SSE Diagnostics

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1

Basic Checks

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Confirm 24 volts to SSE board

- Confirm 24 volts to R and C at the top left on the board. A factory or field installed phase monitor will break this circuit.
- If a red light is visible on the phase monitor power the unit off and swap A and C phase at the load side of the disconnect.. DO NOT SWAP PHASING WITH THE UNIT'S FACTORY WIRNG
- The control voltage is from the transformer(s). There will be a low voltage circuit breaker also in the circuit. Each transformer will have its own circuit breaker.
- If there is 24 volts at R and C the LCD screen should be powered and the Power/SA bus lights should be on. Fault light will flash at start up and if there is a fault. S/A bus will flash if communicating with another device.

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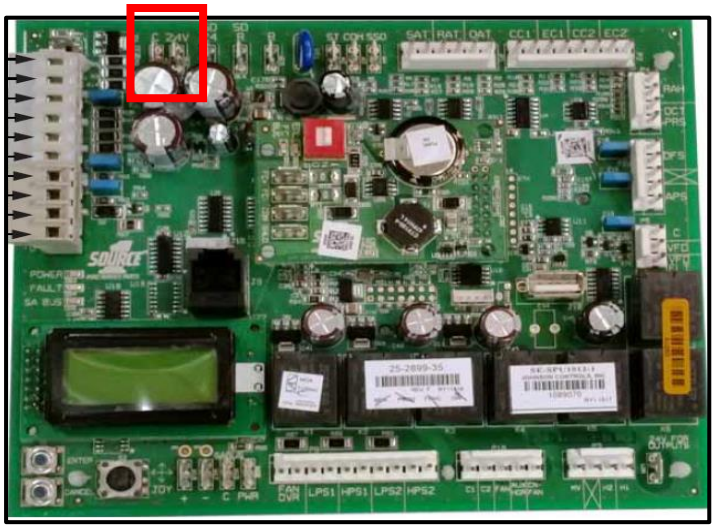
3



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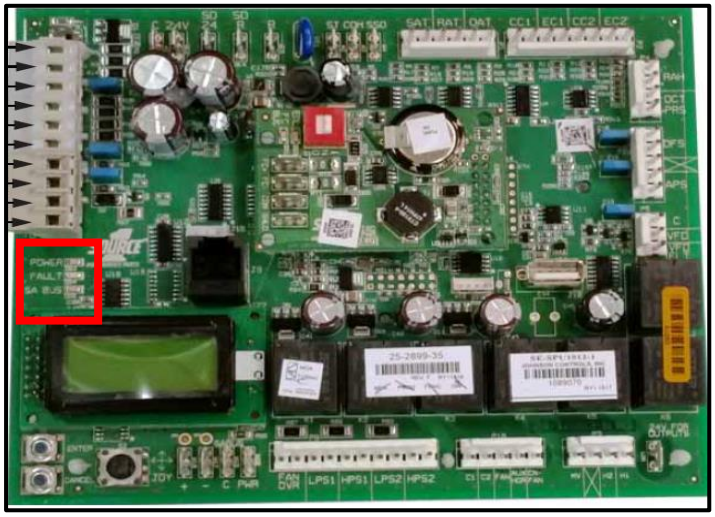
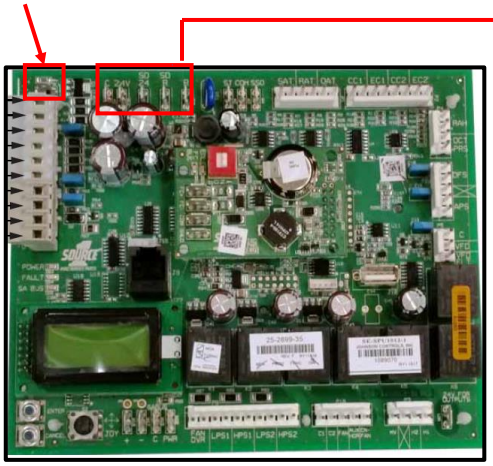
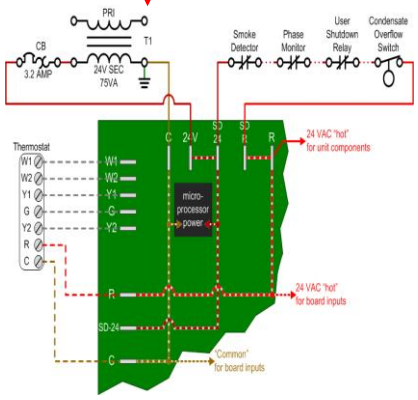


5

Limit Terminal





6

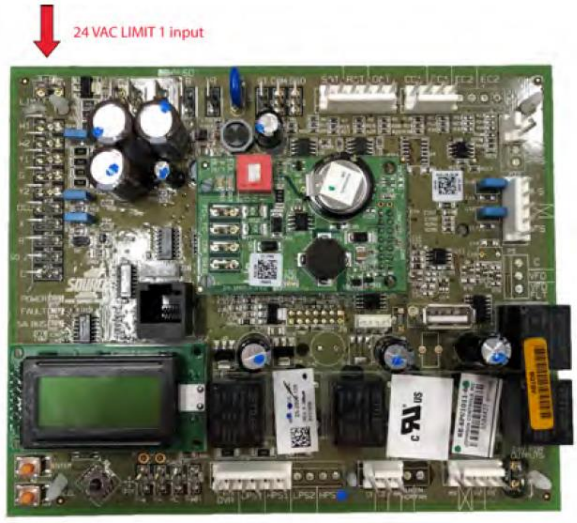
Heating

7

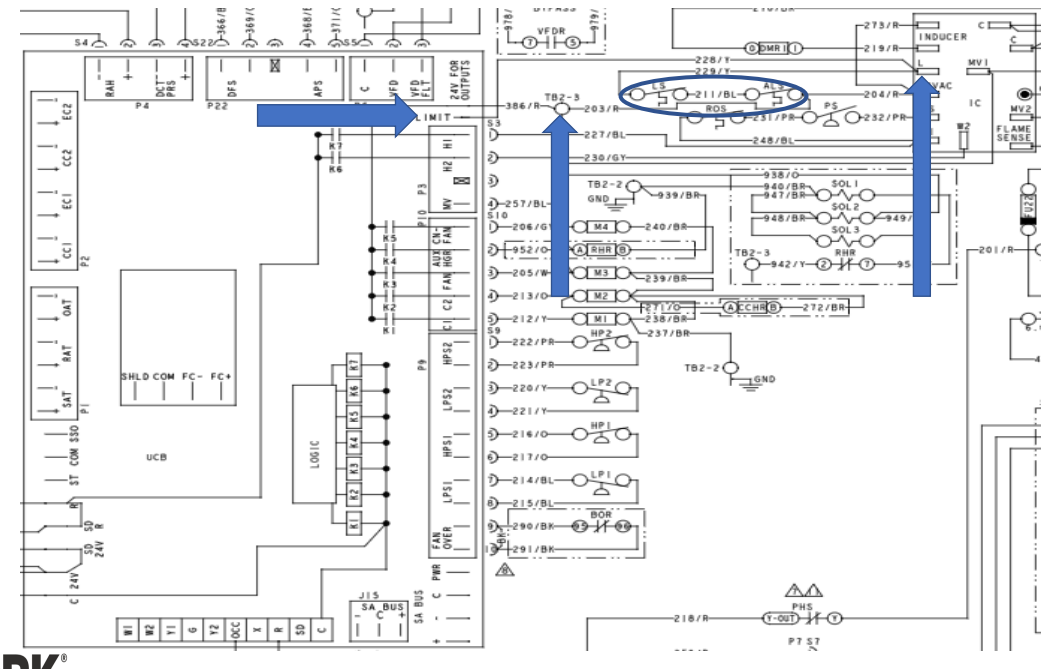
Heating Lockout Due to Limit

- HS1/HS2/HS3 Due to Limit will be displayed as the alarm
- The limit terminal located at the top left of the board. Always requires 24 volts. Wiring diagrams may have it at bottom right. This is only for the diagram.
- Circuit is thru either the heat exchanger limit, aux limit, electric heater limit or 24 volts from a transformer in a cooling only unit.
- Verify 24 volts is present at this terminal. If no voltage is present trace circuit back thru the unit towards the transformer
- ***If unit has gas heat section verifying gas pressure and air flow is required if limit is open***
- ***If electric heater is installed verifying heater amps and air flow is required if limit is open.***
- ***If no heat section at all verify 24 volts from the transformer to the limit terminal.***

