TrueVAV

Thermostat Control

outside air solutions

O/M manual

PD 11/11/2024-
v1.06 PN IOM-0057

Table of Contents

SEE IOM-0035 O/M APPENDICES MANUAL FOR MORE INFORMATION ON INSTALLATION AND SET UP OF PERIPHERAL DEVICES

Reference IOM-0006 for more information on Economizer & Powered Exhaust
Reference IOM-0008 For more information on Air Flow Hood
Reference IOM-0011 For more information on Mod Gas Heat
Reference IOM-0012 For more information on Mod Electric Heat
Reference IOM-0015 For more information on Extra High Static Fan
Reference IOM-0018 For more information on Super High Heat Box
Reference IOM-0025 For more information on Mated ERV
Reference IOM-0053 For more information on Solar HVAC

***** ALL REFERENCE IOM'S AVAILABLE UPON REQUEST *****

Contact iAIRE At:

www.myiaire.com

Email: sales@myiaire.com
Phone: 844-348-9168

TrueVAV Part Numbering Scheme

Commercial Package / Splits

12C - 3 4 5 6 7 8 9 10 11 12 13 - 14

Type (1,2)

VD - Cooling Only
VG - with Gas Heat
VH - DX Cool w/H.W. Coils
VP - with Heat Pump

Fan (4)

L - Low/Std. Static
M - Med. Static
H - High Static
E - Extra High Static

Voltage (5)

G - 230 VAC 1Φ
H - 230VAC 3Φ
K - 460VAC 3Φ
L - 575VAC 3Φ

Control (6)

A - DAT w/ VAV Duct

Electric & Gas Heat (7,8,9)

XXX - Electric (kW)
XXX - Gas (mBH)

Heat Stages (10)

A - No Controls
B - 1 Stage
C - 2 Stage
D - 3 Stage
E - 4 Stage
M - Modulating

Roof Top Units (3)

FC04	FE04	GC04
FC05	FE05	GC05
FC06	FE06	GC06
FC07	FE07	GE04
FC08	FE08	GE05
FC09	FE09	GE06
FC12	FE12	
FC14	FE14	
FC16	FE16	
FC20	FE20	
FC24	FE24	
FC28	FE28	
FC30	FE30	

Comm. Split (3)

COOLING	COOLING	HEAT PUMP
AZ07RF07*	AP25RA30**	AQ07RFQ07*
AZ08RF08*	AP27RA30**	AQ08RFQ08*
AZ12RF12*	AP30RA30**	AQ12RFQ12*
AZ14RF14*	AP4039M**	AQ16RFQ16**
AD12RF12**	AP5039M**	AQ25RQ25**
AD14RF14**	AP6039M**	
AD16RF16**	AP6539M*	
AD25RA25**	AP7039M**	
AD28RA28**	AP8039M**	
	AP9039M**	
	AP10039M**	

*one circuit
**two circuit

Res. Split (3)

COOLING	HEAT PUMP
Z24FT3	Z24FT3
Z36FT3	Z36FT3
Z48FT6	Z48FT6
Z60FT6	Z60FT6
Z24Z36	Z24Z36
Z36Z36	Z36Z36
Z48Z60	Z48Z60
Z60Z60	Z60Z60

Disconnect (11,12)

00 - No Disconnect
01 - 240V - 30A Fuse
02 - 240V - 60A Fuse
03 - 240V - 100A Fuse
04 - 240V - 150A Fuse
05 - 240V - 200A Fuse
06 - 240V - 300A Fuse
11 - 240V - 30A Switch
12 - 240V - 60A Switch
13 - 240V - 100A Switch
14 - 240V - 150A Switch
15 - 240V - 200A Switch
16 - 240V - 300A Switch
21 - 600V - 30A Fuse
22 - 600V - 60A Fuse
23 - 600V - 100A Fuse
24 - 600V - 150A Fuse
31 - 600V - 30A Switch
32 - 600V - 60A Switch
33 - 600V - 100A Switch
34 - 600V - 150A Switch

Configuration (13)

A - Down Supply / Down Return
B - Horizontal Supply / Down Return
C - Down Supply / Horizontal Return
D - Horizontal Supply / Horizontal Return

Options (14)

