

Section VII. Troubleshooting

Troubleshooting Chart

General:

NOTE: These instructions are intended for the use of qualified personnel trained and experienced in the installation and servicing of this type of heating equipment and its related system components. Some states may require installation and service personnel to be licensed. Persons not qualified should not attempt to repair this equipment according to these instructions.

WARNING: Never leave a jumper wire connected to keep a heater running. A jumper wire should be used as a test device only, as it is not a cure for a defective control.

CAUTION: Never allow the main burner to operate more than five seconds with the filter system shut off. Serious damage to the heater will result. Anytime the heater bangs or knocks, it indicates a water void or lack of water flow. Shut off heater immediately if this occurs.

Wiring:

As a preliminary check, make sure that all wire connections are clean and tight and that all wiring conforms to the wiring diagrams See Figures 35 and 36.

Automatic Reset Time

The heater will automatically reset when an error condition is corrected and resume operation as detailed in the table below. The heater can be manually reset using the keypad by cycling the mode button through "STANDBY" and back to the original operating mode ("SPA" or "POOL").

Error Codes (See chart on page 44)

"LO" Error Code

The Version 13 ignition control features revised logic for the "LO" error code. The "LO" error code indicates that the contacts on one or more of the switches in the limit string are open. The limit string contains the temperature limit switches (2), the vent pressure switch, and the water pressure switch. If the limit string opens the error code "LO" will be displayed. There are two types of "LO" error (note there is no differentiation between the types on the display):

1. "Soft" lockout

When an "LO" error is displayed without a call for heat the control will accept keypad inputs to change the mode, adjust the temperature set points, enter bypass operation, or change from °F to °C. The heater will not operate until the error code is cleared. When the error code is cleared the heater will remain in the selected mode and retain any new temperature set points. If

power is interrupted the heater will retain the selected mode and set points. If there is a call for heat "soft" lockout will end and the control will enter "hard" lockout.

2. "Hard" lockout (Safety lockout)

When an "LO" error is displayed and a call for heat is present the control will enter "hard" lockout (safety lockout). The control will only accept keypad inputs to change the mode (to place the heater into "STANDBY" or to reset the control). The heater will not operate until the error code is cleared or the call for heat is removed. When the error code is cleared the heater will remain in the selected mode. If power is interrupted the heater will retain the selected mode in memory.

During a pre-install prior to pool/pump startup the heater will display the "LO" error code because the water pressure switch contacts will be open. This will be a "soft" lockout if the heater remains in "STANDBY" mode or if there is no call for heat in "SPA" or "POOL" modes. If the temperature of the heater is below the factory set points of 65° F, changing the mode from "STANDBY" to "SPA" or "POOL" will generate a call for heat and the control will go into a "hard" lockout. The error code "LO" will be displayed and the control will only accept keypad inputs for mode change until the error code is cleared.

Supply Wiring

If the heater is connected to the line side of the circuit it will be powered at all times. In this situation, when the pump shuts down the heater will display a fault code of "LO". If there is a call for heat and the pump then re-starts there will be a 2-minute delay for the heater to fire. After the pump has been running for at least 2 minutes there is no delay for heater operation.

Wiring the heater to the load side of the timer or controller will not result in a 2-minute delay if the pump primes quickly enough to activate the heater's water pressure switch. If the pump is slow to prime the heater may display an "LO" fault code and will take 2 minutes to automatically restart. If the pump has primed, this wait can be avoided by manually clearing the error code via the keypad by changing the mode through the "STANDBY" setting and returning to the initial setting ("SPA" or "POOL").

When a heater is wired to the line side of the power circuit (continuous power) the blower will not operate when the pump is cycled via a time clock or other switch method.

Internal Wiring

If the heater display is blank after the electrical has been installed check the ribbon cable from the display board leading to the ignition control board. This cable is not polarized and can be inserted upside down if it was removed when electrical was done. Invert the cable on the connector pin and see if the display is now on. The display may read 'CE'. If it does, remove power from the heater for 1 minute and then re-connect the power.