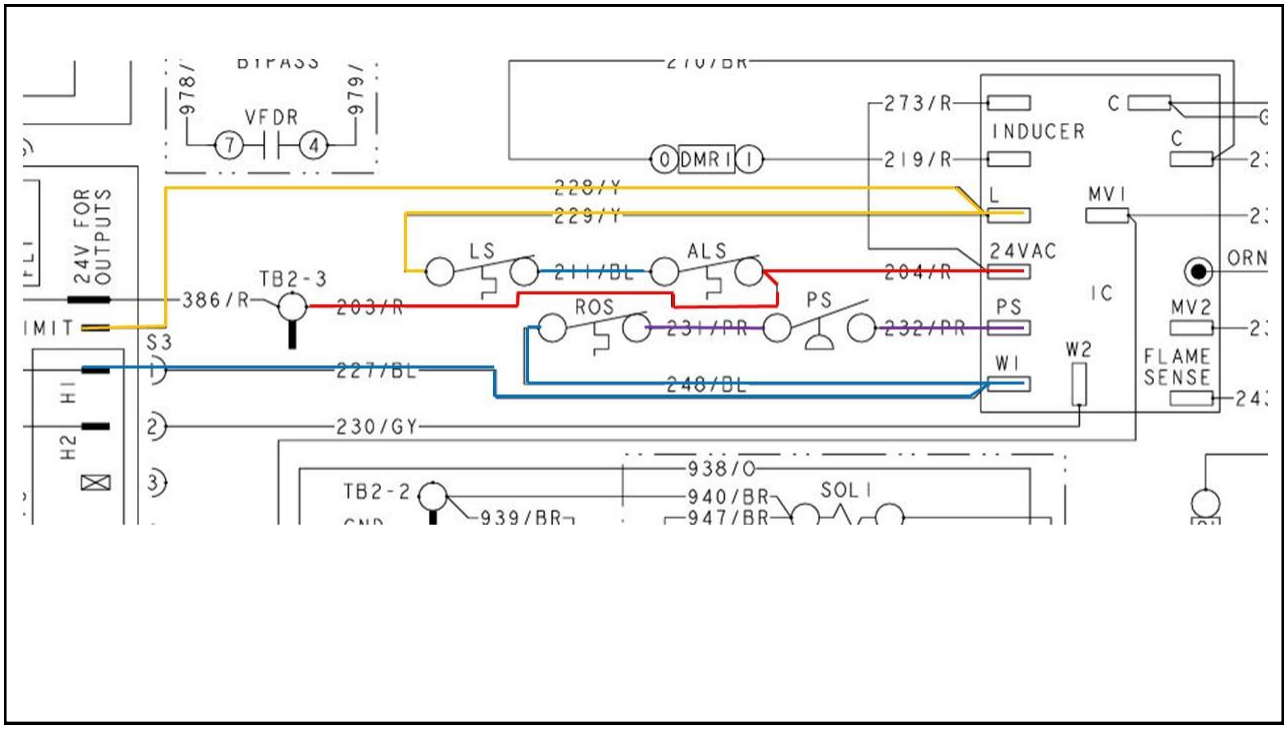
8


24 VAC LIMIT 1 input

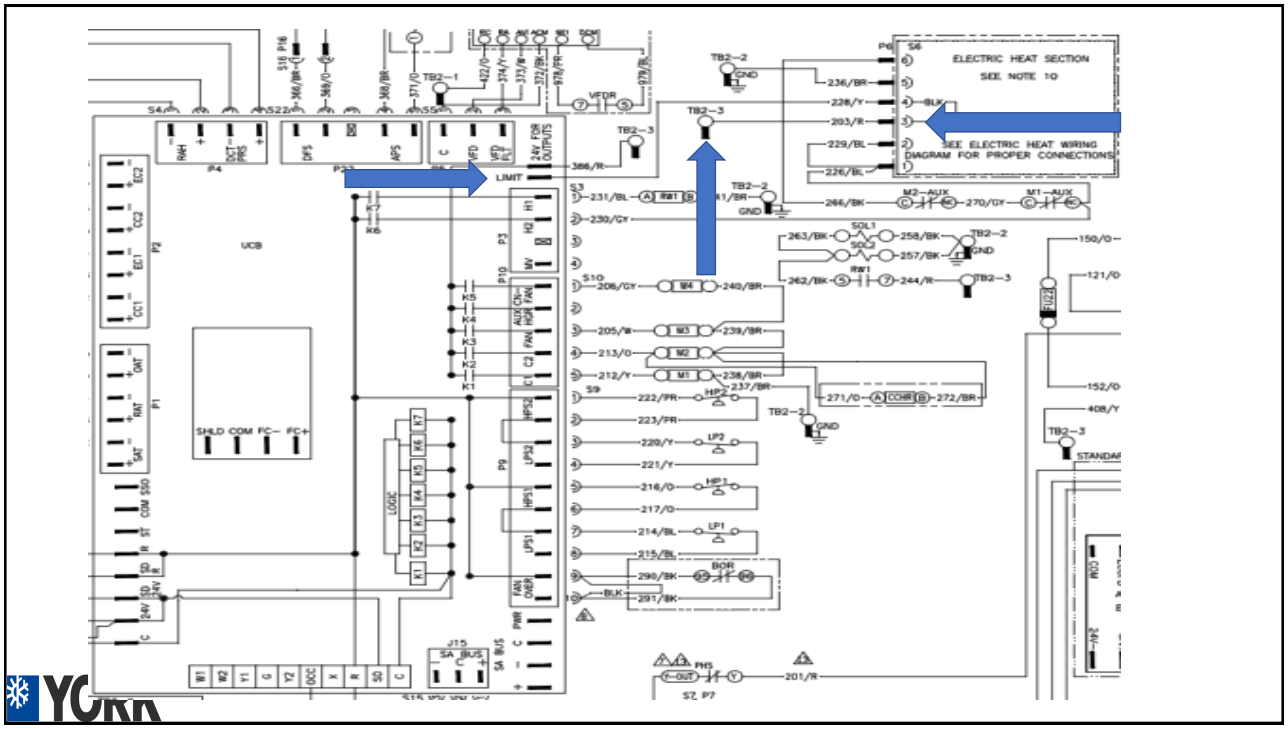
9


LIMIT
TB2-3
TB2-2
GND
INDUCER
SHLD COM FC- FC+
UCB
LOGIC
SA BUS
PHS

10

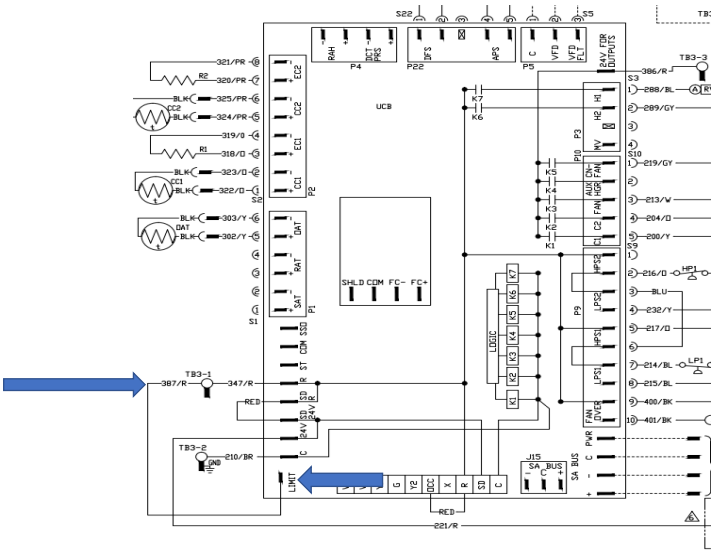

BYPASS
978/
979/
VFDR
7
4
24V FOR OUTPUTS
LIMIT
386/R
TB2-3
203/R
S3
HI
H2
227/BL
230/GY
TB2-2
939/BR
938/O
940/BR
947/BR
SOL1
270/BR
273/R
DMR1
219/R
228/Y
229/Y
LS
211/BL
ALS
ROS
231/PR
PS
232/PR
240/BL
INDUCER
C
L
24VAC
204/R
PS
WI
MV1
IC
W2
MV2
FLAME SENSE
ORN

11


ELECTRIC HEAT SECTION
SEE NOTE 10
SEE ELECTRIC HEAT WIRING DIAGRAM FOR PROPER CONNECTIONS
UCB
LIMIT
24V FOR OUTPUTS
TB2-1
TB2-2
TB2-3
VFDR
SHLD COM FC- FC+
LOGIC
J15
SA BUS
W1
W2
Y1
G
Y2
OCC
X
R
SD
C
201/R

12

Split System with SSE Board Limit Circuit



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Split System Air Handler Limit Cicrcuit

- Splits systems has the limit terminal jumped at the SSE board.
- The limit protection for the air handler is in the electric heater that is field installed.
- These limits are line voltage.
- If open due to high temperatures, the line volt power to the heating elements are broken.

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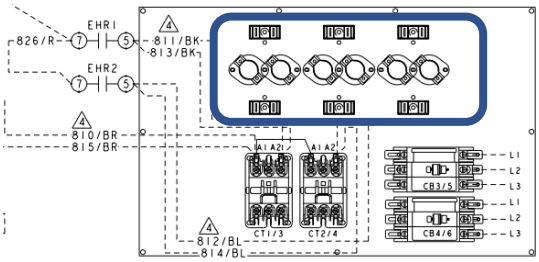
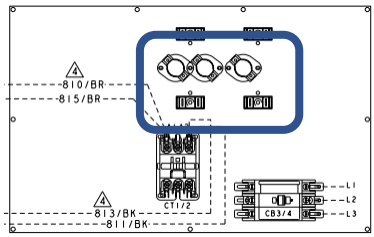
Basic Electric Heater Limit Diagram for Air Handlers



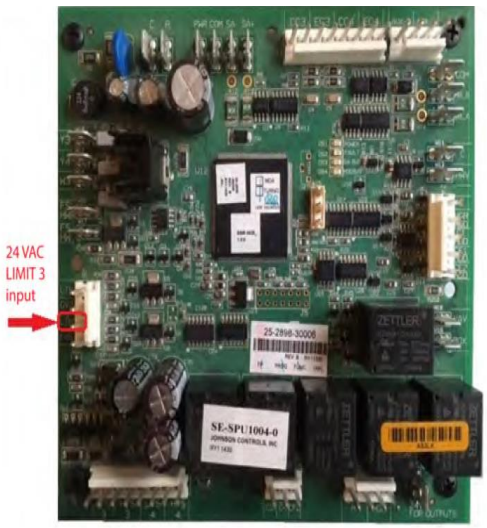


15

HS1 Lockout Due to Limit

- Some larger gas fired units will have multiple limit circuits.
- Diagnostic procedure will be the same for each limit circuit.
- Larger gas fired units will have an expansion module where limit 2 and 3 will be landed.
- If limit opens 3 times in 1 hour the unit will be locked out. Re-setting power may be required to clear alarm and re-start the unit. Re-Set LO can also be used.
- Limit must be closed with 24 volts going thru the circuit before the alarm can be cleared.
- The 4.0 firmware family has settings to allow cooling in an event of a limit alarm. Heating operation will be locked out. HS1 due to limit will appear on the LCD screen.

16



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Heating Lockout Due to Gas Valve

- HS1 due to gas valve will be displayed as the alarm
- The SSE board proves ignition thru the main valve(MV) terminals
- If there is a command for heat and the MV terminal does not receive 24 volts within 6 minutes the unit will lock out.
- If the MV terminal has 24 volts before a command for heat will also occur.
- Verify heat command is active. Verify H1,H2,H3(heating stage dependent) is outputting to the ignition module
- Verify 24 volts is returning to the MV terminal(s)
- In Commissioning mode this will appear on the LCD screen.

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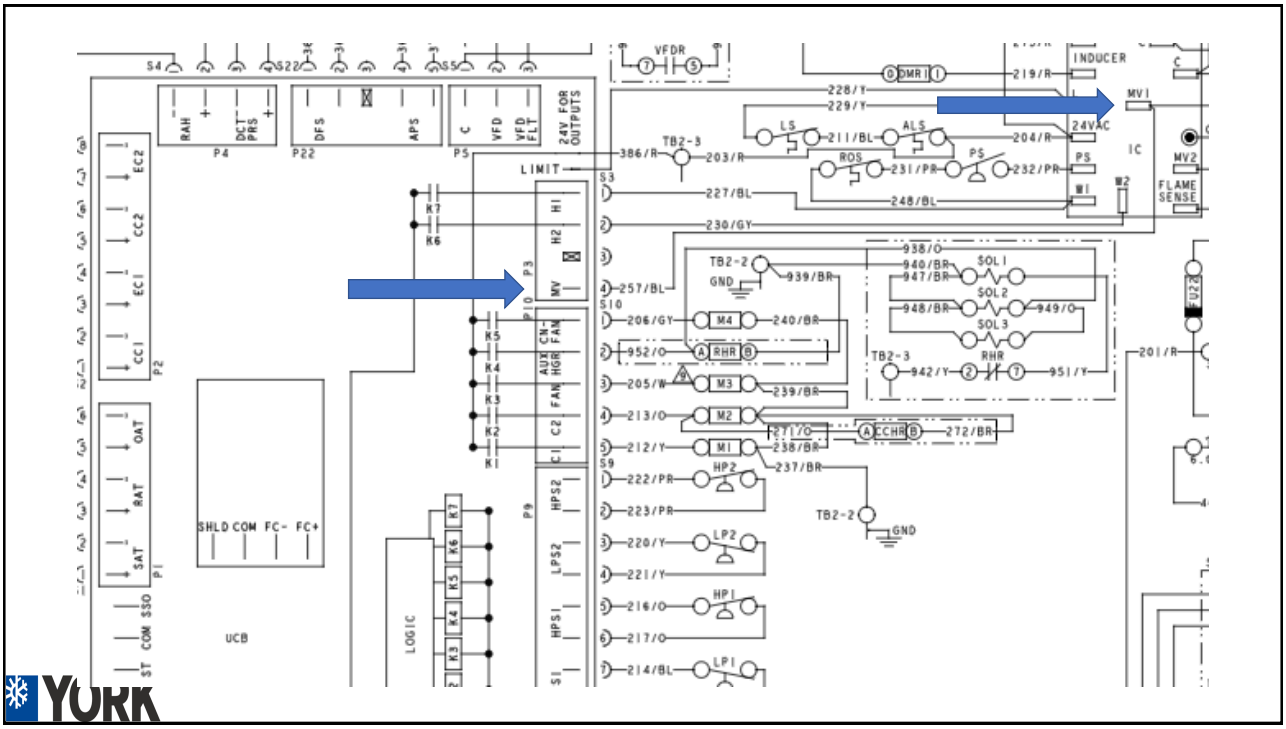

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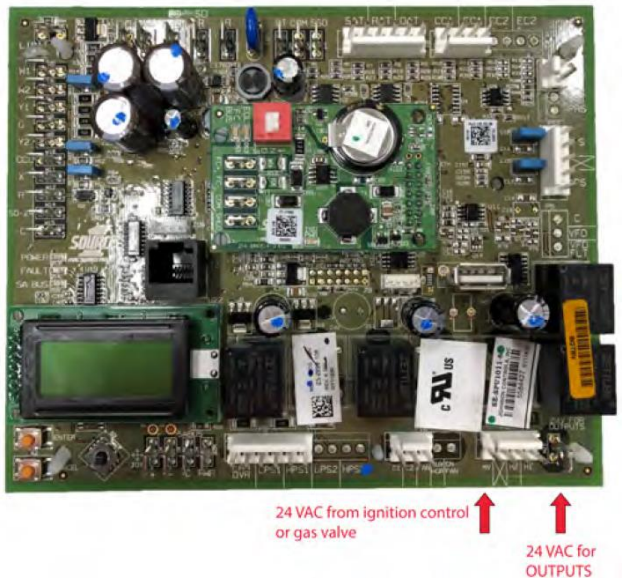
Heating Lockout Due to Gas Valve

- HS2/HS3 alarms will be in units with individual gas valves. Mostly in larger capacity units.
- The diagnostics and logic is the same.
- Larger units may have expansion modules.

