

Bluetooth Module

The Bluetooth module used with Carrier Service Tech App can collect recent fault codes, monitor system operation, and update software. The Bluetooth module is connected to the PCM via a wire harness mounted on the bottom horizontal section of control panel and is centered over the plastic insert to maximize transmission range of module. See appropriate fault code description for Bluetooth Module related faults. If unsuccessful with pairing while fault is not active, see service app for troubleshooting.

DIAGNOSTIC CODES AND TROUBLESHOOTING

Code 13-53 System Control Upgrade Strongly Recommended

Code 13-82 System Control Upgrade Recommended

Code 13-53 indicates that the system control is sufficiently out of date that the equipment will operate and that it is likely that the homeowner will take notice of sub-optimal behavior.

Code 13-82 indicates that the system control is out of date and should be upgraded to take full advantage of the features and functionality of the equipment system.

To correct codes 13-53 or 13-82, upgrade the system control to the latest version available.

Code 14-94 Line Voltage Low

Low line voltage may result in increased electronic component temperatures and shorten the life of VFD. Since control voltage is based on line voltage, solenoids and relays may not pull in and hold correctly as well. "Line Voltage Low" fault is set when incoming line voltage drops below 180V AC RMS at any time, or when line voltage drops below 185V AC RMS for more than 5 seconds. Once line voltage increases above 187V, the fault will clear. While fault is active unit will not operate or will shut down if already running. This fault does not escalate to a malfunction.

This measurement is taken at the secondary side of 24V transformer and a scaler value applied at the factory to correct for transformer variation.

Technician should first measure incoming line voltage at terminal block. Second, check tightness of all line voltage connections. Loose connections can cause excessive voltage drop and trigger this fault. If all connections are tight and line voltage is still low, additional steps involving the local power utility or addition of external power conditioner may be required.

Code 15-94 Line Voltage High

High line voltage may result in increased stress on electronic components and shorten the life of VFD. "Line Voltage High" fault is set when incoming line voltage rises above 285V AC RMS at any time, or when line voltage rises above 280V AC RMS for more than 5 seconds. Once line voltage drops below these thresholds the fault will clear. While fault is active unit will not operate or will shut down if already running. This fault does not escalate to a malfunction.

This measurement is taken at the secondary side of 24V transformer and a scaler value applied at the factory to correct for transformer variation. Technician should first measure incoming line voltage at terminal block using VOM. If voltage reading is below 285 VAC RMS, perform voltage calibration steps using service app. If VOM measured voltage is above 280VAC RMS, additional steps involving the local power utility or addition of external power conditioner may be required.

Code 17-06 Lost BTM Communication

The Bluetooth module used with Carrier Service Tech App can collect recent fault codes, monitor system operation, and update software. The Bluetooth module is connected to PCM via wire harness and is mounted on the bottom horizontal section of control panel and is centered over the plastic insert to maximize transmission range of module. After unit power up, the Bluetooth module will send periodic messages to PCM which confirm the status of module. If 2 consecutive minutes of messages are missing, code 17-06 will become active. Code 17-06 will clear when a single good message is received by PCM. If this fault is active, inspect PCM to Bluetooth module harness and ensure both ends are fully seated on board header. Also inspect and repair any wire

damage on harness. If no green or red led is present on the Bluetooth module, disconnect harness at the Bluetooth module and check for 18-30 VAC between pins 1 and 3 at the Bluetooth module connector end of harness. If voltage is present and code is active, replace Bluetooth module. An active code 17-06 will not affect system operation in any way except the service tool app will not connect to unit. If code is cleared and service app is not able to connect to Bluetooth module, follow troubleshooting steps in service app.

Code 18-11 Indoor Coil Freeze Protection

Code 18-11 indicates that the equipment is reducing compressor speed compared to the requested capacity demand in an effort to prevent ice accumulation on the indoor coil. The PCM monitors the saturated suction temperature at the compressor, and when the saturation temperature approaches 32°F, the compressor speed is reduced until the saturated suction temperature is above 32°F. If the compressor speed reduction is not able to achieve a saturated suction temperature above 32°F then it will continue to operate until either demand is removed or a 32-15 occurs.

Code 18-11 has been activated in PCM software versions 5.0 and above. This fault is not active in PCM software versions less than 5.0

Code 18-11 can be caused by insufficient airflow across the indoor coil due to a dirty filter or restrictive ductwork. Code 18-11 can also be caused by insufficient refrigerant charge in the system. Check the indoor equipment for excessive static air pressure and check refrigerant charge levels to correct this fault.

Code 24-58 5V PCM Power Out of Range Lockout

The PCM supplies 5V DC to VFD through the communication harness to power low voltage IC's (pin 4 of 6 pin wire harness). If this voltage is interrupted the VFD will cease to communicate with PCM. The PCM will continue to operate for a short period of time in case this interruption is intermittent, but if the voltage is not restored the system will shut down and declare code 24-58. The fault will clear once 5V DC is restored to VFD via PCM communication harness. The 5VDC on communication harness is shared with 5VDC powering pressure transducers.

When code 24-58 is active disconnect PCM to VFD communication harness and measure voltage between pin 3 (GND) and pin 4 (+5V DC) at the VFD connection end. If voltage is present, reconnect harness, power cycle, and check if fault is still present. If so, VFD will require replacement. If voltage is not present at VFD end of harness, check for voltage at the PCM header. If voltage is not present there, Disconnect all other sensors from PCM until fault is cleared. Whichever sensor is disconnected that makes fault disappear should be inspected for damage, likely a short exists in the harness. Once all sensors are disconnected and fault is present, confirm 5VDC is not present on PCM board, if not then replace PCM.

Code 25-22 Model Plug Missing

Code 25-62 Model Plug Missing Lockout

The Model Plug Missing Fault and Malfunction indicate that a model plug is not presently installed on the PCM or was not present when power was applied to the equipment. If a valid model plug has previously been installed, the PCM will have the most recently installed model plug value stored in memory.

Code 25-22 indicates that a valid model plug value is present in memory, but a model plug is not currently installed. If a Code 25-22 is active, the equipment will operate properly provided that the model plug value in memory corresponds to the equipment model. To clear Code 25-22, remove power from the equipment, install the model plug corresponding to the equipment model, and reapply power to the equipment.

Code 25-62 indicates that a valid model plug was not present when the equipment was powered up, and there is no valid model plug value stored in PCM memory. If a Code 25-62 is active, the equipment will not operate. The PCM will not acknowledge a new model plug installation while power is applied to the equipment. To clear Code 25-62, remove power from the equipment, install the model plug corresponding to the equipment model, and reapply power to the equipment. Code 25-62 can only be cleared by having a valid model plug installed when power is applied to the equipment.

Code 25-24 Model Plug Changed

Code 25-24 indicates that the model plug presently installed is different from the previously stored valid model plug value. Code 25-24 will be set when the equipment is powered up with a valid model plug value that is different from the stored model plug value in memory. A changed model plug will affect control configuration only if that model plug was present when power was applied to the equipment. Code 25-24 will be set if the model plug is changed to a different valid value or an invalid value while power is applied to the unit. If the model plug change is intentional, then no corrective action is required. Leave the new model plug in place and the code will clear on its own when power is removed and reapplied to the equipment. If the model plug change is not intentional, then remove power from the equipment, install the correct model plug, and reapply power to the equipment.

