

## Section 2.2 Troubleshooting Flow Charts

### Evolution™ Controller E-Codes

NOTE: For any Displayed Alarm on the controller, use the Action Step as a starting point.

Displayed Alarm	Alarm/Warning	E-Code Breakdown	Description	Action Step
Controller Fault	ALARM		No E-code on HSB	Replace Controller
Overcrank	ALARM	1100	<b>Condition - Engine Cranks but will not Start (5 crank attempts)</b> Unit turns over but will not start. Controller is receiving signal on Wire 18.	Problem 17
Overspeed	ALARM	1200	<b>Prolonged (60 Hz on a 50 Hz unit, 72Hz on 60Hz unit)</b> Over specified Hz for 3 seconds. Possible cause: Stepper motor/mixer body assembly issue.	Test 12
Overspeed	ALARM	1205	<b>Instantaneous (62 Hz on a 50 Hz unit, 75Hz on 60Hz unit)</b> Over specified Hz for 0.1 second (100 milliseconds). Possible cause: Stepper motor/mixer body assembly issue.	Test 12
Overspeed	ALARM	1207	Monitors zero cross timing of the AVR to determine the alternator frequency which is a speed indicator. Set for 150 milliseconds of 4500 rpm or higher. Used if the normal ignition pulse sequence(s) are not being seen by the controller.	Test 64 and Test 60
Low Oil Pressure	ALARM	1300	<b>Occurred while running</b> The default Extended alarm for low oil pressure. Check oil level and pressure.	Test 61
High Temperature	ALARM	1400	<b>Condition - Air Flow Impeded / Flow Issue</b> Check the inlet/outlet for debris. Check temperature sensor and wiring.	Test 62
RPM Sensor	ALARM	1501	<b>Twin Cylinder+Running</b> Twin Cylinder Running faults to RPM Sensor Loss. Possible Causes: air pocket in fuel line, dirty fuel, missing ignition pulse (loss of one of the primary coils).	Test 50 and Test 64
RPM Sensor	ALARM	1505	<b>Twin Cylinder+Cranking</b> Twin Cylinder Cranking faults to RPM sensor loss Possible Cause: starter motor issue, missing ignition pulse (loss of one of the primary coils).	If engine cranks, Test 64. If engine does not crank, Problem 15.
RPM Sensor	ALARM	1511	<b>Single Cylinder+Running</b> Single Cylinder Running RPM sensor loss Possible Causes: air pocket in fuel line, dirty fuel. Loss of ignition pulse.	Test 50 and Test 64
RPM Sensor	ALARM	1515	<b>Single Cylinder+Cranking</b> Single Cylinder Cranking faults to RPM sensor loss Possible Cause: starter motor and/or engine issue. Loss of ignition pulse.	If engine cranks, Test 64. If engine does not crank, Problem 15.
Underspeed	ALARM	1600	<b>Condition - Unit is Overloaded (55 Hz for 60 Hz for 30 sec, 40 Hz for 50 Hz unit)</b> Unit is Overloaded slowing engine speed, fuel supply low or throttle control problem.	Problem 3, or Test 50, or Test 12
Underspeed	ALARM	1603	<b>Underspeed</b> The engine never comes up to 3600 RPM.	Check fuel selection and fuel supply
Overvoltage	ALARM	1800	<b>Prolonged Over-Voltage</b>	Problem 2
Undervoltage	ALARM	1900	<b>Prolonged Under-Voltage</b> Undervoltage due to loss of voltage. Below 80% for 10+ seconds) Controller will display "WARMING UP" for 4 minutes. Refer to Section 2.2.	*Preliminary Output Voltage Test (firmware v1.12 and above). Note: Update controller to latest firmware.
Undervoltage	ALARM	1901	<b>Instantaneous Undervoltage due to sudden loss of voltage.</b> (Voltage less than 15 sec 2 sec+) Controller will display "WARMING UP" for 4 minutes. Refer to Section 2.2.	*Preliminary Output Voltage Test (firmware v1.12 and above). Note: Update controller to latest firmware.
Undervoltage	ALARM	1902	<b>Both Zero Crosses missing</b> Undervoltage due to faulty excitation winding, or zero cross circuit, or circuit in general. Possible cause: loose wiring, field boost hardware failure. (Both zero cross missing greater than 1.5 sec) Controller will display "WARMING UP" for 4 minutes. Refer to Section 2.2.	*Preliminary Output Voltage Test (firmware v1.12 and above). Note: Update controller to latest firmware.