20



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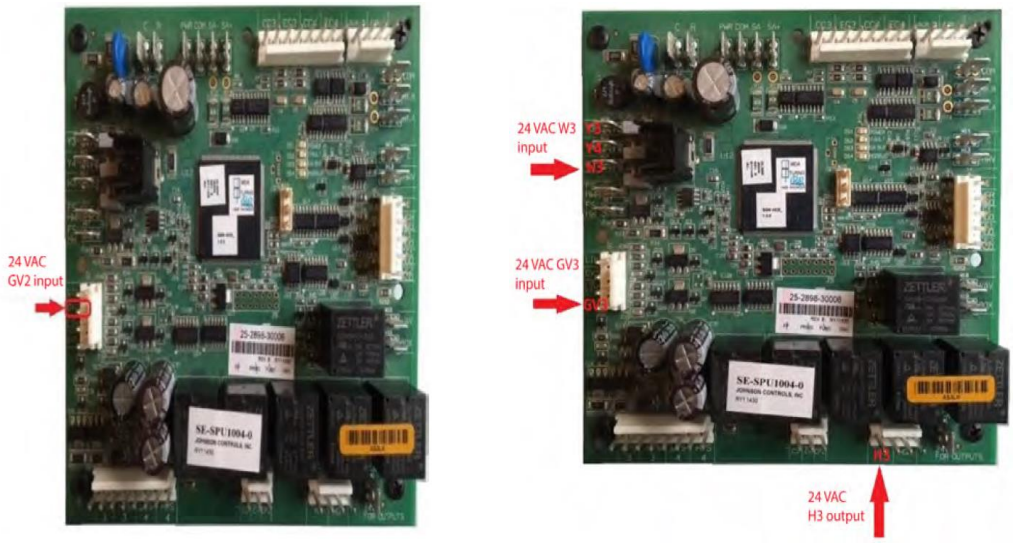
21



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Heating Excessive SAT Alert

- This can be an indication of low airflow.
- Designed to turn off heating prior to the limit opening. This alert will not lock the unit out. Limit alarms will.
- View the temp value of the SAT. Summary>Sensors>Sensors>SAT.
- View the SAT heating limit cutout set point. Details>Heating>Setup>SATHTGlimit-SP.
- If actual SAT is near the setpoint this alert will happen.
- High return temps will trigger this too.

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Heating Excessive SAT Alert

- SAT is an 10k sensor at 77 degrees
- Resistance will decrease as temp increase. Resistance will increase as temp decrease.
- Located in the supply air stream near heat exchanger area.
- Plug location on SSE board is top middle.

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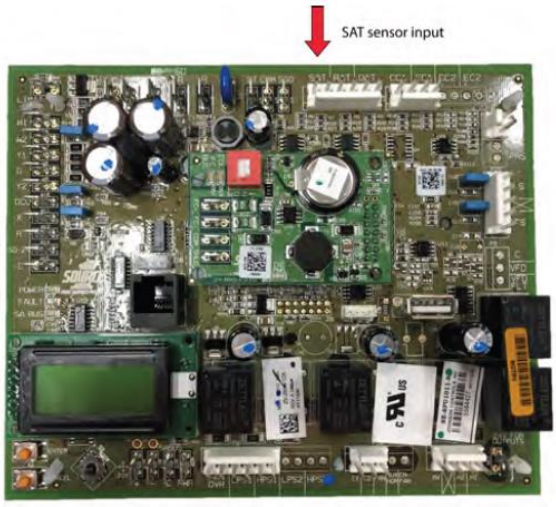

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Call For Heat and No Operation

- Verify call from the stat and no alarms.
- If there is a call from the stat and no alarms transformer phasing is the next thing to confirm.
- This will only be valid on units with 2 transformers.
- One transformer is powering the SSE board
- The other transformer is powering the Ignition Module
- If the two transformers are out of phase, heat will not work.

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Call For Heat and No Operation

- Insure there is 24 VAC between W1 and/or W2 to common or ground at the thermostat connections on the SSE board
- Insure there is 24 VAC at the ignition module L,24VAC and W1 to common or ground.
- Check between L and W1 on the ignition module. If volts are @ 50-55 the transformers are out of phase.
- If this is the case switch the secondary side of one of the transformers.
- If volts read is 0 between L and W1 then transformers are in phase. Further diagnoses will be required.
- If more than 6 minutes has elapsed the HS1 due to gas valve alarm will appear.

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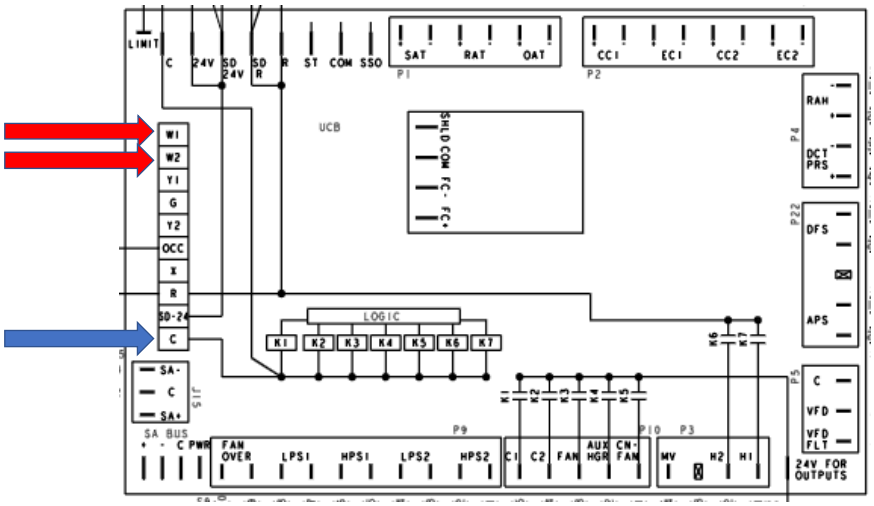
Checking 24 VAC to the SSE board



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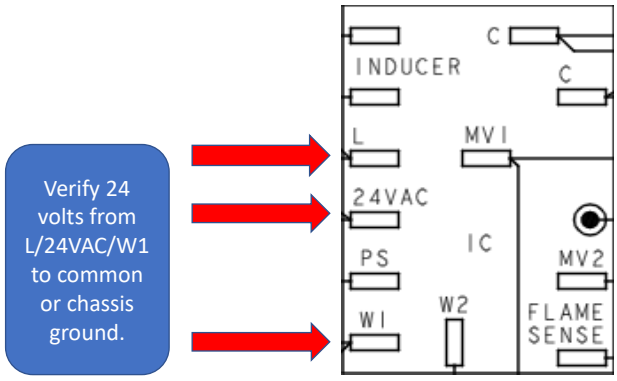
Checking 24 Volts to Ignition Module to Common/Ground



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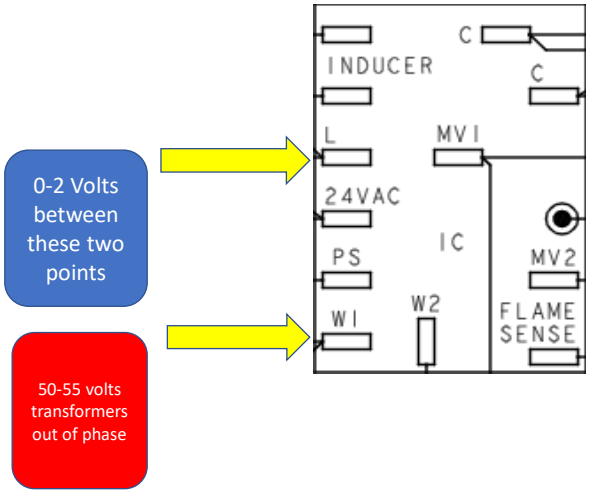
Checking Transformer Phasing L to W1



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Cooling

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Cooling Lockout due to Low Pressure

- Depending on cooling stages there could be a LPS1,LPS2,LPS3,LPS4 alarm.
- LPS 1 and LPS 2 will land on the main SSE board.
- LPS 3 and LPS 4 will land on an expansion module.
- Servicing each circuit will be the same.
- Once the stage is identified with the alarm verify 24 VAC thru the low-pressure switch assigned to that circuit.
- 24 VAC will leave the right pin and should return to the left pin.
- In no 24 VAC at the left pin determine if there is an electrical issue, refrigerant issue or airflow issue.
- Switch will open at 50 PSI (+/-5 PSIG) and close at 71 PSI (+/-5 PSIG). (R-410)

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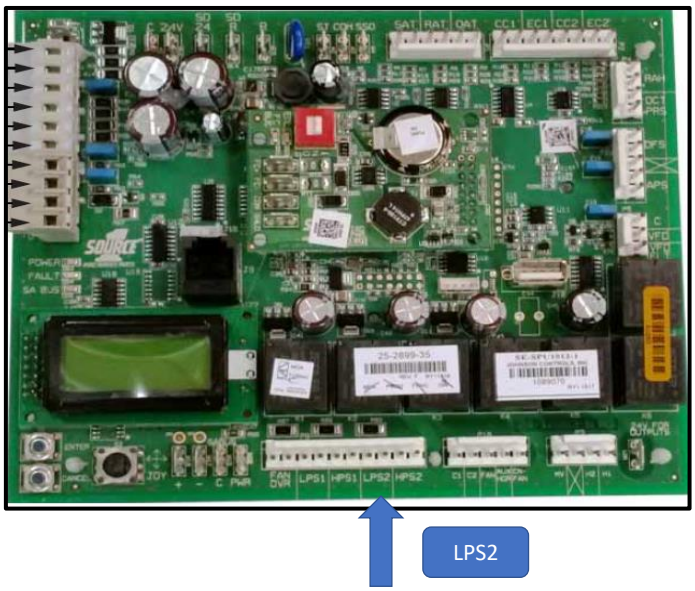

34

C3 locked out due to low pressure

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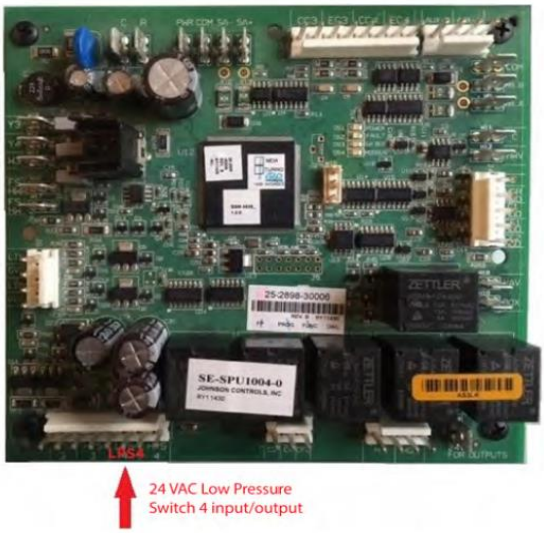
C4 locked out due to low pressure