IDL Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
None	Heater will not power-up.	1. Check for Low & High Voltage Output from Fuse Board	Disconnect plug from P5 connector from Fuse Board. Measure for 24vac between pins of receptacle on Fuse Board. Reconnect plug. Disconnect plug from P6 of Fuse Board. Measure for 120vac between pin 3 and 6 of receptacle on Fuse Board. Reconnect plug. If OK, proceed to section titled "Low voltage circuit fault". Otherwise, proceed to step 2.
		2. Ensure field power supply to heater is turned on.	Measure for field supply voltage across terminals of TB1 terminal block on Fuse Board. If OK, proceed to step 3.
		3. Check for faulty Fuse Board wiring.	Inspect Fuse Board wiring. Ensure all plugs are securely fastened to Fuse Board. If OK, proceed to step 4.
		4. Verify that FC1 and FC2 Fuses on Fuse board are not open.	Remove FC1 and FC2 fuses from fuseholder. Measure continuity across fuse. If fuses are open, proceed to section titled "Open FC1 and/or FC2 Fuses". If fuses are OK, reinstall them and proceed to step 5.
		5. Verify that 240vac Voltage Selector Plug is not installed with a 120vac field power supply.	Check that proper Voltage Selector Plug is installed in Fuse Board. If OK, proceed to step 6.
		6. Check for defective Transformer.	Disconnect plug from P4 connector from Fuse Board. Measure for 24VAC between pins 1 & 2 of plug of Transformer and for 120VAC between pins 4 & 6. If 24VAC or 120VAC is not present, replace Transformer. Otherwise, proceed to step 7.
		7. Fuse Board is defective	Replace Fuse Board.
None	Low voltage circuit fault.	1. Check for Low Voltage Output from Fuse Board	Disconnect plug from P5 connector from Fuse Board. Measure for 24vac across pins. Reconnect plug. If OK, proceed to step 2. Otherwise proceed to step 5.
		2. Check for faulty Control Module wiring.	Inspect Control Module wiring. Ensure all plugs are securely fastened to Control Module. If OK, proceed to step 3.
		3. Verify low voltage input to Control Module.	Verify 24vac across R and C terminals on Control Module. If not OK, replace harness. If OK, proceed to step 4.
		4. Verify that F1 Fuse on Control Module is not open.	Remove F1 fuse from fuseholder. Measure continuity across fuse. If OK, replace Control Module. If fuse is open, proceed to section titled "Open FC3 or F1 Fuse".
		5. Verify that FC3 on Fuse Board is not open.	Remove FC3 fuse from fuseholder. Measure continuity across fuse. If fuse is open, proceed to section titled "Open FC3 and/or F1 Fuses". If OK, reinstall fuse and proceed to step 6.
		6. Check for defective Transformer.	Disconnect plug from P4 connector from Fuse Board. Measure for 24VAC between pins 1 & 2 of plug from transformer. If 24VAC is not present, replace Transformer. Otherwise, proceed to step 7.
		7. Fuse Board is defective	Replace Fuse Board.
None	Open FC1 and/or FC2 Fuses.	1. Verify that 120vac Voltage Selector Plug is not installed in with a 240vac field power supply.	Check that proper Voltage Selector Plug is installed. If OK, proceed to step 2. If 120VAC plug is installed and field supply voltage is 240VAC, FC1 and FC2 fuses will have opened. Install the correct Voltage Selector Plug and new FC1 and FC2 fuses.
		2. Check for faulty Transformer wiring.	Inspect Transformer wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 3.
		3. Defective Transformer	Replace Transformer
None	Open FC3 and/or F1 Fuses.	1. Check for faulty Gas Valve wiring.	Inspect Gas Valve wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 2.
		2. Verify that Gas Valve is not defective	Measure for resistance across Gas Valve terminals and between each terminal and ground. If short exists, replace Gas Valve. If OK, proceed to step 3.
		3. Check for faulty Control Module wiring.	Inspect Control Module wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 4.
		4. Control Module is defective.	Replace Control Module.
None	Open FC4 Fuse.	1. Check for faulty Igniter wiring.	Inspect Igniter wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 2.
		2. Check for faulty Blower wiring.	Inspect Blower wiring. Ensure insulation on wiring is not worn. If OK, proceed to step 3.
		3. Check for defective Igniter.	Disconnect Igniter plug from Control Module. Measure resistance across Igniter. If shorted, replace igniter. If OK proceed to step 4.
		4. Check for defective blower.	Disconnect blower plug from Control Module. Measure resistance across blower windings. Winding resistance across lead should be in the following range: Black-to-White: 10 to 14 ohms, Red-to-White: 18 to 22 ohms. If measured values vary substantially from these values, blower is defective. Replace. Otherwise, proceed to step 5.
		5. Control Module is defective.	Replace Control Module.

