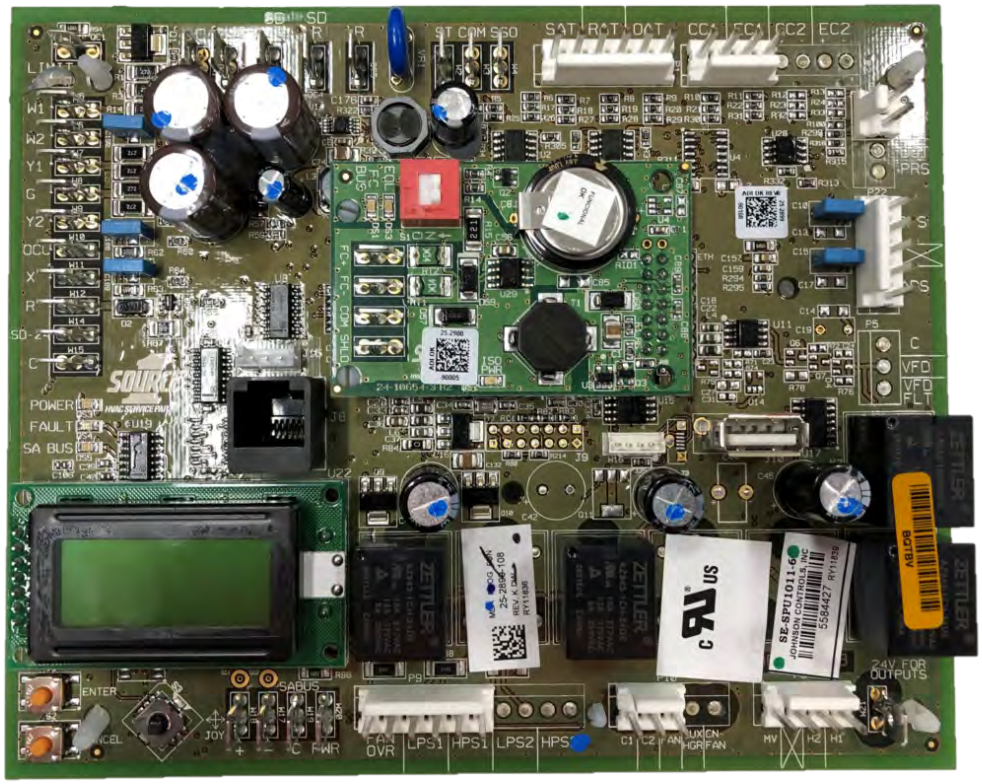
Smart Equipment™ Control Troubleshooting Guide



York International Corporation, 5005 York Drive, Norman, OK 73069

www.york.com

2021-05-25

6138895-UTG-A-0721

A-0521

Johnson Controls Ducted Systems

Contents

Introduction

This document is designed to assist and guide a trained technician or engineer to diagnose and troubleshoot the Smart Equipment Controller alarms. When troubleshooting always use Johnson Controls and industry safety standards.

Preliminary checks

No power

The Smart Equipment™ Control (SEC) board requires 24 VAC to operate. If no power is provided then no alarms are active, the LCD screen is blank, and the unit does **not** function at all.

1. Check that 24 VAC power is present at the SEC board between the C and 24 V terminal blocks on the upper left hand of the board using the voltmeter.

    - If no voltage is present, check the wiring diagram and trace where the 24 VAC power is lost.
    - If voltage is present and no power is indicated on the SEC board through the LCD display or power LED indicator, replace the board.

2. Check for optional components such as the phase monitor in the circuit. If there is a red light visible on the phase monitor, this indicates that the board is not receiving power. Swap the incoming voltage going to the unit, not the voltage within the unit.

Figure 1: SEC board

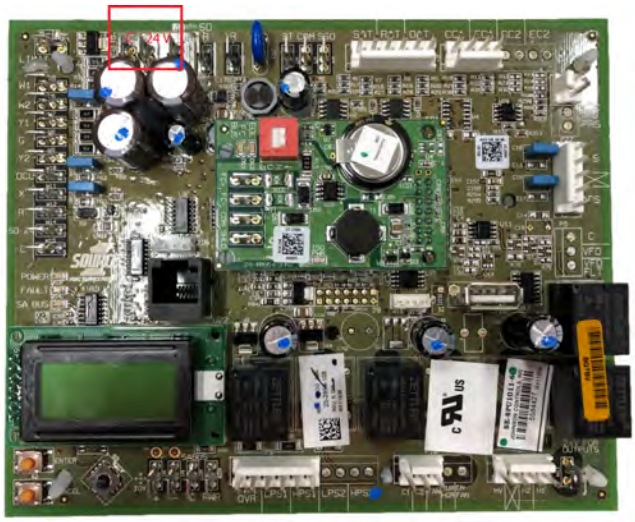


Figure 2: SEC board

Heating alarms

HS1 lockout due to limit switch

The **HS1 Lockout** occurs due to a loss of 24 VAC to the SEC board LIMIT terminal. The LIMIT circuit will have two or more limit switches wired in series. One switch is an automatic limit switch and the other is a manual limit switch. If the SEC board recognizes three limit switch trips in one hour a hard lockout of unit operation occurs and no operation occurs other than blower operation.
If a **HS1 Lockout** occurs complete the following steps:

1. Use a volt meter to check that 24 VAC power is present at the LIMIT terminal located on at the upper left corner of the SEC board.

    a. If no voltage is present, check the wiring diagram and trace where the 24 VAC power is lost.
    b. If voltage is present, continue to Step 2.

2. Determine if a limit switch is open and check the possible cause of the limit trip.
3. Check the circuit wiring for damage or a loose connection.
4. Check if the limit switch is faulty. If the switch is tripping without reaching tripping temperature, this can indicate a faulty LIMIT switch.
5. Check that all the filters are clean.
6. Check for correct air flow according to the unit installation manual. Return static should not be higher than 0.2 in. w.c. Factory equipment should be air balanced to operate in a cfm range from 350 cfm to 450 cfm per ton.

    ⓘ **Note:**

    a. If the unit AHU or RTU is a VAV application during the heating operation, the fan should run at an adequate speed to allow correct air flow that will prevent the unit from tripping on HS1 lockout. This means in most cases the VAV boxes must be open when a call for heat is commanded.
    b. On occasions where the system has two transformers, proper low voltage phasing must be verified or HS1 could occur.

If lockout has occurred after tripping three times in one hour, it may be necessary to reset the power on the unit to clear the HS1 alarm.

Figure 3: HS1 lockout due to limit switch

HS2 lockout due to limit switch

The application of LIMIT 2 is only on the Millennium / Series 40 RTUs. The **HS2 Lockout** occurs due to a loss of 24 VAC to the four stage expansion board LIMIT 2 terminal. The LIMIT circuit will have two or more limit switches wired in series. One switch is an automatic limit switch and the other is a manual limit switch. If the SEC board recognizes three limit switch trips within one hour a hard lockout of unit operation occurs and no operation occurs other than blower operation.

If a **HS2 Lockout** occurs complete the following steps:

1. Use a volt meter to check that 24 VAC power is present at the LIMIT 2 terminal located on at the left side of the four stage expansion board.
    a. If no voltage is present check the wiring diagram and trace where the 24 VAC power is lost.
    b. If voltage is present, continue to step 2.
2. Determine if a limit switch is open and check the possible cause of the limit trip.
3. Check circuit wiring for damage or a loose connection.
4. Check if the limit switch is faulty. If the switch is tripping without reaching tripping temperature, this can indicate a faulty LIMIT switch.
5. Check that all the filters are clean.
6. Check for correct air flow according to the unit installation manual. Return static should not be higher than 0.2 in. w.c. Factory equipment should be air balanced to operate in a cfm range from 350 cfm to 450 cfm per ton.

    ⓘ **Note:**

    a. If the unit AHU or RTU is a VAV application during the heating operation, the fan should run at an adequate speed to allow correct air flow that will prevent the unit from tripping on HS2 lockout. This means in most cases the VAV boxes must be open when a call for heat is commanded.

b. On occasions where the system has two transformers, proper low voltage phasing must be verified or HS2 could occur.

If lockout has occurred after tripping three times in one hour, it may be necessary to reset the power on the unit to clear the **HS2 alarm.**

Figure 4: HS2 lockout due to limit switch

HS3 lockout due to limit switch

The application of LIMIT 3 is only on the Millennium / Series 40 RTUs. The **HS3 Lockout** occurs due to a loss of 24 VAC to the four stage expansion board LIMIT 3 terminal. The LIMIT circuit will have two or more limit switches wired in series. One switch is an automatic limit switch and the other is a manual limit switch. If the SEC board recognizes three limit switch trips within one hour a hard lockout of unit operation occurs and no operation occurs, other than blower operation.

If a **HS3 Lockout** occurs complete the following steps:

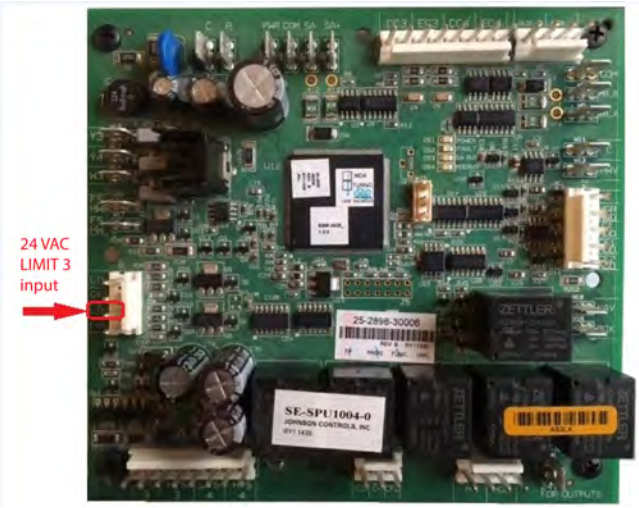
1. Use a volt meter to check that 24 VAC power is present at the LIMIT 3 terminal located on at the left side of the four stage expansion board.
    a. If no voltage is present check the wiring diagram and trace where the 24 VAC power is lost.
    b. If voltage is present, continue to step 2.
2. Determine if a limit switch is open and check the possible cause of the limit trip.
3. Check circuit wiring for damage or a loose connection.
4. Check if the limit switch is faulty. If the switch is tripping without reaching tripping temperature, this can indicate a faulty LIMIT switch.
5. Check that all the filters are clean.
6. Check for correct air flow according to the unit installation manual. Return static should not be higher than 0.2 in. w.c. Factory equipment should be air balanced to operate in a cfm range from 350 cfm to 450 cfm per ton.

Note:

a. If the unit AHU or RTU is a VAV application during the heating operation, the fan should run at an adequate speed to allow correct air flow that will prevent the unit from tripping on HS3 lockout. This means in most cases the VAV boxes must be open when a call for heat is commanded.
b. On occasions where the system has two transformers, proper low voltage phasing must be verified or HS3 could occur.

If lockout has occurred after tripping three times in one hour, it may be necessary to reset the power on the unit to clear the HS3 alarm.

Figure 5: HS3 lockout due to limit switch



HS1 off due to gas valve

The main valve (MV) input is used for gas valve fire proof.
If there is a command for heat and the MV input does not see a 24 VAC input within 6 minutes the SEC board will alarm HS1 Off Due to Gas Valve.

This alarm can also occur if there is no command for heat and a 24 VAC input to MV is present.

If the **HS1 Off Due to Gas Valve** alarm occurs select complete the following steps:

1. Choose the appropriate step from the following:

   a. If you are using a 24 VAC input, use a volt meter to check that 24 VAC power is present at the W1 input for a command of heat.
   b. If you are not using a 24 VAC input, check the operational space temperature is below the occupied heating set point or VAV OCC heating set point.

      Note: You can also check the heating status for heating.

2. Choose the appropriate step from the following:

   a. If 24 VAC is present at W1 or board is commanding heat, check that the H1 output is commanding 24 VAC to the ignition control module.

b. If no 24 VAC output is found, check the 24 VAC for outputs terminal. This terminal should always have 24 VAC power.

3. Choose the appropriate step from the following:

   a. If 24 VAC power is not present, trace wire for loss of power.
   b. If power is present at H1 output and 24 VAC for outputs, check the ignition control module and gas valve.

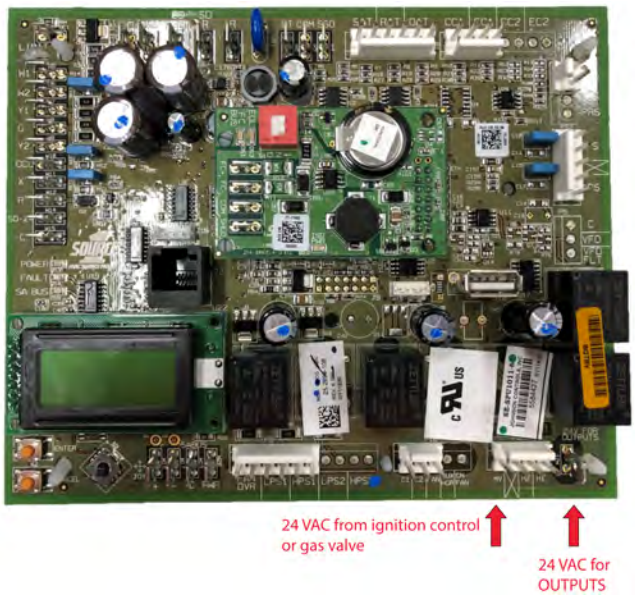
      ⓘ **Note:** Depending on the model of unit, the MV input will come from the ignition control module MV output or directly from the MV on the gas valve.

4. Check that the ignition control module is completing a correct sequence according to the installation manual. If there is no MV feedback, this could indicate a faulty ignition control module or accessory such as ignitor, flame sensor or gas valve.
5. If you are using a 24 VAC input to the W1 terminal ensure that no voltage is leaking. A leak as small as a 0.5 VAC can cause the alarm.

   ⓘ **Note:** It may be necessary to reset the power on the unit to clear the **HS1 Off Due to Gas Valve** alarm if lockout has occurred.

6. Verify LV phasing if two transformers are installed.

Figure 6: HS1 off due to gas valve



HS2 off due to gas valve

The GV2 input is only used on the larger Millennium / Series 40 RTUs and found on the four stage expansion board.

If there is a command for heat and the GV2 input does not see a 24 VAC input within 6 minutes the SEC board will alarm **HS2 Off Due to Gas Valve.**

This alarm can also occur if there is no command for heat and a 24 VAC input to GV2 is present.

If the **HS2 Off Due to Gas Valve** alarm occurs select complete the following steps:

1. Choose the appropriate step from the following:

    a. If you are using a 24 VAC input, use a voltmeter to check that 24 VAC power is present at the W2 input for a command of heat.
    b. If you are not using a 24 VAC input, check the operational space temperature is below the occupied heating set point or VAV OCC heating set point.

        ⓘ **Note:** You can also check the heating status for heating.

2. Choose the appropriate step from the following:

    a. If 24 VAC is present at W2 or board is commanding heat, check that the H2 output is commanding 24 VAC to the ignition control module.
    b. If no 24 VAC output is found, check the 24 VAC for outputs terminal. This terminal should always have 24 VAC power.

3. Choose the appropriate step from the following:

    a. If 24 VAC power is not present, trace wire for loss of power.
    b. If power is present at H2 output and 24 VAC for outputs, check the ignition control module and gas valve.

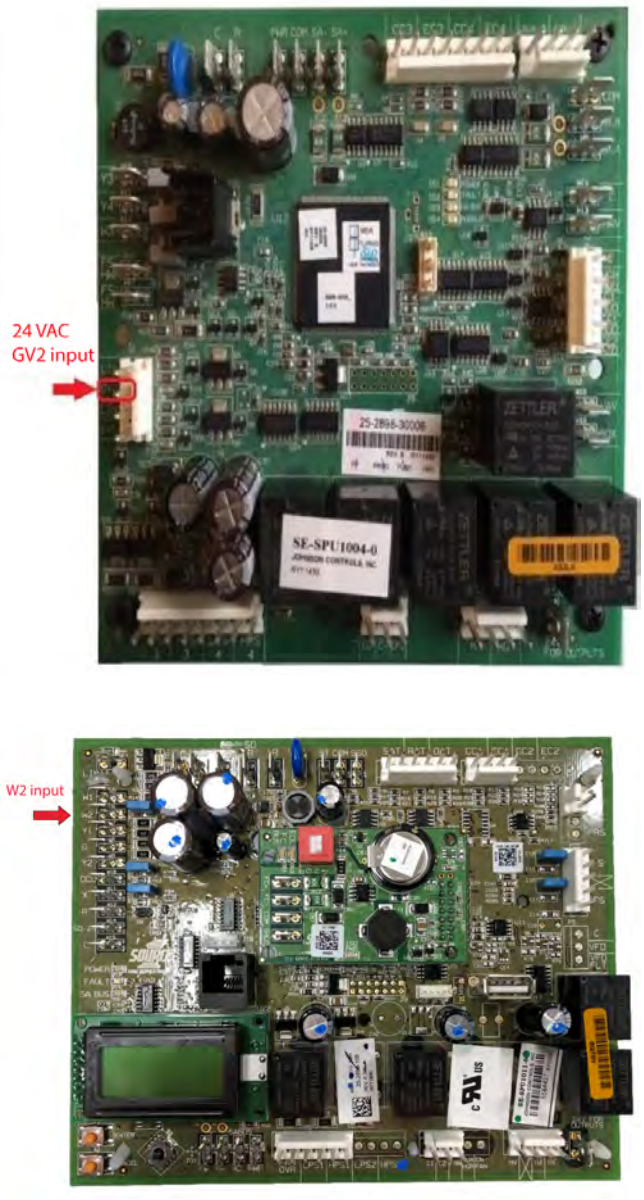
        ⓘ **Note:** Depending on the model of unit the GV2 input will come from the ignition control module MV output or directly from the MV on the gas valve.

4. Check that the ignition control module is completing a correct sequence according to the installation manual. If there is no MV feedback, this could indicate a faulty ignition control module or accessory such as ignitor, flame sensor or gas valve.
5. If you are using a 24 VAC input to the W2 terminal ensure that no voltage is leaking. A leak as small as a 0.5 VAC can cause the alarm.

    ⓘ **Note:** It may be necessary to restore power to the unit to clear the alarm **HS2 Disabled Due to the Gas Valve** if a blockage has occurred.

6. Verify LV phasing if two transformers are installed.

Figure 7: HS2 off due to gas valve



HS3 off due to gas valve

The GV3 input is only used on the larger Millennium / Series 40 RTUs and found on the four stage expansion board.

If there is a command for heat and the GV3 input does not see a 24 VAC input within 6 minutes the SEC board will alarm **HS3 Off Due to Gas Valve.**

This alarm can also occur if there is no command for heat and a 24 VAC input to GV3 is present.