Code 25-61 Invalid Model Plug Lockout

Each system requires a model plug to be installed on the PCM. The model plug consists of two resistors in a unique combination. This model plug identifies the system size and type so PCM software can apply the relevant operating limits and reference correct operating tables. Code 25-61 designates the currently installed model plug is not valid and does not match any possible model in variable speed software. Consult unit installation instructions for model plug to unit model cross reference and replace model plug with correct part. While Code 25-61 is active, the unit will not be operable.

Code 25-63 VFD System Lockout - Model Mismatch

This code is generated when the sensed physical model plug is recognized but not compatible with the installed VFD. Check installed model plug against table in installation instructions for the model being serviced. Replace with correct VFD or model plug part.

Code 26-26 PCM MCU Old Version A

This fault is set when the PCM microcontroller on installed board is recognized as old. This board should not be used in the field and should be returned to Carrier for warranty replacement.

Code 26-27 PCM Reprogramming Failure

Code 26-27 indicates that an attempt for the PCM to reprogram itself failed. If this diagnostic is not recent, then a subsequent reprogramming attempt may have succeeded. The technician should check the current PCM software version against the latest software release. If the PCM software is not the most current, then the PCM should be reprogrammed manually using the Infinity Control or the Carrier Service Tech App.

Code 26-31 External EEPROM Write Failure

The PCM stores equipment configuration information in non-volatile EEPROM memory. An active Code 26-31 can be corrected only by replacing the PCM.

Code 28-71 Fuse 1 Open Lockout

This code will be set if fuse 1 is blown or missing on PCM board. Fuse 1 powers PEV, RVS, and Bluetooth module. When fuse 1 is open none of these components will function. AC units will operate if pressure differential is below the maximum allowable starting threshold (100psi), but HP units will not operate at all. The code will clear once short is removed and fuse is replaced with new, undamaged part. If fuse is blown there is a likely short in either the PEV, RVS, or Bluetooth module harnesses. If no physical damage is observed, begin by unplugging all components from PCM and make connections until replacement fuse opens. Harness should be repaired before replacing fuse. See wiring diagram for fuse size and location

Code 28-72 Fuse 2 Open Lockout

This code will be set if fuse 2 is blown or missing on PCM board. Fuse 2 only powers the LLS. When this fault is active the system will not operate. The code will clear once fuse is replaced with new, undamaged part. LLS are field installed accessories. Check LLS wiring for shorts. See wiring diagram for fuse size and location.

Code 31-11 Compressor High Pressure Limiting**Code 31-58 Compressor High Pressure Lockout**

This system contains a discharge pressure transducer to ensure compressor reliability. The high pressure limit is based on compressor model and varies with operating speed. When this fault occurs, the system will shut down and restart after 5 minute compressor protection time delay if demand is still present. Each time the fault occurs the maximum allowable compressor speed will be reduced by 25% until the minimum allowable compressor speed is reached. Each hour of compressor operation without fault re-occurrence will increase the compressor speed limit by 25%. This ensures that partial operation is still possible and system will self-correct if the issue causing fault is removed. Code 31-58 occurs when the compressor high pressure limit is reached while the compressor is at its minimum operating speed. System will "lock out" for 2 hours and attempt to resume normal operation afterwards. Multiple external factors may generate this fault: Dirty condenser, lack of airflow across condenser, condenser airflow recirculation, extreme high temperature and sun loading, refrigerant circuit blockage, faulty EXV/TXV, or overcharge.

Code 31-16 High Pressure Switch Shutdown

This system contains a 670psi high pressure switch as well as a discharge pressure transducer. This fault should not occur as the pressure transducer utilizes a separate high pressure limit at a lower setting. In the case of a fast transient this switch will safely disable system operation. This switch is connected directly to VFD and a break or short in wire harness during high pressure events will also generate fault. The high pressure switch quickly shuts down high voltage to VFD and additional communication faults may occur since the VFD will cease to communicate with PCM. The PCM/VFD will not attempt to resume system operation until discharge pressure has dropped below 425PSIG. Ensure HPS is closed and securely connected to VFD.

Code 31-19 High Pressure Disable

This fault is triggered when the discharge pressure is too high to start compressor (620psig). If refrigerant saturated pressure is high enough the system will be inoperable until pressures drop to acceptable range. Extreme high ambient temperatures may cause this fault to set and system will be inoperable during this time.

Code 32-15 Compressor Low Suction Shutdown**Code 32-55 Compressor Low Suction Lockout**

Exceeding soft and hard low pressure limits result in code 32-15. The soft low pressure limit can be exceeded for up to 2 minutes before code is generated, while exceeding the hard limit immediately results in code 32-15. Low pressure limits are compressor and rpm dependent, but 30psi and 15psi are typical. 4 occurrences of code 32-15 result in a 2hour lockout. Note: AEM will attempt to mitigate low pressure by adjusting system operation. This fault will only be set if system operation cannot be modified quickly enough to prevent exceeding hard and soft limits. A single occurrence of fault will result in 5 minute time delay followed by attempted restart if demand is still present.

Low pressure conditions can occur from multiple causes: Blockage in liquid line, stuck TXV or EXV, no airflow across evaporator, low system charge. Low ambient temperatures will increase diagnostic sensitivity to contributing factors above. Check pressure drop of liquid line at condenser and evaporator, confirm airflow across evaporator, and confirm system charge is correct. Replace EXV/TXV if necessary.

Code 32-59 Low Pressure Lockout

This fault is triggered when the suction pressure is too low to safely start the compressor. If refrigerant saturated pressure is low enough the system will be inoperable until pressures increase to acceptable range. System will be inoperable while this fault is active. The most likely cause of this fault is a leak in the refrigeration system.

Code 33-15 Compressor Low Discharge Shutdown**Code 33-55 Compressor Low Discharge Lockout**

Code 33-15 will become active if compressor is running and discharge pressure is below the lower safe operating boundary for a period of time. Discharge low pressure boundary only applies to the 5 ton model. Active envelope management will attempt to modify system operation to correct this condition before fault is set, but once time limit beyond the limit is exceeded the system will shutdown. 6 occurrences of code 33-15 within 2 hours will result in code 33-55 and 2 hour lockout.

Low discharge pressure can be caused by malfunctioning reversing valve, low charge, missing or stuck TXV/EXV, or compressor not operating properly.

Code 34-11 Compressor High Temp Limiting**Code 34-58 Compressor High Temp Lockout**

Code 34-11 will be set when discharge temperature exceeds 230F measured near the compressor. Low charge or very high superheat are contributors to this fault condition. For each occurrence of 34-11, the next startup will operate at a 25% reduction in capacity. Each hour of operation without additional faults will allow system to increase available capacity by 25%. Once the system is running at minimum capacity and discharge temperature exceeds 230F, code 34-58 will occur and shut down system for 2 hours.

Code 35-11 Compressor High Compression Limiting**Code 35-58 Compressor High Compression Lockout**

Code 35-11 occurs when the high compression boundary is crossed and AEM cannot adjust system operation to reduce compression ratio. For each occurrence of 35-11, the next startup will operate at a 25% reduction in capacity. Each hour of operation without additional faults will allow system to increase available capacity by 25%. Once the system is running at minimum capacity and the high compression boundary is crossed, code 35-58 will occur and shut down system for 2 hours. High compression ratio can be the result of overcharge or coil blockage/loss of airflow across heat exchanger.

Code 36-15 Compressor Low Compression Shutdown**Code 36-55 Compressor Low Compression Lockout**

Code 36-15 occurs when the low compression boundary is crossed and AEM cannot adjust system operation to increase compression ratio. Before this fault is set, AEM will automatically reduce outdoor fan speed (cooling only) to increase CR, then increase compressor speed. 4 occurrences of code 36-15 within 2 hours will result in code 36-55 and 2 hour lockout. Low compression ratio can be a result of compressor not increasing pressure adequately or low system charge.