Troubleshooting Chart

IDL Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
BD	Bad Board or Secondary High Voltage Fault	1. Verify that FC4 Fuse on Fuse Board is not open.	Remove FC from fuseholder. Measure continuity across fuse. If OK, reinstall fuse and proceed to step 2. If Fuse is open, proceed to section titled "Open FC4 Fuse".
		2. Verify high voltage output from Fuse Board.	Disconnect plug from P6 connector of Fuse Board. Measure for 120VAC across pins 3 and 5 of P6 receptacle on Fuse Board. If OK, reconnect plug and proceed to step 3. If not OK, go to step 4.
		3. Check for defective Harness.	Disconnect plug from E10 connector of Control Module. Measure for 120VAC across pins 1 and 3 of Plug on Harness. If OK replace Control Module. If not OK, replace Harness.
		4. Check for defective Transformer.	Disconnect plug from P4 connector of Fuse Board. Measure for 120VAC between pins 4 & 6 of plug from transformer. If OK, proceed to step 5. If not OK, replace Transformer.
		5. Fuse Board is defective	Replace Fuse Board.
EE	Bad Board	1. Defective Control Module	Replace Control Module.
CE	Communication Error Between Control Module and Display Interface Assembly	1. Check for faulty wiring or connection.	Inspect Display Interface Wiring. Ensure Display Interface Plug is securely attached to Control Module. If OK, proceed to step 2.
		2. Control Module and/or Display Interface Assembly are defective.	Replace Control Module and/or Display Interface Assembly.
IO	Igniter Failure	1. Check for faulty wiring or connection.	Inspect Igniter wiring. Ensure Igniter Plug is securely attached to Control Module. If OK, proceed to step 2.
		2. Igniter is defective.	Replace Igniter.
SB	Keypad Failure	1. Keypad is defective.	Replace Display Interface Assembly.
SF	Temperature sensor input failure.	1. Check for faulty wiring or connection.	Inspect sensor wiring. Ensure sensor is plugged into back of control module. If OK, proceed to step 2.
		2. Sensor is defective.	Replace temperature sensor.
HS	Maximum return water temperature exceeded.	1. Pool water temperature exceeds 108°F.	Verify set point setting of remote thermostat is below 108°F. If set point setting of remote thermostat is OK, or if heater is not configured for remote thermostat proceed to step 2.
		2. Verify that water flow is adequate	Verify that water flow to heater is above minimum required (25 GPM for H250IDL, & 40 GPM for H350IDL & H400IDL).
HF	Flame Present with Gas Valve Not Energized.	Gas Valve is defective.	Replace Gas Valve.
BO	Bypass operation.	1. Check to see if Control Module is in Bypass Operation.	This is a normal display when heater is being controlled by a remote thermostat. No service is required. If heater is not being controlled by remote thermostat, change setting by using the MODE key to put the heater into STANDBY. Press and hold the DOWN key and then press and hold the MODE key. HOLD down both keys for 3 seconds until the indication "bo" is removed from the display.
LO	Water pressure switch fault.	1. Verify that pump is running.	This is a normal display when the pump is off. Turn pump on. LO code should clear. If LO does not clear, proceed to step 2.
		2. Verify that water flow is adequate	Verify that water flow rate to heater is above minimum required (25 GPM for H250IDL, and 40 GPM for H350IDL and H400IDL). If OK, proceed to step 3.
		3. Check for faulty wiring or connection.	Inspect water pressure switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on water pressure switch. If OK, proceed to step 4.
		4. Verify state of water pressure switch contacts.	Remove wire leads from water pressure switch and jumper leads. Operate heater. Measure continuity across water pressure switch fault. If open, proceed to step 5. If closed, LO code is not caused by vent pressure switch fault. Remove jumper from wire leads and reconnect wire leads to water pressure switch.
		5. Ensure that low pump pressure does not exist.	Clean filter or clear blockages. Check position of valves in plumbing system. If OK proceed to step 6.
		5. Check for correct water pressure switch setting.	Adjust water pressure switch setting per installation manual. If LO does not clear, proceed to step 6.
6. Water pressure switch is defective.	Replace water pressure switch.		

