accept no liability for losses of any kind arising from unauthorised opening, adjustments or modifications to any component of a control system.**

### **0810: Throttle High Reference Error (Types '0' & '4')**

This trip occurs when the controller detects that the Analogue 1 / 2 High Reference input is outside of its normal range.

Check the throttle potentiometer and its associated wiring.

### **0E21: Throttle Wiper Open Circuit (Types '1' & '3')**

This trip occurs when the controller detects that the throttle wiper connected to Analogue 1 Input is open circuit.

Check the throttle potentiometer and associated wiring.

### **0E22: Throttle Wiper Error (Types 'All')**

This trip may occur if the throttle wiper output is excessively 'noisy'.

Before returning the controller for repair, please contact PGDT for further advice.

### **0E25: Throttle Input High (Types '2' & '5')**

This trip occurs when the controller detects that the voltage on the Analogue 1 / 2 Input is higher than the value set by the parameter Throttle High Voltage Trip.

Check the throttle voltage source and associated wiring.

### **0E26: Throttle Input Low (Types '2' & '5')**

This trip occurs when the controller detects that the voltage on the Throttle Input is lower than the value set by the

parameter Throttle Low Voltage Trip.

Check the throttle voltage source and associated wiring.

### **0E28: Throttle Input Out of Range (Types '0', '1', '3' & '4')**

This trip occurs when the controller detects that the Analogue 1 / 2 Input is outside of its normal range ( $>1.66V$  for types '0' & '4',  $>3.26V$  or  $<0.064V$  for types '1' & '3').

Check the throttle potentiometer and associated wiring.

### **0E2E: Throttle Potentiometer Resistance High (Types '0', '1', '3' & '4')**

This trip occurs when the controller detects that the throttle potentiometer resistance is too high for the type selected ( $>6k\Omega$  for types '0' & '4',  $>13k\Omega$  for types '1' & '3').

Check the throttle potentiometer and associated wiring.

### **0E2F: Throttle Potentiometer Resistance Low (Types '1' & '3')**

This trip occurs when the controller detects that the throttle potentiometer resistance is too low for the type selected ( $<763\Omega$ ).

Check the throttle potentiometer and associated wiring.

### **0E35: Throttle High Reference ISO Error (Types '1' & '3')**

This trip occurs when the controller detects that the throttle potentiometer wiper is shorted to the Analogue 1 High Reference input. The check is only performed when the parameter ISO Tests is set to 'Yes' and a  $5k\Omega$ , 3-wire potentiometer is fitted.

Check the throttle potentiometer and associated wiring.

### **0E36: Throttle Low Reference ISO Error (Types '1' & '3')**

This trip occurs when the controller detects that the throttle potentiometer wiper is shorted to the Potentiometer Low Reference input. The check is only performed when the parameter ISO Tests is set to 'Yes' and a  $5k\Omega$ , 3-wire potentiometer is fitted.

Check the throttle potentiometer and associated wiring.

## **1310: High Motor Current**

This trip occurs when the controller detects that one or more of the motor phases is drawing excessive current. Check the motor, connectors and associated wiring. Also ensure that the 'Motor' and 'Nameplate' parameters have been programmed correctly and that the commissioning process has been completed successfully.

## **1500: Solenoid Brake Short Circuit**

This trip occurs when the controller detects that the solenoid brake coil is short circuit or is drawing excessive current.

Check the solenoid brake and associated wiring.

## **1502: Solenoid Brake Open Circuit**

This trip occurs when the controller detects that the solenoid brake coil is open circuit.

Check the solenoid brake and associated wiring.

## **1600: High Battery Or Bridge Voltage**

This trip occurs when the controller detects that the controller bridge voltage has exceeded 35.5V or the battery voltage has exceeded 40V.

Check the condition of the batteries, connectors and associated wiring.

## **1701: Line Contactor Open Circuit**

This trip occurs when the controller detects that the line contactor's 'contacts' are open circuit.

Check the line contactor and associated wiring.

## **1705: Line Contactor Short Circuit**

This trip occurs when the controller detects that the line contactor's 'contacts' are welded.

Check the line contactor and associated wiring.

## **170C: Line Contactor Coil Short Circuit**

This trip occurs when the controller detects that the line contactor coil is short circuit.  
Check the line contactor and associated wiring.