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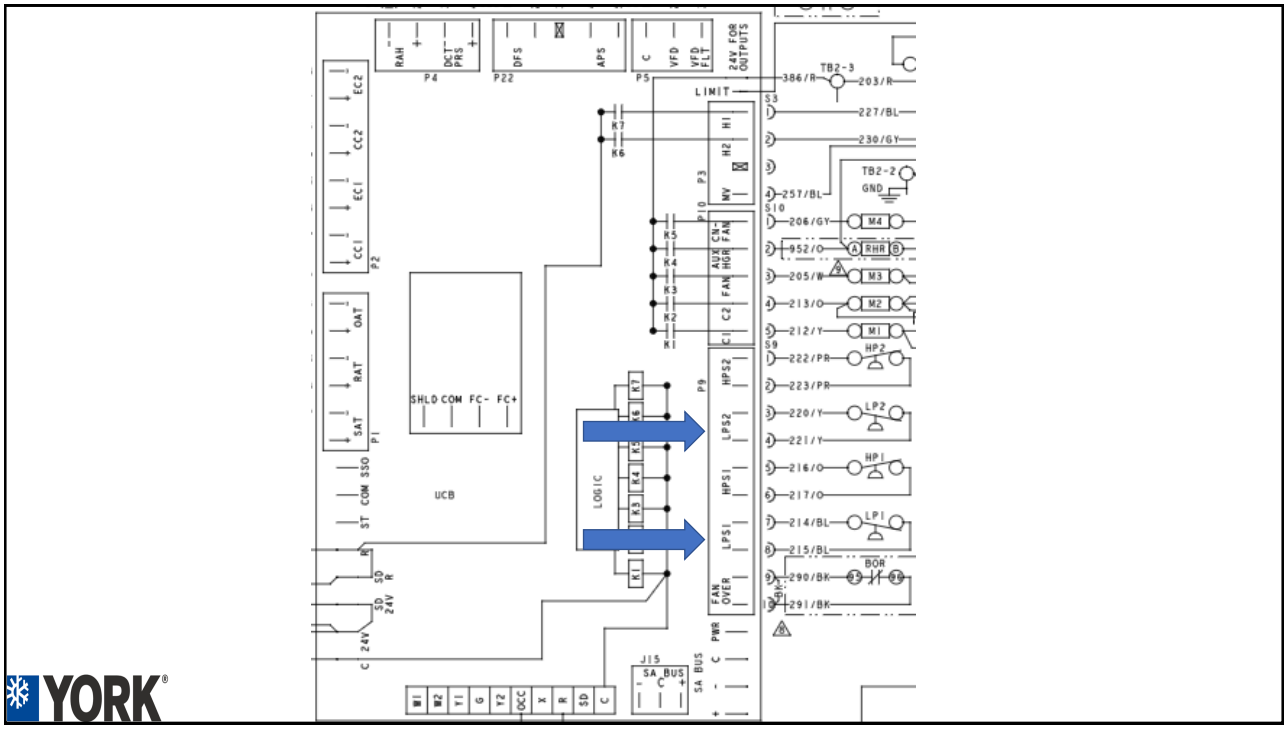
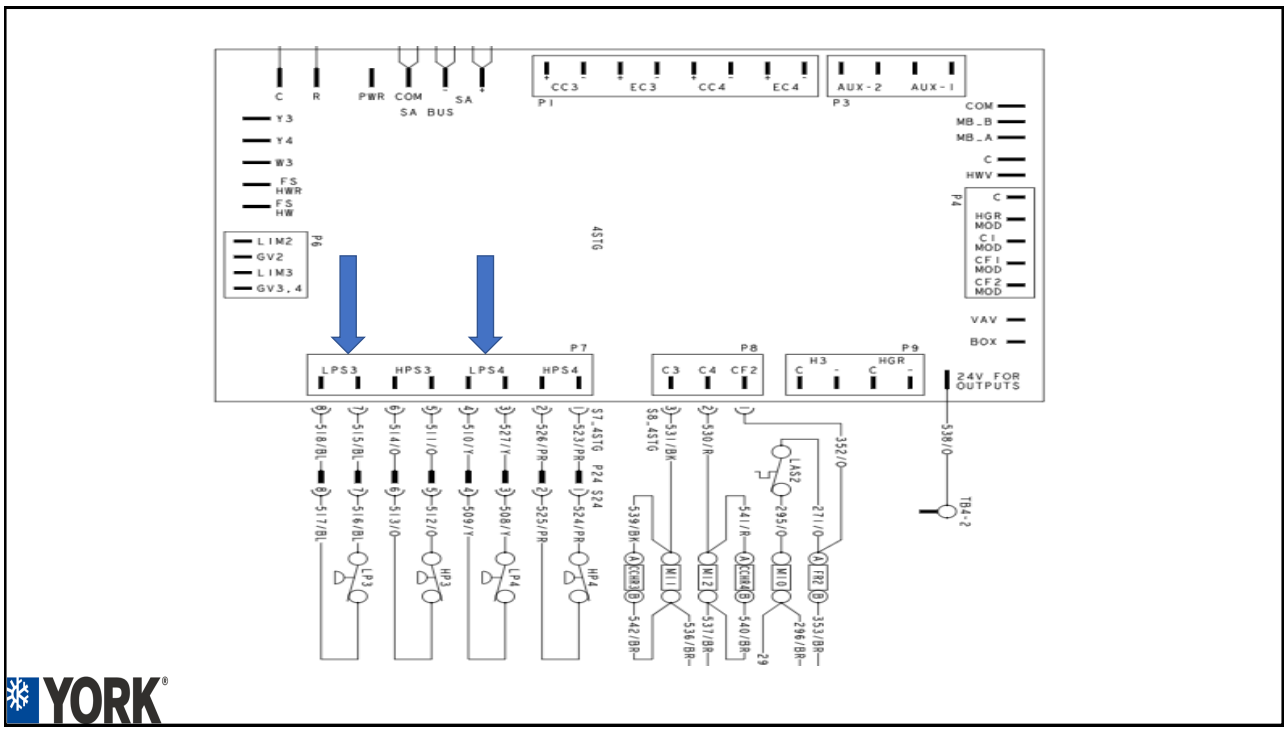

RAH
DCT PRS
P4
DFS
APS
P22
C
VFD
FLT
P5
24V FOR OUTPUTS
EC2
CC2
EC1
CC1
P2
OAT
RAT
SAT
P1
SHLD COM FC- FC+
UCB
ST COM SSO
SD R
SD 24V
C 24V
LOGIC
K7
K6
K5
K4
K3
K2
K1
P9
HPS2
LPS2
HPS1
LPS1
FAN OVER
PWR
J15
SA BUS
W1
W2
Y1
G
Y2
OCC
X
R
SD
C
LIMIT
S3
S10
S9
P3
P10
HI
M2
NV
CN-FAN
AUX HGR
FAN
C2
C1
TB2-3
386/R
203/R
227/BL
230/GY
TB2-2
GND
257/BL
206/GY
952/O
205/W
213/O
212/Y
222/PR
223/PR
220/Y
221/Y
216/O
217/O
214/BL
215/BL
290/BK
291/BK
M4
RHR
M3
M2
M1
HP2
LP2
HPI
LPI
BOR
YORK

37


C
R
PWR
COM
SA
SA BUS
CC3
EC3
CC4
EC4
P1
AUX-2
AUX-1
P3
Y3
Y4
W3
FS HWR
FS HW
LIM2
GV2
LIM3
GV3,4
P6
4STG
COM
MB_B
MB_A
C
HWV
P4
C
HGR MOD
CI MOD
CF1 MOD
CF2 MOD
VAV
BOX
P7
P8
P9
LPS3
HPS3
LPS4
HPS4
C3
C4
CF2
H3
HGR
24V FOR OUTPUTS
S7_4STG
P24
S24
S8_4STG
518/BL
517/BL
515/BL
516/BL
514/O
513/O
511/O
512/O
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525/PR
523/PR
524/PR
LP3
HP3
LP4
HP4
531/BK
530/R
539/BK
541/R
LAS2
352/O
295/O
221/O
530/O
TB4-2
536/BR
537/BR
540/BR
29
296/BR
353/BR
542/BR
YORK

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Cooling Lockout due to Low Pressure- Electrical Issues

- Switch contacts open or corroded.
- No 24 VAC leaving the right pin. Possible control volt issue
- Contactor coil with low resistance. Lowering the transformer control voltages.

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Cooling Lockout due to Low Pressure- Refrigerant Issues

- Leak in the individual circuit. Pressure is below 50 PSI.
- Metering device(TXV) issues.
- Economizer damper open allowing cool outside air with compressor running.
- Mechanical cooling with low loads. No Low Ambient devices installed or not set up correctly.
- Circuit has the correct charge. May have to recover and weigh in amount from nomenclature chart or use pressure/temperature charts and superheat/subcooling charts.

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Cooling Lockout due to Low Pressure-Airflow Issues

- Dirty filters and/or coil.
- Broken belts.
- VFD commands to the motor not correct.
- Duct static issues (VAV style units).
- Incorrect motor sheave adjustment(s).
- Closed manual or fire dampers.
- Low return air temperature.

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Cooling Lockout due to High Pressure

- Depending on cooling stages there could be a HPS1,HPS2,HPS3,HPS4 alarm.
- HPS 1 and HPS 2 will land on the main SSE board.
- HPS 3 and HPS 4 will land on an expansion module.
- Servicing each circuit will be the same.
- Once the stage is identified with the alarm verify 24 VAC thru the high-pressure switch assigned to that circuit.
- 24 VAC will leave the right pin and should return to the left pin.
- In no 24 VAC at the left pin determine if there is an electrical issue, refrigerant issue or airflow issue.
- Switch will open at 625 PSI(+/-25 PSIG) and close at 500 PSI (+/-25 PSIG). (R-410)

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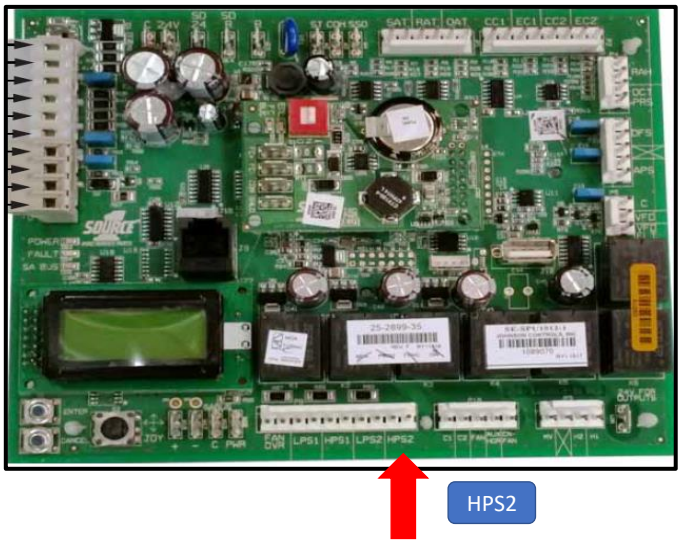
43



44

C3 locked out due to high pressure

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45

C4 locked out due to high pressure

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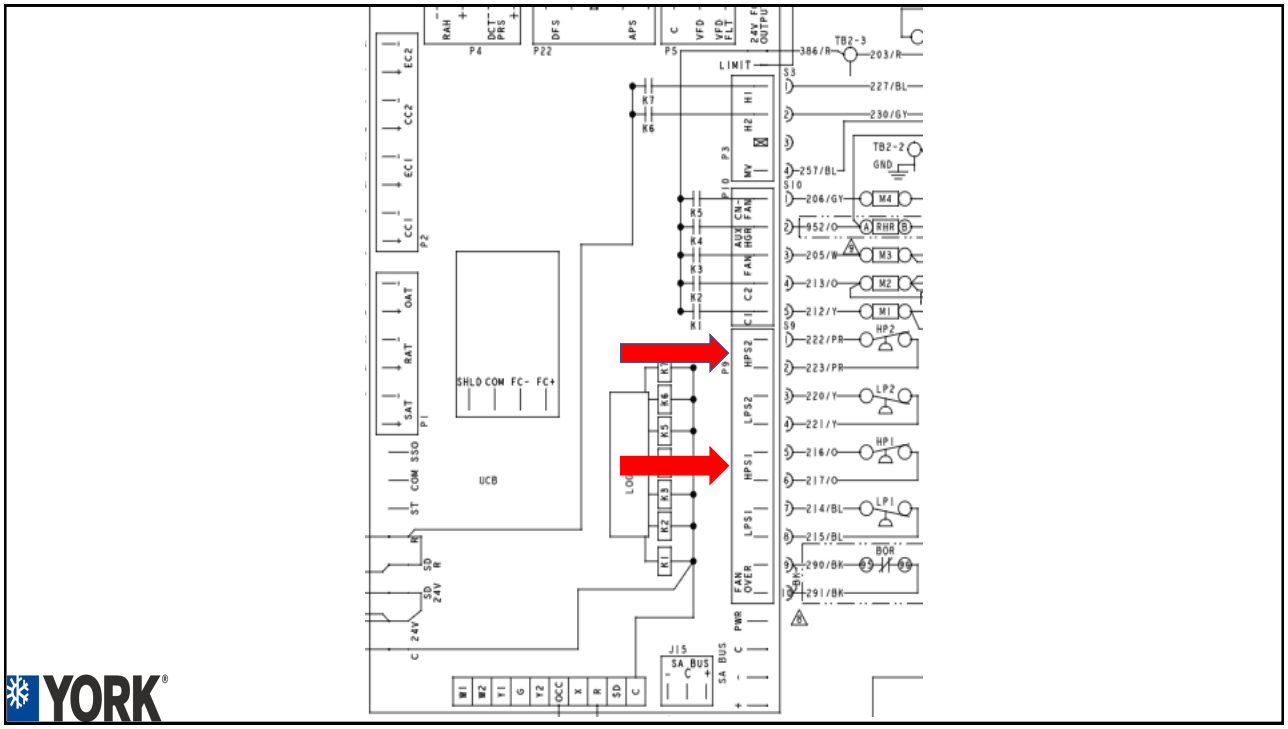
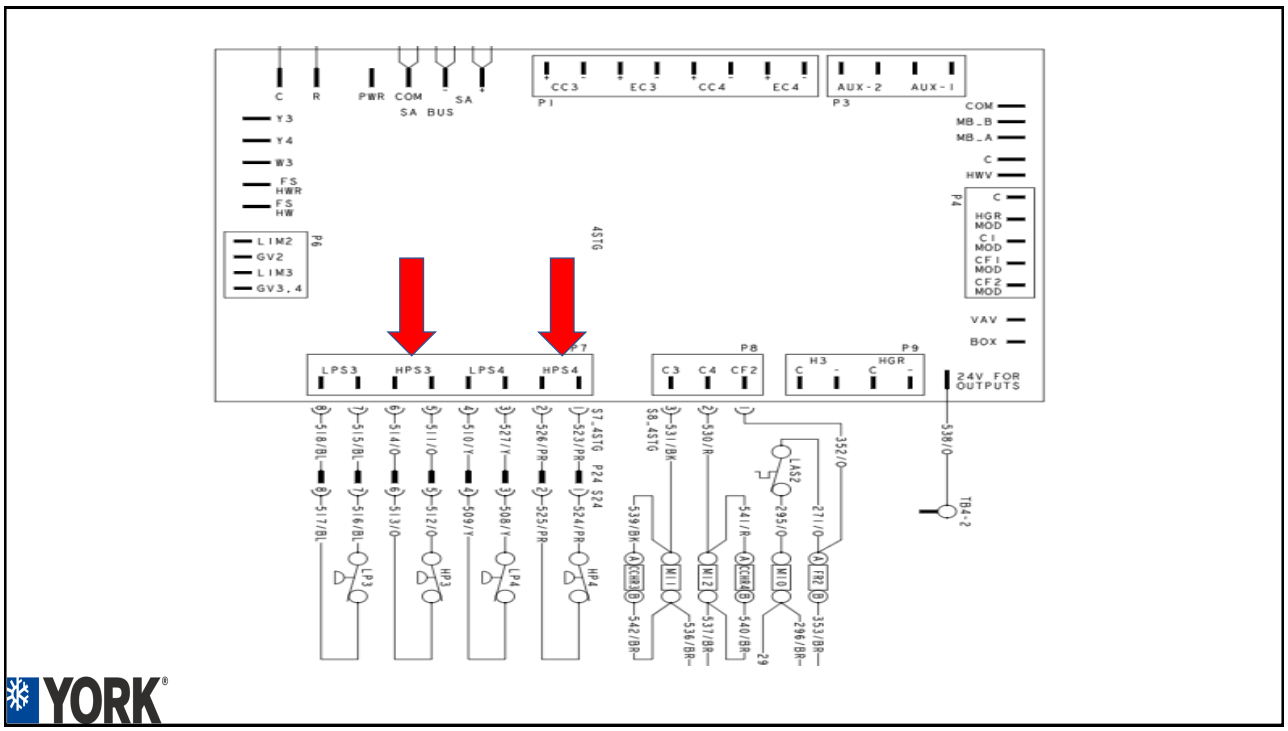
46


