

EC127 Chamber Troubleshooting Guide 01/2026

Chamber not cooling

With the chamber plugged in and powered on, enable cooling by pressing the yellow button with the DOWN pointing arrow near the top left of the front panel. The yellow cool enable LED should be lit up to allow cooling. Enter a cold set point such as SET=0. After a few seconds, the compressor should start up.

If the compressor turns on, observe the LCD for any error codes (E1 through E6). The green cool LED should then turn on, allowing refrigerant into the evaporator. If the green cool LED does not turn on and no error codes are displayed, it's possible the controller has a corrupt parameter. This can be resolved by issuing the software reset command "STOPE9" from the front panel. See "Software reset procedure" section for details.

If the green cool LED does turn on, you should hear a clicking sound every time the green cool LED turns on. You can toggle the green cool LED on and off by enabling and disabling cooling by pressing the yellow button with the DOWN pointing arrow. This will cause the valve to open and close and an audible clicking sound can be heard. If no sound is heard, it's possible that the cool driver board (on chamber's with a DC I/O) or the SSR (on older chambers with an AC I/O) is faulty. This can be checked by removing the right side panel and locating the EC127 I/O board. See the "Identifying whether chamber has an AC I/O or DC I/O" section to determine which I/O board is installed in the chamber. Generally, chambers manufactured after 2005/2006 will have a DC I/O board and corresponding DC valves while chambers manufactured before this will have an AC I/O with AC valves. The date of manufacture is listed on the chamber's serial label located on the back of the chamber.

With the green cool LED ON, locate the air cool output on the 16 position terminal strip on the I/O board. This output typically has a pair of yellow wires connected to it. You should measure approximately 3-7VDC (on a DC I/O) and ~120VAC (on an AC I/O) when the green cool LED is on and approx. 0 VDC (on a DC I/O) and 0VAC (on an AC I/O) when the green cool LED is off. If there is always 0 VDC or 0 VAC, then the driver board or SSR is faulty.

Contact Sun for replacement. The DC driver board part number is 980047 for a DC I/O board and the part number for the SSR used on AC 120VAC chambers is 800004. For 220VAC chambers contact Sun to see if replacement is available.

If the green cool LED is turning on and an audible clicking noise can be heard when the cool enable is toggled on/off and the chamber is still not cooling, then it is likely that the cool valve or cap tube is clogged, preventing refrigerant from entering the evaporator. Contact Sun for an RMA to send the chamber in for evaluation/repair. Please provide the serial number listed on the back of the chamber.

If the compressor does not turn on, observe the LCD for any error codes (E1 through E6).

If an E6 error is observed, then it's possible that the chamber is low on refrigerant. See "Checking system's charge level from pressure sensor output" for details on checking system charge level.

If the output of the pressure sensor measures approximately 0VDC, then charge might be ok but pressure sensor circuitry or motherboard could be faulty. With the chamber plugged in, use a voltmeter set to Vdc to verify that +-12Vdc is present on the jumpers (or pads) labeled +12V and -12V. Black lead of meter can be attached to chamber chassis ground. If voltage is not present, make sure the gray ribbon cable is firmly connected on both ends from the I/O board back to P5 on the motherboard. On older chambers that use a 5 wire (green, blue, purple, brown, brown) pressure sensor wiring harness, make sure that the harness from I/O is firmly connected to the wiring harness coming from the motherboard. If no +-12V is present, then it's possible the harness or motherboard is faulty and should be sent in for evaluation/repair. If +-12V is present and there is still 0Vdc from the jumper (or pad) labeled "OUT", then the pressure sensor or pressure sensor module could be faulty. On chambers with a DC I/O board, the pressure sensor circuitry is mounted on its own board and is replaceable. On chambers with an AC I/O board the PS circuitry is soldered directly onto the AC I/O board. The part number for the pressure sensor module used on the DC I/O, which includes the pressure sensor, is 981096. If the pressure sensor is replaced, the refrigeration must be evacuated, pressurized with N2 gas and leak checked before recharging the system. Use teflon tape on pressure sensor threads before threading into the brass nut. For AC I/O boards with faulty pressure sensor circuitry, I/O board or chamber can be sent in for evaluation/repair.

If an E4 error code is observed and the compressor is not turning on, check for faulty compressor SSR. The compressor SSR can be located by removing the right side panel. The SSR is mounted just above the I/O board and should be labeled "COMP". Power chamber off, then on again, enable cooling and enter a cold set point such as SET=0. Check that the controller is attempting to turn on compressor SSR by measuring the voltage on bottom terminals 3 and 4 where the red/black or red/white wires attach. You should measure approximately 3-5VDC indicating the controller is attempting to turn on SSR.