If the **HS3 Off Due to Gas Valve** alarm occurs select complete the following steps:

1. Choose the appropriate step from the following:

    a. If you are using a 24 VAC input, use a voltmeter to check that 24 VAC power is present at the W3 input for a command of heat.
    b. If you are not using a 24 VAC input, check the operational space temperature is below the occupied heating set point or VAV OCC heating set point.

        ⓘ **Note:** You can also check the heating status for heating.

2. Choose the appropriate step from the following:

    a. If 24 VAC is present at W3 or board is commanding heat, check that the H3 output is commanding 24 VAC to the ignition control module.
    b. If no 24 VAC output is found, check the 24 VAC for outputs terminal. This terminal should always have 24 VAC power.

3. Choose the appropriate step from the following:

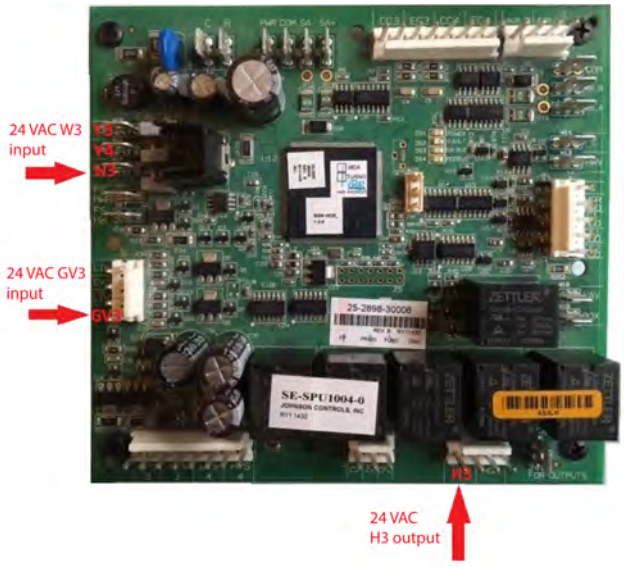
    a. If 24 VAC power is not present, trace wire for loss of power.
    b. If power is present at H3 output and 24 VAC for outputs, check the ignition control module and gas valve.

        ⓘ **Note:** Depending on the model of unit the GV3 input will come from the ignition control module MV output or directly from the MV on the gas valve.

4. Check that the ignition control module is completing a correct sequence according to the installation manual. If there is no MV feedback, this could indicate a faulty ignition control module or accessory such as ignitor, flame sensor or gas valve.
5. If you are using a 24 VAC input to the W3 terminal ensure that no voltage is leaking. A leak as small as a 0.5 VAC can cause the alarm.

    ⓘ **Note:** It may be necessary to restore power to the unit to clear the alarm HS3 Disabled Due to the Gas Valve if a blockage has occurred.

Figure 8: HS3 off due to gas valve



Excessive supply air temp alarm

The **Excessive Supply Air Temp** alarm occurs when the **Supply Air Heating Limit** or **Supply Air Cooling Limit** is enabled and the supply air exceeds the supply air heating limit or cooling limit set point.

If the **Excessive Supply Air Temp** alarm occurs complete the following steps:

1. Use the user interface to check the SAT reading at the SEC controller, map gateway tool or building automation communication.
2. Use your own temperature meter to compare the reading you get with the board SAT reading to check if there is a problem with the unit SAT sensor.
    a. If there is no problem with the sensor the most common cause for the alarm is air flow. Go to Airflow checks.
    b. If the sensor is found to not match your temperature meter you must confirm the SAT sensor is faulty. Go to Sensor checks.

Airflow checks

1. Check that all filters are clean and that there are no blockage or closed dampers.
2. Check that the return static is 0.2 in. w.c. or less and that the total static pressure is within the operating range specified in the installation manual. The unit should be balanced to provide 350 cfm to 450 cfm per ton.

    ⓘ **Note:** If the system is a VAV application and unit is operating morning warm up or VAV occupied heat make sure the VAV boxes are open adequately to allow enough air flow the unit will not trip on heating limits.

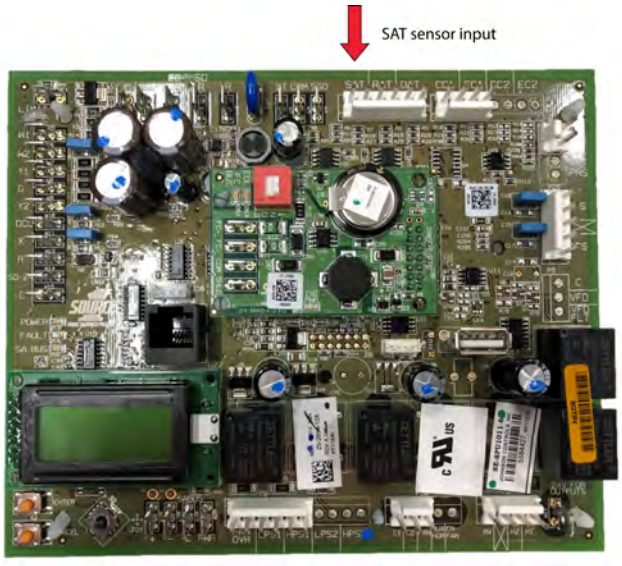
Sensor checks

The SAT sensor is a 10 kohm type three thermistor. To confirm if the sensor is faulty complete the following steps:

1. Ohm out the SAT sensor and compare the resistance reading to the resistance chart.

2. Check if the sensor reading the appropriate temperature.
3. Check if the SEC board is displaying the correct temperature checked.
4. Check wiring to sensor for no damage.
5. Replace sensor if determined to be bad or repair wiring if necessary.

Figure 9: Excessive supply air temp alarm



Cooling alarms

C1 locked out due to low pressure

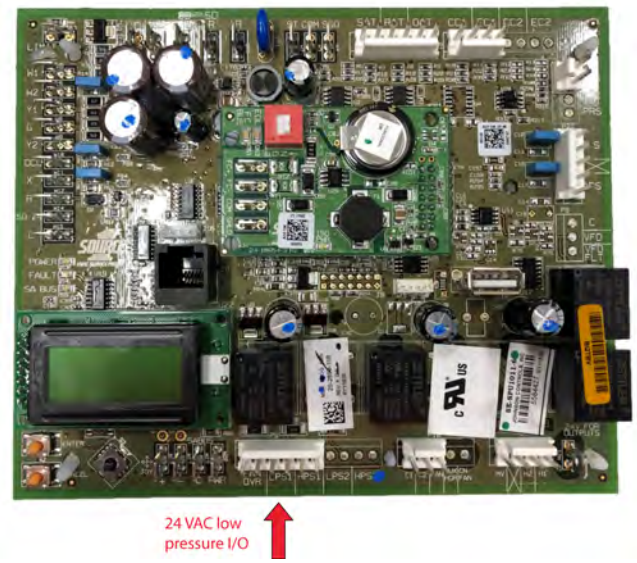
The **C1 Locked Out Due to Low Pressure** alarm occurs when 24 VAC power is lost from the LPS1 terminal located on the SEC board. The terminal consists of 24 VAC output from the SEC board wired through the low pressure switch for refrigeration circuit 1 and back to the LPS1 terminal input. If three **C1 Locked Out Due to Low Pressure** alarms have occurred within one hour, the unit operation will go into a hard lockout and will need to be powered down and back up.

If the **C1 Locked Out Due to Low Pressure** alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports.
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.
3. If the switch is open due to the pressure being below 50 psig, check for the correct air flow.
    a. Check if the air filters are clean.
    b. Check that the unit is moving the correct amount of cfms for the cooling operation.

    ⓘ **Note:** The low pressure switch will open at 50 psig (+/-5 psig) and close at 71 psig (+/-5 psig).
4. Inspect the unit for refrigerant leaks. Check visually for oil and use an electronic leak detector for a more extensive inspection.
5. Check that the unit's compressor is not operating for cooling while there is an **abnormally** low outdoor air temperature with no low ambient control or suction pressure controller such as hot gas bypass.
6. Check that the unit is not allowing an **excessively** low outdoor air temperature through the economizer.
7. If there is a problem with the air flow, a leak or no proper low ambient accessories, make the necessary corrections and test the unit operation.
8. If the air flow, leaks and accessories are not an issue, examine the charge of the refrigeration system and refrigeration system components The basic components include; a compressor, liquid line filter, thermostatic expansion valve (TXV) , evaporator coil and condenser coil. If the system will not run long enough to check superheat and sub-cooling it may be necessary to recover the charge and weigh to determine if the circuit is appropriately charged. **If deciding to remove charge and check amount if you determine the amount is weigh in appropriate charge amount.**
9. If the amount of charge is correct replace the TXV and test the operation as the TXV may be faulty.

Figure 10: C1 locked out due to low pressure



C2 locked out due to low pressure

The **C2 Locked Out Due to Low Pressure** alarm occurs when 24 VAC power is lost from the LPS2 terminal located on the SEC board. The terminal consists of 24 VAC output from the SEC board wired through the low pressure switch for refrigeration circuit one and back to the LPS2 terminal input. If three **C2 Locked Out Due to Low Pressure** alarms have occurred within one hour, the unit operation will go into a hard lockout and will need to be powered down and restarted.

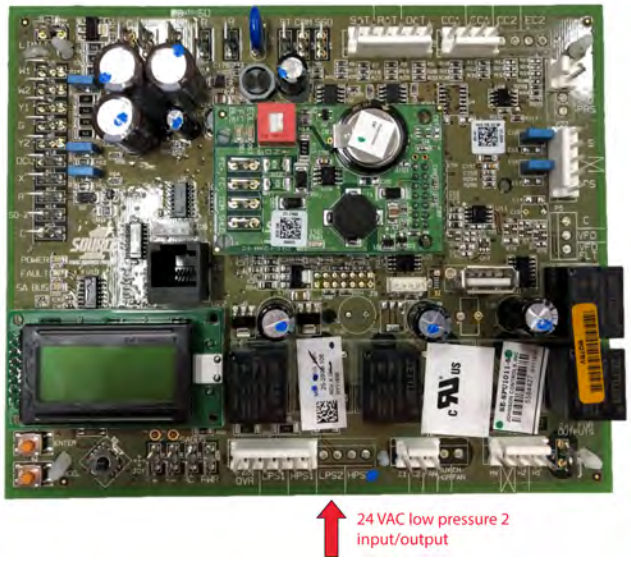
If the **C2 Locked Out Due to Low Pressure** alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports.
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.
3. If the switch is open due to the pressure being below 50 psig, check for the correct air flow.
    a. Check if the air filters are clean.
    b. Check that the unit is moving the correct amount of cfms for the cooling operation.

    ⓘ **Note:** The low pressure switch will open at 50 psig (+/-5 psig) and close at 71 psig (+/-5 psig).
4. Inspect the unit for refrigerant leaks. Check visually for oil and use an electronic leak detector for a more extensive inspection.
5. Check that the unit's compressor is not operating for cooling while there is an **abnormally** low outdoor air temperature with no low ambient control or suction pressure controller such as hot gas bypass.
6. Check that the unit is not allowing an **excessively** low outdoor air temperature through the economizer.
7. If there is a problem with the air flow, a leak or no proper low ambient accessories, make the necessary corrections and test the unit operation.

8. If the air flow, leaks and accessories are not an issue, examine the charge of the refrigeration system and refrigeration system components. The basic components include; a compressor, liquid line filter, thermostatic expansion valve (TXV) , evaporator coil and condenser coil. If the system will not run long enough to check superheat and sub-cooling it may be necessary to recover the charge and weigh to determine if the circuit is appropriately charged. **If deciding to remove charge and check amount if you determine the amount is weigh in appropriate charge amount.**
9. If the amount of charge is correct replace the TXV and test the operation as the TXV may be faulty.

Figure 11: C2 locked out due to low pressure



C3 locked out due to low pressure

The **C3 Locked Out Due to Low Pressure** alarm occurs when 24 VAC power is lost from the LPS3 terminal located on the four stage expansion board. The terminal consists of 24 VAC output from the SEC board wired through the low pressure switch for refrigeration circuit one and back to the LPS3 terminal input. If three **C3 Locked Out Due to Low Pressure** alarms have occurred within one hour, the unit operation will go into a hard lockout and need to be powered down and restarted.

If the **C3 Locked Out Due to Low Pressure** alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports.
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.
3. If the switch is open due to the pressure being below 50 psig, check for the correct air flow.
    a. Check if the air filters are clean.
    b. Check that the unit is moving the correct amount of cfms for the cooling operation.

    ⓘ **Note:** The low pressure switch will open at 50 psig (+/-5 psig) and close at 71 psig (+/-5 psig).
4. Inspect the unit for refrigerant leaks. Check visually for oil and use an electronic leak detector for a more extensive inspection.

5. Check that the unit's compressor is not operating for cooling while there is an **abnormally** low outdoor air temperature with no low ambient control or suction pressure controller such as hot gas bypass.
6. Check that the unit is not allowing an **excessively** low outdoor air temperature through the economizer.
7. If there is a problem with the air flow, a leak or no proper low ambient accessories, make the necessary corrections and test the unit operation.
8. If the air flow, leaks and accessories are not an issue, examine the charge of the refrigeration system and refrigeration system components. The basic components include; a compressor, liquid line filter, thermostatic expansion valve (TXV) , evaporator coil and condenser coil. If the system will not run long enough to check superheat and sub-cooling it may be necessary to recover the charge and weigh to determine if the circuit is appropriately charged. **If deciding to remove charge and check amount if you determine the amount is weigh in appropriate charge amount.**
9. If the amount of charge is correct replace the TXV and test the operation as the TXV may be faulty.

Figure 12: C3 locked out due to low pressure

C4 locked out due to low pressure

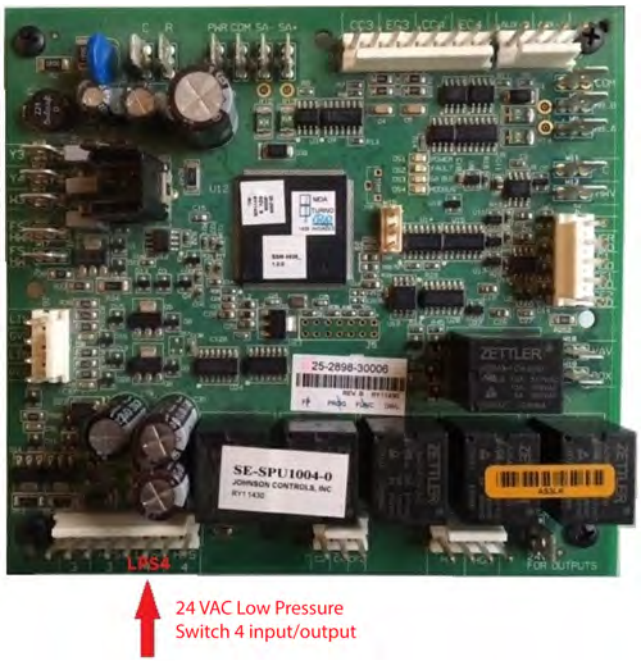
The **C4 Locked Out Due to Low Pressure** alarm occurs when 24 VAC power is lost from the LPS4 terminal located on the 4 stage expansion board. The terminal consists of 24 VAC output from the SEC board wired through the low pressure switch for refrigeration circuit one and back to the LPS3 terminal input. If three **C4 Locked Out Due to Low Pressure** alarms have occurred within one hour, the unit operation will go into a hard lockout and require to be powered down and back up If the **C4 Locked Out Due to Low Pressure**e alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports.
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.

3. If the switch is open due to the pressure being below 50 psig, check for the correct air flow.
    a. Check if the air filters are clean.
    b. Check that the unit is moving the correct amount of cfms for the cooling operation.

    ⓘ **Note:** The low pressure switch will open at 50 psig (+/-5 psig) and close at 71 psig (+/-5 psig).
4. Inspect the unit for refrigerant leaks. Check visually for oil and use an electronic leak detector for a more extensive inspection.
5. Check that the unit's compressor is not operating for cooling while there is an **abnormally** low outdoor air temperature with no low ambient control or suction pressure controller such as hot gas bypass.
6. Check that the unit is not allowing an **excessively** low outdoor air temperature through the economizer.
7. If there is a problem with the air flow, a leak or no proper low ambient accessories, make the necessary corrections and test the unit operation.
8. If the air flow, leaks and accessories are not an issue, examine the charge of the refrigeration system and refrigeration system components. The basic components include; a compressor, liquid line filter, thermostatic expansion valve (TXV) , evaporator coil and condenser coil. If the system will not run long enough to check superheat and sub-cooling it may be necessary to recover the charge and weigh to determine if the circuit is appropriately charged. **If deciding to remove charge and check amount if you determine the amount is weigh in appropriate charge amount.**
9. If the amount of charge is correct replace the TXV and test the operation as the TXV may be faulty.

Figure 13: C4 locked out due to low pressure



C1 locked out due to high pressure

The **C1 Locked Out Due to High Pressure** alarm occurs when 24 VAC power is lost from the HPS1 terminal located on the SEC board. The terminal consists of 24 VAC output from the SEC board wired through the high pressure switch for refrigeration circuit one and back to the HPS1 terminal input. If three **C1 Locked Out Due to High Pressure** alarms take place within one hour the unit operation goes into a hard lockout and needs to be powered down and restarted.

If the **C1 Locked Out Due to High Pressure** alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.

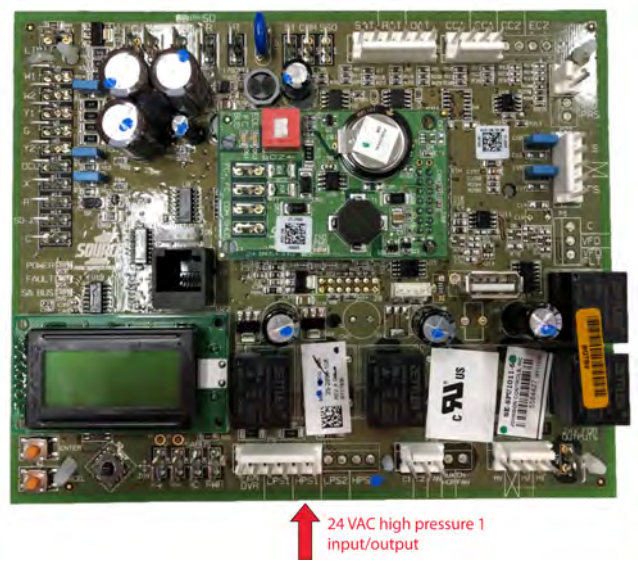
   ⓘ **Note:** The high pressure switch will open at 625 psig (+/-25 psig) and close at 500 psig (+/-25 psig)
3. Check that the condenser coil is clean and clear for adequate air flow.
4. If the coil is dirty or blocked then clean or clear the blockage and test operation.
5. Check that the condenser fan and low ambient control, if used, are working correctly.
6. If the system is a split system, complete the following steps:

   a. Check that the solenoid valves are being energized and are opening.
   b. Check that the SEC board is properly configured. Go the main menu **How to Setup** tab and find SEC condensing unit setup instructions. If the SEC board is not correctly configured this can cause the unit to trip on high head pressure.
7. If no issues have been found, check the system charge, liquid line filter and TXV operation.

   a. If the system will not run long enough to check the superheat and sub-cooling, the temperature change across liquid line filter or test the TXV then **it may be necessary to** remove the refrigerant charge and confirm the system has a correct charge.
   b. If the system has the correct charge replace the liquid line filter and TXV then charge system to correct amount and test operation.