P4
P22
P5
TB2-3
386/R
203/R
LIMIT
S3
227/BL
230/GY
TB2-2
GND
257/BL
S10
206/GY
952/O
205/W
213/O
212/Y
S9
222/PR
223/PR
220/Y
221/Y
216/O
217/O
214/BL
215/BL
290/BK
291/BK
P2
P1
P3
P10
P8
UCB
SHLD COM FC- FC+
OAT
RAT
SAT
ST COM SSO
SD R
SD 24V
24V
C
R
PWR
COM
SA
SA BUS
J15
W1
W2
Y1
G
Y2
OCC
X
R
SD
C
M4
M3
M2
M1
HP2
LP2
HP1
LP1
BOR
K1
K2
K3
K4
K5
K6
K7
K8
HPS2
LPS2
HPS1
LPS1
FAN OVER
PWR
SA BUS

47


C
R
PWR
COM
SA
SA BUS
CC3
EC3
CC4
EC4
P1
AUX-2
AUX-1
P3
Y3
Y4
W3
FS HWR
FS HW
LIM2
GV2
LIM3
GV3,4
P6
4STG
P7
LPS3
HPS3
LPS4
HPS4
P8
C3
C4
CF2
P9
H3
HGR
24V FOR OUTPUTS
COM
MB_B
MB_A
C
HWV
P4
C
HGR MOD
CI MOD
CF1 MOD
CF2 MOD
VAV
BOX
518/BL
517/BL
515/BL
516/BL
514/O
513/O
511/O
512/O
510/Y
509/Y
527/Y
508/Y
526/PR
525/PR
523/PR
524/PR
S7_4STG
P24
S24
S8_4STG
531/BK
530/R
539/BK
541/R
540/BR
537/BR
536/BR
542/BR
LAS2
295/O
352/O
271/O
296/BR
353/BR
530/O
TB4-2
LP3
HP3
LP4
HP4
M11
M12
M10
FR2
ECM1
ECM2

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Cooling Lockout due to High Pressure- Electrical Issues

- Switch contacts open or corroded.
- No 24 VAC leaving the right pin. Possible control volt issue
- Contactor coil with low resistance. Lowering the transformer control voltages.

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Cooling Lockout due to High Pressure- Refrigerant Issues

- Verify condenser coil is clean. **Indoor coil for a heat pump is the condenser in the heating mode.**
- Check operation of the condenser fan motor(s)
- If the system is a split, verify solenoids are opening.
- System over charged. A clogged liquid line drier would appear to be an under charge and charge was added.
- Confirm TXV operations.

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Cooling Lockout due to Freeze Protection

- Each cooling circuit has an evaporator coil thermistor. EC1,EC2,EC3,EC4
- Thermistor is installed either at the evaporator coil or the suction line near the compressor. Location dependent on model.
- Factory setting is 26 degrees.
- Range is 20 to 32 degrees.
- Confirm sensor value thru SSE board/Resistance Charts/VDC charts.
- Compare to actual temperature at coil or suction line.

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Cooling Lockout due to Freeze Protection

- Verify operating pressures.
- Verify airflow. (350-400 CFM/ton)
- Verify clean filters and evaporator coil.
- Verify super heat and sub cooling. High super heat and low subcooling indicates low charge.

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EC1

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EC2

YORK

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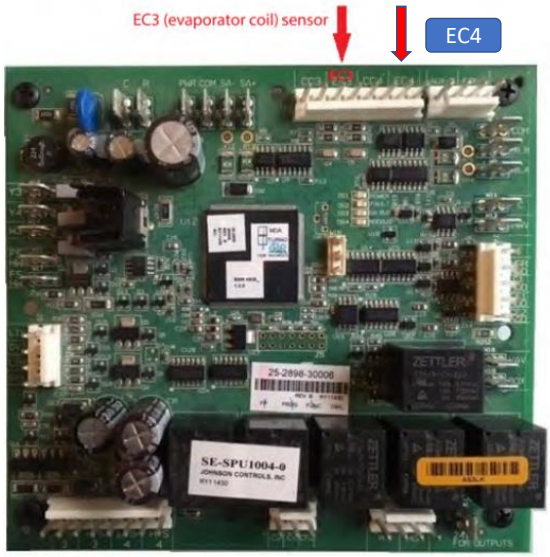
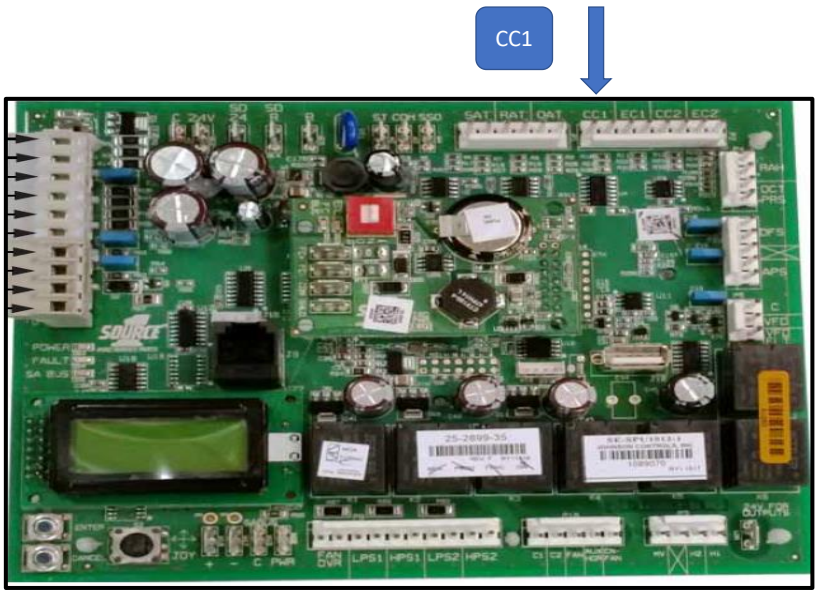


55

Condenser Coil Thermistors

- Coil thermistor CC1,CC2,CC3,CC4. CC1 and CC2 are the most common used.
- Used primarily on Heat pumps. Both Split and Package.
- Used for defrost initiation and termination.
- Location is on the outdoor coil. Usually on an end tube bend.
- Confirm sensor value thru SSE board/Resistance Charts/VDC charts.
- Used on units with the Fault Detection System.

56



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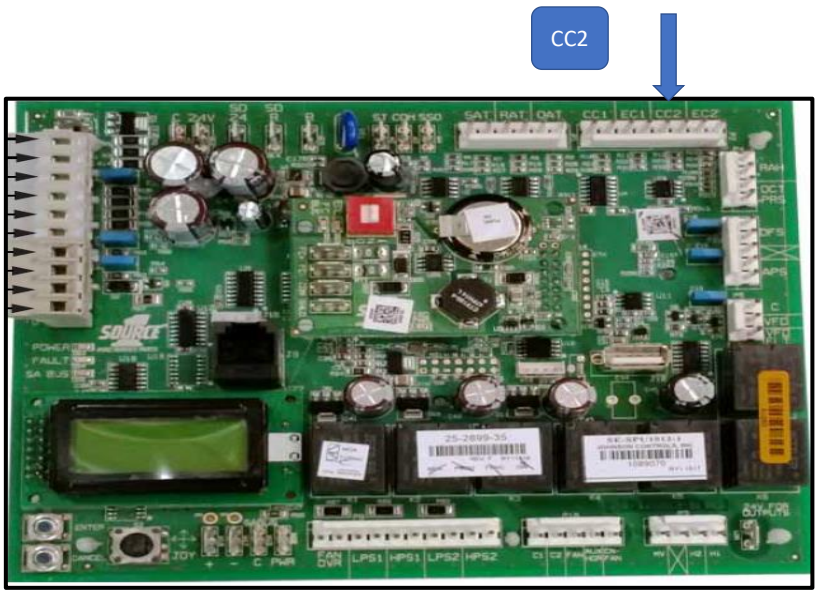

58

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Unit Lock Outs

60

Unit Locked Out Due to Supply Fan

- This alarm occurs when the SSE board doesn't have 24 VAC to the left pin of the FanOVR input. 24 VAC will leave the right pin and should return to the left pin.
- Circuit is wired thru a motor starter overload or jumped out in cases of equipment with VFDs.
- Some larger Millennium units with Danfoss VFDs have the VFD shutdown circuit connected to the FANOVR terminals.
- If FanOVR is on the same circuit as the shutdown ,there may also be SD,FanOVR,LP,HP alarms too.

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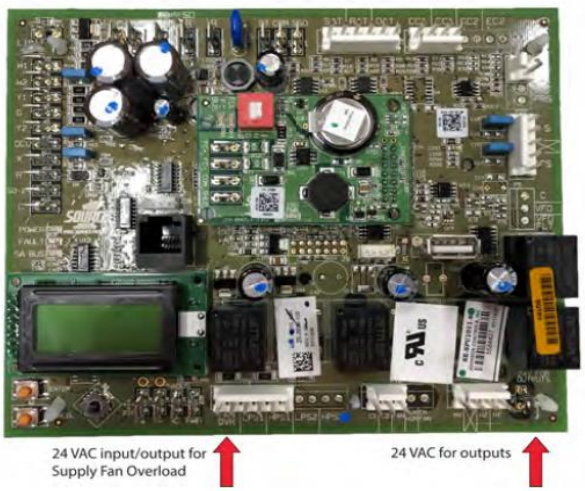
61

Unit locked out due to supply fan overload



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62

Unit Locked Out Due to Air Proving Switch

- APS Open
- The SSE board has APS terminals that output 24 VAC from the lower pin and looks for that 24 VAC to return on the upper pin.
- There are 3 setup options. None, Constant and Variable.
- Confirm correct wiring and set up. Constant is the setting for fixed variable. Variable is the setting for Variable Speed(VAV). None if no APS is required.
- Confirm fan control type is correct. We have seen this setting set to variable speed and the unit is a constant volume with a contactor or fixed variable with a VFD. The SSE board was looking for the input from the APS that wasn't in the unit.
- Confirm pressure tubing isn't kinked or restricted.

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63

Unit Locked Out Due to Air Proving Switch

- APS Closed
- 24VAC is landing on the upper pin with NO fan command
- Confirm volts to upper pin. No fan call should be 0 VAC
- Check for pinched, rubbed wires.
- Confirm tubing isn't blocked.
- Bad Transducer.
- The 4.0-4.1 glitch sometimes will trigger this. When the unit drops some of the parameters this will appear.