0 - No Options
A - Ionization
B - Whole Unit (UG)
C - All Coils (UG)
D - Condenser Coil (UG)
E - ERV (See options pg.2)
F - MERV 13 2" Filter
G - 2 Pos. OA Damper
H - BACNet
J - Hinged Access Doors
K - DW w/ Poly Insulation
L - SS Drip Pan
M - SS Gas Heat Exchanger
N - Dirty Filter Switch
P - Service Outlet (non-pwr)
Q - Service Outlet (pwr)
R - Split Power Fuse Disc.
S - Split Power Switch Disc.
T - Smoke SA
U - Smoke RA
V - Low Ambient Bypass
W - Economizer
X - Intertwined Evap. Coil
Y - Start Up
1 - 365 Day Annual Timer
2 - SOLAR HVAC
3 - Condensate Flow Switch
4 - Airflow Monitoring
5 - Hail Guard
6 - Fixed Powered Exhaust
7 - Phase Monitor
8 - Modulating Powered Exhaust
9 - Crate

ERV Options (if ERV selected on page 1)

- 15 16 17 18

Wheel Diameter (15,16)

19 - 19”
25 - 25”
30 - 30”
36 - 36”
41 - 41”
46 - 46”
52 - 52”
58 - 58”
64 - 64”

Airflow Capability (17)

L - Low
H - High

Options (18)

0 - No Options
A - 2 Position Outside Air Damper
B - 2 Position Exhaust Air
C - Building Pressure
D - Outside Airflow Monitoring
H - Supply Air FIlter Status
J - Exhaust Air FIlter Status
K - Supply Air Blower Status
L - Exhaust Air Blower Status
M - With OA Blower
N - Sensible Wheel
P - Frost Protection

TRUE VAV NUMBERING SCHEME INSTRUCTIONS

How to Translate TRUE VAV Part Numbering Schemes

True VAV's part numbering scheme is composed of similar product identification, when compared to Carrier, in order to easily provide common options and features. By referencing the 2 character "type" in the beginning of each part number, it is easy to distinguish cooling only, gas heat, or heat pump models. A full list of Carrier unit model numbers is provided from by following the link in the web addresses listed below. Using the comparison below, an excerpt is provided from Carrier's technical guide to illustrate how a common unit can be traced from TRUE VAV to Carrier.

Asterisk

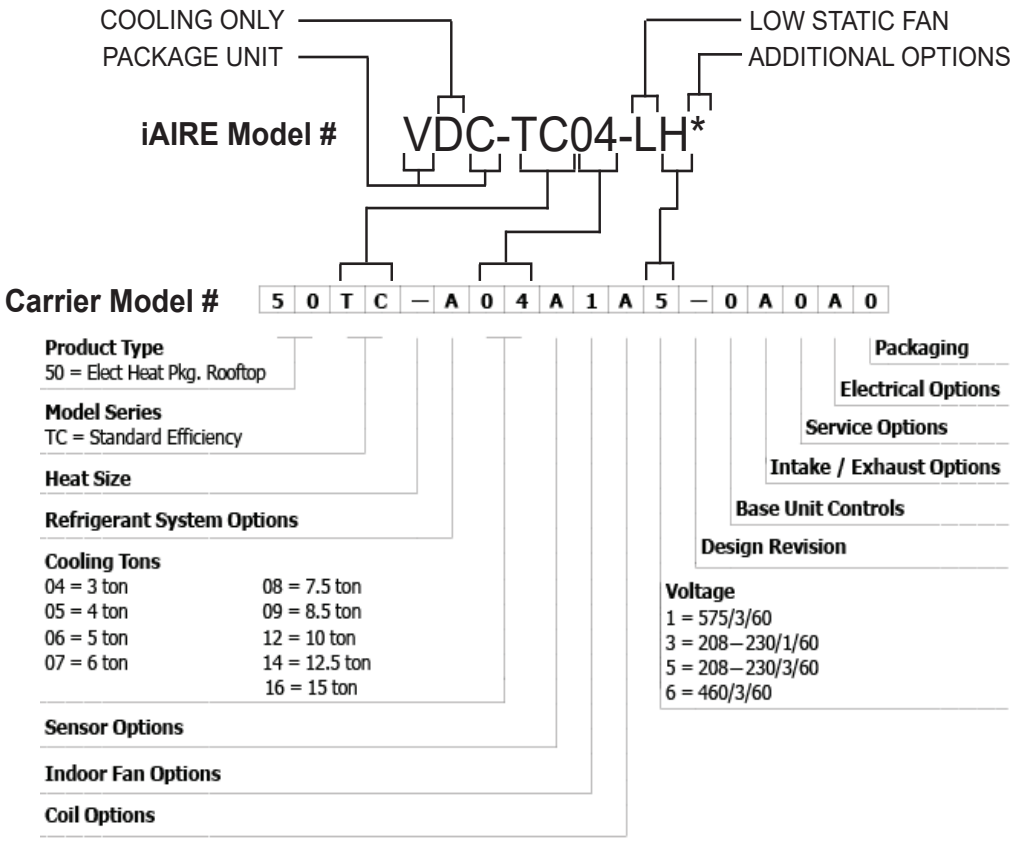
All part numbers and part number references will use an asterisk, * , to designate all characters which do not apply to the part number for the information being provided in that section. Where an asterisk appears in the middle of a part number, the missing characters are irrelevant to the information being provided. Where the asterisk appears at the end of a part number, the remaining part number characters are irrelevant to the information being provided.