Code 38-13 VFD Compressor Fault - Start Fail**Code 38-53 VFD Compressor Lockout - Start Fail**

Code 38-13 originates in VFD after additional compressor starting failures. While this code is active the unit opens PEV in an attempt to equalize pressure across compressor and continue start retries. After 3 consecutive code 38-13, malfunction 38-53 will be set with a 2 hour lockout

Check compressor wiring for secure connections, wire damage, and wire order. This code indicates that the VFD is not able to rotate the compressor rotor enough to complete starting process, indicating compressor damage or high pressure differential. If malfunctions continue to be generated and technician confirms pressure differential across compressor is <40psi, replace compressor.

Code 38-18 High Diff Pressure Start Disable

Attempting to start the compressor against a high pressure differential may result in start failures with an otherwise healthy compressor. The PEV is included to ensure compressor will never start against a high pressure differential. This fault will become active if a demand exists and the PEV is not successful in lowering pressure differential below

100psi. The fault will clear and unit will start normally once pressure differential is below 100psi and demand is still present.

The most likely cause of this fault is a non-functioning PEV. Possibly the PEV suffered a mechanical failure, or the coil is not mounted to PEV. Verify PEV coil is attached to PEV valve body. If coil is attached to body, replace PEV harness and coil first, and PEV body if problem is not fixed.

Code 38-31 VFD Compressor Fault - Estimator**Code 38-71 VFD Compressor Lockout - Estimator**

The VFD Estimator is used in the compressor starting process. While this fault is active the PEV will open and compressor will continue attempts at restarting. Three continuous code 38-31 will result in code 38-71 malfunction and 4 hour lockout. Repeated malfunctions indicate high starting torque and possible compressor damage. First, ensure the VFD model and compressor models are correct for unit being serviced as incorrect compressor motor parameters will not allow the VFD to complete the starting process correctly. If all parts are correct for the model being serviced, compressor damage exists and should be replaced.

Code 38-54 Compressor No Pump Lockout

This diagnostic checks to ensure the compressor is running in the correct direction and pumping properly. Once the compressor speed is >400rpm, the compressor has up to 30 seconds to increase the pressure differential (discharge pressure - suction pressure) by 20psi. If this pressure differential is not met, code 38-54 sets by locking operation for 30 minutes.

The most likely cause of this fault is the compressor leads being wired incorrectly. Check wire colors against wiring diagram to ensure UVW wires are attached to the correct terminals. Less likely but still possible is compressor motor shaft breakage allowing compressor motor to rotate but is disconnected from compression mechanism.

Fan Motor Faults General Info

The fan motor used on these models require 5 wires. 240~373 VDC is supplied through Pin 1 of 3 pin connector (VDC) and Pin 1 of 4 pin connector (GND). Pin 2 of 4 pin connector is Vcc signal for IC power supply (~15Vdc). Pin 3 of 4 pin connector is Vsp signal, which is 0-5VDC input speed control. Pin 4 of 4 pin is FG or feedback signal, sending rpm information back to VFD. The motor is controlled using a closed loop control where variable speed is increased or decreased by VFD depending on the RPM command from PCM to VFD along with actual RPM information read through FG pin. Use [Table 7](#) to confirm damaged electronics within fan motor. Note - winding resistance cannot be measured on fan motor due to embedded electronics. Note - resistances are approximate, temperature may affect measurements so only declare motor bad if results differ greatly from values in [Table 4](#). Though the fan motor has internal current protection, an external replaceable fuse is located on VFD for short circuit protection. See wiring diagram for fuse replacement specifications.

Code 39-13 Fan Start Failure**Code 39-53 Fan Start Failure Lockout**

When a demand startup begins a fan speed is commanded to VFD. After 25 seconds of FG (fan speed feedback signal) = 0, the PCM will reset the VFD and try to start fan again. After 3 VFD resets Code 39-13 will be set. PCM will continue to reset VFD a total of 6 times before declaring code 39-53 and locking out for 1 hour. A successful fan start will reset the fan start failed counter.

Inspect all wiring and connectors for damage and loose connections. Check for fan blade blockage and free spin. Check external fan fuse. If no physical blockage is present and fuse is not open, ohm motor and replace if necessary.

Code 39-14 Fan Speed Error

A code 39-14 is declared when the commanded speed is greater than 200rpm and differs from actual speed (as reported from fan to VFD) by more than 20%. This fault is also declared when the commanded speed is 0 and the VFD is receiving greater than 80rpm feedback from fan motor. The most likely scenario for this fault is a partial physical blockage of blade, ice buildup on fan blade, extreme coil blockage that loads blade heavily, or bearings with high resistance to spinning.

Code 39-15 Unexpected Fan Shutdown**Code 39-55 Unexpected Fan Lockout**

A code 39-15 is declared when VFD commanded speed is above 200rpm and actual speed is reduced to less than 80rpm as reported via VFD for 10 seconds consecutively after starting. The fault triggers compressor and fan shutdown, then VFD reset. If demand is still present the system will attempt to restart normally and run. An intermittent open connection on fan FG wire or a failing fan motor may create these faults.

Code 39-58 VFD System Lockout - Fan Motor Fail

Code 39-58 originates in the VFD control when fan motor feedback signal (FG) is not received while a Vsp value has been sent to fan motor for 30 seconds. The fault can also be set when speed error between feedback and command is greater than 100rpm. This fault should never occur because code 39-15 will be declared after 10 seconds. When fault is active, compressor and fan are shut down and lockout time is 30 minutes. Internal electrical damage is likely causing FG feedback to not be received by VFD. Replace fan motor 1st, then VFD.

Code 41-13 Defrost Timeout

This system operates using both a time and temperature requirement. After a predetermined length of time at a possible coil frosting condition (OCT below 35F) defrost will be initiated. OCT is monitored and will complete defrost cycle once it reaches a target value dependent on model and OAT value. Code 41-13 is triggered when defrost is terminated on maximum time and the target coil temperature has not been reached. This may indicate an extreme amount of ice formed on coil or the OCT sensor not being securely attached to butterfly tube. This fault may also trigger if high winds are present and are cooling the coil, not allowing heat to build and melt frost or ice.

Code 44-13 PEV Timeout

The PEV is used to equalize suction and discharge pressures and lessen the starting torque required from compressor and VFD. The PEV will open 2.5 minutes after compressor shutdown if pressure differential is between 200-300psi or if pressure differential is greater than 50psi and demand is present. In both cases PEV will open until differential pressure is less than 40psi. Code 44-13 will be set if PEV is open for 10 minutes and does not reduce pressure differential below 40psi. If this occurs it is likely the valve or coil has failed. Replace PEV coil and harness first and if fault persists open refrigeration system and replace PEV valve itself. This fault will not prevent system from starting, but will likely be accompanied by another fault.

Code 51-01 OAT Open

The outdoor air thermistor determines operating range of compressor and fan speeds in cooling and heating operating modes. When "OAT Open" fault is active, the OCT will be substituted in its place and compressor operating speed will be limited to 2700rpm. Fan speeds will be limited based on OCT value. The sensor is monitored continuously and if resistance is above 465kohm for 1 second this fault will occur. Once sensor value drops below 465kohm for 1 second the fault will clear. This fault does not escalate to a malfunction.