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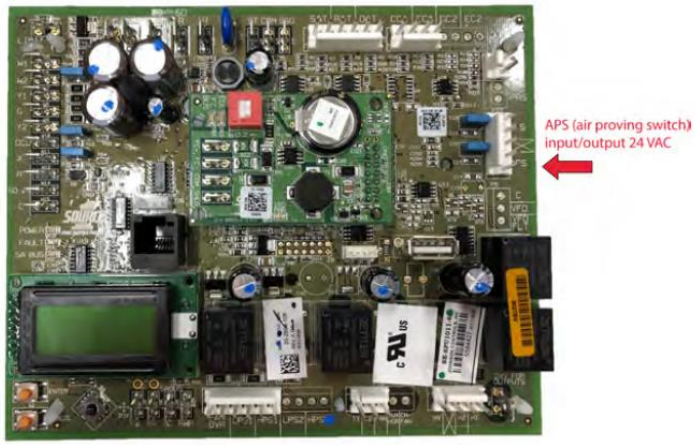
64

Unit locked out due to APS



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65

Unit Locked Out Due to Fan VFD Failure

Will only see this if there is a VFD installed

- Each manufacture(Mitsubishi/Delta) has a fault circuit.
- 24 VAC is sent to the VFD. If the VFD has a fault 24VAC is sent back to the VFD Fault terminal on the SSE board.
- This is how the SSE board knows the VFD is in a fault condition.
- Fault on SSE display will be VFD Failure. Need to retrieve fault code from the VFD.

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67

Unit Locked Out Due to Smoke

This alarm is present when the SSE board has no 24 VAC to the SD-R terminal

- If no voltage present at SD-R trace circuit to see where 24 VAC is lost.
- Voltage for this circuit is provided from the SD-24 terminal.
- SD-24 is powered by the control transformer thru internal trace in the SSE board.
- This alarm may cause other alarms such as economizer communication, 4 stage board communications, fan overload and sensor failures.

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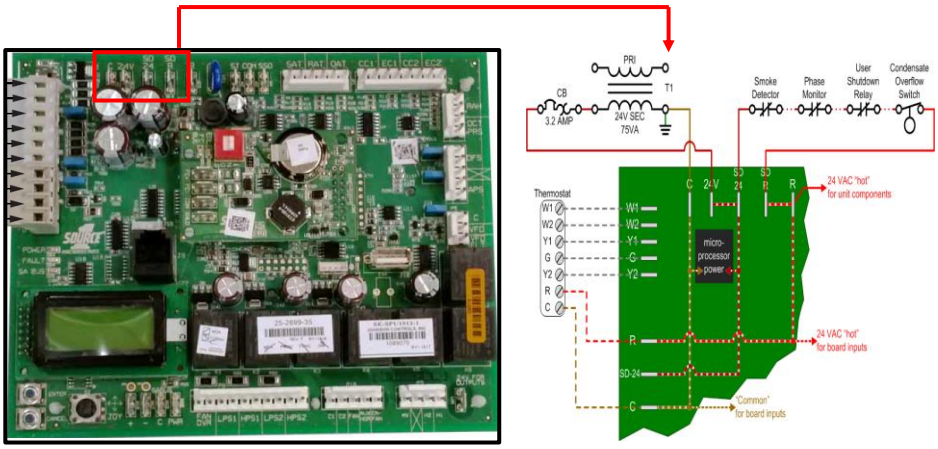

69

Nuisance Cooling Safeties Lockouts

- If experiencing an LPS,HPS or Low 24 for output volts alarm and all switches and circuits are intact a voltage droop could be responsible.
- This is caused by a coil of a contactor(s) that has a low resistance value.
- Resistance should be 7 ohms or higher.
- The further the reading is below 7 the more likely that device is part of the issue.
- When the SSE board powers the relay for the individual contactors and the resistance is low (below 7 ohms) a voltage droop will occur.

70

Nuisance lock outs of Cooling Safeties

- Sometimes the droop is faster than a meter can detect but the SSE board will pick this up.
- The first device it identifies where the droop happens is what the lock out will be. If the board recognizes the droop thru the LPS first, then that will be the lock out. If it recognizes the droop thru the HPS first, then that would be the lock out. And so on.
- If experiencing nuisance lockouts test all contactor coils resistance by de-energizing the unit remove the coil wires and test the resistance of the coil.
- Compressor contactors are the biggest culprits.

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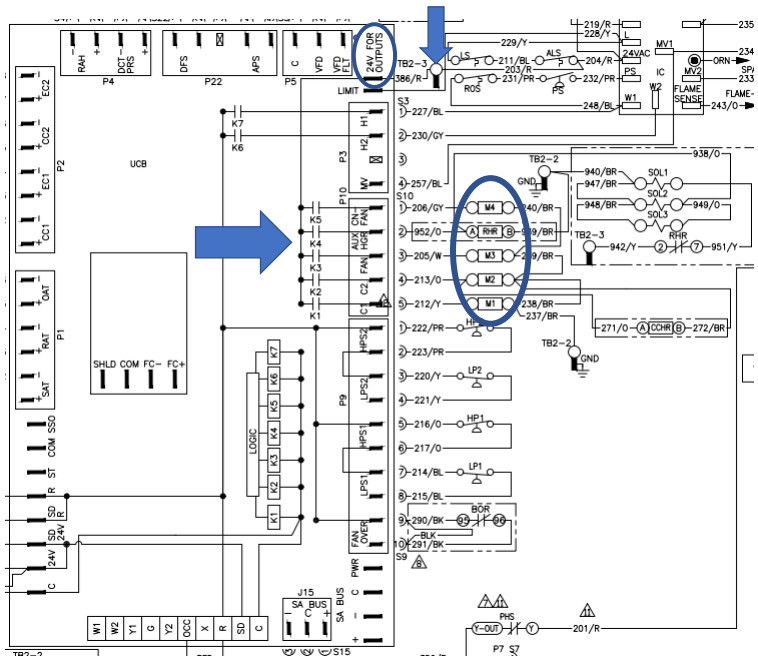

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Sensors

73

Sensors that are Connected to the SSE Board

- OAT
- RAT
- SAT
- EC1-4
- CC1-4
- All are 10k at 77-degree sensors. All have a VDC to temperature range too.
- Installed sensors are model dependent.
- Other sensors may be connected to the economizer module.
- OAT Temps can be influenced by sunlight and roofing material.

74

Sensors that are Connected to the SSE Board

- Diagnosing can be done in multiple ways.
- Viewing the value thru the SSE board.
- Details>Cooling>Sensors to find EC and CC sensor values
- Summary>Sensors>Operation Mode>OprOAT.
- Summary>Sensors>Sensor> SAT or RAT
- These are the paths using firmware versions 3.3 to current.
- Using a meter set to resistance. Unplugging the sensor from the board and comparing the resistance to the temp value.
- Using a meter set to volts DC. Leave the sensor plugged in and test between the 2 pins and compare VDC to the temp value.

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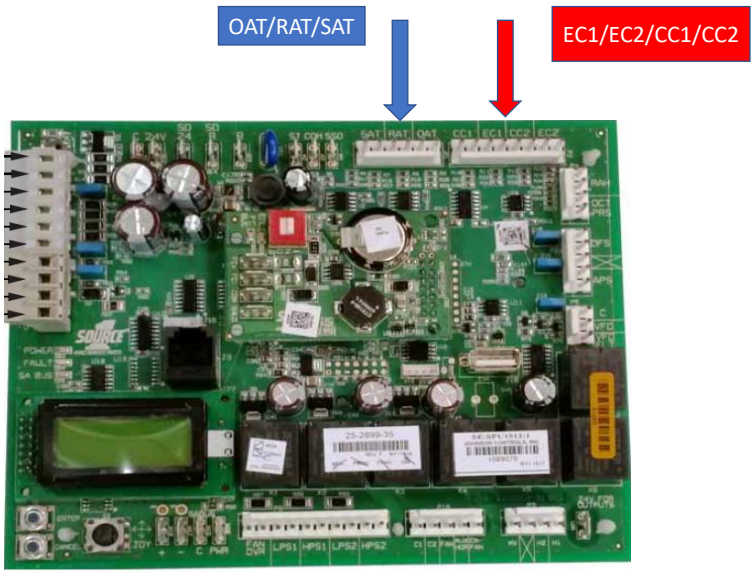

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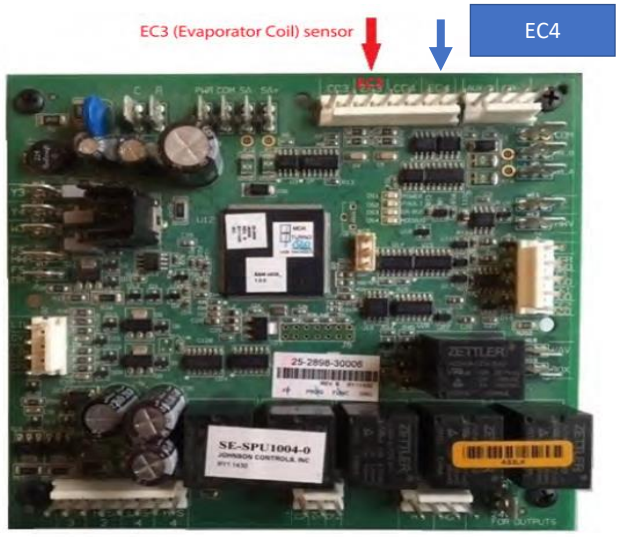

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Using Return Instead of Space Temp

- This is not an alarm but rather operational information.
- Will NOT see this if T-stat Only is set to yes.
- When T-stat only is set to no, the SSE board will look for the highest priority sensor that is connected to it.
- If there are no comm board/Net sensors/space temp sensors found, then RAT will be used. This message will appear.
- The order will be Comm board/SA Bus/ST input/RAT.

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Duct Pressure

- Pressure transducer is required in all VAV set ups. (Not Single Zone VAV)
- Unit will lock out if duct pressure that is transmitted back to the SSE board is below the minimum for 60 seconds or above the maximum. Adjustable time range is 0-600 seconds.
- These values can be read and adjusted thru the SSE board. Details>FanVFD>Setup>DctPrs-SP and Dctshutdown-Sp.
- Monitoring actual duct pressure can be viewed thru Details>FanVFD>Service>DctPrs.
- Ensure tubing to the transducer is correct. High port is connected to the supply duct. Refer to unit install manual for location recommendations. The low port is referencing atmospheric pressure. Outside of the unit cabinet.

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Duct Pressure

- Transducer needs 24 VAC.
- The duct static pressure reading is sent back to the SSE board as a VDC signal. 0-5 VDC.
- Verify the transducer has 24 VAC from + terminal to cabinet ground or common.
- Power the unit off and read the VDC between Com and out. It should be 0 VDC. Anything other than this is a faulty transducer.
- If transducer is correct verify probe placement and duct work.
- One cause could be when all the VAV boxes opening during morning start up. This will drop duct static.

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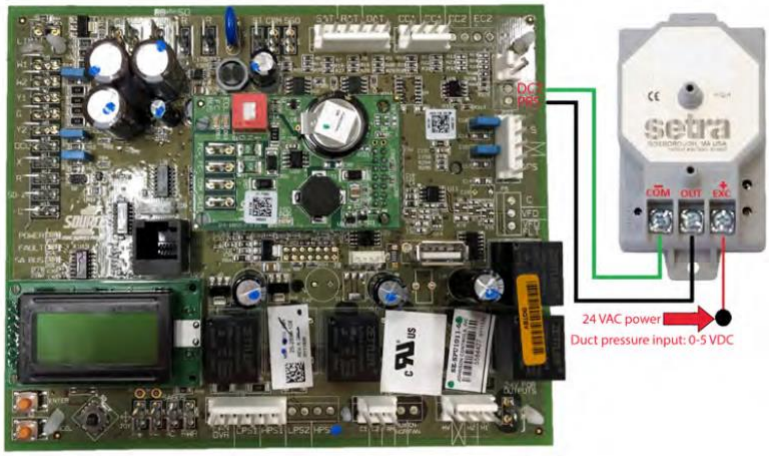
80

Testing the Sectra duct transducer



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SSE Processing Alarms

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Outputs Disabled Due to Low Input Voltage

- This alarm will occur when the 24 VAC for output terminal receives less than 20 VAC.
- Verify there is 24 VAC at the terminal with the wire landing on the board.
- If no 24 VAC trace circuit back towards the transformer to find where it is open. Possible low volt circuit breaker, transformer taps or wire integrity issue.
- Check phasing by reading VAC from the R terminal and the 24 VAC for output terminal. It should be 0-2 VAC if in phase. If reading @50 volts, transformers are out of phase.
- If power and phasing are correct then,
- Remove P10 plug to contactors/relays to see if alarm clears.