If 3-5 Vdc is present on terminal 3 and 4 of compressor's SSR and compressor is not starting up and to see if the SSR is the issue, you could temporarily swap the "COMP" SSR with the "HEAT" SSR as these are the same SSRs (25A, 240VAC). If it is determined the compressor SSR was the issue, contact Sun for replacement SSR (part number is 800003).

If the compressor still does not start up with 3-5VDC on terminals 3 and 4 using a known good SSR, then the compressor is faulty. Contact Sun for an RMA number and send the chamber in for evaluation/repair. Please provide the serial number listed on the back of the chamber. If you decide to have a refrigeration tech replace the compressor, the part number for the compressor used in a 120VAC chamber is 590021 and for a 220VAC chamber it is 590022.

If no error codes are observed and there is never a 3-5VDC compressor signal measured on terminal 3 and 4 (only 0VDC) of the compressor SSR, verify that gray I/O ribbon cable is fully seated on both the I/O board end and motherboard end to P5 connector. If the I/O cable is connected ok, then it's possible the motherboard is faulty. It's rare for the motherboard's compressor output to fail, so be sure to double check the previous instructions. The control section can be removed and sent in on an RMA for evaluation/repair. See "Control section removal" section for details. Please provide serial number when requesting an RMA.

Error codes

E1

If the compressor only starts up and therefore the chamber only cools after sitting for a few hours, or displays an E1 error code, then it's possible the Hot Bypass valve is not opening. The HB valve is used to increase suction side pressure either before starting the compressor or during cooling to prevent suction side dropping below 0 psig (which can occur if cooling is disabled or at the set point). To manually turn on the HB valve for troubleshooting purposes you can issue the following command from the front panel:
OUT0:4,1 <ENTER>

If a clicking sound is heard, then the driver board (for chambers using DC valve) or SSR (for chambers using AC valves) is good. If no sound is heard, then it's possible that the driver board (or SSR) is faulty.

DC valves can also be manually opened using a 9VDC battery. Locate the HB valve wires (which are typically orange) that are connected to I/O board terminals labeled "HOT BYPASS" on I/O board's 16 position terminal strip. Disconnect the pair of orange wires and connect wires to a 9 volt battery. If an audible clicking sound can be heard when 9VDC is applied, then the valve is opening. When reconnected to the I/O board and no sound is heard when OUT0:4,1 command is issued from the front panel, and gray I/O ribbon cable is firmly seated on both ends, then it's possible the driver board is faulty and should be replaced. The part number for the DC driver board is 980047. For chambers with AC valves and AC I/O, that valve can be opened using 120VAC. If the valve can be opened (clicking sound heard) using 120VAC but not opening when attached to HOT BYPASS output after the OUT0:4,1 command is issued, then SSR

could be faulty. Part number for the 2A SSR used on 120VAC chambers is 800004. Contact Sun for availability of SSR used on 220VAC chambers.

If, however, a clicking sound can be heard after issuing the OUT0:4,1 command, indicating the valve is opening, then it's possible that the HBvalve or cap tube is clogged. An RMA can be issued and the chamber sent back in for evaluation/repair.

E2

If cooling works fine from ambient, but displays an E2 error code when coming down from hot temperatures, then the Cool Bypass valve might not be opening.

Issue the command OUT0:5,1 to manually turn on the CB valve and listen for an audible clicking sound. The output will turn on, then turn off. This is normal when manually turning on using the OUT command. If no sound is heard, then it's possible that the driver board on chamber's using a DC I/O board is faulty. Or the SSR on chamber's using an AC I/O board is faulty. The part number for the DC driver board is 980047. The part number for the 2A SSR is 800004.

If the valve can be heard turning on, verify that channel #3 (suction side temperature) is reasonable. After chamber has sat for several hours, channel #3 should be close to room temperature (20-30C). This can be checked by issuing the command C3? to get temperature reading of channel #3 and C4? is the command used to get the temperature of channel #4 (compressor temperature). If a faulty reading is observed, try clearing calibration by issuing the command CALC3,9 for channel#3 and CALC4,9 for channel#4. If faulty readings are still present, contact Sun for an RMA and send in the control section for evaluation/repair. See "Remove EC127 Control Section" for details. If temperature readings are valid and the valve can be heard clicking on when the OUT0:5,1 command is issued, it's possible the CB valve or cap tube is blocked. Contact Sun for an RMA number and send the chamber in for evaluation/repair.