   ⓘ **Note:** If the system has other accessories that could affect head pressure then check the accessory operation.
8. Ensure that the wire connection on the high pressure switch is connected correctly.

Figure 14: C1 locked out due to high pressure



C2 locked out due to high pressure

The **C2 Locked Out Due to High Pressure** alarm occurs when 24 VAC power is lost from the HPS2 terminal located on the SEC board. The terminal consists of 24 VAC output from the SEC board wired through the high pressure switch for refrigeration circuit two and back to the HPS2 terminal input. If three **C2 Locked Out Due to High Pressure** alarms take place within one hour the unit operation goes into a hard lockout and needs to be powered down and restarted.

If the **C1 Locked Out Due to High Pressure** alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.

   ⓘ **Note:** The high pressure switch will open at 625 psig (+/-25 psig) and close at 500 psig (+/-25 psig)
3. Check that the condenser coil is clean and clear for adequate air flow.
4. If the coil is dirty or blocked then clean or clear the blockage and test operation.
5. Check that the condenser fan and low ambient control, if used, are working correctly.
6. If the system is a split system, complete the following steps:

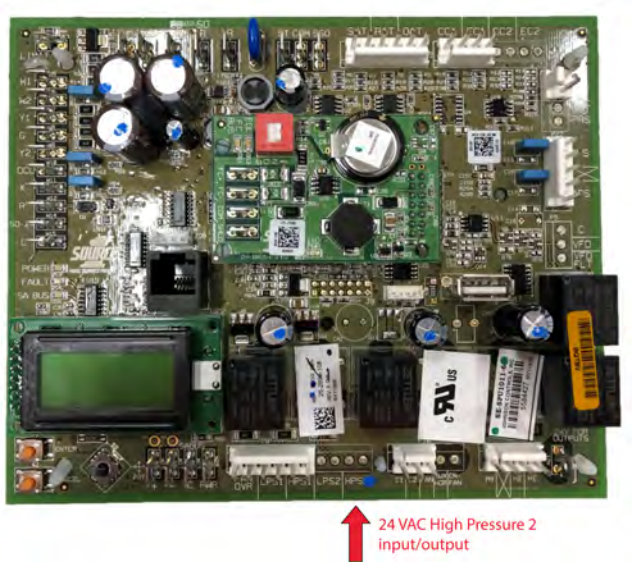
   a. Check that the Solenoid valves are being energized and are opening.
   b. Check that the SEC board is properly configured. Go the main menu **How to Setup** tab and find SEC condensing unit setup instructions. If the SEC board is not correctly configured this can cause the unit to trip on high head pressure.
7. If no issues have been found, check the system charge, liquid line filter and TXV operation.

   a. If the system will not run long enough to check the superheat and sub-cooling, the temperature change across liquid line filter or test the TXV then **it may be necessary to** remove the refrigerant charge and confirm the system has a correct charge.
   b. If the system has the correct charge replace the liquid line filter and TXV then charge system to correct amount and test operation.

Note: If the system has other accessories that could affect head pressure then check the accessory operation.

8. Ensure that the wire connection on the high pressure switch is connected correctly.

Figure 15: C2 locked out due to high pressure



C3 locked out due to high pressure

The **C1 Locked Out Due to High Pressure** alarm occurs when 24 VAC power is lost from the HPS3 terminal located on the SEC board. The terminal consists of 24 VAC output from the SEC board wired through the high pressure switch for refrigeration circuit one and back to the HPS3 terminal input. If three **C3 Locked Out Due to High Pressure** alarms take place within one hour the unit operation goes into a hard lockout and needs to be powered down and restarted.

If the **C3 Locked Out Due to High Pressure** alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.

   Note: The high pressure switch will open at 625 psig (+/-25 psig) and close at 500 psig (+/-25 psig)

3. Check that the condenser coil is clean and clear for adequate air flow.
4. If the coil is dirty or blocked then clean or clear the blockage and test operation.
5. Check that the condenser fan and low ambient control, if used, are working correctly.
6. If the system is a split system, complete the following steps:

   a. Check that the Solenoid valves are being energized and are opening.
   b. Check that the SEC board is properly configured. Go the main menu **How to Setup** tab and find SEC condensing unit setup instructions. If the SEC board is not correctly configured this can cause the unit to trip on high head pressure.

7. If no issues have been found, check the system charge, liquid line filter and TXV operation.
    a. If the system will not run long enough to check the superheat and sub-cooling, the temperature change across liquid line filter or test the TXV then **it may be necessary to** remove the refrigerant charge and confirm the system has a correct charge.
    b. If the system has the correct charge replace the liquid line filter and TXV then charge system to correct amount and test operation.

    ⓘ **Note:** If the system has other accessories that could affect head pressure then check the accessory operation.
8. Ensure that the wire connection on the high pressure switch is connected correctly.

Figure 16: C3 locked out due to high pressure

C4 locked out due to high pressure

The **C4 Locked Out Due to High Pressure** alarm occurs when 24 VAC power is lost from the HPS1 terminal located on the SEC board. The terminal consists of 24 VAC output from the SEC board wired through the high pressure switch for refrigeration circuit one and back to the HPS1 terminal input. If three **C4 Locked Out Due to High Pressure** alarms take place within one hour the unit operation goes into a hard lockout and needs to be powered down and restarted.

If the **C4 Locked Out Due to High Pressure** alarm occurs, complete the following steps:

1. Connect the pressure gauges to the unit service ports
2. Check both the suction and discharge pressure readings on refrigeration circuit 1.

    ⓘ **Note:** The high pressure switch will open at 625 psig (+/-25 psig) and close at 500 psig (+/-25 psig)
3. Check that the condenser coil is clean and clear for adequate air flow.
4. If the coil is dirty or blocked then clean or clear the blockage and test operation.
5. Check that the condenser fan and low ambient control, if used, are working correctly.

6. If the system is a split system, complete the following steps:

    a. Check that the Solenoid valves are being energized and are opening.
    b. Check that the SEC board is properly configured. Go the main menu **How to Setup** tab and find SEC condensing unit setup instructions. If the SEC board is not correctly configured this can cause the unit to trip on high head pressure.

7. If no issues have been found, check the system charge, liquid line filter and TXV operation.

    a. If the system will not run long enough to check the superheat and sub-cooling, the temperature change across liquid line filter or test the TXV then **it may be necessary to** remove the refrigerant charge and confirm the system has a correct charge.
    b. If the system has the correct charge replace the liquid line filter and TXV then charge system to correct amount and test operation.

    ⓘ **Note:** If the system has other accessories that could affect head pressure then check the accessory operation.

8. Ensure that the wire connection on the high pressure switch is connected correctly.

Figure 17: C4 locked out due to high pressure

C1 locked out due to coil freeze

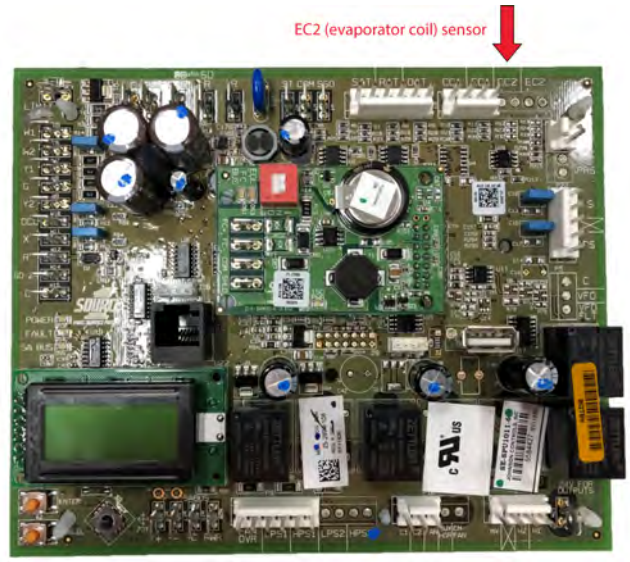
The **C1 Locked Out Due to Coil Freeze** alarm occurs when the evaporator coil 1 (EC1) sensor reads below the freeze condition set-point of default 26°F. The set-point has a range of 20°F to 32°F. The sensor is a 10 kohm type 3 thermistor. The sensor is either installed at the evaporator section or suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid return to the compressor due to low suction pressure. If three trips take place within one hour, a hard lockout occurs.

If the **C1 Locked Out Due to Coil Freeze** alarm occurs, complete the following steps:

1. Check that the evaporator or suction line is frozen or cold according to your temperature meter.
2. Use a pressure gauge to check the pressures and make note of information.
3. Check that all air filters, dampers and any other accessories are not blocking air flow.
4. Check that unit is properly moving air. The unit should be balanced from 350 cfm to 450 cfm per ton.
5. Check that static pressure is within the unit air performance as shown in the IOM manual. The return static should not exceed 0.2 in. w.c. A higher return static can contribute to improper air flow.
6. If the unit is operable with gauges attached to the service ports, check the unit superheat and sub-cooling. A high superheat and low sub-cooling can indicate that the system is low on charge.
7. Add charge and monitor if the system will maintain the correct operating pressures.
8. Check that system does not have a leak. Investigate the refrigeration lines, accessories, evaporator coil and condenser coil for oil. If nothing is found visually use an electronic leak detector or soap bubbles to pin point the leak.
9. If there is no leak, the thermostatic expansion valve (TXV) or other refrigeration circuit accessory could be faulty.
    a. Check the refrigeration circuit accessory and TXV.
    b. If the accessory or TXV are faulty replace these parts.
10. If no issue is found with the refrigeration circuit or TXV, check the EC1 sensor. Use an ohm meter to check that the sensor is not shorted and is reading correctly. Use the resistance temperature chart at the home page for reference.

    ⓘ **Note:** This sensor a 10 kohm thermistor.

Figure 18: C1 locked out due to coil freeze



C2 locked out due to coil freeze

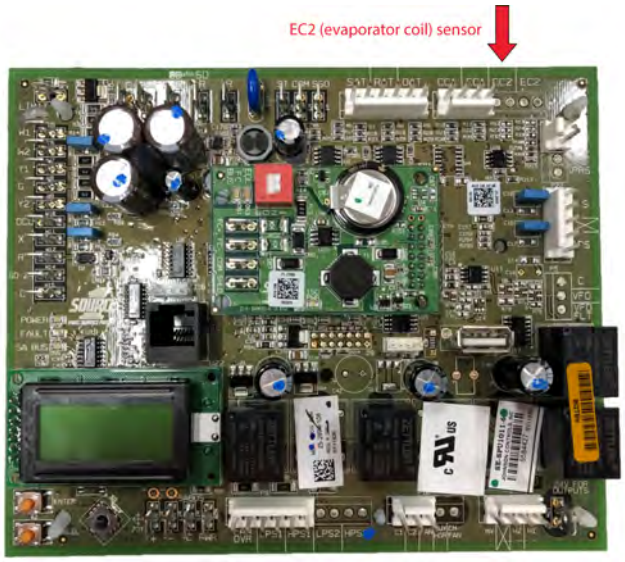
The **C2 Locked Out Due to Coil Freeze** alarm occurs when the evaporator coil 1 (EC1) sensor reads below the freeze condition set-point of default 26°F. The set-point has a range of 20°F to 32°F. The sensor is a 10 kohm type 3 thermistor. The sensor is either installed at the evaporator section or suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid return to the compressor due to low suction pressure. If three trips take place within one hour a hard lockout occurs.

If the **C2 Locked Out Due to Coil Freeze** alarm occurs, complete the following steps:

1. Check that the evaporator or suction line is frozen or cold according to your temperature meter.
2. Use a pressure gauge to check the pressures and make note of information.
3. Check that all air filters, dampers and any other accessories are not blocking air flow.
4. Check that unit is properly moving air. The unit should be balanced from 350 cfm to 450 cFM per ton.
5. Check that static pressure is within the unit air performance as shown in the IOM manual. The return static should not exceed 0.2 in. w.c. A higher return static can contribute to improper air flow.
6. If the unit is operable with gauges attached to the service ports, check the unit superheat and sub-cooling. A high superheat and low sub-cooling can indicate that the system is low on charge.
7. Add charge and monitor if the system will maintain the correct operating pressures.
8. Check that system does not have a leak. Investigate the refrigeration lines, accessories, evaporator coil and condenser coil for oil. If nothing is found visually use an electronic leak detector or soap bubbles to pin point the leak.
9. If there is no leak, the TXV or other refrigeration circuit accessory could be faulty.
    a. Check the refrigeration circuit accessory and TXV.
    b. If the accessory or TXV are faulty replace these parts.
10. If no issue is found with the refrigeration circuit or TXV, check the EC1 sensor. Use an ohm meter to check that the sensor is not shorted and is reading correctly. Use the resistance temperature chart at the home page for reference.

    ⓘ **Note:** This sensor a 10 kohm thermistor.

Figure 19: C2 locked out due to coil freeze



C3 locked out due to coil freeze

The **C3 Locked Out Due to Coil Freeze** alarm occurs when the evaporator coil 1 (EC1) sensor reads below the freeze condition set-point of default 26°F. The set-point has a range of 20°F to 32°F. The sensor is a 10 kohm type 3 thermistor. The sensor is either installed at the evaporator section or suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid return to the compressor due to low suction pressure. If three trips take place within one hour a hard lockout occurs.

If the **C3 Locked Out Due to Coil Freeze** alarm occurs, complete the following steps:

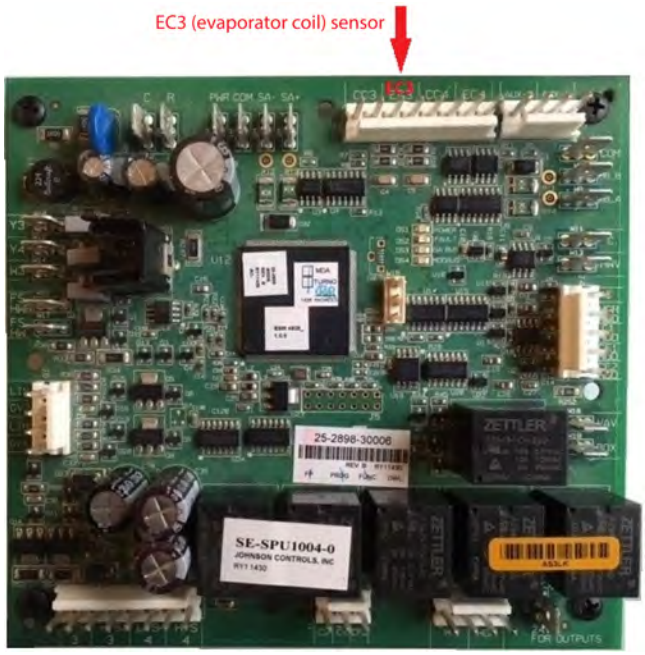
1. Check that the evaporator or suction line is frozen or cold according to your temperature meter.
2. Use a pressure gauge to check the pressures and make note of information.
3. Check that all air filters, dampers and any other accessories are not blocking air flow.
4. Check that unit is properly moving air. The unit should be balanced from 350 cfm to 450 cfm per ton.
5. Check that static pressure is within the unit air performance as shown in the IOM manual. The return static should not exceed 0.2 in.w.c. A higher return static can contribute to improper air flow.
6. If the unit is operable with gauges attached to the service ports, check the unit superheat and sub-cooling. A high superheat and low sub-cooling can indicate that the system is low on charge.
7. Add charge and monitor if the system will maintain the correct operating pressures.
8. Check that system does not have a leak. Investigate the refrigeration lines, accessories, evaporator coil and condenser coil for oil. If nothing is found visually use an electronic leak detector or soap bubbles to pin point the leak.
9. If there is no leak, the TXV or other refrigeration circuit accessory could be faulty.
    a. Check the refrigeration circuit accessory and TXV.

b. If the accessory or TXV are faulty replace these parts.

10. If no issue is found with the refrigeration circuit or TXV, check the EC1 sensor. Use an ohm meter to check that the sensor is not shorted and is reading correctly. Use the resistance temperature chart at the home page for reference.

    ⓘ **Note:** This sensor a 10 kohm thermistor.

Figure 20: C3 locked out due to coil freeze



C4 locked out due to coil freeze

The **C4 Locked Out Due to Coil Freeze** alarm occurs when the evaporator coil 1 (EC1) sensor reads below the freeze condition set-point of default 26°F. The set-point has a range of 20°F to 32°F. The sensor is a 10 kohm type 3 thermistor. The sensor is either installed at the evaporator section or suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid return to the compressor due to low suction pressure. If three trips take place within one hour a hard lockout occurs.

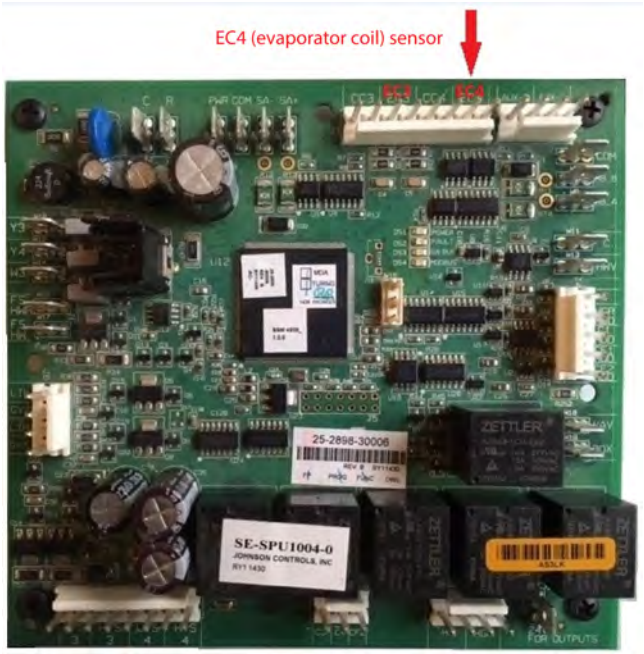
If the **C4 Locked Out Due to Coil Freeze** alarm occurs, complete the following steps:

1. Check that the evaporator or suction line is frozen or cold according to your temperature meter.
2. Use a pressure gauge to check the pressures and make note of information.
3. Check that all air filters, dampers and any other accessories are not blocking air flow.
4. Check that unit is properly moving air. The unit should be balanced from 350 cfm to 450 cfm per ton.
5. Check that static pressure is within the unit air performance as shown in the IOM manual. The return static should not exceed 0.2 in. w.c. A higher return static can contribute to improper air flow.