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Outputs Disabled Due to Low Input Voltage

- Remove the P3(H1/H2/MV) plug and see if alarm clears.
- If alarm clears with either P10 or P3 removed inspect the devices connected to that plug. Contactor/relay coil resistance.

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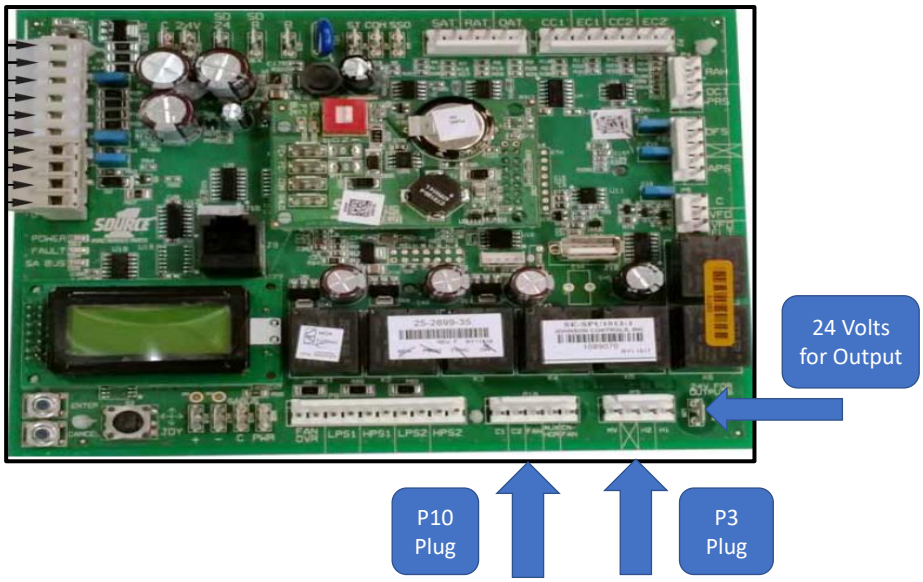

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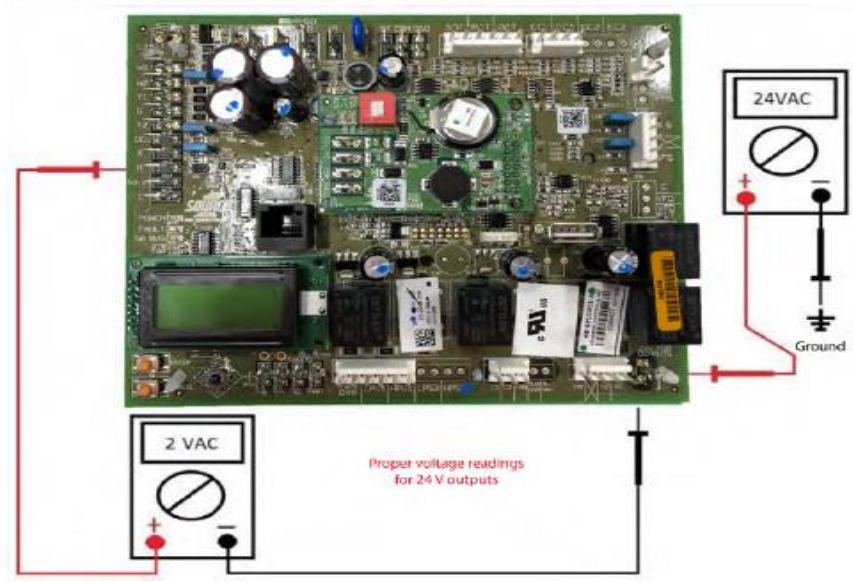
Checking the 24 V For Outputs terminal voltage



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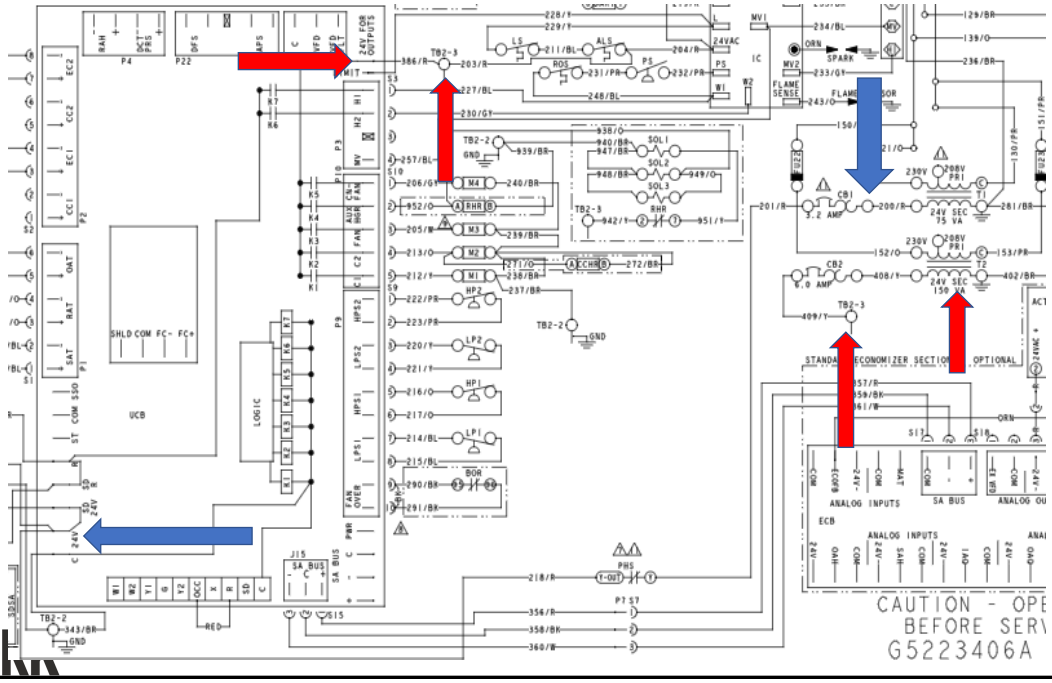


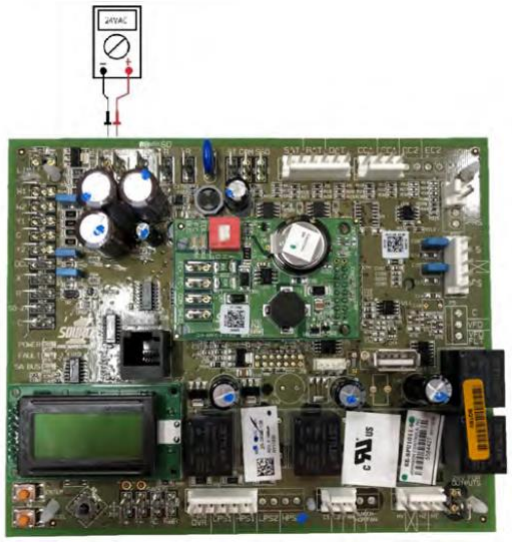
87

Outputs Disabled Due to Brownout Input Voltage

- This alarm will occur when 24 volts has dropped below 20 VAC at the 24V terminal.
- Check for proper volts at 24V and C.
- If not 20 volts or more verify transformer tapping is correct.
- Verify primary voltage to transformer.
- Faulty or open low volt circuit breaker.

88

Checking for 24VAC power at the 24V terminal



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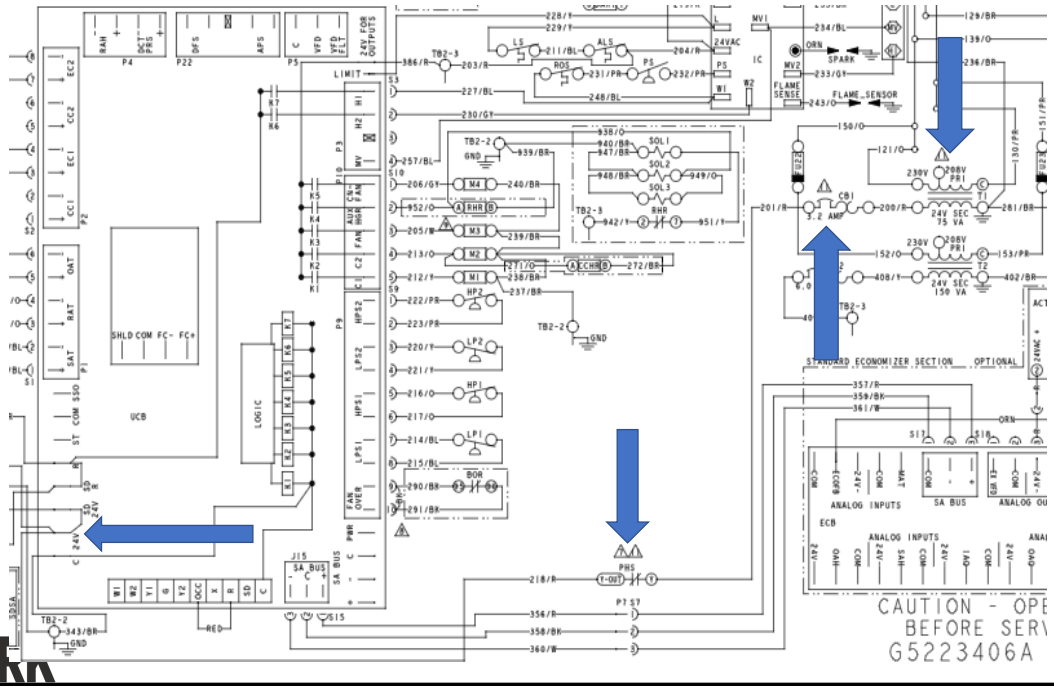

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Firmware Mis Match

- This alarm will occur if the SSE board firmware does NOT match the firmware in the economizer module, fault detection board or expansion module.
- Confirm the firmware versions thru:
- Controller>Firmware>UCB Main Version
- Controller>Firmware>Econ Main Version
- Controller>Firmware>FDD Main Version
- Controller>Firmware>4Stage Main Version
- All must match the SSE board's firmware version.

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Firmware Mis Match

- This happens on older units when the economizer module is replaced, and that firmware is different than the SSE board.
- Depending on the original SSE board's firmware it can be either updated to match the econ or the SSE board will have to be replaced with the economizer module.
- If diagnosing a bad econ,FDD,4 stage module confirming SSE firmware is recommended.
- 3.3 or higher upgrade just the firmware
- 3.2 and lower recommend a new SSE board with repair.

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Economizers

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Economizers

- Units with VFDs have sequences for minimum position.
- Low speed fan Min position and min position need to be confirmed.
- If low speed fan min position and min position are two different values, the damper may open to a value between those numbers.
- Logic in the SSE board will drive this. The board knows OAT, SAT and RAT and will adjust the min position per that logic.
- If a constant min position is required set both the low-speed fan and the min position to the same value.

94

Economizers

- The damper position can be confirmed thru the SSE board.
- Volts DC can be confirmed at the economizer module.
- The actuator command is 2-10 VDC output
- That is an 8-volt span.
- Multiply the % command x 8 then add 2 will get the VDC command
- Ex. 20% min position command would be (0.20x8)= 1.6(VDC) + 2 (VDC)= 3.6 VDC total output.

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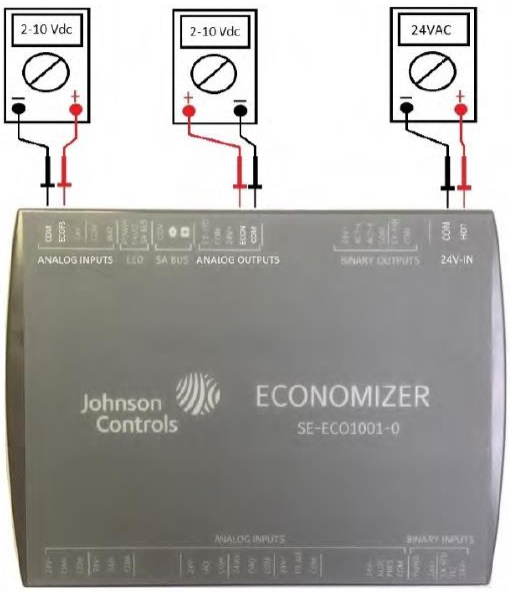
95

Calculating the economizer's expected voltage output



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Economizers Communication

- Verify S/A bus comm wires are plugged in correctly
- Model dependent there will be either one continuous wire harness from the SSE board to the econ module or factory wiring harness to a plug that the econ wiring harness connects too.
- Verify polarity off the plugs.
- If harness is correctly plugged in, then remove the harness and ohm it out. Replace harness if any wire is open.
- If harness is good unplug the SA bus harness at the econ module.
- Check VDC from C to SA-(0 to 1 VDC) and C to SA+(2.5 to 3.5 VDC)
- If not in these ranges replace the module.