### **170D: Line Contactor Coil Open Circuit**

This trip occurs when the controller detects that the line contactor coil is open circuit.  
Check the line contactor and associated wiring.

### **1D02: Cycle Power**

This trip occurs when the controller detects that one of the following parameter values has been reprogrammed.  
Encoder Pulses Per Revolution.  
ISO Tests.  
Throttle Deadband.  
Throttle Gain.  
Throttle Type.  
Cycle the keyswitch to continue.

### **1D04: Both Direction Switches Active**

This trip occurs when the controller detects that both direction switches are active at the same time.  
Check the direction switches and associated wiring.

### **1E08: Inhibit 1 Active**

This trip occurs when the controller detects that the Inhibit 1 switch input is active, Inhibit 1 Speed Limit has been set to 0% and Inhibit 1 Latch has been set to 'Yes'.  
Check the state of the switch, Inhibit 1 programming, connectors and associated wiring.

### **1E09: Inhibit 2 Active**

This trip occurs when the controller detects that the Inhibit 2 switch input is active, Inhibit 2 Speed Limit has been set to 0% and Inhibit 2 Latch has been set to 'Yes'.  
Check the state of the switch, Inhibit 2 programming, connectors and associated wiring.

## **1E0A: Inhibit 3 Active**

This trip occurs when the controller detects that the Inhibit 3 switch input is active, Inhibit 3 Speed Limit has been set to 0% and Inhibit 3 Latch has been set to 'Yes'.

Check the state of the switch, Inhibit 3 programming, connectors and associated wiring.

## **2B04: High Motor Voltage**

This trip occurs when the controller detects a higher than expected voltage on one or more of the motor phases.

Check the motor, connectors and associated wiring. Also ensure that the 'Motor' and 'Nameplate' parameters have been programmed correctly and that the commissioning process has been completed successfully.

## **2C00: Low Battery Voltage**

This trip occurs when the controller detects that the battery voltage has fallen below approximately 14V.

Check the condition of the batteries, connectors and associated wiring.

## **2C02: Low Voltage Cut-Out**

This trip occurs when the level set by Low Voltage Cut-Out has been present for the period set by the parameter Low Voltage Time.

Charge the batteries.

## **2C04: High Battery Foldback**

This trip indicates the controller bridge voltage has exceeded 33V.

Check the condition of the batteries, connectors and associated wiring.

## **2D01: Demand Drive Mismatch**

This trip occurs when the controller detects that the controller is in drive without an input demand being present.

Check the setting of Encoder Signal Swap.

## **2F01: Drive Command Active At Start-Up**

This trip occurs when the controller detects that a drive command is active at start-up, e.g. the throttle is displaced. Check the direction switches, throttle, tiller / seat switch and associated wiring.

## **2F10: Lift Or Lower Command Active At Start-Up**

This trip occurs when the controller detects that a lift or lower command is active at start-up. Check the lift & lower switches and associated wiring.

## **3106: Very High Bridge Voltage**

This trip indicates the controller bridge voltage has exceeded 40V. Check the condition of the batteries, connectors and associated wiring.

## **3A00: Bad Settings**

This trip occurs when the controller detects a 'bad' programmable setting. Reprogram the controller using a known good file.

## **3A06: Invalid Settings (Types '1' & '3')**

This trip occurs if Input Source – Throttle is set to 'Analogue 2' and Throttle Type is set to '1' or '3'. Set Input Source – Throttle to 'Analogue 1' or change the Throttle Type to '0', '2', '4' or '5'.

## **3A08: Bad Nameplate Settings**

This trip occurs when the controller detects that the Motor Nameplate settings are incorrect. Program each of the nameplate parameters with the correct values.

## **3B01: Motor Open Circuit**

This trip occurs when the controller detects an open circuit motor connection.

Check the motor, connectors and associated wiring.

### **3D02: Motor Shorted High**

This trip occurs when the unit detects that one or more of the motor phases is shorted to Battery Positive.

Check the motor, connectors and associated wiring.

### **3D03: Motor Shorted Low**

This trip occurs when the unit detects that one or more of the motor phases is shorted to Battery Negative.

This trip may also occur if the controller's 'B+' and 'B-' terminals are wired incorrectly.

Check the motor, connectors and associated wiring.

### **4401: Record Of Controller Error**

'4401' is not actually an error code but rather an historical record that a controller trip has been written to the Control Log.