If the resistance value of OAT thermistor is higher than the electrical circuit is capable of measuring, this fault will be generated. Measure resistance value of thermistor at the PCM connector. If value is above 465kohm, look for a break in the wiring or at the connector itself. If no breaks are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

Code 51-02 OAT Shorted

The outdoor air thermistor determines operating range of compressor and fan speeds in cooling and heating operating modes. When "OAT Shorted" fault is active the OCT value will be substituted in its place, and compressor operating speed will be limited to 2700rpm. Fan speeds will be limited based on OCT value. The sensor is monitored continuously and if resistance is below 1kohm for 1 second this fault will occur. Once sensor value increases above 1kohm for 1 second the fault will clear. This fault does not escalate to a malfunction.

If the resistance value of OAT thermistor is lower than the electrical circuit is capable of measuring, this fault will be generated. Measure resistance value of thermistor at the PCM connector. If value is below 1kohm, look for bare wire, short in the wiring, or at the connector itself. If no bare wires or shorts are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

Code 52-01 OCT Open

The outdoor coil thermistor is used to determine when the outdoor coil is completely cleared during defrost. For this reason all defrosts performed when this fault is active will occur for the maximum time length allowed by software. The sensor is monitored continuously and if resistance is above 465kohm for 1 second this fault will occur. Once sensor value drops below 465kohm for 1 second the fault will clear. This fault does not escalate to a malfunction.

Measure resistance value of thermistor at the PCM connector. If value is above 465kohm, look for a break in the wiring or at the connector itself. If no breaks are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

*Note if any combination of OAT and OCT shorted/open are present the system will limit operation based on each individual fault.

Code 52-02 OCT Shorted

The outdoor coil thermistor is used to determine when the outdoor coil is completely cleared during defrost. For this reason all defrosts performed when this fault is active will occur for the maximum time length allowed by software. The sensor is monitored continuously and if resistance is below 1kohm for 1 second this fault will occur. Once sensor value increases above 1kohm for 1 second the fault will clear. This fault does not escalate to a malfunction.

Measure resistance value of thermistor at the PCM connector. If value is below 1kohm, look for a short in the wiring or at the connector itself. If no shorts are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

*Note if any combination of OAT and OCT shorted/open are present the system will limit operation based on each individual fault.

Code 53-41 OST Open - Backup Heat Only

The suction thermistor is required for control of the outdoor EXV in HP systems. For this reason, heating mode operation will be locked out if the OST is determined to be open or shorted. Cooling operation will be allowed if OST is not functional, though on HP systems the malfunction will be displayed on wall control screen. This will remind homeowner to repair the sensor before heating season. Open OST sensor value will default to "47" on status or checkout display. The sensor is monitored continuously and if resistance is above 465kohm for 1 second this fault will occur. Once sensor value drops below 465kohm for 1 second the fault will clear.

Measure resistance value of thermistor at the PCM connector. If value is above 465kohm, look for a break in the wiring or at the connector itself. If no breaks are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

Code 53-42 OST Shorted - Backup Heat Only

The suction thermistor is required for control of the outdoor EXV in HP systems. Similar to "OST Open" fault, heating mode operation will be locked out if the OST is determined to be open or shorted. Cooling operation will be allowed if OST is not functional, though on HP systems the malfunction will be displayed on wall control screen. This will remind homeowner to repair the sensor before heating season. Shorted OST sensor value will default to "47" on status or check-out display. The sensor is monitored continuously and if resistance is below 1kohm for 1 second this fault will occur. Once sensor value rises above 1kohm for 1 second the fault will clear.

Measure resistance value of thermistor at the PCM connector. If value is below 1kohm, look for bare wire, short in the wiring, or at the connector itself. If no bare wires or shorts are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

Code 54-01 ODT Open

The discharge thermistor is used to protect the compressor and ensure discharge superheat is present at all times. When "ODT Open" malfunction is active 47 will be substituted by default. The sensor is monitored continuously and if resistance is above 310kohm for 1 second this malfunction will occur. Once sensor value drops below 310kohm for 1 second the malfunction will clear. Since achieving discharge superheat is an integral requirement for startup, when this sensor does not read a valid value, the system will only run at startup speed. Normal operation will resume once valid ODT value is read by PCM.

Measure resistance value of thermistor at the PCM connector. If value is above 310kohm, and OAT and OCT measure above 25F, look for a break in the wiring or at the connector itself. If no breaks are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

Code 54-02 ODT Shorted

The discharge thermistor is used to protect the compressor and ensure discharge superheat is present at all times. When "ODT Shorted" malfunction is active 47 will be substituted by default. The sensor is monitored continuously and if resistance is below 670 ohm for 1 second this malfunction will occur. Once sensor value rises above 670 ohm for 1 second the malfunction will clear. Since achieving discharge superheat is an integral requirement for startup, when this sensor does not read a valid value, the system will only run at startup speed. Normal operation will resume once valid ODT value is read by PCM.

Measure resistance value of thermistor at the PCM connector. If value is below 670 ohm, look for a short in the wiring or at the connector itself. If no shorts are observed, replace sensor. If measured resistance is within allowable range, replace PCM.

Code 57-01 P1 Open Fault**Code 57-41 P1 Open Lockout****Code 58-01 P2 Open Fault****Code 58-41 P2 Open Lockout**

Pressure transducers are dynamically assigned based on their relative values within PCM software. This feature allows the pressure transducers and harnesses to be interchangeable. Each pressure transducer requires 3 wires: Ground (BLK), Power (+5V DC, RED), and Signal (GRN). The ratio of voltage between power and signal wires is converted into a pressure value. If the signal is above or below the pressure transducers ability to measure it may be because the power wire is not supplying 5V DC or the signal wire is not returning a DC Voltage between 0.5-4.5 VDC. A base code of 57 or 58 is determined based on which PCM connection has the issue, P1 or P2. The expansion codes 01 and 41 explain the type of issue, in this case "open", meaning the signal wire is returning more than 4.5V DC. The most likely cause of this the sensor wire being disconnected and the PCM board "pulling" up the signal voltage to +5V DC.

Code 57-02 P1 Shorted Fault**Code 57-42 P1 Shorted Lockout****Code 58-02 P2 Shorted Fault****Code 58-42 P2 Shorted Lockout**

Pressure transducers are dynamically assigned based on their relative values within PCM software. This feature allows the pressure transducers and harnesses to be interchangeable. Each pressure transducer requires 3 wires: Ground (BLK), Power (+5V DC, RED), and Signal (GRN). The ratio of voltage between power and signal wires is converted into a pressure value. If the signal is above or below the pressure transducers ability to measure it may be because the power wire is not supplying 5V DC or the signal wire is not returning a DC Voltage between 0.5-4.5 VDC. A base code of 57 or 58 is determined based on which PCM connection has the issue, P1 or P2. The expansion codes 02 and 42 explain the type of issue, in this case "shorted", meaning the signal wire is returning less than 0.5V DC. The most likely cause of this the sensor wire being shorted to the metal chassis.

Code 57-43 P1 Sensor Lockout**Code 58-43 P2 Sensor Lockout**

Pressure transducers are dynamically assigned based on their relative values within PCM software. For this reason the pressure transducers and harnesses are interchangeable. Each pressure transducer requires 3 wires: Ground (BLK), Power (+5V DC, RED), and Signal (GRN). The ratio of voltage between power and signal wires is converted into a pressure value. The pressure transducer is capable of sending a value to PCM via sensor wire if it is not working correctly. A base code of 57 or 58 is determined based on which PCM connection has the issue, P1 or P2. When a DC V value of 4.84-4.95 is returned to PCM it will trigger 57-43 or 58-43 fault. The most likely cause of this is a failed transducer part. Switch the harnesses from P1 and P2 to see if the malfunction follows the transducer. If so, follow procedure to replace failed pressure transducer. Trace wires from PCM board connection to ensure correct transducer is being replaced.

