

## SEISCO Trouble Shooting Procedure SH-5 through SH-28

**Tools required:** Phillip Screw Driver, Volt Ohm Meter, Amp Meter, Wire Cutter,

**Materials required, all available on the internet.**

**SEISCO Installation Guide:**

[http://www.ttherm.com/rms/PDF/Installation\\_Guide.pdf](http://www.ttherm.com/rms/PDF/Installation_Guide.pdf)

**SEISCO Owner's Manual:**

[http://www.ttherm.com/rms/PDF/SEISCO\\_Owner\\_Manual.pdf](http://www.ttherm.com/rms/PDF/SEISCO_Owner_Manual.pdf)

**SEISCO Testing, Service and Repair Guide:**

[http://www.ttherm.com/rms/PDF/SEISCO\\_Testing\\_Service\\_Repair\\_Guide.pdf](http://www.ttherm.com/rms/PDF/SEISCO_Testing_Service_Repair_Guide.pdf)

Error codes are found on page 8 of the of the Testing, Service & Repair Guide

**SENSOR Resistance Chart:**

**Do not apply voltage to a sensor at any time as damage to the sensor may result.**

**Turn off the power to the heater at the circuit breaker.**

**Do not make resistance measurements while power is applied.**

**Set VOM to read K (1000) Ohms.**

**Remove each of the quick disconnects from the board and measure from the terminal on one wire to the other terminal on the other wire.**

Temperature		Resistance	Temperature		Resistance
Degrees F	Degrees C	Ohms	Degrees F	Degrees C	Ohms
40	4	26,099	70	21	11,883
45	7	22,763	75	24	10,501
50	10	19,900	80	27	9,299
55	13	17,436	85	29	8,250
60	16	15,311	90	32	7,334
65	18	13,474	95	35	6,532

**Customer Serviceable Part List:**

Part Number	Description	Quantity	
		Model Number/Qty	Model Number/Qty
M1-8630	Heating Element 7000 W 240V	SH-14 2 ea.	SH-28 4 ea.
M1-8631	Heating Element 5500 W 240V	SH-11 2 ea.	SH-22 4 ea.
M1-8632-A	Heating Element 4500 W 240V	SH-9 2 ea.	SH-18 4 ea.
M1-8633	Heating Element 3500 W 240V	SH-7 2 ea.	
M1-8633A	Heating Element 2500 W 240V	SH-5 2 ea.	
M1-8634	Control Board 4 Chamber Version 3.04/3.66	SH-18 thru SH-28	
M1-8635	Control Board 2 Chamber Version	SH-5 thru SH-14	
M1-8638	Temperature Sensor Version 3.04/2.34	SH5 thru SH-11 3ea	SH-18 thru SH-28 4 ea.
M1-8641	High Limit Switch w/seal 200 degrees F Manual Reset	All models 1 each	
M1-8653	Inlet Tube – 6"	All models 1 each	
M1-8654	Outlet Tube – 4"	All models 1 each	

No Part Number	Microwave & Electronic Light Control Fix	From 1 to4 or as needed.
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### Element Resistance:

Turn off the power to the heater at the circuit breaker.

Do not make resistance measurements while power is applied.

Remove both Screws from each terminal on an element. Measure the resistance from one terminal to the other terminal on that element.

Element Power	Element Resistance Calculated	Resistance Measured Use VOM to measure total resistance.
7000 watts	8.24 ohms	9.2 ohms
5500 watts	10.4 ohms	11.5 ohms
4500 watts	12.8 ohms	14 ohms
3500 watts	16.46 ohms	17 ohms
2500 watts	23 ohms	25 ohms

### Element Current

Use extreme caution while measuring current.

Current levels are lethal.