To determine the specific Carrier unit you need, see below for how to determine which Carrier manual you will need.

For more information about Carrier Commercial Split Units go to: **http://www.carrier.com/building-solutions/en/us/products/split-systems/split-systems/**

For more information about Carrier Commercial Units go to: **http://www.carrier.com/building-solutions/en/us/products/packaged-outdoor/outdoor-packaged-units/**

For more information about Carrier Residential Units go to: **http://www.carrier.com/homecomfort/en/us/products/heating-and-cooling/packaged-products/**



START-UP REQUIREMENTS
! IMPORTANT !

To maintain factory warranty, all units must have an authorized factory start-up and the start-up paperwork on file

For Questions, Contact iAIRE At:

www.myiaire.com

Email: sales@myiaire.com
Phone: 844-348-9168

Fill out Start-Up request form here:

https://www.myiaire.com/support-service/service-request/

REFRIGERANT PIPING GUIDELINES

IMPORTANT: The information below is intended for general information on refrigerant piping only. Reference specific AHU and condensing units manuals for specific piping details.

The design of a refrigerant piping system should:

Ensure proper refrigerant feed to evaporators; Provide practical refrigerant line sizes without excessive pressure drop; Prevent excessive amounts of lubricating oil from being trapped in any part of the system; Protect the compressor at all times from loss of lubricating oil; Prevent liquid refrigerant or oil slugs from entering the compressor during operating and idle time; and Maintain a clean and dry system.

REFRIGERANT LINE VELOCITIES

Economics, pressure drop, noise, and oil entrapment establish feasible design velocities in refrigerant lines. These are:
Suction line - 700 to 4,000 fpm
Discharge line - 500 to 3,500 fpm
Condenser drain line - 100 fpm or less
Liquid line - 125 to 450 fpm

Minimum Discharge- Line Velocities		
Refrigerant Velocity, fpm		
Nominal Pipe Size, in.	Riser	Horizontal
7/8	375	285
1-1/8	430	325
1-3/8	480	360
1-5/8	520	390
2-1/8	600	450

Higher gas velocities are sometimes found in relatively short suction lines on comfort air conditioning or other applications where the operating time is only 2,000 to 4,000 hrs per year and where the low initial cost of the system may be more significant than low operating cost.

Industrial or commercial refrigeration applications, where equipment runs almost continuously, should be designed with low refrigerant velocities for the most efficient compressor performance and low equipment operating cost.

The liquid line from the condenser to the receivers should be sized for 100 fpm or less to ensure positive gravity flow without incurring a backup of liquid flow. Liquid lines from the receivers to the evaporator should be sized to maintain velocities below 300 fpm, thus minimizing or preventing liquid hammer when solenoids or other electrically operated valves are used.

LINE SIZING

In sizing refrigerant lines, cost considerations favor keeping the line size as small as possible. However, suction and discharge line pressure drops cause loss of compressor capacity and increased power usage.

Excessive liquid line pressure drops can cause the liquid refrigerant to flash, resulting in faulty expansion valve operation. Refrigeration systems are designed so that friction pressure losses do not exceed a pressure differential equivalent to a corresponding change in the saturation boiling temperature.

The primary measure for determining pressure drop is a change in saturation temperature. Pressure drop in a refrigerant line causes a reduction in system efficiency. Correct sizing must be based on minimizing cost and maximizing efficiency.

Pressure drop calculations are determined as normal pressure loss associated with a change in saturation temperature of the refrigerant. Typically, the refrigeration system will be sized for pressure losses of 2°F differential or less for each segment of the discharge, suction, and liquid lines. An HFC refrigerant liquid line is sized for pressure losses of 1° differential or less.

IMPORTANT: The information above is intended for general information on refrigerant piping only. Reference specific AHU and condensing units manuals for specific piping details.

THERMOSTAT CONTROL

Uses a standard thermostat with a humidistat, a call for cooling turns on Y1, a call for heating turns on W1, a call for fan turns on fan. A humidity call (when there is no call for cooling) will turn on Y1 and also engage the modulating hot gas reheat valves.