6. If the unit is operable with gauges attached to the service ports, check the unit superheat and sub-cooling. A high superheat and low sub-cooling can indicate that the system is low on charge.
7. Add charge and monitor if the system will maintain the correct operating pressures.
8. Check that system does not have a leak. Investigate the refrigeration lines, accessories, evaporator coil and condenser coil for oil. If nothing is found visually use an electronic leak detector or soap bubbles to pin point the leak.
9. If there is no leak, the TXV or other refrigeration circuit accessory could be faulty.
    a. Check the refrigeration circuit accessory and TXV.
    b. If the accessory or TXV are faulty replace these parts.
10. If no issue is found with the refrigeration circuit or TXV, check the EC1 sensor. Use an ohm meter to check that the sensor is not shorted and is reading correctly. Use the resistance temperature chart at the home page for reference.

    ⓘ **Note:** This sensor a 10 kohm thermistor.

Figure 21: C4 locked out due to coil freeze



Unit locked out due to supply fan overload

The **Supply Fan Overload** alarm occurs due to a loss of 24 VAC to the FANOVR input located on the SEC board. The SEC board provides a 24 VAC output from the FANOVR that can wire through a starter overload then back to the FANOVR input. Some unit models have a jumper from the FANOVR input and output. The larger Millennium / Series 40 RTUs with VFD wire to the Danfoss variable-frequency drive (VFD) TB1 terminal 1 and 3. If this alarm occurs it will shut down the unit operation.

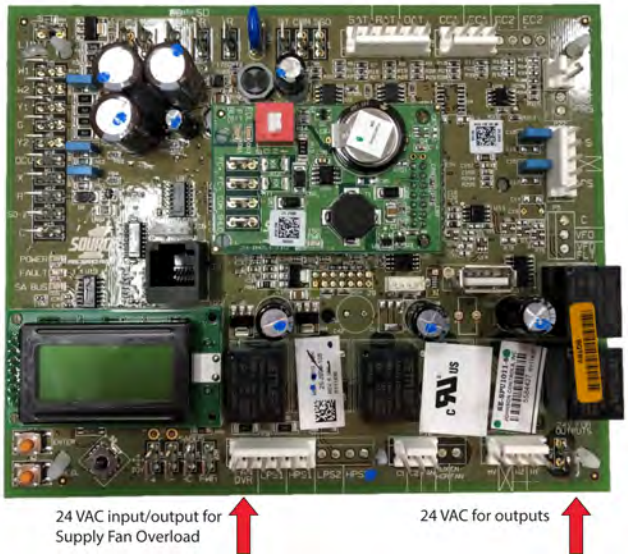
ⓘ **Note:** FANOVR is on the same circuit as SD. If SD trips, there may be SD, FANOVR, LP and HP faults.

If the **Supply Fan Overload** alarms occurs, complete the following checks:

1. Check that the FANOVER from the SEC board is providing 24 VAC output.
    a. If the output shows 24 VAC, trace the circuit through either the overload or VFD circuit.
    b. If the circuits are open check the blower motor amperage settings on the Overload and VFD.
2. Check that the blower motor sheave is closed as this can cause the motor to over amp and trip the overload. You must adjust the motor sheave appropriately to reduce the motor amps.
3. Check that 24 VAC is not present at both terminals with the jumper on. If the FANOVR has a jumper and 24 VAC is not present the board may be faulty.
4. Check that 24 VAC is present at the 24 VAC for outputs terminals.

    - If 24 VAC is present at the 24 VAC for outputs terminals, check voltage across the R terminals located on the left side of SEC board where a thermostat would connect and 24 VAC for outputs terminal. The voltage difference should be 0 VDC to 2 VDC. This indicates that the transformers providing 24 VAC power to the SEC board is phased properly at the primary voltage side of the transformer.
    - If the voltage difference is approximately 50 VAC this commonly indicates that the primary high voltage side of the transformers are not phased the same. Change the primary high voltage side of the transformers so they are phased the same.
    - If the unit has an additional 24 VAC transformer for an SEC 4 stage board, ensure the phasing is the same.
    - If the transformers are not being phased properly, the SEC board can fail. If this is the case, replace the SEC board.

Figure 22: Unit locked out due to supply fan overload



Unit locked out due to air proving switch

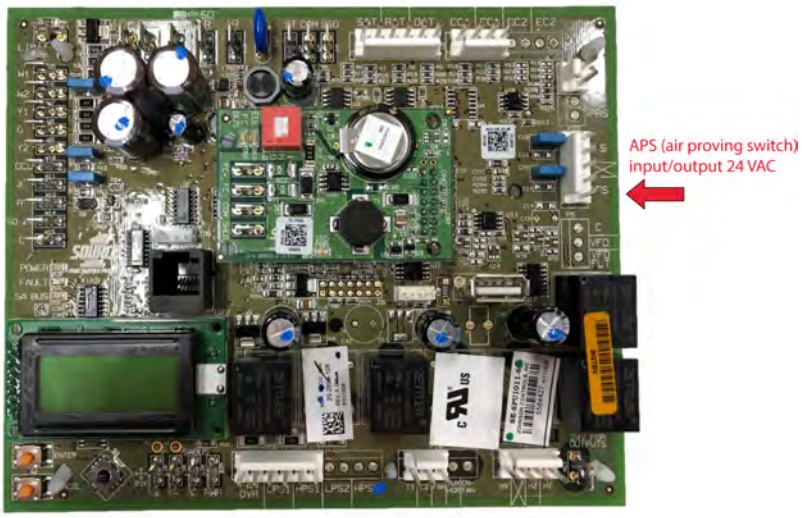
The SEC board has an air proving switch (APS) terminal that provides an output of 24 VAC and input of 24 VAC if an APS is used. The APS alarm occurs when the APS input loses 24 VAC. The APS has

three options for setup NONE, CONSTANT and VARIABLE. If the APS SETUP is set for CONSTANT or VARIABLE, the unit has a fan command and 24 VAC input is lost, the board will alarm Unit Locked Out Due to APS.

If the **Unit Locked Out Due to APS** alarm occurs complete the following checks:

1. Check that an APS is installed, wired properly and SEC board setting is set properly for APS Setup. If the unit has an APS and the SEC board fan control type is set to CONSTANT VOLUME or FIXED VARIABLE, then the APS Setup will be set to CONSTANT. If the SEC board fan control type is set to VARIABLE and an APS is installed, then APS Setup will be set to VARIABLE.
2. Check that the APS SEC board terminal has a 24 VAC output and 24 VAC input.
    - If 24 VAC is present at the APS output and no input voltage is present, trace the wiring to where the voltage is lost and make repairs as necessary.
3. If there is no APS switch installed, then the SEC board APS setup must be set to NONE. It may be necessary to do a relearn and power cycle the unit.
4. If there is an APS, verify that the pressure tubing is not restricted and reading pressure when the blower is operating. The use of a Manometer is recommended as blowing in tubing can damage the APS.

Figure 23: Unit locked out due to APS



APS stuck closed

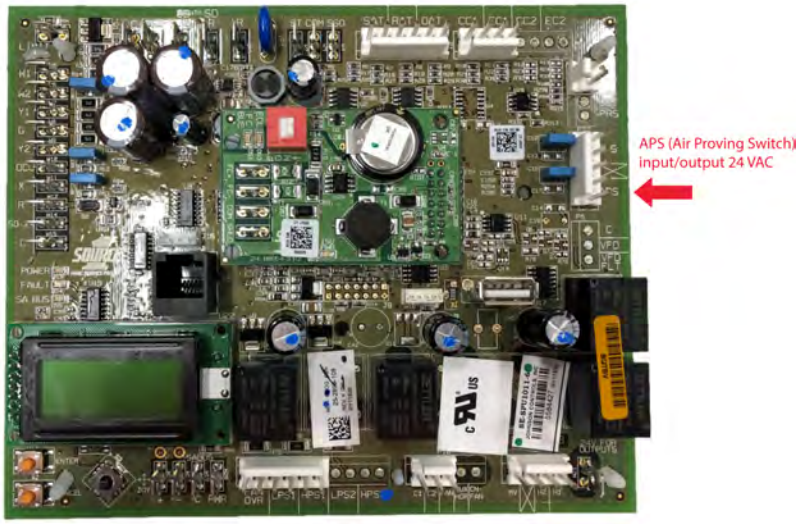
The SEC board has an APS terminal that provides an output of 24 VAC and input of 24 VAC if an APS is used. The Air Proving Switch Stuck Closed alarm occurs when the APS input has 24 VAC present with no fan command. The APS has three options for setup NONE, CONSTANT and VARIABLE.

If the **Air Proving Switch Stuck Close**d alarm occurs, complete the following steps:

1. Check that an APS is installed, wired correctly and SEC board setting is set correctly for the APS Setup.
    - If the unit has an APS and the SEC board fan control type is set to CONSTANT VOLUME or FIXED VARIABLE, then the APS Setup will be set to CONSTANT.
    - If the SEC board fan control type is set to VARIABLE and an APS is installed, then APS Setup will be set to VARIABLE.

2. Check the APS SEC board terminal has a 24 VAC output and 24 VAC input.
    - If 24 VAC is present at the APS output and input with no supply fan operation present, trace the wiring to ensure APS is correctly wired and make repairs as necessary.
    - The APS should not be closed if there is no supply fan operation. APS may need to be replaced.
3. If there is no APS switch installed, then the SEC board APS setup must be set to NONE.
4. Check that the APS wiring is not wired together when no APS switch is being used.

Figure 24: APS stuck closed



Supply fan VFD failure

The **Supply Fan VFD Failure** alarm occurs when the VFD fails. The VFD will then close an alarm contact sending a 24 VAC input to the VFD fault input located on the SEC board.

If the **Supply Fan VFD Failure** alarm occurs, complete the following steps:

1. Check that 24 VAC is present at the VFD fault input on the SEC board.

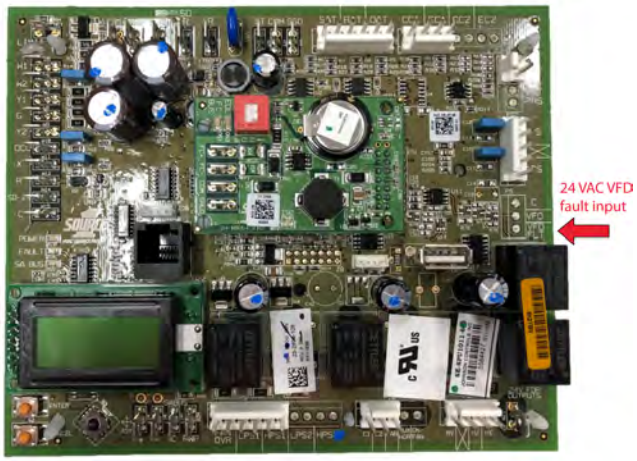
    - If 24 VAC is not present at the VFD fault input on the SEC board:

    a. Remove the plug connecting the VFD and SEC board.
    b. Reset the unit and check if the alarm stops.
    c. If the alarm continues, replace the SEC board.

    - If 24 VAC is present at the VFD fault input on the SEC board:

    a. Check the VFD for specific fault that occurred.
    b. Follow steps to correct specific VFD fault that occurred. 4.
    c. The most common VFD fault is Over Amperage alarm. If this is occurring check that the unit is properly air balanced and blower motor is not exceeding amps.
    d. Check that the VFD amperage and voltage settings matches the blower motor.

Figure 25: Supply fan VFD failure



Unit shutdown due to smoke

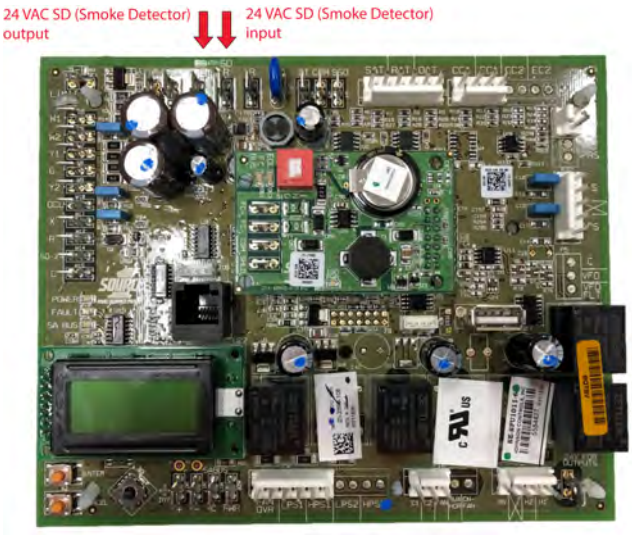
The alarm **Unit Shutdown Due to Smoke** occurs when 24 VAC is lost at the SDR input terminal located on the SEC board. The 24 VAC input to SDR is sourced from the SD24 24 VAC output.
If the alarm **Unit Shutdown Due to Smoke** occurs, complete the following checks:

1. Check the SD24 output for 24 VAC. This output is typically wired through a factory return or the supply smoke detector or a third party smoke detector. The 24 VAC circuit will then input to the SEC board SDR terminal.
2. Check the SDR terminal for 24 VAC.

    - If there is no power, trace the circuit until you find where the power was lost.

The **Unit Shutdown Due to Smoke** alarm will cause several alarm indications such as; loss of communications with economizer and four stage expansion board, fan overload and sensor failure alarms.

Figure 26: Unit shutdown due to smoke



Sensor alarms

Evaporator coil temperature 1 sensor failure

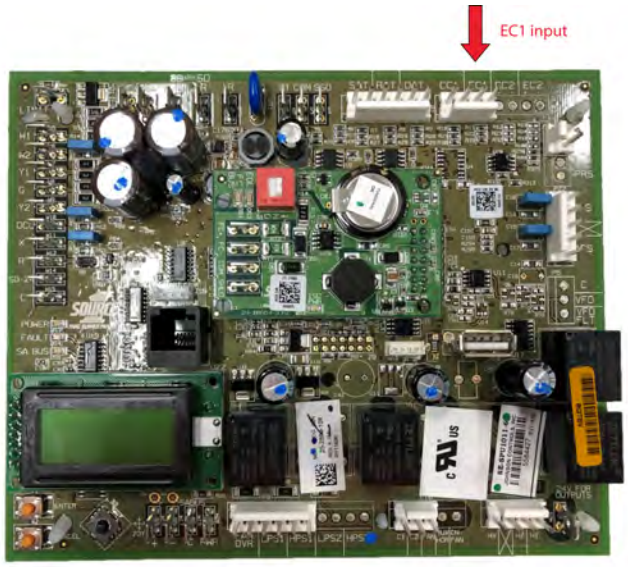
The **Evaporator Coil Temperature 1 Sensor Fail** alarm occurs when Evaporator Coil 1 (EC1) fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is either installed at the evaporator section or at the suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid to return to the compressor due to low suction pressure. After 3 trips have occurred within one hour, a hard lockout will occur.

If the **Evaporator Coil Temperature 1 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool . From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***EC1= value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the EC1 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is reading the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 27: EC1 sensor location



Evaporator coil temperature 2 sensor failure

The **Evaporator Coil Temperature 2 Sensor Fail** alarm occurs when Evaporator Coil 2 (EC2) fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor

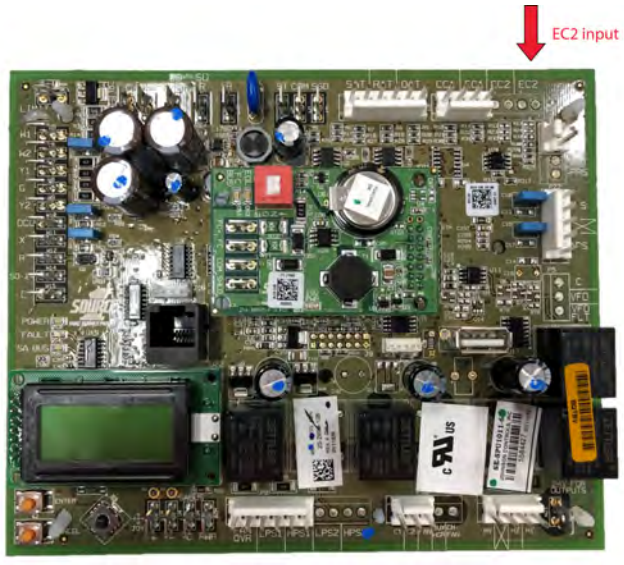
and is either installed at the evaporator section or at the suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid to return to the compressor due to low suction pressure. After 3 trips have occurred within one hour, a hard lockout will occur.

If the **Evaporator Coil Temperature 2 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***EC2=value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the EC2 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is reading the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 28: EC2 sensor location



Evaporator coil temperature 3 sensor failure

The **Evaporator Coil Temperature 3 Sensor Fail** alarm occurs when Evaporator Coil 3 (EC3) fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is either installed at the evaporator section or at the suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid to return to the compressor due to low suction pressure. After 3 trips have occurred within one hour a hard lockout will occur.

If the **Evaporator Coil Temperature 3 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***EC3= value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the EC3 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is reading the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 29: EC3 sensor location

Evaporator coil temperature 4 sensor failure

The **Evaporator Coil Temperature 4 Sensor Fail** alarm occurs when Evaporator Coil 4 (EC4) fails due to either an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is either installed at the evaporator section or at the suction line near the compressor. The sensor is used to protect the compressor from freezing conditions that would cause liquid to return to the compressor due to low suction pressure. After 3 trips have occurred within one hour a hard lockout will occur.

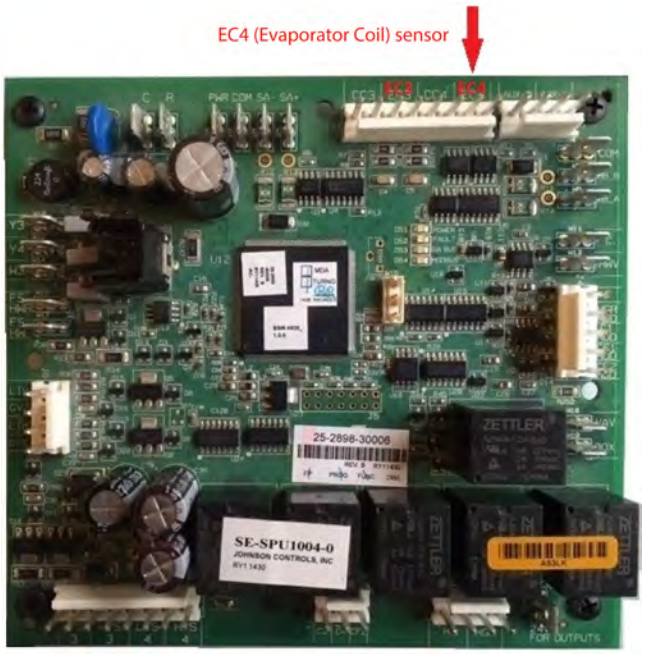
If the **Evaporator Coil Temperature 4 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***EC4= value***. If the reading value is not appropriate, follow the next set of steps.