Code 61-13 Reversing Valve Timeout Fault**Code 61-53 Reversing Valve Timeout Lockout**

Applies to HP only. The reversing valve is required to be energized for cooling operation and for defrosting during heating operation. The reversing valve will only actuate when the pressure difference between the suction and discharge of the compressor is above a minimum level. The 61-13 will be set whenever the minimum pressure condition prevents a reversing valve switch for 10 minutes. The 61-53 will be set when the 61-13 has been set 4 times in 2 hours. The 61-53 will result in a 2 hour lockout. When this fault occurs it may be due to the reversing valve being stuck between the heating and cooling positions, or the compressor is not pumping properly. If this lockout occurs repeatedly then a reversing valve or compressor replacement may be needed.

Code 61-41 RVS Open Lockout

Applies to HP only. Reversing valve is required to be energized for cooling operation, and for defrosting during heating operation, therefore the system will declare 61-41 when it senses the reversing valve coil is "open" or infinite resistance, and not operational. This check can only be performed when the reversing valve is not energized so it is possible that a reversing valve coil failure during the cooling season may not be identified since the reversing valve continues to be powered between cooling cycles. In this case the system will not declare a fault but the reversing valve will be in the heating position.

Remove RVS connector from PCM and measure continuity between pins 1 & 3. If open or shorted, inspect wire for damage and repair if necessary. If no damage is found, replace coil and harness.

Code 62-01 PEV Solenoid Open

PEV (pressure equalization valve) is used to equalize pressures across the compressor prior to starting in order to ensure the compressor can align itself and start with minimal effort. The system will declare 62-01 when it senses the PEV coil is "open" or infinite resistance. The system will continue to operate while this fault is active as long as the pressures are within acceptable range prior to start attempt. If not, the system will not start until pressure differential drops to acceptable range.

Remove PEV connector from PCM and measure continuity between pins 1 & 3. If open, inspect wire for damage and repair if necessary. If no damage is found, replace coil and harness.

Code 64-41 EXV-H Phase Open Lockout

Applies to HP only. EXV-H is required to control superheat in heating mode. Each time power is applied to outdoor unit the EXV-H will operate to a known position as the valve does not have the capability to feedback actual position. The PCM software must know the starting point and then count as EXV stepper motor is pulsed. At the end of each cycle the valve will close to help maintain pressure differential and optimize cyclic efficiency. HP units will not operate if this fault is active because the valve position at time of failure is unknown.

This code occurs when the PCM determines the resistance of the stepper motor coil circuit is above the maximum value to properly function. Inspection of the wire harness and plug should be performed, as well as using multimeter to confirm "open" continuity between pins. If nothing is found, replace coil and harness assembly.

Code 64-44 EXV-H Power Shorted Lockout

Applies to HP only. EXV-H is required to control superheat in heating mode. Each time power is applied to the unit, the EXV-H will operate to a known position as the valve does not have the capability to feedback actual position. The PCM software must know the starting point and then count when stepper motor is pulsed. At the end of each cycle the valve will close to help maintain pressure differential and optimize cyclic efficiency. HP units will not operate if this fault is active because the valve position at time of failure is unknown.

This code occurs when the PCM determines the EXV power supply is drawing excessive current. The most likely cause of this fault is the wire attached to pin 1 of EXV-H connector being shorted to ground. Inspection of the wire harness and plug should be performed, as well as using multimeter to confirm "short to ground" continuity. If nothing is found, replace coil and harness assembly.

Code 64-45 EXV-H Phase Shorted Lockout

Applies to HP only. EXV-H is required to control superheat in heating mode. Each time power is applied to the unit, the EXV-H will operate to a known position as the valve does not have the capability to feedback actual position. The PCM software must know the starting point and then count when stepper motor is pulsed. At the end of each cycle the valve will close to help maintain pressure differential and optimize cyclic efficiency. HP units will not operate if this fault is active because the valve position at time of failure is unknown.

This code occurs when the PCM determines the EXV power supply is drawing excessive current. The most likely cause of this fault is one or more wires attached to pins 2-5 of EXV-H connector being shorted to ground. Inspection of the wire harness and plug should be performed, as well as using multimeter to confirm "short to ground" continuity. If nothing is found, replace coil and harness assembly.

Code 65-41 EXV-VI Phase Open Lockout

Applies to 5T AC and HP only. EXV-VI is required to operate the vapor injection circuit which is used in high demand situations such as high ambient cooling or low ambient heating. Once per day the EXV-VI will test itself by operating to a known position as the valve does not have the capability to feedback actual position. The PCM software must know the starting point and then count when stepper motor is pulsed. The valve will remain closed until additional capacity is needed.

This code occurs when the PCM determines the resistance of the stepper motor coil circuit is above the maximum value to properly function. Inspection of the wire harness and plug should be performed, as well as using multimeter to confirm "open" continuity between pins. If nothing is found, replace coil and harness assembly.

Code 65-44 EXV-VI Power Shorted Lockout

Applies to 5T AC and HP only. EXV-VI is required to operate the vapor injection circuit which is used in high demand situations such as high ambient cooling or low ambient heating. Once per day the EXV-VI will

test itself by operating to a known position as the valve does not have the capability to feedback actual position. The PCM software must know the starting point and then count when stepper motor is pulsed. The valve will remain closed until additional capacity is needed.

This code occurs when the PCM determines the EXV power supply is drawing excessive current. The most likely cause of this fault is the wire attached to pin 1 of EXV-H connector being shorted to ground. Inspection of the wire harness and plug should be performed, as well as using multimeter to confirm "short to ground" continuity. If nothing is found, replace coil and harness assembly.

Code 65-45 EXV-VI Phase Shorted Lockout

Applies to 5T AC and HP only. EXV-VI is required to operate the vapor injection circuit which is used in high demand situations such as high ambient cooling or low ambient heating. Once per day the EXV-VI will test itself by operating to a known position as the valve does not have the capability to feedback actual position. The PCM software must know the starting point and then count when stepper motor is pulsed. The valve will remain closed until additional capacity is needed.

This code occurs when the PCM determines the EXV power supply is drawing excessive current. The most likely cause of this fault is one or more wires attached to pins 2-5 of EXV-H connector being shorted to ground. Inspection of the wire harness and plug should be performed, as well as using multimeter to confirm "short to ground" continuity. If nothing is found, replace coil and harness assembly.

Code 66-41 VFD Control Relay Open Lockout

The PCM commands the VFD to close a relay in the power circuit during VFD initialization. If PCM senses the VFD relay coil is open this code is set. While this code is active the VFD will not be powered and system is inoperable. 12VDC is fed from Pins 6&7 of the PCM into pins 5&6 of the VFD via communication cable as long as system is ready to run (other faults that stop system from operation are not active).

To troubleshoot this fault, remove the PCM-VFD harness from the PCM while leaving the other end connected to the VFD. Check the resistance between the pins 6 & 7 of the harness connector. The resistance should be approximately 720 ohms. If the resistance is much higher than 720 ohms, then remove the connector at the other end of the cable from the VFD. Check the resistance between pin 6 of the PCM connector and pin 5 of the VFD connector, then pin 7 of the PCM connector and pin 6 of the VFD connector. If either of these shows a resistance higher than just a few ohms, then the cable is the cause of the problem. If the cable checks OK, the problem may be with the VFD. Check the resistance between pins 5 and 6 of the VFD connector. If this resistance is significantly higher than 720 ohms, then the problem is within the VFD.