GENERAL INSTRUCTIONS

An iAIRE's operation is a function of the options and control packages that the iAIRE unit is equipped with.

Confirm that all unit clearances shown on the submittal are present around the unit. If the installation is on a roof with a parapet wall, make sure there is enough air flow through the condensing coil to not impact operations.

RECEIVING / INSPECTION

Check part # of iAIRE unit to ensure it is what was ordered.

Verify voltage/phases match.

At the time of delivery the iAIRE unit should be visually inspected for possible damage. If any damage is found it should be reported immediately to the last courier company, preferably in writing.

RIGGING

Utilize the Carrier factory information on rigging these units. If you need help accessing this information, please contact iAIRE customer service at: sales@myiaire.com or 844-348-9168. **Refer to IOM-0035 for ERV rigging**.

SAFETY CONSIDERATIONS

Installation and servicing of the iAIRE units can be hazardous due to system, pressure, electrical components and moving parts. Only trained and qualified service personnel should install, repair or service these units.

When working on iAIRE or other HVAC units observe precautions in the literature, tags and labels attached to the units, and any other safety precautions that may apply.

Follow all local, national and industry electrical codes when installing these units and accessories.

START-UP

SPACE / DISCHARGE AIR TEMP CONTROL PACKAGE START-UP

Physical Inspection (pre power-up)

Check part # of iAIRE unit to ensure it is what was ordered.
Verify voltage/phases match.

1. Verify condition of unit and note any installation or shipping damage to coils or cabinets.

2. Verify installation of condensate drain trap.

3. Verify power is available at disconnect and fuses are installed if required. Check incoming power to make sure it is within tolerance.

4. Verify that all airways are open. (Fire dampers and supply air registers.)

5. Check blower belt tension. (if available)

6. Confirm that the space sensor is installed. (Space Control units only, see wiring in figure "B" on installatoin wiring diagram pages. Space Sensors must be wired using shielded wire.

After power-up

1. Check incoming 3-phase power for a stinger leg if voltage is 208/230VAC. If so ensure that stinger leg (high voltage phase to ground) is the center leg.

2. Go to thermostat and set both the heat and cool CFM. The heat CFM is the VFD % in the heat mode that the AHU fan will run. The cool CFM is the VFD % the AHU fan will run in all other modes.

3. Remove panel from outside air section and verify outside air damper is fully open. Set adjustment thumb wheel on damper motor for full opening. Check crank arms and ball joints on damper mechanism allow damper to open fully.

Charging

1. Ensure Compressor VFD is running at 60Hz.

2. Disconnect 2-pin signal plug from Sporlan IB circuit board. This will close the modulating hot gas valve to allow correct charging.

3. Invert refrigerant jug to provide liquid charge into suction line and proceed to charge unit for 10 degrees of subcooling and 20 degrees superheat. Depending on ambient conditions, evaporator leaving air temperature should be between 48-58˚F.

4. When charge is complete return signal connector to Sporlan IB board and re-open Rawal ball valve.

5. Disconnect jumper from terminal strip input to allow the thermostat to take over machine.

6. Adjust sensor setpoint to a low setpoint to bring all cooling stages on and check if hot gas line warms up.

TEST PROCEDURE
Verify operation as described above by monitoring liquid line temperature and observing motor speed.

Heater check
1. Verify Kw of installed electric heaters.

2. Disconnect white space temperature sensor wire from terminal strip. (This will make the thermostat see a space temperature of -40 degrees and start heaters) There is a five minute delay at start of heat cycle. With heater running check amperage and verify discharge air temperature.

3. Return white space temperature sensor wire to terminal strip.

Checking and adjusting system refrigerant charge.

Before connecting gauges to the systems suction and discharge service ports, make the following adjustments.

1. Before running blower and compressors, ensure Compressor VFD is running at 60Hz.

2. If Low Ambient is installed, shut off ball valve to low ambient and open bypass around low ambient to isolate L.A. valve.