E3

If an E3 error code is observed when cooling, it's possible that the Cold Bypass valve is stuck open. Measure the voltage on the terminals labeled "COLD BYPASS" on the 16 position terminal strip on the I/O board. If the inside of the chamber is close to 20-30C, the voltage measured from these terminals on a DC I/O should be approximately 0VDC and on chambers with an AC I/O board approximately 0VAC as this valve is only energized when coming down from hot temperatures.

Check that the C3 temperature is reading a reasonable value. After the chamber has been sitting idle for several hours, the channel #3 temperature should be close to room temperature (20-30C). This can be checked by issuing the command C3? From the front panel.

If C3 reading is reasonable and valve output is approximately 0Vdc, then the CB valve could be mechanically stuck open. Contact Sun for an RMA and send the chamber in for evaluation/repair.

E4

An E4 error code as mentioned at the beginning of this section is typically caused by a compressor not turning on. See that section for details if the compressor is not turning on. If the compressor is turning on, check that the Cool valve, Hot Bypass valve and Cool Bypass valve outputs are not always on and therefore opening one or more of the valves at all times. With the chamber just plugged in and powered off, remove the right side panel of the chamber and locate the I/O board's 16 position terminal strip and the three pairs of wires. The silk screen on the I/O board is labeled "AIR COOL", "HOT BYPASS" and "COLD BYPASS" for all three valve outputs. The yellow pair of wires is for the cool valve, orange pair for the HB valve and the red pair for the CB valve. Measure the voltage for all three outputs while the chamber is plugged in and powered off. On a chamber with a DC I/O, all three valves should measure approximately 0VDC and for a chamber with an AC I/O, all three outputs should measure approximately 0VAC. If there is voltage present (such as 3-6VDC for DC I/O or 120/220vAC for chambers using an AC I/O), then the driver board (for DC I/O) or SSR (for AC I/O) is faulty and should be replaced. The part number for the DC driver board is 980047 and the part number for the SSR used on 120VAC chambers is 800004. Contact Sun for availability of the SSR used on 220VAC chambers.

If voltages measured are approximately 0VDC or 0VAC, then it's possible one or more valves are mechanically stuck open. Contact Sun for an RMA number and send the chamber in for evaluation/repair.

E5

An E5 error code is displayed when the channel #4 temperature, which measures compressor temperature, is too high. You can verify the C4 reading by issuing the C4? Command and observing the response. If a high value is displayed but the compressor does not feel hot, then this could be a faulty reading. Try clearing the channel #4 calibration by issuing the CALC4,9 command to clear calibration. If reading is still faulty, then there could be an issue with the motherboard or scannerboard. Contact Sun for an RMA number and send the control section in for evaluation/repair. See "Removing EC127 control section" section for details.

If the channel #4 reading is high, check to see if the compressor is warm by removing the left side panel of the chamber to allow access to the compressor. If the compressor temperature matches up with the channel 4 temperature, then the compressor is overheating, possible due to excessive dust in the refrigeration section. Use a vacuum

or compressed air to clean out the refrigeration section including condenser coils and compressor. Make sure there is adequate air ventilation by not blocking vent holes for the bottom refrigeration section.

E6

An E6 error code will be displayed if suction side pressure sensor voltage is low. This can be caused by a system low on refrigerant. See “Checking system’s charge level from pressure sensor output” section for details on checking charge.

If charge is ok, then it’s possible that the Hot Bypass valve is not opening. Issue the command OUT0:4,1 from the front panel to manually open the HB valve. An audible clicking sound should be heard. To turn off the valve issue the command OUT0:4,0. If no clicking sound is heard, remove the right side panel and locate the HOT BYPASS valve wires (typically orange) connected to the 16 position terminal strip on I/O board terminals labeled “HOT BYPASS”.

On chambers using DC refrigeration valves with a DC I/O board, the DC valve can be manually opened using a 9 volt battery. Disconnect the orange pair of HB valve wires and connect to a 9V battery. If the valve is opened when connecting a 9V battery, but is not opening when OUT0:4,1 command is issued, then check that the gray ribbon cable is fully seated on both ends (I/O board end and P5 on motherboard end). If the gray ribbon cable is connected properly, then it’s possible that the HB driver board is faulty (on chamber’s with DC I/O board) or the HB SSR is faulty (on older chamber’s using an AC I/O board). The part number for the Driver board used on the DC I/O is 980047 and the part number for the SSR that was used on the AC I/O is 800004. If voltage is getting to the valve, then it’s possible that the valve or its cap tube is clogged. Contact Sun for an RMA number to send the chamber in for evaluation/repair.