Code 66-42 VFD Control Relay Shorted Lockout

The PCM commands the VFD to close a relay in the power circuit during VFD initialization. If PCM senses the VFD relay coil is shorted to ground this code is set. While this code is active the VFD will not be powered and system is inoperable. 12VDC is fed from Pins 6&7 of the PCM connector into pins 5&6 of the VFD connector via communication cable as long as system is ready to run (other faults that stop system from operation are not active). Check to ensure comm harness is not damaged and shorting to ground or another wire.

To troubleshoot this fault, remove the PCM-VFD harness from the PCM while leaving the other end connected to the VFD. Check the resistance between the pins 6 & 7 of the harness connector. The resistance should be approximately 720 ohms. If the resistance is much lower than 720 ohms, then remove the connector at the other end of the cable from the VFD. Check the resistance between pins 5 and 6 of the comm cable connection at VFD. If this resistance is significantly lower than 720 ohms, then the problem is within the VFD.

VFD Related Faults General Info

Occasional VFD faults may occur that are caused by specific external circumstances. In these cases the VFD will self-recover and continue to operate normally. Once faults escalate to malfunctions permanent damage may be present. The service person should use judgement when replacing components to determine if occasional external conditions are present or if equipment is damaged and require replacement because system is not providing expected performance.

Code 81-13 VFD System Fault - PFC**Code 81-53 VFD System Lockout - PFC**

The power factor correction circuit (PFC) in VFD introduces an inductance which corrects the current phase shift inherent with powering motors. This in turn minimizes the reactive power transmitted back to input power cables. This fault is set when the PFC circuit exceeds a peak current limit when driving compressor. System will shut down and VFD will reset, if demand persists, system will attempt to resume normal operation. After 2 occurrences within 10 minutes, code 81-53 is set and system is locked out for 4 hours. A power cycle will clear malfunction lockout timer. Continued malfunctions indicate high current situation. This is likely due to VFD or compressor damage. Measure reactor(s) resistance. As reactor charges the resistance will be reduced to 0. If measurement is open, replace reactor. Otherwise replace VFD.

Code 81-14 VFD System Fault - Unbalanced PFCM**Code 81-54 VFD System Lockout - Unbalance PFCM**

Applicable to 4 and 5 ton models only with multiple reactors. This fault occurs when current in PFCM circuits is not balanced. It is most likely caused by a disconnected or faulty reactor. The VFD will shut down and attempt to restart after each occurrence of code 81-14. After 2 occurrences within 10 minutes, code 81-54 is set and system is locked out for 4 hours.

Disconnect and measure resistance of both reactors in system. As reactor charges the resistance will be reduced to 0. If measurement is open, replace reactor. Otherwise replace VFD.

Code 81-58 VFD System Lockout - Wiring Error

This fault occurs when the VFD senses that 1 or more of the compressor wires are not connected to VFD. While this fault is active the system is inoperable. Check compressor wire harness at each end and ensure connections are tight fitting and wires are undamaged. Perform continuity test on compressor harness with DMM. Check resistance of compressor windings at VFD end of compressor harness to ensure no windings are open. Refer to [Table 4](#) for compressor winding resistance by outdoor model.

Code 82-11 VFD System Fault - Line Current Lim

The VFD monitors input current and will limit or reduce compressor speed if the current rises above threshold. Current limits are model specific. While code 82-11 is active the VFD will continue to operate compressor at a reduced or limited speed, while fan operation will not be affected directly. This code will clear once VFD input current drops below threshold. Low input voltage combined with high load is the most likely cause of this code. Check system for overcharge and indoor/outdoor coil blockage as well as input voltage.

Code 82-13 VFD Reset with Power Dropout**Code 82-53 VFD Lockout - Reset with Power Drop**

This code indicates the VFD has reset itself due to a line voltage loss. When this code is set the PCM will complete a shutdown, reset the VFD, and restart if demand is still present. The system should resume operation after the 5 minute compressor protection time delay expires. 3 occurrences of code 82-13 within a 1 hour period will result in a code 82-53 and 2 hour lockout. Occasional occurrences of this code may happen due to momentary power loss or electrical noise from utility. Check tightness of all line voltage connections. Loose connections can cause momentary voltage drop due to vibration and trigger this fault. If all connections are tight, additional steps involving the local power utility or addition of external power conditioner may be required.

Code 82-15 VFD Fault with Power Dropout**Code 82-55 VFD Lockout - Fault with Power Drop**

This code indicates the VFD has shutdown due to a line voltage loss. When this code is set the PCM reset the VFD, and restart if demand is still present. The system should resume operation after 5 minute compressor protection time delay expires. 4 occurrences of code 82-15

within a 1 hour period will result in a code 82-55 and 2 hour lockout. Occasional occurrences of this code may happen due to momentary power loss or electrical noise from utility. This code can be paired with other codes if electrical noise is present. Check tightness of all line voltage connections. Loose connections can cause momentary voltage drop due to vibration and trigger this fault. If all connections are tight, additional steps involving the local power utility or addition of external power conditioner may be required.

Code 82-16 VFD System Fault - Low Line Volt**Code 82-56 VFD System Lockout - Low Line Volt**

The VFD monitors line voltage and will set code 82-16 if line voltage drops below 180VAC peak. When code 82-16 occurs the system will shut down and reset VFD. System will attempt to resume operation once 5 minute compressor protection timer expires. 4 occurrences of code 82-16 in a 1 hour period will result in code 82-56 and will shut down equipment for a 2 hour lockout. Measure input voltage with a power quality analyzer and contact power utility provider if necessary.

Code 82-17 VFD System Fault - High Line Volt**Code 82-57 VFD System Lockout - High Line Volt**

The VFD monitors line voltage and will set code 82-17 if line voltage rises above 410VAC peak. When code 82-17 is occurs the system will remain operating as it is likely caused by a momentary voltage spike that will not damage the VFD. If a long term unsafe high voltage event occurs, the PCM will generate a 15-94 and shut down equipment. 10 events of code 82-17 in a 1 hour period will result in code 82-57 and will shut down equipment for a 2 hour lockout. Measure input voltage with a power quality analyzer and contact power utility provider if necessary.

Code 83-11 VFD Compressor Fault - Current 1**Code 83-12 VFD Compressor Fault - Current 2**

The VFD monitors multiple compressor current conditions and will limit or reduce compressor speed if the current rises above threshold. Current limits are model specific. While codes are active the VFD will continue to operate compressor at a reduced or limited speed, and fan operation will not be affected directly. This code will clear once compressor current drops below threshold. This code indicates the compressor may have minor damage and requires slightly higher torque (current) to operate at desired rpm. If damage continues to worsen the compressor may cause code 83-15, 83-55, 83-16, and 83-56. Check system for overcharge and indoor/outdoor coil blockage as well as input voltage. Listen to compressor during operating for abnormal noise indicating physical damage. If code persists or compressor has abnormal noise, replace compressor.