2. Check the sensor at the board by unplugging the wires from the EC4 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is reading the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 30: EC4 sensor location



Condenser coil temperature 1 sensor failure

The **Condenser Coil Temperature 1 Sensor Fail** alarm occurs when Condenser Coil 1 (CC1) fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is installed on the condenser section of the unit. The sensor monitors the condenser temperature and heat pump applications for the defrost function.

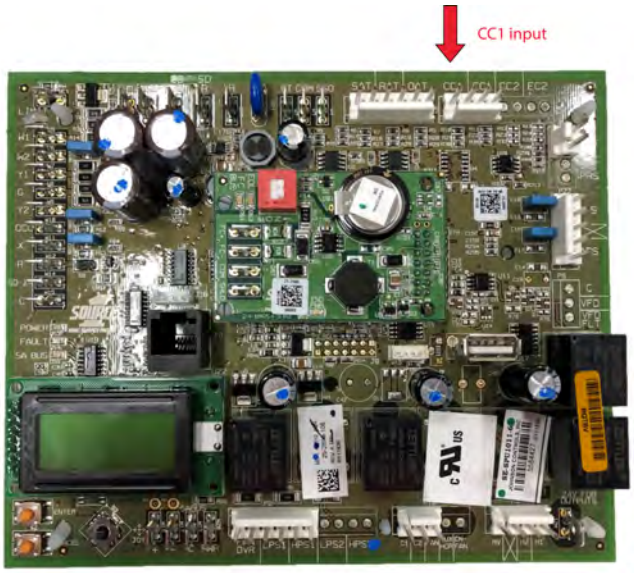
If the **Condenser Coil Temperature 1 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***CC1= value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the CC1 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.

3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 31: CC1 input location



Condenser coil temperature 2 sensor failure

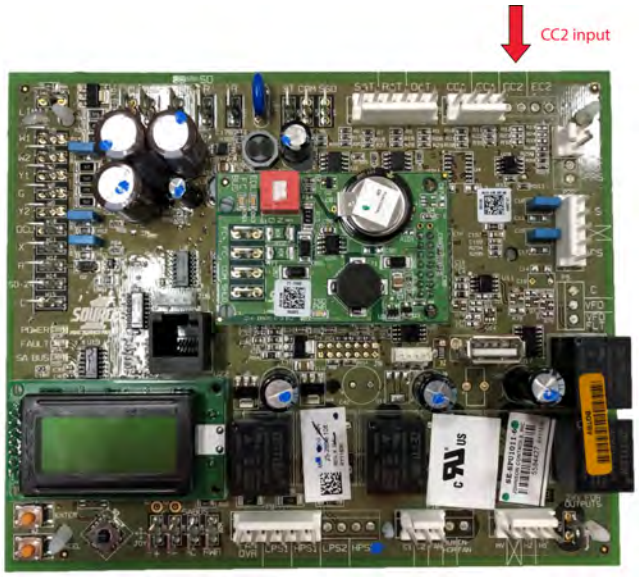
The **Condenser Coil Temperature 2 Sensor Fail** alarm occurs when Condenser Coil 2 (CC2) fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is installed on the condenser section of the unit. The sensor monitors the condenser temperature and heat pump applications for the defrost function.

If the **Condenser Coil Temperature 2 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***CC2= value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the CC2 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 32: CC2 input location



Condenser coil temperature 3 sensor failure

The **Condenser Coil Temperature 3 Sensor Fail** alarm occurs when Condenser Coil 3 (CC3) fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is installed on the condenser section of the unit. The sensor monitors the condenser temperature and heat pump applications for the defrost function.

If the **Condenser Coil Temperature 3 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***CC3= value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board first by unplugging the wires from the CC3 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is reading the correct temperature according to the resistance.
3. If unable to read the correct resistance, trace wires to plug and ohm out from plug to sensor. Using the resistance chart, check that the sensor is reading the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 33: CC3 input location

Condenser coil temperature 4 sensor failure

The **Condenser Coil Temperature 4 Sensor Fail** alarm occurs when Condenser Coil 4 (CC4) fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is installed on the condenser section of the unit. The sensor monitors the condenser temperature and heat pump applications for the defrost function.

If the **Condenser Coil Temperature 4 Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***CoilSensors*** > ***CC4= value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the CC4 input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 34: CC4 input location

Outdoor air temperature sensor failure

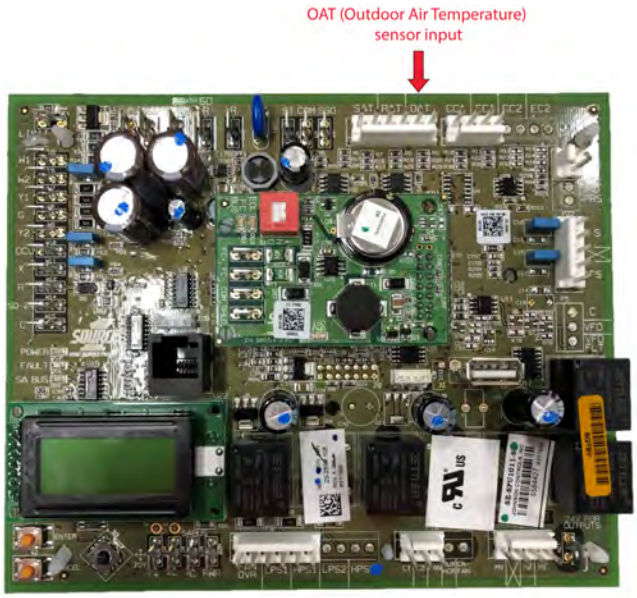
The outdoor air temperature **(OAT) Sensor Fail** alarm occurs when the OAT sensor fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is either installed at the compressor, outdoor economizer or condenser section depending on model of unit. The sensor is used for such functions as outdoor heating and cooling lockout operation, economizer operation and general monitoring of the outdoor air temperature.

If the **OAT Sensor Fail** alarm occurs, complete the following steps:

1. Check the sensor reading at the board or through the Map Gateway tool first. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***OAT=value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board first by unplugging the wires from the OAT input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 35: OAT sensor input location



Return air temperature sensor failure

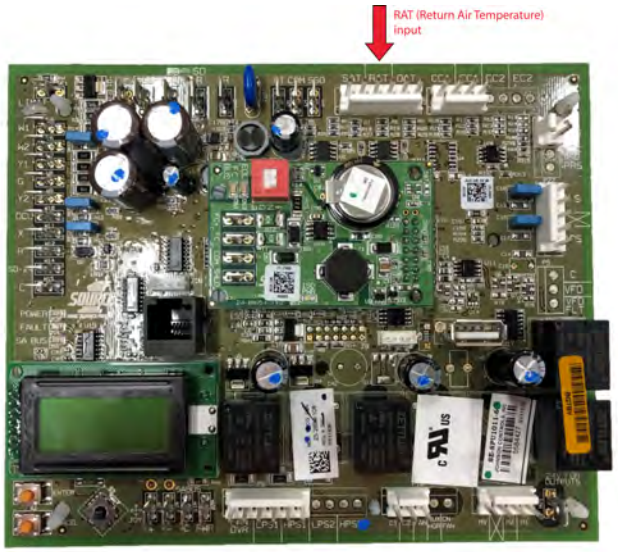
The return air temperature **(RAT) Sensor Fail** alarm occurs when the RAT sensor fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is installed at the return section of roof top units. The sensor is used for functions of heating and cooling operations and the monitoring of the return air temperature.

If the **RAT Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***RAT=value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the RAT input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 36: RAT input location



Supply air temperature failure

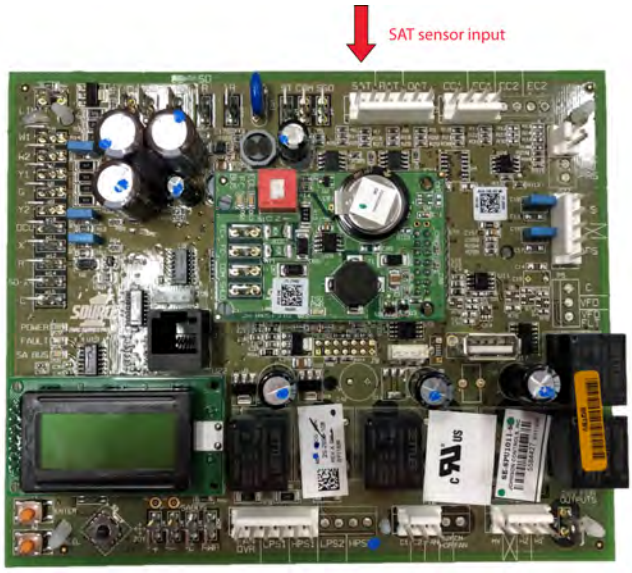
The supply air temperature **(SAT) Sensor Fail** alarm occurs when the SAT sensor fails due to an open circuit or by exceeding its input range. The sensor is a 10 kohm type 3 thermistor and is installed at the supply section of roof top units. The sensor is used for the functions of heating and cooling operations and monitoring of the supply air temperature.

If the **SAT Sensor Fail** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***SAT=value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the SAT input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 37: SAT sensor input location



No heat-cool due to unreliable space temp

The **No Heat-Cool Due to Unreliable Space-Temp** alarm occurs when the space sensor fails due to either an open circuit or by exceeding its input range. The space sensor is a 10 kohm type 3 thermistor and wired to the ST, COM and SSO (if used) input of the SEE board. The sensor is used for the functions of heating and cooling operations and the monitoring of the space temperature.

If the **No Heat-Cool Due to Unreliable Space-Temp** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***ST=value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board first by unplugging the wires from the ST, COM and SSO (if used) input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 38: Space sensor input location

Space indoor temp sensor failure

The **Space Indoor Temp Sensor Failure** alarm occurs when the space sensor fails fails due to an open circuit or by exceeding its input range. The space sensor is a 10 kohm type 3 thermistor and wired to the ST, COM and SSO (if used) input of the SEE board. The sensor is used for functions of heating and cooling operations and monitoring of the space temperature.

If the **Space Indoor Temp Sensor Failure** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool . From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***ST=value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the ST, COM and SSO (if used) input on the SEC board and ohm the wires to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.

3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor. Using the resistance chart, check that the sensor is recording the correct temperature according to the resistance.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Space offset sensor failure

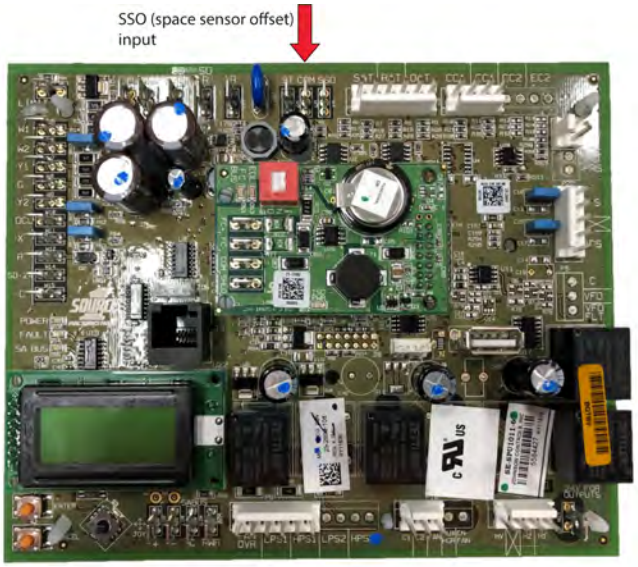
The **Space Offset Sensor Failure** alarm occurs when the space sensor offset fails due to an open circuit or by exceeding its input range. The space sensor offset input has a range from 0 to 20,000 ohms potentiometer connected to the COM and SSO input of the SEC board and a 0 to 5 degree setting in the SEC board.

If the **Space Offset Sensor Failure** alarm occurs, complete the following steps:

1. First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***SSO=value***. If the reading value is not appropriate, follow the next set of steps.
2. Check the sensor at the board by unplugging the wires from the ST, COM and SSO (if used) input on the SEC board and ohm the wires COM and SSO to the sensor.
3. If you are unable to get a correct resistance reading, trace the wires to the plug and ohm out from the plug to the sensor.
4. Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness, replace the sensor.
    c. If both the harness and sensor are functional, replace the SEC board.

Figure 39: Space sensor offset input location



Building pressure sensor failure

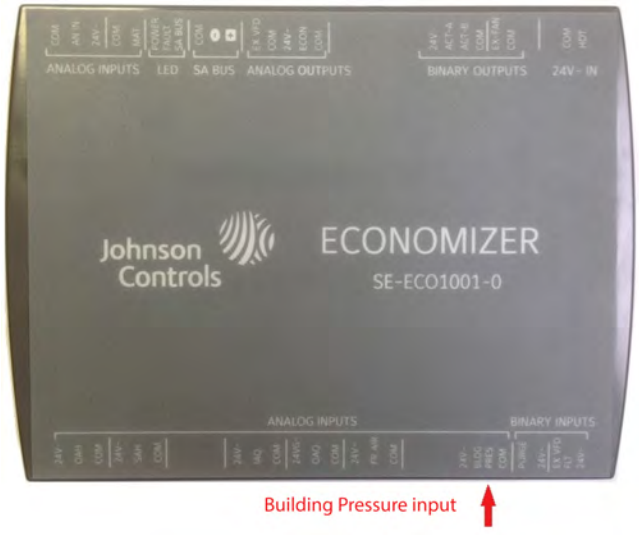
The **Building Pressure Sensor Failure** alarm occurs when the SE-ECO1001 Economizer Module was once recognized a building pressure input and it is now no longer recognized. The building pressure input has a range from 0 VDC to 5 VDC input connected to BLDG PRES input on the SE-ECO1001 Economizer Module. The building pressure operates in a range of -.25 in. to +.25 in. w.c., going beyond this range can also cause the sensor to fail and the alarm to occur.

If the **Building Pressure Sensor Failure** alarm occurs, complete the following steps:

- First check the sensor reading at the board or through the Map Gateway tool. From the menu, click ***Summary*** > ***Power Exhaust*** > ***Bldg Pres*** > ***value***. If the reading value is not appropriate, follow the next set of steps.
- Check that the sensor has 24 VAC power. If there is no power available, check the wiring and the power source.
- Check that the sensor's high and low port tubes are correctly installed. The high port should be installed in an area in the building where it will be affected by the building's static pressure. Do not put the tube near a supply or return vent or any other building component that will affect the sensor inappropriately. The low port tuber should be installed in a manner that it is only influenced by atmospheric pressure.
- Check that the sensor is providing a 0 VDC to 5 VDC output to the SE-ECO1001 module's building pressure input. When the unit is running, the voltage should be greater than 0 VDC. If the SE-EC01001 building pressure input is not receiving an appropriate voltage but voltage is present at the sensor, check the wiring.
- Choose the appropriate step from the following:

    a. If the wiring harness is damaged, replace or repair it.
    b. If there are no problems with the wiring harness and tubes, replace the sensor if it not providing any voltage.
    c. If both the harness and sensor are ok, replace the SE-ECO1001 board.

Figure 40: Building pressure input location



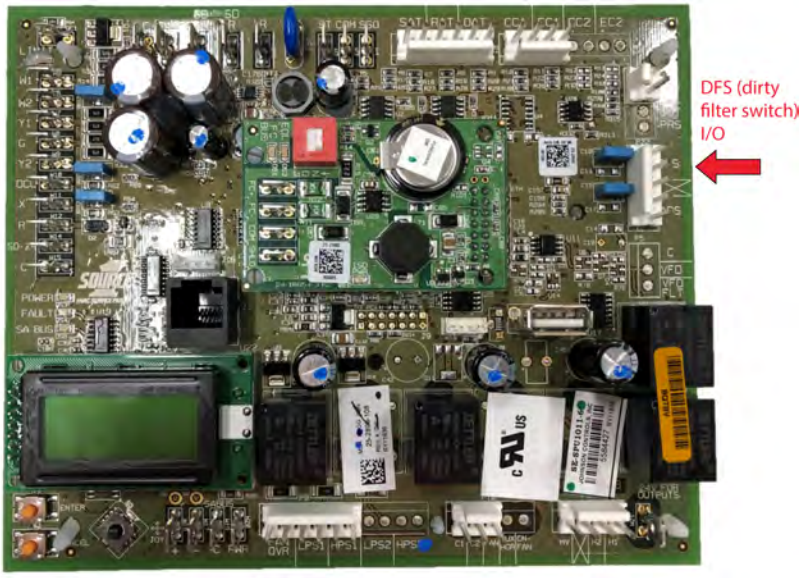
Dirty filter switch trip

The dirty filter switch **(DFS) Trip** alarm occurs when the DFS closes and sends a 24 VAC input to the DFS input on the SEC board. This is to provide the DFS Trip alarm to alert that the air filters must be changed.

If the **DFS Trip** alarm occurs, complete the following steps:

- Check that the air filters are clean. If clean, follow the next set of steps.
- Check that the high and low port tubes are correctly installed and not are blocked.
- Check that there is a 24 VAC input to the SEC board's DFS input that would trigger an alarm. The SEC board provides a 24 VAC output from the DFS and an input at the DFS. The DFS simply closes when the switch indicates an increase in pressure. The DFS can be adjusted by a range of 0.05 in. to 0.5 in..
- If you find that the DFS switch is closed and the tubes, air filters, settings and wiring are ok, check the return static pressure. If the unit is having to work against a high return static pressure, this can cause the DFS to trip. The factory recommends that the return static should not exceed 0.2 in. w.c.
- If the SEC board is showing **DFS Trip** alarm with no 24 VAC input and the tubes, air filters, settings and wiring are ok, then power down the unit and back up. If alarm does not clear replace the SEC board.

Figure 41: Dirty filter swich I/O location



Using return instead of space temp

The **Using Return Instead Of Space** alarm is not actually an alarm but rather an indicator showing that the board is only recognizing a return air sensor. If the SEC board T-Stat Only is enabled to Yes, the board will not show **Using Return Instead Of Space** otherwise the indicator will not clear if using only a return air sensor.