One or more fans not circulating air inside chamber

If the chamber was built before 2023, then it likely has AC motors installed. These motors use a start capacitor mounted on top of the motor. If one motor is not functioning, swap start capacitors to see if the issue follows the start capacitor. If the start capacitor is found to be faulty, contact Sun for replacement. If the capacitor is not faulty, remove the back plate and check for loose motor wires and that they are properly connected. Refer to the wiring diagram on the motor if needed.

If both motors are not turning on, remove the right side panel and locate the I/O board (board with large transformer). Verify that gray ribbon cable is fully seated into the connector on the I/O board and that the other end of the cable is connected to the connector labeled P5 on the motherboard (NOT P6!).

Verify that the controller is powering on the 3-10A fan SSR located on the I/O board to the left of the transformer, by measuring the voltage on terminals 3 and 4 where black/red or white/red wires connect. With chamber on, you should measure approximately 3-5Vdc on terminals 3 and 4 of 3-10A motor SSR. If no voltage is present, and gray ribbon cable is firmly connected to P5 on motherboard and 26 pin connector on the I/O board, then it's possible the motherboard is faulty (this is rare but possible) and the control section can be sent in on an RMA for evaluation/repair. If the 3-5VDC voltage is present on terminals 3,4 on the motor SSR and both motors are not working, unplug the chamber and use an 18GA wire to temporarily jumper terminals 1 and 2 of the 3-10A motor SSR. Plug chamber back in to see if both motors now start up. If so, then 3A motor SSR is faulty and should be replaced. Remember to remove the jumper from motor SSR terminals 1 and 2. The part number for this SSR is: 800011. If the chamber was built in 2023 or later, it likely has BLDC motors. These motors can be identified by their lack of a start capacitor.

Remove the right side panel of the chamber and locate the motors 24VDC power supply. With the chamber turned on, verify that the green LED on the power supply is lit and that the power supply is producing approximately 24VDC from both outputs. If the power supply's LED is not lit and no voltage present from output, measure line voltage input to see if the 24VDC power supply is receiving line voltage.

If line voltage is present to the input of the 24 Vdc power supply and no voltage is present on its output, then the power supply is faulty and should be replaced. Part number for 24 Vdc power supply is 840039.

If no line voltage is present to the power supply input, with chamber on, measure voltage on terminals 3 and 4 of the 3-10A SSR located to the left of the transformer. This is the ON/OFF (or motor) control voltage from the motherboard. If no voltage is present, first verify that gray I/O ribbon cable is fully seated on both ends. If connection is good and no voltage is present on SSR terminals 3 and 4 then it's possible the motherboard is faulty (this is rare, but possible) and control section should be sent in for evaluation/repair. If the 3-5 VDC ON/OFF motor control voltage is present on terminals 3 and 4 of the motor SSR, unplug chamber and temporarily jumper terminals 1 and 2 of SSR. Plug chamber back in to see if line voltage is now present to 24VDC power supply and motors are now working. If so, then the SSR is faulty and should be replaced. Part number for this SSR is 800011.

If only one of the BLDC motors is not working, remove the right side panel and locate the BLDC controllers for each motor (mounted on panel next to power supply). The motor on the left side as viewed from front is the CW motor and its controller is labeled CW, while the motor on the right side as viewed from front is the CCW motor and its controller is labeled CCW. Check that the BLDC motor controller cables are connected and that the BLDC controller for that motor is receiving power. An LED on the

controller should be lit up when it is receiving power. If the LED is not lit up, verify that the red/black wires from power supply to controller are properly connected and supplying 24 Vdc to the controller. If the controller's LED does not turn on when supplied with 24Vdc then the controller is faulty and should be replaced. If the controller is receiving power, its LED is on and the motor is not functioning, check the wiring to the faulty motor for loose or poor connections. If connections are good, then it's possible that the controller is faulty. To eliminate the possibility that the motor is faulty, connect the faulty motor to the BLDC controller currently connected to the motor that is working. If the previously faulty motor now starts working, then the BLDC controller is faulty and should be replaced. Part number for a BLDC motor is: 840038. Make sure to reconnect the good motor to its controller and specify which controller (CW or CCW) is needed when ordering a replacement BLDC controller.

Chamber not heating

Enter a hot set point (such as SET=100) and enable heating by pressing the yellow button with the UP pointing arrow on top left of the front panel. The yellow heat enable LED should be lit up.

The controller should then turn on the red heat LED located below the LCD.

If the red heat LED does not light up, it's possible that the controller has a corrupt PID parameter. Perform a software reset by issuing the STOPE9 command from the front panel. See "Software reset procedure" section for details.

If the red heat LED is lighting up, then it's possible that the 25A heater SSR or one or more heater elements are "open".