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97

Checking the economizer board SA bus

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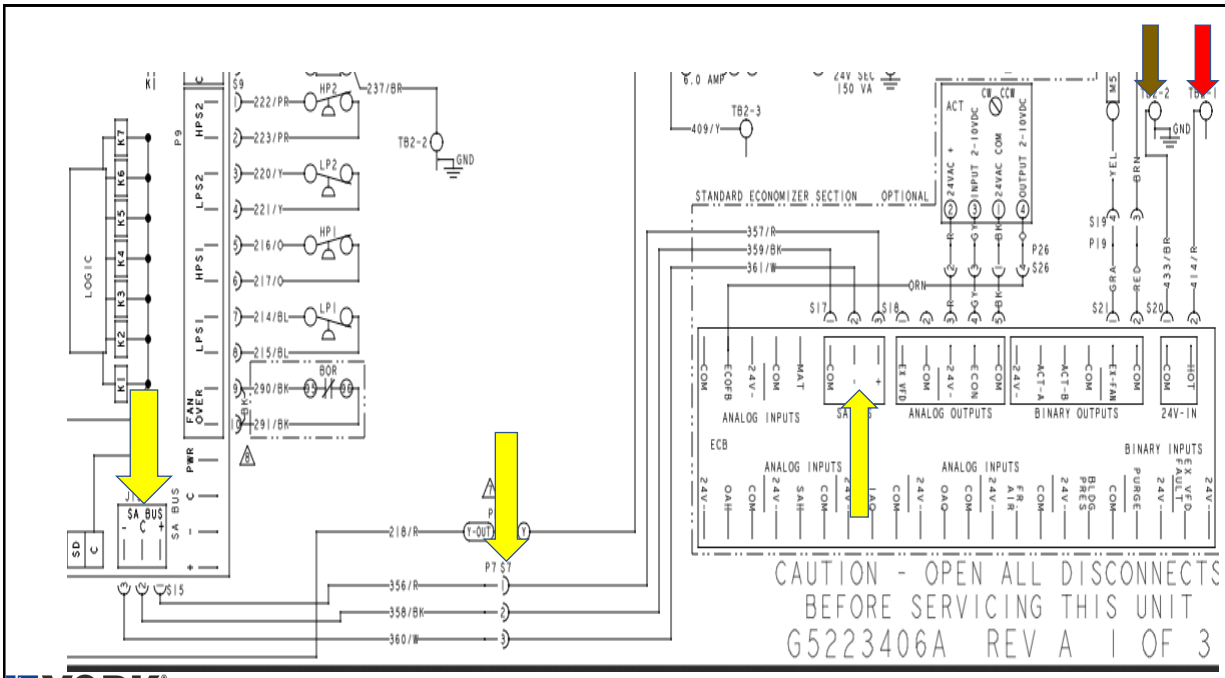
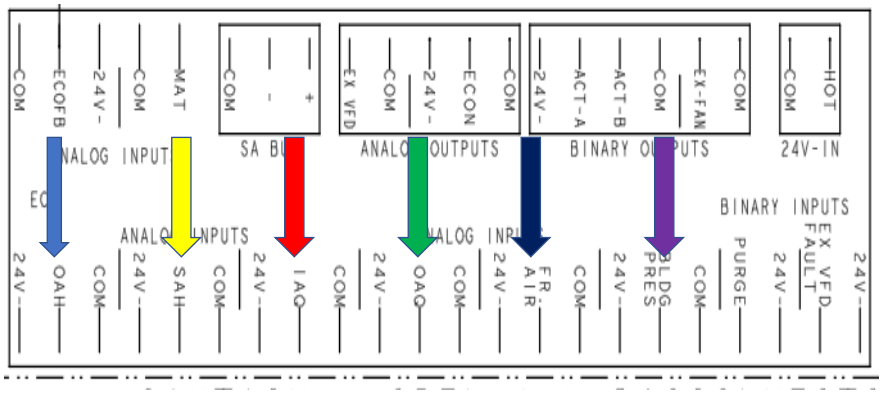


99

Economizers Communication

- Disconnect any inputs to the module such as humidity sensors, CO2 sensors, and the actuator.
- If one of these devices are shorted to ground or have failed , this can affect the SA bus communications.
- After disconnecting the components power cycle, the economizer module and re-check the SA bus voltages again.
- If not in range replace the module.

100



101

Cooling in mild weather

- The option B setting is using the SAT input to decide if compressor help with free cooling is required.
- If the SAT is at the 55-degree value(factory setting) then compressor(s) will not energize.
- If SAT is below the SAT setting the damper will modulate closed.
- If the SAT is above 55 degrees and damper is 100% open, then compressor help is allowed.
- In cases where the SSE board will not bring on the compressors with a call for cooling and the economizer damper is 100% open. Here are some things to confirm and try:

102

Cooling in Mild Weather

- Disable the economizer thru the SSE board. Details>SetUp>Econ>Econ-En. Get a call on Y1 and Y2. If compressors start, then an economizer logic is the culprit.
- Verify in the Economizer set up menus the EconMech Set up is on Option B (factory default). Details>Econ>SetUp>EconMech-Stp.
- Thru the SSE board view the SAT value. Summary>Sensors>Sensors>SAT
- Thru the SSE board view the Cooling Supply Temp Upper and Lower Temp Settings. Details>FanFVD>SetUp>SAT>Up-Sp and SATLo-SP.

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Cooling in Mild Weather

- With an Y1 call dampers will modulate to get the SAT to within 5 degrees of the SAT Upper set point
- With an Y2 call the damper will modulate to get the SAT within 5 degrees of the SAT lower set point.
- Compressors will be held off unless the SAT temperature is 5 degrees greater than the Lower SAT temperature setting. The damper will have to be 100% open for 5 minutes as well. Compressor staging will be every 5 minutes while the damper is at 100%.

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Cooling in Mild Weather

- To get mechanical cooling on with economizer cooling the lower SAT set point needs to be set to at least 5 degrees lower than the actual SAT temperature value.
- Keep in mind there may be excessive SAT shutdowns due to the fact there is colder air from the economizer and mechanical compressors running at the same time.

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Bypassing the VFD

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Temporarily By Passing the VFD

- **Temporary VFD Bypass (3 Phase Equipment ONLY)**
- On the chance that there is a VFD failure, and you need to have the unit operating while a replacement VFD is being ordered, there is a way to bypass the VFD safely.
- ***DO NOT USE THE VFD TERMINALS AS A JUNCTION POINT!*** *It is possible that you could damage the SSE control board if the main power is connected to the U V or W terminals of the VFD.*
- ***This will only work on 3-phase equipment. There are models that are single phase but have a 3- phase motor and VFD.***

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Temporarily By Passing the VFD

- Disconnect power; lock out and tag out.
- You will need to get a 3-pole contactor with a 24-volt coil and mount it near the fan motor; remove the wires that feed power into the VFD drive and connect them to the **line side** of the contactor.
- Remove the 3 motor leads from the VFD drive that feed power to the motor and connect them to the **load side** of the contactor
- Remove the wire on the VFD relay coil and connect it to the one side of the contactor coil and connect a wire from the other side of the contactor coil to Common on the SSE board.
- Re-connect power, make a call for fan and check rotation of fan motor to ensure it is correct, if not reverse leads accordingly.

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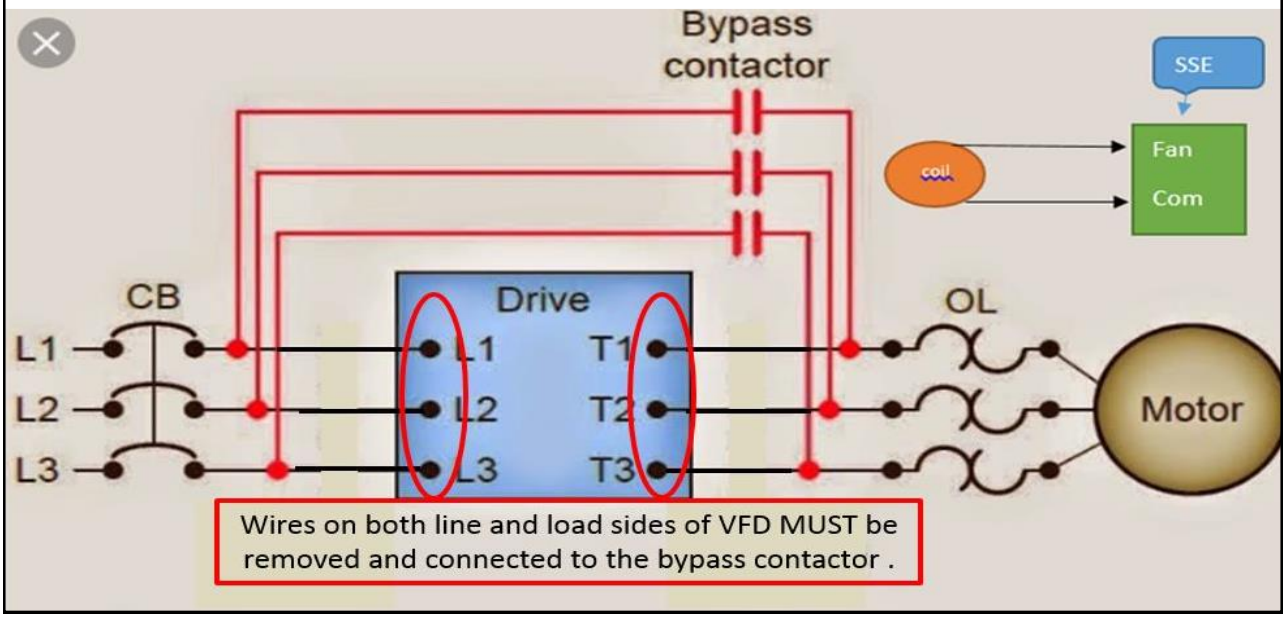
Temporarily By Passing the VFD



109

C1= Compressor #1 Contactor Output
C2= Compressor #2 Contactor Output
Fan= Fan Contactor Output or Signal to VFD Relay
AUX HGR= Hot Gas Re-Heat Output. Only on Magna Dry Units (ZR series)
Cn-Fan= Condenser Fan Contactor Output
24 VAC

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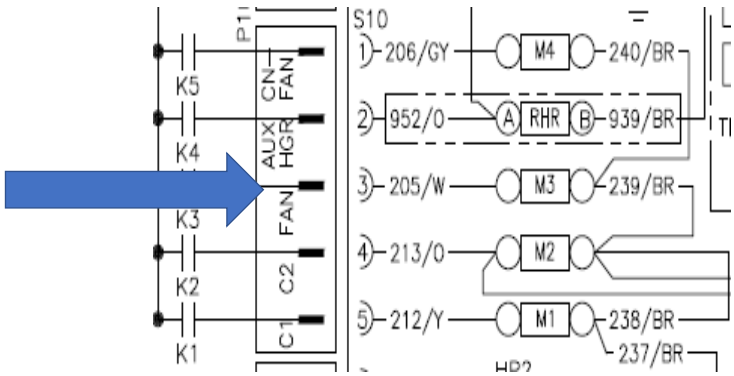

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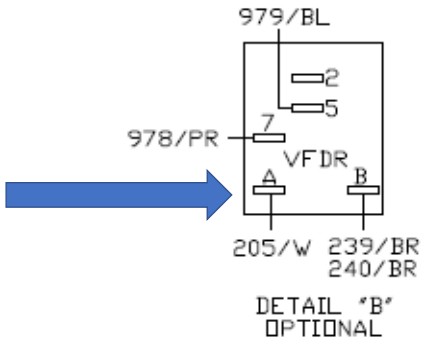

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Temporarily By Passing the VFD

- **NOTE:** Failure to connect the contactor coil can create issues with operation especially in a heat pump system. The compressors have a minimum run time of 3 minutes so if you have the fan connected to G and someone turns the stat up and then down the fan will stop running but the compressor/s will continue to run until the 3-minute timer lapses, and you could have an inadvertent HP trip due to the head pressure rising due to no fan operation. Use a contactor based on the fan motor amp rating, a 20-amp contactor should work in most situations.

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Thank You

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