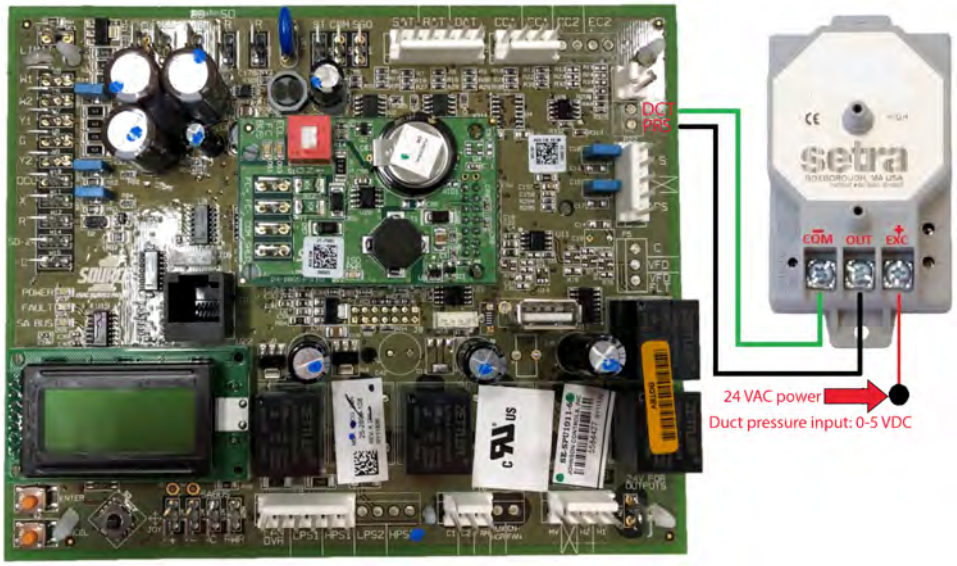
Unit locked out due to high duct pressure

The **Unit Locked Out Due To High Duct-P** alarm occurs when the duct pressure exceeds the duct pressure shutdown set point. When the alarm occurs, the unit will be shut down until alarm is cleared.

If the **Unit Locked Out Due To High Duct-P** alarm occurs, complete the following steps:

1. Check that the duct pressure shutdown set point through the pathway ***Details*** > ***Control*** > ***IndoorFan*** > ***Setup*** > ***DctShutdownSp*** is set correctly. The duct pressure shutdown set point defaults to 4.5 in., check that it is set correctly for your application.
2. If the duct pressure shutdown set point is set correctly, power up the unit and command blower to run. Monitor the duct static pressure through the pathway ***Summary*** > ***Fan*** > ***DctPrs***. If the duct pressure exceeds the limit setpoint, follow the steps below.
3. Check that the Setra duct transducer's high and low port tubes are properly installed. The high port should be installed in the supply duct not to exceed 25 ft in length of tube and placed at least 5 to 10 from the supply outlet of the unit supply. Do not put the tube near an elbow or T, but rather in the main straight duct before branching off. The tube should be attached to a pito tube that will allow the reading of static pressure only. The low port tube should be installed in a manner that it is only influenced by atmospheric pressure.
4. Check that the Setra duct transducer has 24 VAC power and is providing a 0 VDC to 5 VDC output to the SEC board DCT PRS input. When the unit off the voltage should be 0 VDC. If it is greater than 0, this would indicate a faulty Setra transducer.
5. If the transducer is functional, check the duct work for a closed zone damper, bypass, VAV box or fire damper.
6. If the SEC Settings, Setra sensor, wiring, tubes, and dampers are all functional then replace the SEC board.

Figure 42: Testing the Sectra duct transducer



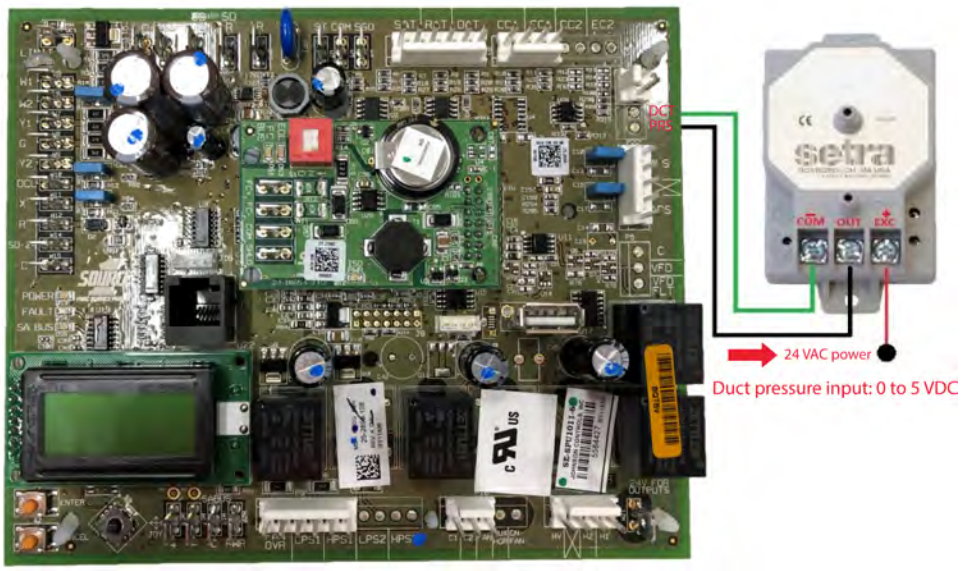
Duct pressure sensor failure

The **Duct Pressure Sensor Failure** alarm occurs when there was once a duct pressure input and the input is no longer recognized with a VAV application. The alarm can also occur if the duct pressure goes below the duct pressure minimum limit set in the SEC Board of 0.1 in. w.c. This point cannot be changed with any factory released version of firmware less than 3.2.0.0138. When this alarm occurs, it may also be shown as **Unit Locked Out Due to APS**. This alarm can be difficult to determine at times due to the SEC board not always displaying the fault. When unit is no longer operating the blower and the SEC board is showing idol and occupied status, check the fan status through pathway ***Status*** > ***Fan*** > ***Status***. If the status is shown as **Unit Locked Out Due to APS**, this indicates that the unit is not meeting the minimum duct static of at least 0.1 in. W.C and indicates either a faulty duct static transducer or an air flow issue.

If the **Duct Pressure Sensor Failure** alarm occurs, complete the following steps:

1. Check that the duct pressure set point through the pathway ***Details*** > ***Setpoints*** > ***DctPrs-Sp*** is set correctly. The duct pressure setpoint defaults to 1.5 in. w.c.. When the unit receives an OCC command, the fan should start to run. The board allows 60 seconds to reach 0.1 in. w.c. of duct pressure or it will fail. The board will allow for 2 more attempts before completely locking out. The board will either display Idol, Duct Static Pressure Sensor Failure and/or fan status will show Unit Locked Out Due to APS.
2. Set the unit to an unoccupied state through pathway ***Details*** > ***Service*** > ***Inputs*** > ***NetworkInputs*** > ***NetOcc=Unoccupied*** or remove 24 VAC input to the OCC terminal if providing a binary command for occupancy. If using the internal schedule through the Map Tool, set the unit to unoccupied. Power down the unit and back up. When the SEC board has booted back up, occupy the unit through whatever means you unoccupied the unit.
3. Next, monitor the supply static through ***Summary*** > ***Fan*** > ***DctPrs*** > ***Value***. If the duct pressure is not going above 0.1 in. w.c., there are additional steps you can follow.
4. If the unit is not building static beyond 0.1 in. w.c., check that the unit blower sheaves are properly adjusted to allow for adequate air flow. The unit should be balanced to provide 350 CFMs to 450 CFMs per ton at max output for VAV application.
5. If the unit is properly balanced, check if the VAV boxes are open. If the VAV boxes are open, this will not allow the unit to build enough static within the appropriate time and lock out. If possible, have the boxes shut to a minimum whenever the unit is unoccupied or powered off. When the unit is commanded occupied, allow approximately 30 seconds after the unit has been occupied for the system to build static then release the boxes.
6. If unable to set the VAV boxes to a minimum position, another option is to raise the minimum hertz on the VFD. While this option can be effective, it reduces the total range of operation for the VFD. The VFD has a default minimum hertz of 25 Hz in cases not meeting minimum static we has seen and increase to 30 Hz be effective.
7. The final solution is to contact your technical support representative and see if a firmware patch or upgrade is possible.

Figure 43: Testing the Sentra duct transducer



Return air humidity sensor failure

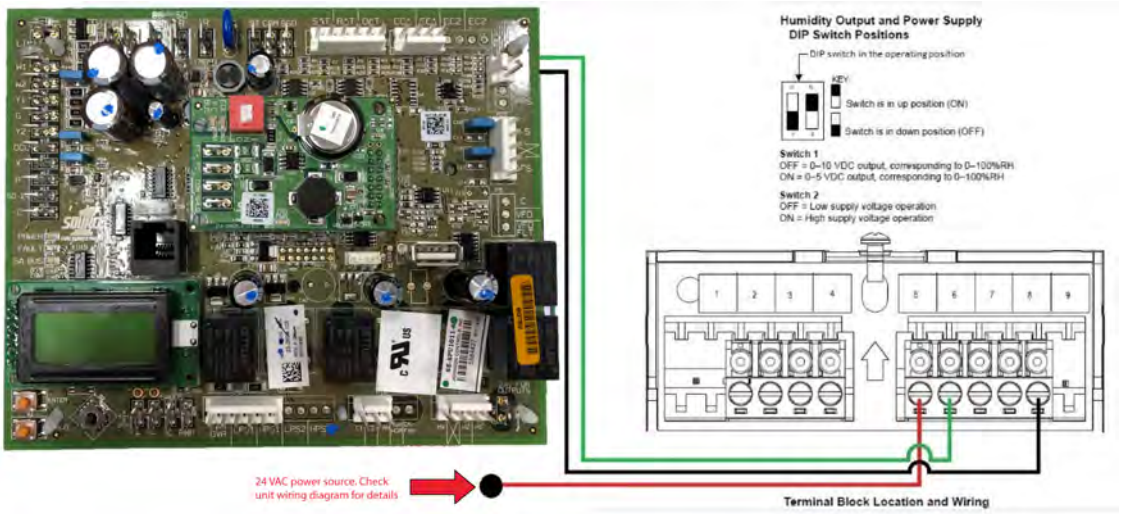
The **Return Air Humidity Sensor Fail** alarm occurs when the SEC Board return air humidity (RAH) sensor input has lost its 0 VDC to 10 VDC signal that was once recognized. The RAH input is an operating input for the economizer and reheat operations with the SEC board and SE-ECO1001 econ module.

If the **Return Air Humidity Sensor Fail** alarm occurs, complete the following steps:

1. Check that the sensor is correctly wired and setup, if using the RAH input for economizer or reheat operation, the factory uses humidity sensor model HE-68N3-0N00WS. The HE-68 sensor uses terminal 5, 6, and 9 wired to 24 VAC power source, COM(-) and RAH(+) terminals. Check that the HE-68 sensor is correctly wired to the SEC Board RAH inputs. Terminal 5 wires to a 24 VAC power source, terminal 6 wires to the SEC RAH Common(-) terminal, terminal 9 wires to the SEC RAH (+) terminal for 0 VDC to 10 VDC signal. The HE-68 sensor has 2 sets of dip switches. The first set has a 1 and 2 switch and the second set has a 1, 2, and 3 switch. Check that the first set has switch 2 ON and all other switches are OFF.
2. If the wiring and dip switches are set correctly, check that the HE-68 sensor has 24 VAC power between terminal 6 and 5. If power is not present check the 24 VAC power source.
3. If 24 VAC power is available, check that the HE-68 sensor is providing a signal from the 0 VDC to 10 VDC output between terminals 6 and 9. If the output is 0 VDC, the alarm will still occur. The sensor should output a voltage greater than 0 VDC as it is highly unlikely to be in an environment with 0% humidity.

   ⓘ **Note:** The output signal correlates to a 0% to 100% humidity range.
4. If the 24 VAC power is ok and there is no output despite the correct wiring and settings, replace the sensor.
5. If there are no problems with the sensor and you are still unable to get a reading from the SEC board, then you should replace the SEC board.

Figure 44: Testing the return air humidity sensor



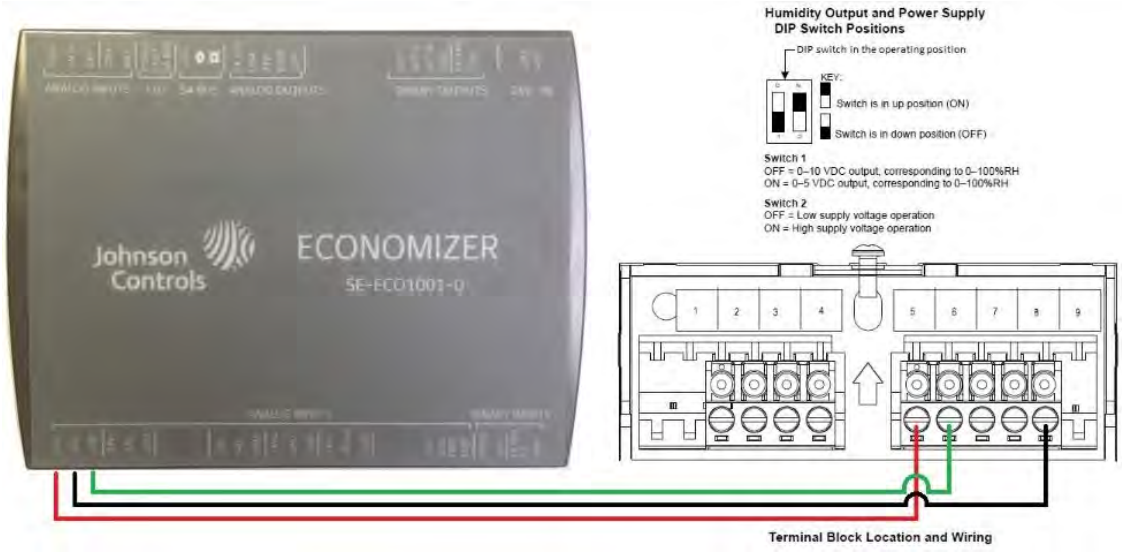
Outdoor air humidity sensor failure

The **Outside Air Humidity Sensor Fail** alarm occurs when the SE-ECO1001 economizer module outside air humidity sensor (OAH) input has lost its 0 VDC to 10 VDC signal that was once recognized. The OAH input is an operating input for single and dual enthalpy economizer functions with the SE-ECO1001 econ module. If the SEC board is showing Outside Air Humidity Sensor Fail alarm and no sensor is being used, you cannot clear the alarm with any firmware version less than 3.2.0.0138. The alarm will not prevent any unit operation and you will have to replace the SE-ECO1001 econ module or upgrade the SEC firmware to version 3.2.0.0138 to clear the alarm.

If the **Outside Air Humidity Sensor Fail** alarm occurs, complete the following steps:

1. Check that the sensor is correctly wired and setup, if using the OAH input for economizer control, the factory uses humidity sensor model HE-68N3-0N00WS. The HE-68 sensor uses terminal 5, 6, and 9 wired to the SE-ECO1001 24 V, COM and OAH terminals. Check that the HE-68 sensor is properly wired to the SE-ECO1001 module. Terminal 5 wires to a 24 VAC power source, terminal 6 wires to the SE-ECO1001 OAH Common terminal, terminal 9 wires to the SE-ECO1001 OAH terminal for 0 VDC to 10 VDC signal. The HE-68 sensor will have 2 sets of dip switches. The first set will have a 1 and 2 switch and the second set will have a 1, 2 and 3 switch. Check that the first set has switch 2 ON and all other switches are OFF.
2. If the wiring and dip switches are set properly, check that the HE-68 sensor has 24 VAC power between terminal 6 and 5. If power is not present, check the 24VC power source.
3. If 24 VAC power is available check that the HE-68 sensor is providing a signal from 0 VDC to 10 VDC output between terminal 6 and 9. If the output is 0 VDC, the alarm will still occur. The sensor should output a voltage greater than 0 VDC as it is highly unlikely to be in an environment with 0% humidity. The output signal correlates to a 0% to 100% humidity range.
4. If 24 VAC power is ok and there is no output with proper wiring and settings replace the sensor.
5. If there are no problems with the sensor and you are unable to get a reading from the SEC board then you should replace the SE-ECO1001 econ module.

Figure 45: Testing the outdoor air humidity sensor



Supply air humidity sensor failure

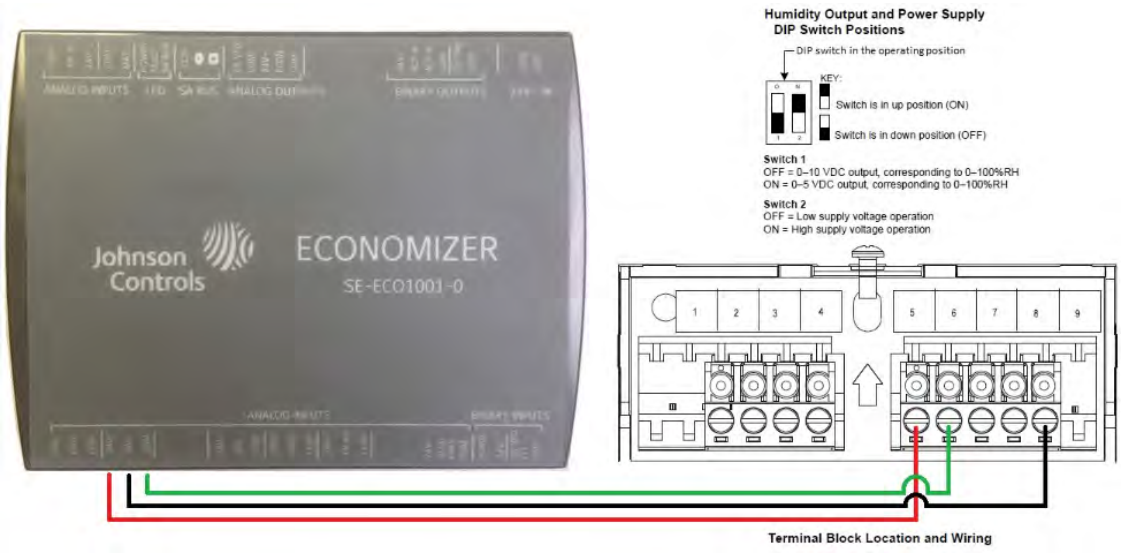
The **Supply Air Humidity Sensor Fail** alarm occurs when the SE-ECO1001 economizer module supply air humidity (SAH) input has lost its 0 VDC to 10 VDC signal that was once recognized. The SAH input is not an operating input for any functions with the SEC board or SE-ECO1001 econ module and only for monitoring purposes. If the SEC board is showing Supply Humidity Sensor Fail alarm and no sensor is being used, you cannot clear the alarm with any firmware version less than 3.2.0.0138. The alarm will not prevent any unit operation and you will have to replace the SE-ECO1001 econ module or upgrade the SEC firmware to 3.2.0.0138 to get rid or alarm.