Remove the backplate on the chamber, set aside insulation and inspect heater element connections for charring, loose wire or nuts. Inspect for cracked ceramic insulators as well. Replace any charred connectors or ceramic insulators if necessary. Disconnect at least one wire from each element and measure resistance of elements one at a time.

The chamber uses (2) 400 W elements that measure approximately 32 ohms each. On 120VAC chambers, the elements are wired in parallel and will measure 16 ohms when wired up. On 220VAC chambers they are wired in series and measure 64 ohms.

Replace any open elements as needed. See Heater replacement section below for details.

If heater elements measure ok and all wiring, ceramic insulators and connections are good, then check 25A heater SSR by removing the right side panel of the chamber. There are 2 SSR's installed on sheet metal just above the I/O board. They should be labeled "HEAT" and "COMP". The SSR labeled "HEAT" is for the heater elements while the SSR labeled "COMP" is for the compressor. If no label is present, the heater SSR can be identified by the 14GA, beige fiberglass insulated heater wire connected to the top terminal (usually terminal 1). At this point, and with the chamber unplugged, you

could also measure the equivalent resistance of heater elements by measuring the resistance from the “HEAT” SSR terminal 1 and circuit breaker terminal B2. The circuit breaker is located in the back of the chamber above the power cord. The B2 terminal is the bottom terminal furthest from you.

You should measure approximately 16 ohms for a 120VAC chamber and 64 ohms for a 220VAC chamber. If resistance measured is reasonable, then plug the chamber back in, power back on and enter a hot set point such as SET=100. The red heat LED should turn on. Use a meter set to VDC to verify that when the red heat LED is on, there is approximately 3-5VDC present on bottom terminals 3 and 4 of the heater SSR. If this voltage is present and the chamber is still not heating, then the heater SSR could be faulty. For troubleshooting purposes you could temporarily swap the “COMP” SSR with the “HEAT” SSR to see if the problem is with the heater SSR. Part number for the 25A SSR is 800003.

If no heat control voltage is present on the heater SSR terminals 3 and 4 with red heat LED on, verify that the gray I/O ribbon cable is firmly seated on both ends and is plugged into the P5 connector on the motherboard. If the connection is good, then it's possible the motherboard is faulty. This is rare but possible. Contact Sun for an RMA number if you would like to send in the EC127 control section (includes motherboard with front panel). See “Removing EC127 control section” for details.

Chamber always heating

If the chamber is always heating, it's possible the 25A heater SSR is faulty or one or both of the 400W heater elements are “open” and shorting to ground (chassis). With the chamber unplugged, remove the ‘L’ shaped baffle from the chamber interior by removing the 2 screws holding the baffle to standoffs located on the chamber's ceiling and 2 screws holding the baffle to the evaporator cover. The baffle can then be removed, exposing the two heater elements. Check for open heater elements shorting to chassis. With the chamber plugged in, if both heater elements turn on, then the problem is most likely with the 25A heater SSR. To replace heater SSR, remove the right side panel of the chamber and locate 25A SSR mounted above the I/O board labeled “HEAT”. The heater SSR can also be identified by the 14GA, beige fiberglass insulated heater wire connected to one of its AC terminals. Verify that the controller is not the issue by measuring heat control voltage on terminals 3 and 4 of the heater SSR. With the chamber plugged in, powered on and no set point, it should measure ~0Vdc. If a voltage is present, then the motherboard could be faulty. Contact Sun for an RMA if you would like to send the control section in for an evaluation/repair. Please provide serial number listed on the back of the chamber. If no heat control voltage is present on terminals 3 and 4 of the heater SSR and chamber is heating, then SSR is most likely faulty and should be replaced. Part number for a 25A replacement heater SSR is 800003.

Note: For troubleshooting purposes, the 25A SSR labeled “COMP” (used for compressor) is the same part and can be temporarily swapped to see if the issue follows the SSR.

If just one element turns on, remove backplate, set aside insulation and check for a cracked or missing ceramic insulator. Disconnect wires to elements and measure each terminal to ground. You should measure OL (out of limit) or a very high resistance (megaohms). If not, then the terminal could be shorting to ground via a cracked insulator. Measure the resistance of each element. Each 400W heater element should measure approximately 32 ohms. Replace faulty heater elements or cracked ceramic insulators as needed. See Heater Replacement section for details. Part number for 400W heater element is 980200 and part number for female ceramic insulators is 140003. New heater elements come with ceramic insulators.