Troubleshooting Chart

IDL Heater Diagnostic Guide

Code	Fault	Diagnosis Step	Remedy
LO	Vent pressure switch fault.	1. Check for faulty wiring or connection.	Inspect vent pressure switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on vent pressure switch. If OK, proceed to step 2.
		2. Verify state of vent pressure switch contacts.	Remove wire leads from vent pressure switch and jumper leads. Operate heater. Measure continuity across vent pressure switch. If closed, LO code is not caused by vent pressure switch fault. If open, proceed to step 3. Remove jumper from wire leads and reconnect wire leads to vent pressure switch.
		3. Check for restricted or blocked flue.	Ensure that flue is not blocked or restricted. See indoor vent sizing requirements in installation manual. If OK, proceed to step 4.
		4. Vent pressure switch is defective.	Replace vent pressure switch.
LO	Temperature limit switch fault.	1. Check for faulty wiring or connection.	Inspect temperature limit switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on temperature limit switches. If OK, proceed to step 2.
		2. Verify state of temperature limits' contacts.	Remove wire leads from limit switch and jumper leads. Operate heater. Measure continuity across limit switches. If closed, LO code is not caused by temperature limit switch fault. If open, proceed to step 3. Remove jumper from leads and reconnect leads to temperature limits.
		3. Verify that water flow is adequate	Verify that water flow rate to heater is above minimum required (25 GPM for H250IDL, and 40 GPM for H350IDL and H400IDL). If OK, proceed to step 4.
		4. Temperature limit switch is defective.	Replace temperature limit switch.
IF	Ignition failure	1. Ensure gas supply shutoff valves are open.	Ensure that main gas shutoff installed adjacent to heater is open. Ensure that knob on gas valve inside unit is in on position. If OK, proceed to step 2.
		2. Check for low gas supply pressure.	Ensure inlet gas supply pressure exceeds minimum valve indicated on rating plate. If OK, proceed to step 3.
		3. Check for faulty flame sense wiring or connection.	Inspect flame sense wiring. Ensure wire harness terminals are securely fastened to flame sense and to control module. If OK, proceed to step 4.
		4. Check for faulty gas valve wiring or connection.	Inspect gas valve wiring. Ensure wire harness terminals are securely fastened to spade terminals on gas valve. If OK, proceed to step 5.
		5. Check for gas valve failure or gas valve relay failure.	1. Measure voltage across gas valve during trial for ignition. If 24 vac is present and gas valve does not open, gas valve is defective. Replace gas valve. 2. If 24 vac is not present, gas valve relay on control module is defective. Replace control module.
AC	Blower vacuum switch closed.	1. Check for defective blower on relay or control module.	Disconnect Blower plug from Control Module. With heater off, measure continuity across pins 1 and 2 and across 2 and 3 of receptacle on Control Module. If either pair is closed, control module relay is defective. Replace control module. If OK, proceed to step 2.
		2. Vacuum switch is defective.	Replace blower vacuum switch.
AO	Blower vacuum switch open	1. Check for faulty vacuum switch tubing.	Check tubing and replace if necessary. If OK, proceed to step 2.
		2. Check for faulty vacuum switch wiring or connection.	Inspect vacuum switch wiring. Ensure wire harness terminals are securely fastened to spade terminals on vacuum switch. If OK, proceed to step 3.
		3. Check for faulty blower wiring or connection.	Inspect blower wiring. Ensure plug on blower is securely fastened to control module. If OK, proceed to step 4.
		4. Check for defective vacuum switch.	Disconnect Blower plug from Control Module. Measure resistance across Blower windings. Winding resistance across lead should be in the following range: Black-to-White: 10 to 14 ohms, Red-to-White: 18 to 22 ohms. If measured values vary substantially from these values, Blower is defective. Replace. If OK, proceed to step 5.
		5. Check for defective blower relay.	Disconnect blower plug from Control Module. Place heater in Pool or Spa mode. Lower set point temperature to generate call for heat. During pre-purge period, measure for 120VAC across pins 1 and 2. If 120VAC is not present, control module relay is defective. Replace control module. If OK, proceed to step 6.
		6. Vacuum switch is defective.	Replace blower vacuum switch.