Each time the unit trips with a controller error, it records one instance of the code '4401' in the controller's System Log. At the same time, the actual controller trip code is written to the controller's Control Log. Providing neither log has been cleared, the number of '4401' trips should therefore equal the total number of Control Log trips. More information on the controller's diagnostic logs can be found in the Technical Manual.

Check the batteries, motor, connectors and wiring to the controller, before returning the controller for repair.

#### **NOTE:**

**A number of supposedly faulty controllers, returned to PGDT each year, are subsequently found to operate correctly. All vehicle components, connections and wiring should therefore be thoroughly checked before returning a controller.**

### **7802: Motor Temperature Foldback**

This trip occurs when the motor thermistor resistance reaches the value set by Motor Thermistor Foldback. At this point, the controller's available output current will be reduced linearly until the Motor Temperature Cut-Off point is reached. During this period, the Current Foldback Icon will be displayed on the iGauge (if fitted).

Allow the motor to cool before operating again.

### **7804: Timed Current Foldback**



An occurrence of this trip will be recorded in the System Log, when the controller enters Timed Foldback. Check that the timed foldback parameters have been programmed correctly for the application.

### **7810: Motor Temperature Cut-Off**

This trip occurs when the motor thermistor resistance reaches the value set by Motor Thermistor Cut-Off. At this point, the controller's available output current will be reduced to the level set by Absolute Minimum Current, as measured during the commissioning process.

Allow the motor to cool before operating again.

### **7820: Controller Temperature Foldback**

This trip occurs when the internal controller temperature exceeds approximately 92°C and the controller enters thermal foldback. At this point, the controller's available output current will be reduced linearly until the Controller Temperature Cut-Off level is reached. During this period, the Temperature Foldback Icon will be displayed on the iGauge (if fitted).

Allow the controller to cool before operating again.

### **7902: Controller Temperature Cut-Off**

This trip occurs when the internal controller temperature reaches approximately 100°C. At this point, the controller's available output current will be reduced to the level set by Absolute Minimum Current, as measured during the commissioning process.

Allow the controller to cool before operating again.

### **7904: Belly Button Active At Start-Up**

This trip occurs when the controller detects that the Belly Button switch is active at start-up.

Check the Belly Button switch and associated wiring.

### **7905: Belly Button Input Invalid**

This trip occurs when the controller detects that the Belly Button input is outside its expected range.

Check the Belly Button switch, programming and associated wiring.

## **7906: Belly Button Input Mismatch**

This trip occurs when the controller detects that the Belly Button's local input and CAN input disagree. Check the Belly Button switch, programming and associated wiring.

## **7907: Belly Button Input Configuration Error**

This trip occurs if the Belly Button High Threshold has been programmed to a lower value than Belly Button Low Threshold.

Reprogram the controller with appropriate values.

## **7908: Motor Thermistor Open Circuit**

This trip occurs when the controller detects that the motor thermistor is open circuit. Check the thermistor and associated wiring.

### **NOTE:**

**If no motor thermistor is fitted, the parameters Motor Thermistor Cut-Off and Motor Thermistor Foldback should be set to 00hms to disable the trip.**

## **7910: Belly Button Input Data Timeout**

This trip occurs when the controller does not detect data from the CAN Belly Button signal, within a set time period.

Check the Belly Button switch, programming and associated wiring.

## **791D: Throttle Input Data Timeout**

This trip occurs when the controller does not detect data from the CAN throttle signal, within a set time period.

Check the throttle, programming and associated wiring.

## **7944: Lift/Lower Input Data Out Of Range**

This trip occurs when the controller detects data from the CAN lift / lower signal that is outside of its normal range.

Check the Throttle, programming and associated wiring.

## **794D: Throttle Input Data Out Of Range**

This trip occurs when the controller detects data from the CAN throttle signal that is outside of its normal range. Check the throttle, programming and associated wiring.

## **9100: Lift Contactor Coil Open Circuit**

This trip occurs when the controller detects that the lift contactor coil is open circuit. Check the lift contactor and associated wiring.

## **9102: Lift Contactor Coil Short Circuit**

This trip occurs when the controller detects that the lift contactor coil is short circuit. Check the lift contactor and associated wiring.