Chamber blows fuses when plugged into outlet

With the chamber unplugged, remove the chamber’s backplate and set aside. If the chamber has an AC motor with a start capacitor. Remove the nut holding the capacitor onto the motor and hang to the side to allow removal of the back plate. Remove the fiberglass insulation and look for signs of a short such as charring on backplate, melted motor wires, loose heater wire or broken/missing ceramic insulators and repair/replace as needed. Measure each heater terminal to ground to verify no shorts. You should get a very high resistance (an OL “out of limit” or megaohms) from each heater terminal screw to ground. Remove wires to each element to verify each element is measuring approximately 32 ohms.

If no signs of short behind back plate exist, remove the right side panel of the chamber and locate the 25A compressor SSR (labeled “COMP”) mounted just above the I/O board (board with large transformer) and usually just under the heater SSR. With the chamber unplugged, disconnect the black wire coming from the compressor and attached to terminal 1 (outside terminal) of SSR. Measure this resistance to ground to verify a high reading. A low reading near 0 ohms indicates a short in the compressor and will require replacement. Replacement of the compressor will require a licensed refrigeration technician.

Part number for the 110VAC compressor is: 590021.

Part number for the 220VAC compressor is: 590022.

Contact Sun if you would like to send the chamber in on an RMA for evaluation/repair. Please provide the serial number listed on the back of the chamber.

Chamber not powering up

Verify there is power at the outlet that the chamber is plugged into.

Check fuse(s) on the back of the chamber near the power cord. Fuses used should be 15A slow blow fuses.

Check that the motherboard is receiving power from the I/O board. To access the I/O board, remove the right side panel and set aside. The I/O board is the 8" X 9" PCB with the large transformer. With the chamber plugged in, set meter to VAC and verify that approximately 15-25VAC is present on the 2 prong connector that the black twisted pair wire from motherboard is connected to.

If no voltage is present on the I/O board's 2 prong connector with chamber plugged in, check that 120VAC (220VAC for 220VAC chambers) is present on the 8 position terminal strip located on the right side of I/O where black/white wires connect and that there are 2 jumpers installed for 120VAC chambers and that they are installed on the terminals labeled 120VAC and that 1 jumper is installed for 220VAC chamber's between the terminals labeled 220VAC.

If line voltage is present, but there is no 15-25VAC present on the I/O board's 2 prong connector, then it's possible the transformer is faulty. Part number for a new DC I/O board is 981043E.

If voltage is present on the I/O board's 2 prong connector, then check that the front panel ribbon cable was properly connected. See "Removing EC127 control section" for details on removal. After removal, check that the front panel ribbon cable was properly connected from the P7 connector on the motherboard to the front panel connector and that the motherboard's 3A fuse is not blown. If the cable was not connected properly or fuse was blown, replace fuse, reconnect cables and power up to see if the issue is now resolved. If the problem persists, then the issue is most likely with the motherboard/front panel.

Contact Sun for an RMA number to send in the control section. Provide serial number listed on label located on back of chamber.

PROBE #5,#6,#7,#8 etc. ERROR displayed on front panel

The EC127 chamber uses channels 3 and 4 and therefore should only have 2 scanner channels enabled. This issue can be resolved by entering the SDEF menu and enabling 2 scanner probes or by issuing the STOPE9 software reset command. See "Software reset procedure" section for details.

PROBE#1, PROBE#2 ERROR

A probe error can be caused by either a faulty (open) probe or corrupt calibration data. To check that probe is not the issue, remove the left side panel of chamber to access both the channel#1 and channel#2 probes. The probes are connected to green 8 position connectors that plug into the motherboard. Verify that the probe leads are securely connected to the green 8 position connector. The leads are secured using a small precision flat head screwdriver. Swap channel #1 and channel #2 probes (if only

receiving one probe error) to see if probe error follows probe. If probe error follows probe, then probe is faulty and should be replaced. Contact Sun for a replacement probe.

If probe error is always present even with a known good probe, the problem could be corrupt calibration data. Restore default calibration data to see if this resolves the issue. See “Restore default calibration section”.

If restoring default calibration data does not resolve the issue and probe is good, then the issue is most likely with the main motherboard. Contact Sun for an RMA number if you would like to send the control section in for evaluation/repair. See “Removing EC127 control section” for details on removing control section.

Cool Boost not functioning

To turn on cool boost, enter a cold set point such as SET = 0 and enable both cooling and cool boost by pressing both yellow buttons with DOWN pointing arrows labeled “AIR” (this is cool enable) and “RH” (this is cool boost). Both yellow LED’s should be lit up to enable cooling as well as cool boost.