Code 83-15 VFD Compressor Fault - Current 3**Code 83-55 VFD Compressor Lockout - Current 3****Code 83-16 VFD Compressor Fault - Current 4****Code 83-56 VFD Compressor Lockout - Current 4**

The VFD monitors multiple compressor current conditions and will limit or reduce compressor speed if the current rises above threshold. Current limits are model specific. Code 83-15, 83-16, 83-55, and 83-56 will result if the VFD is not capable of reducing compressor speed far enough or fast enough while running. This code will shut down system and attempt restart after 5 minute compressor protection timer has expired. 2 instances of code 83-15/83-16 in a 4 hour period will result in code 83-55/83-56 and a 2 hour lockout. These codes indicate the compressor requires higher torque (current) to operate at desired rpm. Check system for overcharge and indoor/outdoor coil blockage as well as input voltage. Check wiring from VFD to compressor for poor connections causing high current. Check compressor winding resistance against table. Listen to compressor during operating for abnormal noise indicating physical damage. VFD may have internal damage causing high current, or compressor may be damaged.

Code 83-57 VFD Compressor Lockout - Current I

This code will be set when any of the VFD compressor speed limiting codes are active and the compressor speed is reduced below the lowest allowable operating speed for a given OAT. Once 1 hour lockout timer expires the unit will attempt to resume operation. This code indicates the compressor requires higher torque (current) to operate at desired rpm and compressor is mechanically damaged. If code persists, replace compressor.

Code 84-11 VFD Heatsink Overtemp Fault**Code 84-58 VFD Heatsink Overtemp Malfunction**

The VFD has internal temperature sensors to monitor critical power components and take action if operating temperatures cross thresholds that may shorten the VFDs operating life. If the heat sink temperature sensor fails, it will no longer be capable of preventing critical power components from operation above the safe reliable temperature threshold. This fault will be set when the VFD IPM or PFCM temperatures are greater than or equal to 203°F.

If this fault is active, the VFD will shut down compressor but continue to operate fan to draw air across heat sink. Once heat sink temperature is acceptable, system will restart but reduce demand by 25% for each occurrence of 84-11. Once speed can no longer be reduced further, code 84-58 will be set and system locked out for 2 hours. Each hour of operation without additional code 84-11 will allow increased demand of 25%. The most likely cause is restricted airflow over heat sink. Inspect and clear heatsink of anything that may inhibit airflow or contact with air. A less likely possibility is inadequate contact of power components with heat sink, not allowing intended heat transfer between components and heat sink. If clearing heatsink of blockage does not eliminate codes, replace VFD.

Code 85-13 VFD System Fault - DC Under Voltage**Code 85-53 VFD System Lockout - DC Under Volt**

The VFD boosts line voltage and uses the PFC circuit to maintain DC voltage within an acceptable range. Code 85-13 is set when the DC voltage is lower than the acceptable lower limit of 180VDC. Attempting to operate VFD below minimum DC voltage can cause failed/reduced compressor or fan operation. 4 occurrences within 1 hours result in 85-53 malfunction which has a 2 hour lockout time. An instance of 85-13 will result in VFD shutdown and system restart once 5 minute compressor protection timer expires. Low AC line voltage, quickly loading the compressor, or a damaged PFC circuit in VFD may result in a code 85-14. Check to ensure reactors are plugged in securely. Manually power cycle outdoor unit with disconnect, if malfunction persists replace reactors, then VFD.

Code 85-14 VFD System Fault - DC Over Voltage**Code 85-54 VFD System Lockout - DC Over Volt**

The VFD boosts line voltage and uses the PFC circuit to maintain DC voltage within an acceptable range. Code 85-14 is set when the DC voltage exceeds the acceptable upper limit of 410VDC. Exceeding maximum DC voltage can damage electrical circuits or shorten VFD's operating life. 4 occurrences within 1 hours result in 85-54 malfunction which has a 2 hour lockout time. An instance of 85-14 will result in VFD shutdown and system restart once 5 minute compressor protection timer expires. High AC line voltage or quickly unloading the compressor may result in a code 85-14. Manually power cycle outdoor unit with disconnect, if malfunction persists replace VFD.

Code 86-06 VFD System Fault - Communication**Code 86-46 VFD System Lockout - Communication**

If communication between VFD and PCM does not occur for a continuous 15 seconds, code 86-06 is set by PCM. 3 occurrences within 15 minutes will result in 86-46 malfunction, which has a 1 hour lockout. When code 86-06 is set, VFD will shut down compressor and fan, and re-initialize in an attempt to re-establish communication between VFD and PCM. Inspect PCM to VFD communication harness for damage and

connectivity, replace if necessary. If this does not fix problem, the VFD communicating components have been damaged and PCM or VFD requires replacement.

Code 87-13 VFD Initialization Fault**Code 87-53 VFD System Lockout - Initialization**

The VFD communicates identification information to PCM when initializing to run. This information is used to identify the equipment and reference correct operating tables. When unrecognized information is received the PCM will set fault 87-13 and reset the VFD to restart the initialization process. After 3 instances of fault 87-13 within 4 hour period 87-53 malfunction is set and system is locked out for 4 hours. The most likely cause of this fault is an incorrect model plug. Check for correct model plug in model plug table.

Code 88-15 VFD Internal Fault - Unexpect Reset**Code 88-55 VFD Lockout - Unexpected Reset**

Communication between the VFD and PCM is monitored continuously. If communication fails, the PCM will initiate a VFD reset in an attempt to restart the communicating components of VFD. The system will shut down and restart after 5 minute compressor protection timer expires. Three occurrences of code 88-15 within a 1 hour period will result in 88-55 malfunction and 2 hour lockout. Inspect PCM to VFD communication harness for damage and connectivity, replace if necessary. If this does not fix problem, the VFD communicating components have been damaged and VFD requires replacement.

Code 88-27 VFD Reprogramming Failure

Code 88-27 indicates that an attempt to reprogram the VFD failed. If this diagnostic is not recent, then a subsequent reprogramming attempt may have succeeded. The technician should check the current VFD software version against the latest software release. If the VFD software is not the most current, then the VFD should be reprogrammed manually using the Infinity Control or the Carrier Service Tech App.

Code 88-31 VFD Internal Fault - Current Sensor**Code 88-71 VFD Lockout - Comp Current Sensor**

The VFD measures the compressor current value internally. If the compressor current measurement is not reported to VFD, it will shut down and attempt a restart after 5 minute compressor protection timer expires. Operating VFD without monitoring compressor current may result in compressor damage. Three occurrences of code 88-31 within a 4 hour period will result in 88-71 malfunction and 4 hour lockout. While this fault or malfunction is active the unit is inoperable. This malfunction, once set, is unlikely to go away and indicates VFD damage. Manually power cycle outdoor unit with disconnect, if malfunction persists replace VFD.

Code 88-32 VFD Internal Fault - IPM Temp Sens

The VFD has internal temperature sensors to monitor critical power components and take action if operating temperatures cross thresholds that may shorten the VFDs operating life. If the IPM temperature sensor fails it will no longer be capable of preventing the IPM module from operation above the safe reliable temperature threshold. If this fault is active the VFD will continue to operate normally, since the only way to correct this fault is to replace VFD.

Code 88-33 VFD Internal Fault - DC Link Sensor**Code 88-73 VFD Lockout - DC Link Sensor**

The VFD measures the DC voltage value internally. If the DC voltage measurement is not within acceptable operating parameters the VFD will shut down and attempt a restart after 5 minute compressor protection timer expires. Three occurrences of code 88-33 within a 4 hour period will result in 88-73 malfunction and 4 hour lockout. While this fault or malfunction is active the unit is inoperable. This malfunction, once set, is unlikely to go away and indicates VFD damage. Manually power cycle outdoor unit with disconnect, if malfunction persists replace VFD.