## Evolution™ Controller E-Codes

**NOTE:** For any Displayed Alarm on the controller, use the Action Step as a starting point.

Displayed Alarm	Alarm/Warning	E-Code Breakdown	Description	Action Step
Undervoltage	ALARM	1906	<b>Single Zero Cross missing</b> Undervoltage due to faulty excitation winding, zero cross circuit, or circuit in general. Possible cause: field boost hardware failure. (One zero cross missing greater than 1.5 sec) Controller will display "WARMING UP" for 4 minutes. Refer to <b>Section 2.2</b> .	*Preliminary Output Voltage Test (firmware v1.12 and above). Note: Update controller to latest firmware.
Wiring Error	ALARM	2099	<b>Mis-wired</b> Customer connection low voltage and high voltage wires are crossed.	Check for AC voltage on Wire 194 at customer connection in generator.
Overload Remove Load	ALARM	2100	<b>Overloaded - Default (Output Current Method)</b> Unit is overloaded. One or both CT(s) detecting an overload condition. Check transfer switch loadshed functionality. (Change load dynamics or utilize loadshed).	Remove Load
Undervoltage Overload	ALARM	2299	Unit was overloaded and attempted to start with a large load connected. The unit can not ramp up the generator voltage to its normal target voltage value if it starts with a large load connected	Remove Load
Stepper Overcurrent	ALARM	2399	Current flow in stepper coil(s) above specification	Test 12
Fuse Problem	ALARM	2400*	<b>Missing / Damaged Fuse</b> The 7.5 amp Controller Fuse is missing or blown (open). *Firmware version 1.11 and older only	Test 44
Aux Shutdown	ALARM	2800	External shut down circuit is open.	Check the continuity of the harness and operation of the switch(es). Repair/replace as needed.
Low Battery	WARNING		Condition->Battery less than 12.1 Volts for 60 seconds	Test 45
Battery Problem	WARNING		Condition->More than 16 Volts of battery voltage or 600 milliamperes or more of charge current at the end of an 18 hour charge	Test 45
Charger Warning	WARNING		Less than 12.5 volts of battery voltage at the end of a 18 hour charge	Problem 22
Charger Missing AC	WARNING		AC power is missing from the battery charger input	Problem 22
Model Ident Problem - Fix Harness Resistor			Controller was powered up before the resistor plug was connected.	Problem 23 - Controller displays "Model Ident Problem Fix Harness Resistor" fault
	Service Schedule		Service Schedule A 200hours 2 years Service Schedule B 400 Hours 4 years	Perform Maintenance

## Additional Codes For 8 and 9 kW Units Only

Displayed Alarm	Alarm/Warning	E-Code Breakdown	Description	Action Step
Overcrank	ALARM	1101	<b>Engine/Starter Problem</b> Limiting number of cranking cycles to protect the starter motor.	If the engine has tried to crank for 10 times unsuccessfully, this will trigger.
Overload Remove Load	ALARM	2102	<b>Overloaded</b> Unit re-cranks 5 times when load is applied, engine dies (0 RPM) and has low voltage (< 180V)	Check for Overloaded condition on unit. Inspect stepper motor operation.
Overload Remove Load	ALARM	2103	<b>Overloaded</b> Unit has run and attempted to accept load 10 times, could not accept due to overload condition	Check for Overloaded condition on unit