When the compressor starts up, green cool LED on left side (for regular cooling) will light up as well as green cool LED on right side (for cool boost valve). When green cool LED for cool boost lights up, an audible clicking sound can be heard from cool boost solenoid on back of chamber. You can also toggle the cool boost valve on and off by enabling/disabling the cool boost enable by pressing the yellow button with DOWN pointing arrow toward bottom of front panel labeled “RH”. A clicking sound should be heard from the cool boost solenoid on the back of the chamber when the green cool boost LED on right is turned on/off.

If no clicking sound can be heard, remove the right side panel of the chamber, locate the I/O board (board with large transformer). The cool boost output can be identified by the terminal pair with blue wires attached and labeled “COOL BOOST”. When the green cool boost LED (on right side) is on, you should measure approximately 3-7Vdc on chambers with DC I/O board and approximately line voltage for chambers with an AC I/O board. See section on identifying whether the chamber has DC or AC I/O. If no voltage is present, verify that the gray ribbon cable to the I/O board is firmly connected on both ends. If the connection is good, it’s possible that the cool boost driver board is faulty (for DC I/O) or SSR is faulty (for AC I/O). Part number for this driver board used on chambers with a DC I/O is 980047. The part number for the SSR used on an AC I/O board is 800004.

If voltage is present and solenoid is not opening, then, for chambers with a DC I/O and DC valve, measure the solenoid coil resistance. DC valve coil resistance is approximately 18 ohms. If much higher then solenoid should be replaced. If coil resistance is ok, then check filter assembly for debris. The middle fitting of the filter assembly has a cylindrical screen installed. Remove and inspect this screen. Use

compressed air to clean. Apply several wraps of teflon tape when reinstalling fittings. If filter assembly is ok, then solenoid is most likely at fault. Please provide serial number when ordering part or requesting an RMA to send in I/O board or chamber in for evaluation/repair.

If the cool boost valve is opening but not cooling, check that the hose is connected to the liquid port of dewar. Cooling will only be possible if liquid is available. If cool boost valve is attached to a bulk supply with long lines, then gas will only be available to the valve and cooling will not take place until gas is purged from lines. Bulk supply with long lines is not recommended for use with a cool boost valve for this reason. It is recommended to use an LN2 dewar with 6-10 ft insulated lines or a supply that ensures liquid will always be available to the cool boost valve.

GPIO not functioning

Verify that GPIO cable is firmly connected on both ends and that GPIO card and cable are not faulty. Confirm that the GPIO address of the chamber is set to an address between 1 and 32 and is set to the correct address the application is attempting to communicate with.

Issue the STOPER software reset command. See software reset procedure section below for details on how to do this. If issued correctly, the chamber should turn off. Unplug chamber, wait several seconds then plug chamber back in and power back on to see if issue is now resolved.

RS232 not functioning

Enter the SDEF menu to verify RS232 settings such as baud rate are set to the correct value that the application requires. When commands are sent remotely to the controller, the yellow REM LED on the chamber's front panel should light up and the response to the command sent will be displayed for several seconds on LCD. If REM LED is not turning on, then verify cable is wired properly in a NULL modem configuration as shown below:

DB9 connector (female) on PC end	DB25 connector (male) on controller end
Pin #3 (TXD)	Pin #3 (RXD)
Pin #2 (RXD)	Pin #2 (TXD)
Pin #5 (GND)	Pin #7 (GND)

Occasional "COMMAND ERROR" message received remotely over RS232

If a command error message is occasionally received after sending a valid EC127 command, lower the baud rate to 2400 via the SDEF menu.

Software reset procedure

Some issues can be resolved by issuing the software reset command. When this command is issued, any local programs stored in RAM will be erased and many controller parameters such as the controller's PID values, UTL, LTL will be restored to factory defaults. Calibration parameters however, will not be disturbed.

To issue a software reset, the command is **STOPE9**. This can be done from the front panel as follows:

Press STOP key,

Press GREENSHIFT key

Press E key

Press 9 key

Press ENTER.

The controller should turn off if performed correctly. Power chamber back on to see if issue is resolved. (RAM LOST DATA message after powering back on is normal).

Checking system's charge level from pressure sensor output

The pressure sensor circuit measures the suction side pressure. The relationship of the voltage to pressure is 20psia/Volt. So at 1 atm or 14.7psi, you would get .735Vdc. Or 0psig. On older chambers (built before 2005/2006) that use the AC I/O board, the pressure sensor circuitry is soldered directly to the I/O board and the output of this circuit can be measured from the pad with the purple wire labeled "OUT".

On chambers with a DC I/O board, the pressure sensor circuitry is on its own board mounted vertically and installed into a 5 position connector. The part number for this module, which includes a pressure sensor, is 981096. Keep in mind that if the pressure sensor is replaced, the system must be evacuated, charged with nitrogen and leak checked before recharging with 1.25 lbs of R404A.