If the **Supply Air Humidity Sensor Fail** alarm occurs, complete the following steps:

1. Check that the sensor is properly wired and setup, if using the SAH input for monitoring purposes the factory uses humidity sensor model HE-68N3-0N00WS. The HE-68 sensor uses terminal 5, 6, and 9 wired to the SE-ECO1001 24 V, COM and SAH terminals. Check that the HE-68 sensor is properly wired to the SE-ECO1001 module. Terminal 5 wires to a 24 VAC power source, terminal 6 wires to the SE-ECO1001 SAH Common terminal, terminal 9 wires to the SE-ECO1001 SAH terminal for 0 VDC to 10 VDC signal. The HE-68 sensor will have 2 sets of dip switches. The first set will have a 1 and 2 switch and the second set will have a 1, 2, and 3 switch. Check that the first set has switch 2 ON and all other switches are OFF.
2. If the wiring and dip switches are set correctly, check that the HE-68 sensor has 24 VAC power between terminals 6 and 5. If power is not present, check the 24 VC power source.
3. If 24 VAC power is available, check that the HE-68 sensor is providing a signal from 0 VDC to 10 VDC output between terminals 6 and 9. If the output is 0 VDC, the alarm will still occur. The sensor should output a voltage greater than 0 VDC as it is highly unlikely to be in an environment with 0% humidity.

   ⓘ **Note:** The output signal correlates to a 0% to 100% humidity range.
4. If 24 VAC power is ok, the wiring and settings are correct and there is still no output then replace the sensor.
5. If the sensor has no problems and you are still unable to get a reading from the SEC board, then you should replace the SE-ECO1001 econ module.

Figure 46: Testing the supply air humidity sensor



Indoor air quality sensor failure

The **Indoor Air Quality Sensor Fail** alarm occurs when the SE-ECO1001 economizer module indoor air quality (IAQ) input has lost its 0 VDC to 10 VDC signal that was once recognized. The IAQ input is an input for demand ventilation operation to reduce CO_2 levels. If the SEC board is showing **Indoor Air Quality Sensor Fail** and no sensor is being used, you cannot clear the alarm with any firmware version less than 3.2.0.0138. The alarm will not prevent any unit operation and you will have to replace the SE-ECO1001 econ module or upgrade the SEC firmware to 3.2.0.0138 to clear the alarm.

If the **Indoor Air Quality Sensor Fail** alarm occurs, complete the following steps:

1. Check that the sensor is properly wired using terminals 1, 2, 7, and 8 wired to the SE-ECO1001 24V, COM and IAQ terminals. Terminal 1 wires to a 24 VAC power source, terminal 2 wires to the SE-ECO1001 Common terminal, terminal 8 wires to the SE-ECO1001 IAQ terminal for 0 VDC to 10 VDC signal and jumper a wire from terminal 7 to terminal 2 for common.
2. If the wiring is correct, check that the CO_2 sensor has 24 VAC power between terminals 1 and 2. If there is no power, check the 24 VC power source.
3. If 24 VAC power is available, check that the CO_2 sensor is providing a signal from 0 VDC to 10 VDC output between terminals 7 and 9. If the output is 0 VDC the alarm will still occur. The sensor should output a voltage greater than 0 VDC as it is highly unlikely to be in an environment with 0 ppm CO_2.

   ⓘ **Note:** The output signal correlates to a range of 0 ppm to 2000 ppm.
4. If the 24 VAC power is ok, the wiring and settings are correct and there is still no output then replace the sensor.
5. If the sensor has no problems and you are still unable to get a reading from the SEC board, then you should replace the SEC board.

Figure 47: Indoor air quality sensor connections

Outdoor air quality sensor failure

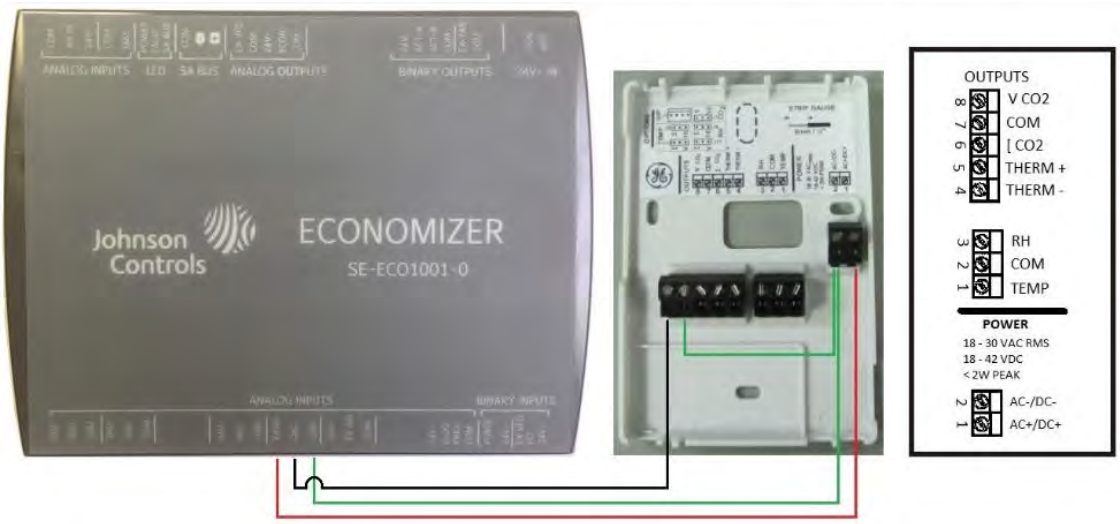
The **Outdoor Air Quality Sensor Fail** alarm occurs when the SE-ECO1001 economizer module Outdoor Air Quality (OAQ) input has lost its 0 VDC to 10 VDC signal that was once recognized. The OAQ input is an input for demand ventilation operation to reduce CO_2 levels. If the SEC board is showing **Outdoor Air Quality Sensor Fail** and no sensor is being used, you cannot clear the alarm with any firmware version less than 3.2.0.0138. The alarm will not prevent any unit operation and you will have to replace the SE-ECO1001 econ module or upgrade the SEC firmware to 3.2.0.0138 to get rid or alarm.

If the **Outdoor Air Quality Sensor Fail** alarm occurs, complete the following steps:

1. Check that the sensor is correctly wired using terminals 1, 2, 7, and 8 wired to the SE-ECO1001 24V, COM and IAQ terminals. Terminal 1 wires to a 24 VAC power source, terminal 2 wires to the SE-ECO1001 Common terminal, terminal 8 wires to the SE-ECO1001 OAQ terminal for 0 VDC to 10 VDC signal and jumper a wire from terminal 7 to terminal 2 for common.
2. If wiring is correct, check that the CO_2 sensor has 24 VAC power between terminals 1 and 2. If power is not present, check the 24 VC power source.
3. If 24 VAC power is available, check that the CO_2 sensor is providing a signal from 0 VDC to 10 VDC output between terminals 7 and 9. If the output is 0 VDC, the alarm will still occur. The sensor should output a voltage greater than 0 VDC as it is highly unlikely to be in an environment with 0 ppm CO_2.

   ⓘ **Note:** The output signal correlates to a range of 0 ppm to 2000 ppm.
4. If 24 VAC power is ok, the wiring and settings are correct and there is still no output then replace the sensor.
5. If the sensor has no problems and you are still unable to get a reading from the SEC board, then you should replace the SEC board.

Figure 48: Outdoor air quality sensor connections



Fresh air intake sensor failure

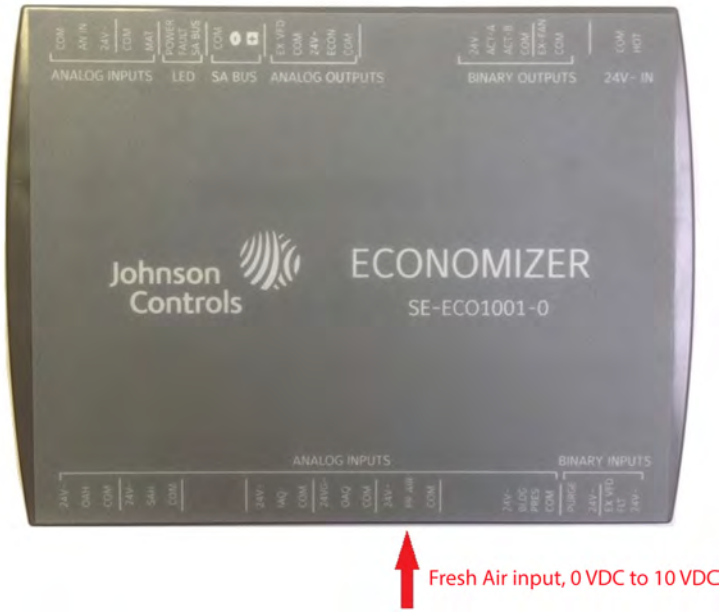
The **Fresh Air Intake Sensor Fail** alarm occurs when the SE-ECO1001 economizer module FR AIR input has lost its 0 VDC to 10 VDC signal that was once recognized input from a third party air monitor controller. The FR AIR input is an input for air monitor operation to maintain a desired

amount of CFM's for outdoor fresh air. If the SEC board is showing **Outdoor Air Quality Sensor Fail** and no sensor is being used, you cannot clear alarm with any firmware version less than 3.2.0.0138. The alarm will not prevent any unit operation and you will have to replace the SE-ECO1001 econ module or upgrade the SEC firmware to 3.2.0.0138 to clear the alarm.

If the **Fresh Air Intake Sensor Fail** alarm occurs, complete the following steps:

1. Check that the third party air monitor controller is correctly wired to the SE-ECO1001 FR AIR input.
2. If wired correctly, check that there is a 0 VDC to 10 VDC input to the SE-ECO1001 FR AIR input. If the air monitor controller is installed correctly, the fan is running and the outside air damper is open, there should be reading greater than 0 VDC.
3. If there is no input from the air monitor, check the air monitor sensors and module for correct installation and setup.
4. If there is a voltage reading greater than 0 VDC and equal to or less than 10 VDC input, but there is no reading on the SEC board and air monitor is properly setup with SEC, replace the SE-ECO1001 module.

Figure 49: Fresh air input location



Mixed air temperature sensor failure

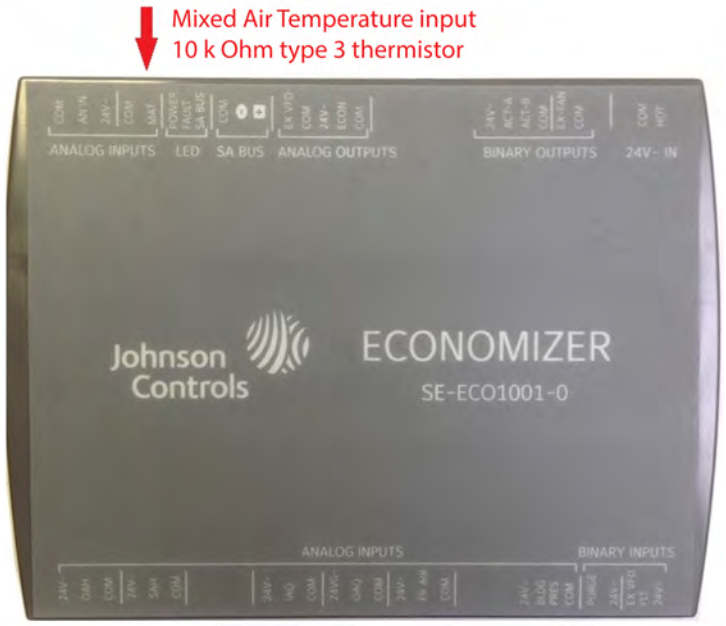
The **Mixed Air Temperature Sensor Fail** alarm occurs when the SE-ECO1001 economizer module Mixed Air Temperature (MAT) input has lost its signal that was once recognized. The MAT input is not an operating input for any functions with the SEC board or SE-ECO1001 econ module and only for monitoring purposes. If the SEC board is showing the **Mixed Air Temperature Sensor Fail** alarm and no sensor is being used, you cannot clear the alarm with any firmware version less than 3.2.0.0138. The alarm will not prevent any unit operation and you will have to replace the SE-ECO1001 econ module or upgrade the SEC firmware to 3.2.0.0138 to clear the alarm.

If the **Mixed Air Temperature Sensor Fail** alarm occurs, complete the following steps:

1. Check that the sensor is correctly wired and setup, if using the MAT input for monitoring purposes. The SE-ECO1001 economizer module provides a 24 V power, Common/Ground and MAT sensor input for reading mixed air temperature.

2. If sensor is properly wired check if required sensor has 24 VAC power.
3. If 24 VAC power is available, check that the sensor will ohm properly for a 10 K Type 3 thermistor. See the resistance chart on the home page and compare the resistance to the temperature.
4. If 24 VAC power is ok and the sensor ohms out correctly, replace the SE-ECO1001 economizer module.

Figure 50: Mixed air temperature input



Smart equipment processor alarms

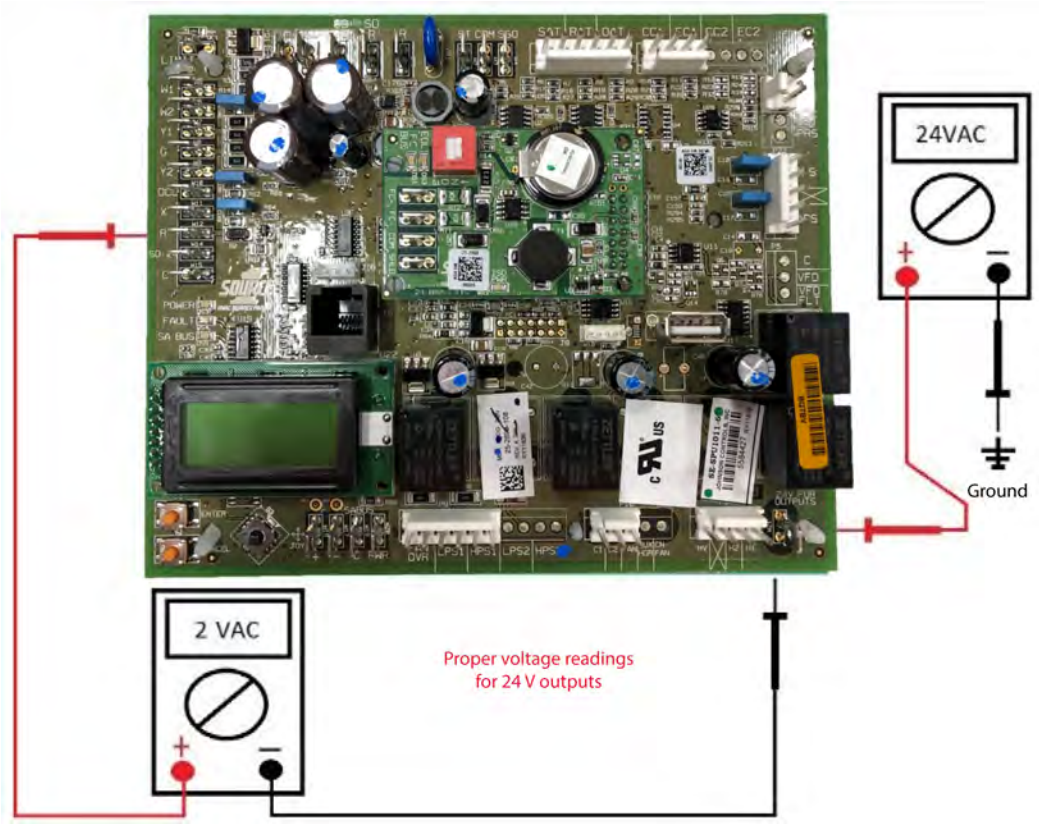
Outputs disabled due to low input voltage

The **Outputs Disabled Due to Low Input Voltage** alarm occurs when the SEC board recognizes 24 VAC power has dropped below 20 VAC at the 24 V For Outputs terminal, 24 VAC power has been lost to the 24 V For Outputs terminal, an output component has shorted or there is a voltage imbalance between the 24 V For Outputs terminal and the 24 VAC power to the SEC board.

If the **Outputs Disabled Due to Low Input Voltage** alarm occurs, complete the following steps:

1. Check that 24 VAC power is available at the 24 V For Outputs terminal. If no power is available, follow wire to where the power is lost and repair. If there is no 24 VAC power, it could indicate a tripped circuit breaker, fuse or bad transformer.
2. If 24 V For Outputs terminal is less that 20 VAC check wiring and transformer providing 24 VAC power has the correct primary voltage and is tapped properly.
3. If the low voltage and high voltage wiring are found to be at the correct power, check the voltage across the R terminal and 24 V For Outputs terminal. If the voltage difference is approximately 50 VAC, this indicates improper phasing. The 24 VAC transformers must be phased properly. Power down the unit and correctly wire the high voltage primary side of each 24 VAC transformer so they are phased from the same legs of power. For example, if transformer one's primary voltage is wired to L1 and L2 and transformer two's primary voltage is wired to L2 and L3, move transformer two's wire from L3 to L1. This will make the transformers phased that same. Next, power up the unit and check the voltage between R and 24 V For Outputs. The voltage should be 2 VAC or less.
4. After making the checks and corrections if necessary, you find that the alarm is still sounding and the voltage is not reading properly, this may indicate a component such as a motor, relay or contactor is faulty. Power down the unit and unplug the P10 plug that provides the 24 VAC output to C1, C2, Fan, Aux HGR and CN Fan. Power the unit and check for alarm and 24 VAC on the 24 V For Outputs terminal. If voltage is ok and the alarm has cleared, you need to isolate each output C1, C2, Fan, Aux HGR and CN Fan to determine what may be causing the fault. Starting with the fan, C1, C2, CN Fan and possibly Aux HGR if used. When you find the component that has failed or is shorting, replace or repair it.
5. If the P10 plug components are ok, move to the heating output and feedback P3 plug. Power down the unit and remove the P3 plug from the SEC board. Power up the unit and check for proper voltage on the 24 V For Outputs terminal. If the voltage is ok and the alarm has cleared, isolate the heating output and test operation until a fault is detected. If a fault is detected, this indicates a possible gas component is faulty such as the ignition module, gas valve, wiring, spark ignitor, sensor, or limit switch.
6. If no issues have been found after following the previous set of steps, 24 VAC power to the 24 V For Outputs is present and the alarm does not clear, replace the SEC board.