Element Power	Current/Element Calculated Use Current probe to measure Current.	Maximum current Use Current probe to measure Current.
7000 watts	26 amps	SH-14 59 amps      SH-28 117 amps
5500 watts	20.8 amps	SH-11 46 amps      SH-22 92 amps
4500 watts	17 amps	SH- 9 38 amps      SH-18 75 amps
3500 watts	14 amps	SH- 7 29 amps
2500 watts	9.6 amps	SH- 5 21 amps

### Useful formulas:

**Ohms Law:**  $I=E/R$ .  $E=IR$ .  $R=E/I$ , I is current in amps, E is voltage is volts, R is resistance in Ohms

**Power Law:** Power  $P=IE$ . P is Power in watts. I is current in amps, E is voltage in volts.

A trouble shooting and replacement procedure is described in the **“Testing, Service & Repair Guide”**.

Diagnostic codes can be found on page 8 of the **“Testing, Service & Repair Guide”**.

Follow the procedures in the above documents for diagnosing and correcting heater problems.

### Hints and Tips

- Your SEISCO radiant heating system pump(s) should be exercised for a period of time during the non heating season. Take the steps to energize the pump(s) so that they are turned on without the elements of the heater being turned on. This should help extend the life of the pump(s).
- Error Code 134, 135, 136 and 137. During initial start up, operating the heater will on occasion indicate an error code that is to be considered a false code. If this is a false error code it should clear by is self after a period of time. This could be several days. Should the error not clear by its self, after several days, then complete the diagnostic procedures above for Sensors.
- Error Code 121. An error code of 121 is on occasions an indication that a load control has been installed by the utility company. Should this be the case, you will need to talk with the utility company to determine when the voltage for the heater will be enabled.

- Upon a new installation, occasionally the relays will make a clicking sound constantly with or without an error code. Check the following:
  - Remove the ground wire coming from the electrical panel to the chassis of the heater. If the clicking stops an alternative safety ground should be installed on the heater.
  - An error code can be indicated with a faulty thermostat.
  - Error codes can be indicated when the heater is receiving an extraneous Microwave Signal. The proposed fix is to install the Microwave & Electronic Light Control fix. This component is intended to bypass microwave signals. Should the error code continue, try the hint indicated above by removing the ground wire at the heater chassis.
  - The fluid movement could be restricted by the fluid viscosity of the antifreeze. When using RV antifreeze it is to be used at full strength. When using Propylene Glycol it should be mixed with water prior to being injected in the system at a mixture not greater than 1 part Propylene Glycol to 4 parts water.
  - Occasionally for a new or existing installation a hissing sound will come from the heater during the heater turn off/shut down. Rewire the heater load control contacts, P8 and P9, in such a manner that elements will be turned off at the same time that the pump is turned off by the thermostat. Use a separate relay contact that is mechanically synchronized with the thermostat that shuts down of the pump. This can be accomplished by the normally open contacts in a W-704a or W-004B pump control relay.
  
- A vibration of the system will occur on occasion. The root cause for this could be related to fluid viscosity or that the elements have accumulated mineral deposits. Removal of the elements and cleaning them in a mild acid bath such as vinegar will remove the minerals. The root cause for the minerals in the system could be because of the use of well water. We do not recommend the use of well water. We also do not recommend the use of de-ionized water. If the elements have not accumulated deposits then the viscosity of the anti-freeze should be checked and determine if the mixture is greater than 22% Propylene Glycol. (RV antifreeze is at 30% Propylene Glycol.)
  
- If RV antifreeze is used it should be used at full strength.
  
- When measuring resistance of the heater element, remove one wire from the element. When measuring resistance of the sensor remove only one quick disconnect from the board. Make a resistance measurement from the terminal on the element that the wire was removed from to the terminal that still has the wire connected or from the lead wire of the sensor that was disconnected from the board to the lead wire of the sensor that is still on the board. The reason for disconnecting the wire from the element is that should the relay be stuck in the closed position there will be no influence of the printed circuit board on the measurement. By disconnecting one sensor wire from the board there will no influence of the circuitry of the board on the sensors when measuring the resistance.