Code 88-34 VFD Internal Fault - PFCM Sensor A**Code 88-74 VFD Lockout - PFCM Sensor A**

The VFD has internal current measurement to protect PFC components from exceeding current thresholds that may shorten the VFDs operating life. If the PFCM Sensor A exceeds safe reliable value, the VFD will shut down immediately and attempt a restart after 5 minute compressor protection timer expires. Three occurrences of code 88-34 within a 4 hour period will result in 88-74 malfunction and 4 hour lockout. While this fault or malfunction is active the unit is inoperable. This malfunction, once set, is unlikely to go away and indicates VFD damage. Manually power cycle outdoor unit with disconnect, if malfunction persists replace VFD.

Code 88-35 VFD Internal Fault - PFCM Sensor B**Code 88-75 VFD Lockout - PFCM Sensor B**

The VFD has internal current measurement to protect PFC components from exceeding current thresholds that may shorten the VFDs operating life. If the PFCM Sensor B exceeds safe reliable value, the VFD will shut down immediately and attempt a restart after 5 minute compressor protection timer expires. Three occurrences of code 88-35 within a 4 hour period will result in 88-75 malfunction and 4 hour lockout. While this fault or malfunction is active the unit is inoperable. This malfunction, once set, is unlikely to go away and indicates VFD damage. Manually power cycle outdoor unit with disconnect, if malfunction persists replace VFD.

Code 88-36 VFD Internal Fault - Line Volt Sens**Code 88-76 VFD Lockout - Line Volt Sensor**

The VFD has internal voltage measurement to protect components from operating outside of voltage thresholds that may shorten the VFDs operating life. If the line volt sensor value is outside of safe reliable range, the VFD will shut down immediately and attempt a restart after 5 minute compressor protection timer expires. Three occurrences of code 88-36 within a 4 hour period will result in 88-76 malfunction and 4 hour lockout. While this fault or malfunction is active the unit is inoperable. This malfunction, once set, is unlikely to go away and indicates VFD damage. Manually power cycle outdoor unit with disconnect, if malfunction persists replace VFD.

Code 88-37 VFD Internal Fault - PFCM Temp Sens

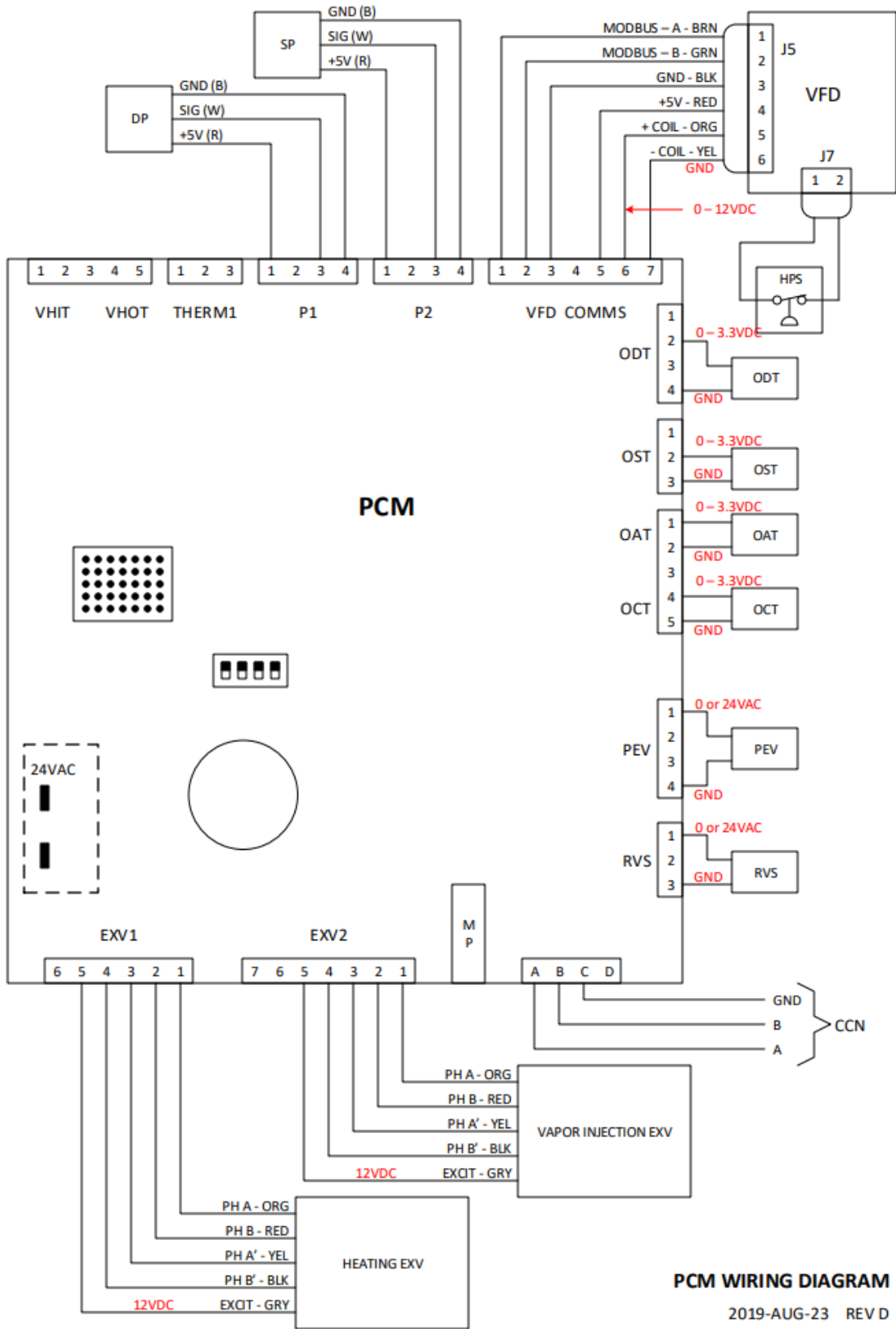
The VFD has internal temperature sensors to monitor critical power components and take action if operating temperatures cross thresholds that may shorten the VFDs operating life. If the PFCM temperature sensor fails it will no longer be capable of preventing the PFC circuit from operation above the safe reliable temperature threshold. If this fault is active the VFD will continue to operate normally, since the only way to correct this fault is to replace VFD.

Code 88-38 VFD Internal Fault - DC Discharge**Code 88-78 VFD Lockout - Int DC Discharge**

The unit VFD converts boosts 230VAC line voltage and then converts to DC voltage before switching the DC voltage on and off rapidly to create a 3 phase waveform and operate compressor at varying speeds. This fault becomes active when the DC voltage is shorted to ground and the VFD will open the power relay. While this fault or malfunction is active the unit is inoperable. The VFD will attempt to reset itself automatically but if problem persists, the fault will escalate to 88-78 malfunction and lock out system for 4 hours. Manually power cycle outdoor unit with disconnect, if malfunction persists replace VFD.

Code 88-39 VFD Internal Fault - Microprocessor**Code 88-79 VFD Internal Lockout - Microprocessor**

This VFD has internal diagnostics to verify that the microprocessor is operating sufficiently to maintain safe compressor and fan operation. If the microprocessor detects any abnormal condition that could result in unsafe operation it will set a diagnostic code. If this occurs, the PCM will set 88-39 and reset the VFD to attempt to remedy the condition. If this attempt is unsuccessful, malfunction Code 88-79 will be set and the system will be locked out for 4 hours. Manually power cycle the outdoor system. If the diagnostic code persists replace the VFD.



PCM WIRING DIAGRAM

2019-AUG-23 REV D

Fig. 33 – PCM Wiring Diagram

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