Figure 51: Checking the 24 V For Outputs terminal voltage



Outputs disabled due to brownout input voltage

The **Outputs Limited Due to Brownout Input Voltage** alarm occurs when the SEC board recognizes that 24 VAC power has dropped below 20 VAC at the 24 V terminal or 24 VAC power has been loss to the 24 V terminal and quickly established. This alarm can also be triggered through a switching of power from high line power to generator power.

If the **Outputs Limited Due to Brownout Input Voltage** alarm occurs, complete the following steps:

1. Check that 24 VAC power is available at the 24 V terminal. If the voltage is less than 20 VAC, check for possible causes of a voltage drop. This could be caused by incorrect high voltage to the primary side of the transformer, incorrect high voltage tapping of the transformer, loose or incorrect wiring or a faulty fuse or breaker.
2. If no issues have been found after following the previous set of steps, the alarm does not clear after powering down the unit and back up, and 24 VAC power to the 24 V is present, then replace the SEC board.

Figure 52: Checking for 24VAC power at the 24V terminal

Main controller calibration error

The **Main Controller Calibration** error occurs when the SEC board has not been calibrated from the factory.

If the **Main Controller Calibration** error occurs, complete the following step:

- Power down unit and back up. Allow the board to reboot. If alarm does not clear, replace the SEC board.

Econ controller calibration error

The **Econ Controller Calibration** error occurs when the SE-ECO1001 economizer board has not been factory calibrated.

If the **Econ Controller Calibration** error occurs, complete the following step:

- Power down unit and back up. Allow board to reboot. If alarm does not clear, replace the SE-ECO1001 economizer board.

Four stage controller calibration error

The **Four Stage Controller Calibration** error occurs when the SEC four stage expansion board has not been factory calibrated.

If the **Four Stage Controller Calibration** error occurs, complete the following step:

- Power down unit and back up. Allow the board to reboot. If alarm does not clear, replace the four stage expansion board.

Firmware not matching

The **Firmware Not Matching** alarm occurs when the SEC board recognizes that either the SE-ECO1001 economizer board, SEC four stage expansion board or fault detection diagnostics (FDD) board do not have the same firmware version as the SEC board.

If the **Firmware Not Matching** alarm occurs, complete the following steps:

1. Determine what boards are in the unit.
2. Check the firmware of the SEC Board through the pathway ***Controller*** > ***SysCntrls*** > ***UCB*** > ***UCBMainVer***. As an example, if the UCBMainVer shows 3.1.0.0128 then the additional boards communicating with the SEC board must have that same firmware version.
3. Next, check the SE-ECO1001 economizer board firmware if installed through the pathway ***Controller*** > ***SysCntrls*** > ***Econ*** > ***EconMainVer***. If the firmware version is not an exact match with the SEC board firmware, then it is necessary to update the firmware. Contact your technical support for firmware and update instructions.
4. If the SE-ECO1001 economizer board has matching firmware and the unit has a SEC four stage expansion board, compare the firmware to the SEC board through the pathway ***Controller*** > ***SysContrls*** > ***4stg*** > ***4StgMainVer***. If the firmware version is not an exact match with the SEC board firmware, then it is necessary to update the firmware. Contact your technical support for firmware and update instructions.
5. Finally, if the unit has a fault diagnostics detection board, check if the firmware matches the SEC board through the pathway ***Controller*** > ***SysContrls*** > ***FDDM*** > ***FDDMMainVer***. If the firmware is not an exact match with the SEC board firmware, then it is necessary to update the firmware. Contact your technical support for firmware and update instructions.

Economizer alarms

Econ economizing when it should not

The **Econ Economizing When It Should Not** alarm indicates that the economizer damper is not within the economizer enabling parameters and the outside air damper is open beyond the minimum position when the unit is in occupied mode.

If the **Econ Economizing When It Should Not** alarm occurs, complete the following steps:

1. First, check the status of the economizer through ***SEC pathway Status*** > ***Econ-S=*** this will help lead in the direction of the possible issue. If the unit is in occupied mode and not in free cooling, the economizer status should show Economizer Minimum Position if no other economizer operation is enabled.
2. Second, check what the economizer minimum position is set to. If the unit is a fixed variable or variable fan control type you will need to check both the economizer minimum position and low speed fan minimum position. The pathway for the points are ***Details*** > ***Control*** > ***Econ*** > ***Econ-MinPos*** and ***Details*** > ***Control*** > ***Econ*** > ***Setup*** > ***LowSpeedFan-MinPos***. The minimum positions should be set equal unless wanting to have a minimum damper % based on fan speed and low speed fan minimum position. Now, compare the economizer damper position using pathway ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***EconDampPos*** to the minimum positions. If the economizer damper position is greater than the minimum positions, then this is a possible cause of the alarm Econ Economizing When It Should Not.
3. Third, if you determine the damper position is greater than the minimum position, check the voltage output from the SE-ECO1001 econ module's ECON analog output. The output is a 2 VDC to 10 VDC output. The voltage should match the % of minimum position. For example, if the economizer minimum position is set to 20% then the voltage output should be 3.6 VDC. If the voltage does not match the proper minimum position disconnect, then disconnect the ECON analog output and common plug from the SE-ECO1001 econ module and check the voltage at the pins on the econ module. If the voltage is still not reading correctly, check the power voltage to the SE-ECO1001 econ module at the COMMON and HOT terminal. The power voltage should be 24 VAC, but should never be greater than 29 VAC or less than 20 VAC. If power voltage is not within range, check the power source. If the power source requires corrective action, make the necessary repairs. If power voltage is found to be ok, the ECON analog output is exceeding % command and economizer status shows minimum position, then replace the SE-ECO1001 module.
4. Fourth, if the ECON analog output is correct, check the SE-ECO1001 feedback terminal. This terminal is located at the analog inputs and identified as ECOFB. If the ECOFB terminal reads a greater voltage than the ECON output check that the actuator is set for reverse acting. This is a switch located on the front of the actuator that provides for forward or reverse acting modulation. If the switch is not set for the correct forward acting setting, change the setting and check that the voltage is ECOFB input is correct. If the voltage is incorrect, check that the actuator has 24 VAC power. If the actuator has 24 VAC and no proper feedback, then replace the actuator. If the actuator is not receiving the correct 24 VAC power, check the wiring and SE-ECO1001 24 V power to the actuator. If the correct 24 VAC power is not being received from the SE-ECO1001 econ module, replace the SE-ECO1001 econ module.
   When determining the expected voltage output from the SE-ECO1001 Econ analog output according to the % requested there are a few steps you can take to calculate the voltage.
   a. The voltage output for economizer actuator command is 2 VDC to 10 VDC output. This is an 8 V span.

b. If the economizer minimum position is 20% multiply .2 (min.%) x 8 (span)= 1.6 (VDC) + 2 (VDC) = 3.6 VDC total output.
c. Another example is if the economizer minimum position is set to 25%, multiply .25 (min.%) x 8 (span)= 2 (VDC) + 2 (VDC) = 4 VDC total output.
d. A final example is if the economizer is at 80% open, what is the expected voltage output? Multiply .8 (% open) x 8 (span) = 6.4 (VDC) + 2 (VDC) = 8.4 VDC total output.

Econ not economizing when it should

The **Econ Not Economizing When It Should** alarm indicates that the economizer damper is not within the economizer enabling parameters and the outside air damper is open less than the minimum position when the unit is in occupied mode.
If the **Econ Not Economizing When It Should** alarm occurs, complete the following steps:

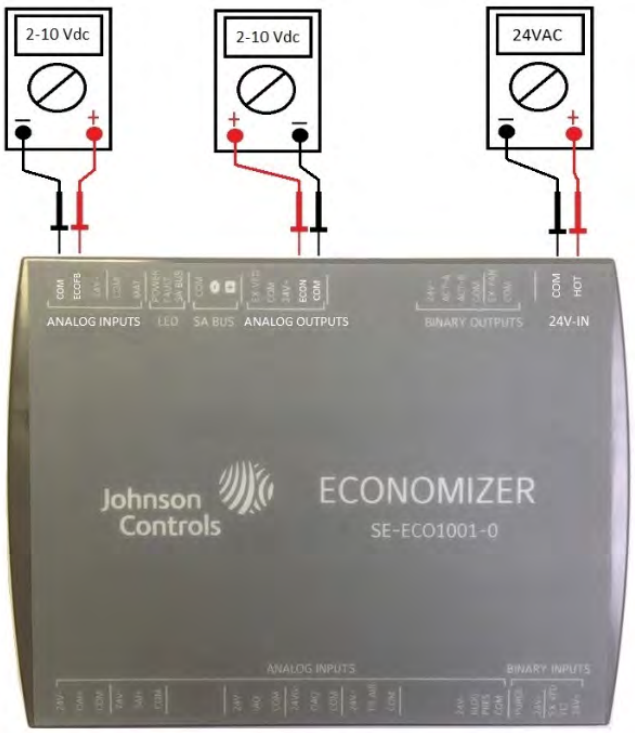
1. First, check the status of the economizer through the SEC pathway ***Status*** > ***Econ-S=***, this will help lead in the direction of the possible issue. If the unit is in occupied mode and not in free cooling, the economizer status should show Economizer Minimum Position if no other economizer operation is enabled. If the unit is in occupied mode and in free cooling, the economizer status should show Economizer Free Cooling is Available.
2. Second, check what the economizer minimum position is set to. If the unit is a fixed variable or variable fan control type you need to check both the economizer minimum position and low speed fan minimum position. The pathway for the points are ***Details*** > ***Control*** > ***Econ*** > ***Setup*** > ***Econ-MinPos*** and ***Details*** > ***Control*** > ***Econ*** > ***Setup*** > ***LowSpeedFan-MinPos***. The minimum positions should be set equal unless wanting to have a minimum damper % base on fan speed and low speed fan minimum position. Now, compare the economizer damper position through the pathway ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***EconDampPos*** to the minimum position(s) or current damper position through pathway ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***EconDampPos***. If the economizer damper position is less than the minimum positions, this is a possible cause of the alarm **Econ Economizer When It Should**.
3. Third, if you determine that the damper position is less than the minimum position(s), check the voltage output from the SE-ECO1001 econ module ECON analog output. The output is a 2 VDC to 10 VDC output. The voltage should match the % of minimum position or % of damper command. For example, if the economizer minimum position is set to 20% then the voltage output should be 3.6 VDC. If the voltage does not match the proper minimum position, disconnect then disconnect the ECON analog output and common plug from the SE-ECO1001 econ module and check the voltage at the pins on the econ module. If the voltage is still not reading correctly, check the power voltage to the SE-ECO1001 econ module at the COMMON and HOT terminals. The power voltage should be 24 VAC, but should never be greater than 29 VAC or less than 20 VAC. If the power voltage is not within range, check the power source. If the power source requires corrective action, make the necessary repairs. If power voltage is ok, the ECON analog output is less than % command and the economizer status shows minimum position, replace the SE-ECO1001 module.

4. Fourth, if the ECON analog output is found to be correct, check the SE-ECO1001 feedback terminal. This terminal is located at the analog inputs and is identified as ECOFB. If the ECOFB terminal shows less voltage than the ECON output, check if the actuator is set for reverse acting. This is a switch located on the front of the actuator that provides for forward or reverse acting modulation. If the switch is not set for the correct forward acting setting, change the setting and check the voltage is ECOFB input is correct. If voltage issue did not correct itself, check that the actuator has 24 VAC power. If the actuator has 24 VAC and no proper feedback, replace the actuator. If the actuator is not getting the correct 24 VAC power, check the wiring and SE-ECO1001 24 V power to the actuator. If not getting proper 24 VAC power from the SE-ECO1001 econ module, replace the SE-ECO1001 econ module.
   When determining the expected voltage output from the SE-ECO1001 Econ analog output according to the % requested, there are a few steps you can take to calculate the voltage.

   a. The voltage output for economizer actuator command is 2 VDC to 10 VDC output. This is an 8 V span.
   b. If the economizer minimum position is 20%, multiply .2 (min.%) x 8 (span)= 1.6 (VDC) + 2 (VDC) = 3.6 VDC total output.
   c. Another example is if the economizer minimum position is set to 25%, multiply .25 (min.%) x 8 (span)= 2 (VDC) + 2 (VDC) = 4 VDC total output.
   d. A final example is if the economizer is at 80% open, what is the expected voltage output? Multiply .8 (% open) x 8 (span) = 6.4 (VDC) + 2 (VDC) = 8.4 VDC total output.

   Refer to the following figure.

Figure 53: Calculating the economizer's expected voltage output



Economizer damper not modulating

The **Economizer Damper Not Modulating** alarm indicates that the economizer damper is not providing a feedback input to the SE-ECO1001 econ module ECOFB input when the unit is in occupied mode and outside air damper is commanded to minimum position or economizing.

If the **Economizer Damper Not Modulating** alarm occurs, complete the following steps:

1. First, check the status of the economizer through the SEC pathway ***Status*** > ***Econ-S=*** this can help to identify the possible issue. If the unit is in occupied mode and not in free cooling the economizer status should show Economizer Minimum Position if no other economizer operation is enabled. If the unit is in occupied mode and in free cooling the economizer status should show Economizer Free Cooling is Available.
2. Second, check what the economizer minimum position is set to. If the unit is a fixed variable or variable fan control type you will need to check both the economizer minimum position and low speed fan minimum position. The pathway for the points are ***Details*** > ***Control*** > ***Econ*** > ***Setup*** > ***Econ-MinPos*** and ***Details*** > ***Control*** > ***Econ*** > ***Setup*** > ***LowSpeedFan-MinPos***. The minimum positions should be set equal unless wanting to have a minimum damper % base on fan speed and low speed fan minimum position. Now, compare the economizer damper position through the pathway ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***EconDampPos*** to the minimum position(s) or current damper position through the pathway ***Details*** > ***Service*** > ***Inputs*** > ***Sensors*** > ***EconDampPos***. If the economizer damper feedback is 0 VDC and the economizer is commanding minimum position or economizing, the alarm **Economizer Damper Not Modulating** will display.
3. Third, if the SE-ECO1001 econ module ECOFB terminal has 0 VDC, check the wiring from the input to the actuator. If the wiring is correct and the actuator has 24 VAC power and is modulating or not modulating correctly, replace the actuator. If the wiring is incorrect, make the necessary repairs.
4. Fourth, if the ECOFB wire from the actuator is not available for connection to the ECOFB and the feedback if not required for Title 24 requirements, then you can disable the Economizer Fault Detection by following the pathway ***Commission*** > ***Econ*** > ***EconFltDetectEn= Disabled***. This will prevent the alarm from sounding.

   When determining the expected voltage output from the SE-ECO1001 Econ analog output according to the % requested, there are a few steps you can take to calculate the voltage.

   a. The voltage output for the economizer actuator command is 2 VDC to 10 VDC output. This is an 8 V span.
   b. If the economizer minimum position is 20%, multiply .2 (min. %) x 8 (span) = 1.6 (VDC) + 2 (VDC) = 3.6 VDC Total output.
   c. Another example is if the economizer minimum position is set to 25%, multiply .25 (min. %) x 8 (span)= 2 (VDC) + 2 (VDC) = 4 VDC total output.
   d. A final example is if the economizer is at 80% open, what is the expected voltage output? Multiply .8 (% open) x 8(span) = 6.4 (VDC) + 2 (VDC) = 8.4 VDC total output.

   Refer to Figure 53

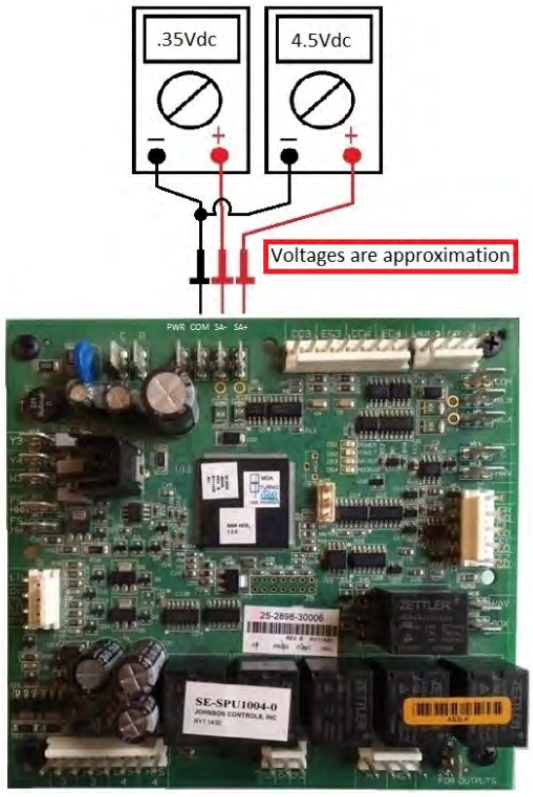
Communication Alarms

Four stage communication failure

The **Four Stage Communication Failure** alarm indicates that the four stage expansion board is no longer communicating with the SEC board through SA bus communications.
If the **Four Stage Communication Failure** alarm occurs, complete the following steps:

1. Check that communication harness is correctly plugged into the four stage expansion board and SEC board.
2. If the communication harness is correctly plugged in, then unplug the harness and ohm out the wires for good continuity. If the wires do not ohm out, replace the harness.
3. If the harness is ok, you will need to check the voltage of the SA bus at the four stage board SA bus connections. Unplug the harness from the four stage board and check the voltage from COM to SA+ and COM to SA-. If the voltages are not reading within their ranges, check the board components. A. COM to SA+ = 3.5 to 4.5 VDC B. COM to SA- = .1 to 1 VDC
4. Disconnect the board components such as compressor outputs and temperature sensors. Power cycle the board and check the SA bus voltages. If the voltage is still not in range, replace the board.

Figure 54: Checking the SA bus voltage



Economizer communication failure

The **Economizer Communication Failure** alarm indicates that the economizer board is no longer communicating with the SEC board through SA bus communications.

If the **Economizer Communication Failure** alarm occurs, complete the following steps:

1. Check that communication harness is correctly plugged into the economizer board and SEC board.
2. If the communication harness is correctly plugged in, then unplug the harness and ohm out the wires for good continuity. If the wires do not ohm out, replace the harness.
3. If the harness is ok, you will need to check the voltage of the SA bus at the economizer board SA bus connections. Unplug the harness from the economizer board and check the voltage from COM to SA+ and COM to SA-. If voltages are not reading within the ranges replace. Check the economizer components C. COM to SA+ = 3.5 to 2.5 VDC D. COM to SA- = 0 to 1 VDC
4. Disconnect possible sensors such as the humidity, CO_2 or actuator sensors. If one of these components are shorted to ground or failed, this can affect the SA bus communications.
5. After disconnecting the components from the economizer module, power cycle the economizer module and check the SA bus again. If the voltage is still not in range, replace the economizer module.

Figure 55: Checking the economizer board SA bus