## **9110: Proportional Valve Open Circuit**

This trip occurs when the controller detects that the proportional valve coil is open circuit. Check the proportional valve and associated wiring.

## **9114: Proportional Valve Over Current**

This trip occurs when the controller detects that the proportional valve current is over 2.75A. Check the proportional valve and associated wiring.

## **9120: Lower Valve Open Circuit**

This trip occurs when the controller detects that the lower valve coil is open circuit. Check the lower valve and associated wiring.

## **9121: Lower Valve Short Circuit**

This trip occurs when the controller detects that the lower valve coil is short circuit.

Check the lower valve and associated wiring.

## **9200: High Battery Current**

This trip occurs when the controller detects a very high battery current.

Check the battery, connectors and associated wiring.

## **9300: Keyswitch Service Speed Limit Active**

This trip shows that the one of the Keyswitch service speed limits has been activated. Service speed limits occur once the applicable service overdue time has been exceeded. The iGauge (if fitted), will flash the Service icon to indicated a limiting condition.

Refer to the Technical Manual for more information.

## **9301: Drive Service Speed Limit Active**

This trip shows that the one of the Drive service speed limits has been activated. Service speed limits occur once the applicable service overdue time has been exceeded. The iGauge (if fitted), will flash the Service icon to indicated a limiting condition.

Refer to the Technical Manual for more information.

## **9500: Lift/Lower Wiper Error (Types 'All')**

This trip may occur if the lift / lower wiper output is excessively 'noisy'.

Before returning the controller for repair, please contact PGDT for further advice.

## **9501: Lift/Lower High Reference Error (Types '0' & '4')**

This trip occurs when the controller detects that the Analogue 1 / 2 High Reference input is outside of its normal range.

Check the lift / lower potentiometer and its associated wiring.

## **9502: Lift/Lower Input Out Of Range (Types '0', '1', '3' & '4')**

This trip occurs when the controller detects that the Analogue 1 / 2 Input is outside of its normal range (>1.66V for types '0' & '4', >3.26V or <0.064V for types '1' & '3').

Check the lift / lower potentiometer and associated wiring.

### **9503: Lift/Lower Input High (Types '2' & '5')**

This trip occurs when the controller detects that the voltage on the Analogue 1 / 2 Input is higher than the value set by the parameter Lift/Lower High Voltage Trip.

Check the lift / lower voltage source and associated wiring.

### **9504: Lift / Lower Input Low (Type '2' & '5')**

This trip occurs when the controller detects that the voltage on the Analogue 1 / 2 Input is lower than the value set by the parameter Lift/Lower Low Voltage Trip.

Check the lift / lower voltage source and associated wiring.

### **9505: Lift/Lower Potentiometer Resistance High (Types '0', '1', '3' & 4)**

This trip occurs when the controller detects that the lift / lower potentiometer resistance is too high for the type selected (>6kOhms for types '0' & '4', >13kOhms for types '1' & '3').

Check the lift / lower potentiometer and associated wiring.

### **9506: Lift/Lower Potentiometer Resistance Low (Types '1' & '3')**

This trip occurs when the controller detects that the lift / lower potentiometer resistance is too low for the type selected (< 763Ohms).

Check the throttle potentiometer and associated wiring.

### **9507: Lift/Lower Wiper Open Circuit (Types '1' & '3')**

This trip occurs when the controller detects that the lift / lower wiper connected to Analogue 1 Input is open circuit.

Check the lift / lower potentiometer and associated wiring.

### **9509: Lift/Lower High Reference ISO Error (Types '1' & '3')**

This trip occurs when the controller detects that the lift / lower potentiometer wiper is shorted to the Analogue 1 High Reference input. The check is only performed when the parameter ISO Tests is set to 'Yes' and a 5kOhms,

3-wire potentiometer is fitted.

Check the lift / lower potentiometer and associated wiring.

### **950A: Lift/Lower Low Reference ISO Error (Types '1' & '3')**

This trip occurs when the controller detects that the lift / lower potentiometer wiper is shorted to the Potentiometer Low Reference input. The check is only performed when the parameter ISO Tests is set to 'Yes' and a 5kOhms, 3-wire potentiometer is fitted.

Check the lift / lower potentiometer and associated wiring.

### **All Other Codes: Controller Error**

These trips occur when the controller detects an internal error.

Check the batteries, motor, connectors and wiring to the controller, before returning the controller for repair.