To check the output voltage of the pressure sensor, remove the right side panel of the chamber and locate the chamber's I/O board (board with large transformer).

Identify if the chamber is equipped with DC valves with DC I/O board or AC valves with AC I/O board. See "Identifying whether EC127 has AC I/O or DC I/O" section for details.

If a DC I/O board is installed, there will be a pressure sensor board installed vertically near the back on the right side of the I/O board into a 5 position connector. There is a jumper labeled "OUT". This is the output of the pressure sensor circuit. With the chamber plugged in, set meter to VDC and attach black ground lead of meter to chamber chassis and use red probe lead to measure voltage from jumper labeled

“OUT”. On an AC I/O board, locate the pad labeled “OUT” with the purple wire soldered to it.

After sitting overnight, this voltage typically measures approximately 4-9VDC. If the pressure measures .735 to 2VDC, then the system is low on refrigerant and likely has a leak. Contact Sun for an RMA number if you would like to ship the chamber in for evaluation/repair. A licensed refrigeration tech can also be used to check for leaks, repair and recharge the system with 1.25lbs of R404A refrigerant.

Removing EC127 control section

The control section includes the front panel, motherboard and scanner board. The control section can be slid out by removing both the left and right side panels of the chamber as well as the screws along the bottom front side of the front panel.

Disconnect the black twisted pair wire, gray I/O board ribbon cable, (5 wire pressure sensor wiring harness on older chambers), both the channel #1 and channel#2 probes (accessed from left side) as well as channel 3 and 4 scanner probes located just behind the front panel. The control section can then be slid out and shipped back to Sun on an RMA for an evaluation/quote for repair.

Restoring default calibration

To restore factory default calibration, power on chamber and enter the CAL menu by pressing the GREEN shift button followed by the CAL button. The probe type that the controller is set up for will be displayed for a few seconds. Most EC127's are equipped with K thermocouples on both channels but verify that this is the case.

Answer YES to CAL PROBES? , then press ENTER.

Answer 9 to ENTER CAL ACCESS CODE, then press ENTER

Answer YES to CAL CH#1? and press ENTER until the correct probe type currently installed on chamber is displayed. As mentioned previously, most EC127 chambers are equipped with K thermocouple probes and should be set to K THERMOCOUPLE NARROW.

If K thermocouple probes are installed on chamber, press ENTER until you see K THERMOCOUPLE NARROW?, then answer YES, and press ENTER.

Answer NO to “PROBE AT 0 DEG C?” Answering “NO” to this prompt will force the controller to enter factory default calibration values.

Repeat the above steps for channel #2 to enter factory default calibration values, making sure to select the probe that is installed in the chamber.

Heater replacement

The heating elements are located behind the air baffle, towards the top, located inside the test chamber area. The air baffle has been cut to allow removal of the top portion of baffle and removal.

Unplug chamber from line voltage and ensure that interior of chamber has had time to reach ambient temperature.

Remove the air baffle by removing the (2) screws located at the top of the evaporator cover and the (2) screws connecting the baffle to standoffs on the chamber's inner ceiling. This should allow the 'L' shaped baffle to slide out of the chamber exposing the two heater elements.

Remove the screws located on the perimeter of the chamber back plate, remove back plate and set aside fiberglass insulation to allow access to heater terminals. Remove nut holding wire to terminal and disconnect wires to terminals of heater being replaced. Note where the wires are connected when wiring new elements back in.

Remove the nuts and beveled washers holding terminal in place. This will allow elements to be removed from the front interior of chamber.

Install new elements and make sure to install bevelled washers the same way as they were installed when shipped. Flat washer on first should make contact with ceramic insulator and 2 bevelled washers placed front facing front to allow for expansion and compression without cracking insulators. Tighten the nuts finger tight plus $\frac{3}{4}$ of a turn or approximately 4 inch pounds of torque. Do not over tighten nuts or ceramic insulators will crack when the chamber is heated.

Identifying whether EC127 has AC I/O or DC I/O

AC I/O boards were used before 2005/2006 so if date on serial label is later than this, then chamber most likely as a DC I/O board with DC valves.

AC I/O boards will have part number 840066. It uses black SSR's to drive AC valves with 120VAC or 220VAC depending on the voltage of the chamber. The pressure sensor circuitry is soldered directly onto the I/O board.

DC I/O boards will have part number 840081. It uses small 1.25" x 1" driver boards to drive the three DC valves and has a small pressure sensor module board installed vertically near the back of the I/O board. The module has the pressure sensor circuitry soldered onto its own board making it more easily replaceable. The part number for the EC127 I/O board assembly is 981043E.