3. Before running blower and compressors, put thermostat in TEST mode and manually set Hot Gas Valve % to 0.0% to direct all refrigerant to DX cooling.

a) Connect gauges. (Pre-load evacuated split systems with nominal weight of refrigerant)

b) Enable FAN and then Cool Stage 1 in TEST mode and allow several minutes for system to stabilize.

c) Note, high pressure saturation Temperature on gauge and the temperature of the Liquid Line leaving the condenser. (Condensing temperature should be 100-110 degrees minimum)

d) Calculate Sub cooling (Saturation Temp – Liquid line Temp = Sub cooling)

e) Charge systems for 12-15 degrees of sub cooling. Add refrigerant if sub cooling is low and remove if high. With all cooling stages enabled system should deliver 55 degree air, or less depending on ambient conditions.

f) Record sub cooling temperature _____ degrees

g) With thermostat still in TEST mode, increase the Hot gas valve position in increments until discharge air, (DAT) is raised to 70 - 72 degrees.

h) Record sub cooling temperature _____ Record evap saturation temperature _____

i) Let Compressor VFD run normal.dsezs

j) If Low Ambient is installed, open valve to low ambient and close valve to bypass Low Ambient.

k) Record sub cooling temperature _____ Record evap saturation temperature _____

l) Note: You can leave the TEST menu and enter the STATUS menu to check system temperatures at any time. TEST mode will remain active until it is manually disabled.

m) When charging and checks are complete, disable the TEST mode and let Compressor VFD run normal.

n) Allow system to stabilize and check sub cooling again.

o) Add/Remove refrigerant as necessary to maintain about 4 degree of sub cooling.

p) Remove gauges and replace service port covers.

q) If charging for the first time note all required conditions in startup sheets and record weight of all refrigerant added.

Record Keeping
1. Record all readings and conditions in startup sheets and add notes to call attention to any issues for the unit installing contractor to attend to.

2. Have the startup documents signed by supervising foreman for mechanical contractor.

MODULATING GAS SETUP:
1: SEE IOM-0035 for standard carrier heat
2: SEE IOM-0035 for High Heat Box.

TROUBLESHOOTING

1. The unit does not come on.
   a. Check to make sure there is power to the unit.
   b. Check to make sure the disconnect is on.
   c. Check to make sure the jumper between pins on terminal strip 1 is removed.
      i. If other wires are attached to pins, make sure there is not a short or the unit will not turn on. This is the location for remote start/stop.
   d. Check to make sure the circuit breaker or the 24V power supply is not tripped.

2. Fan speed is not correct.
   a. Go to the thermostat and adjust the fan speed up or down as required.

3. The unit is tripping out on high heat and requires a manual reset.
   The air speed needs to be raised to prevent the heat from being too hot in the unit.

SEQUENCE OF OPERATIONS

THERMOSTAT CONTROL

FAN SPEED CONTROL

These units are equipped with variable speed supply fan control. There is a cooling and heating fan speed set point. In this application, both the cooling and heating fan speed set point should be the same. This should be set by the test and balance contractor to provide and correct CFM for the unit. Once the supply fan speed is initially set, it will not modulate.

NORMAL HOURS (not night set back)

Cooling Mode(humidistat on cooling) –When the temperature gets above the set point temperature by more than 2 degrees, the compressor will come on and start cooling the air. Once the temperature reaches the set-point, the compressor will turn off and the air will continue to circulate in the space without heating or cooling.

Heating Mode (humidistat on heating) – When the temperature gets below the set point temperature by more than 2 degrees, the heat pump will come and begin heating the air. Once the temperature reaches the set point temperature, the heat pump will turn off and the air will continue to circulate in the space without heating or cooling.

Humidity mode – When the unit is not running in cooling or heating and the humidity sensor on the humidistat registers a humidity higher than the set point humidity, the compressor will come on for cooling and the hot gas on/off valves will open to raise the discharge temperature of the air entering the building after cooling. This will help reduce the humidity without cooling the building off too much. Once the humidity is below the set point humidity, the unit compressor and hot gas on/off valves will shut off and the air will continue to circulate in the space without heating or cooling.

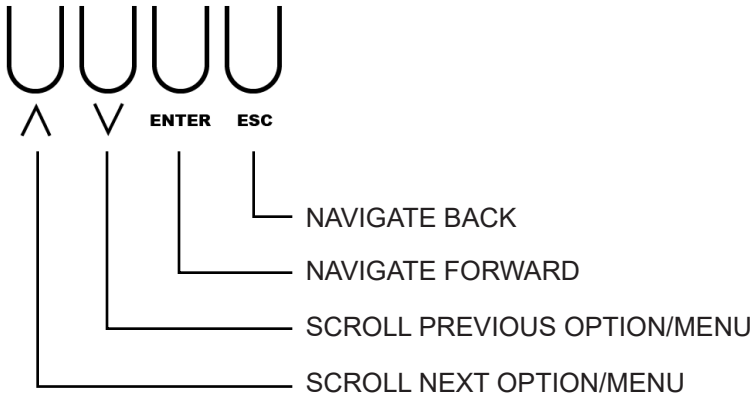
NIGHT SET BACK HOURS

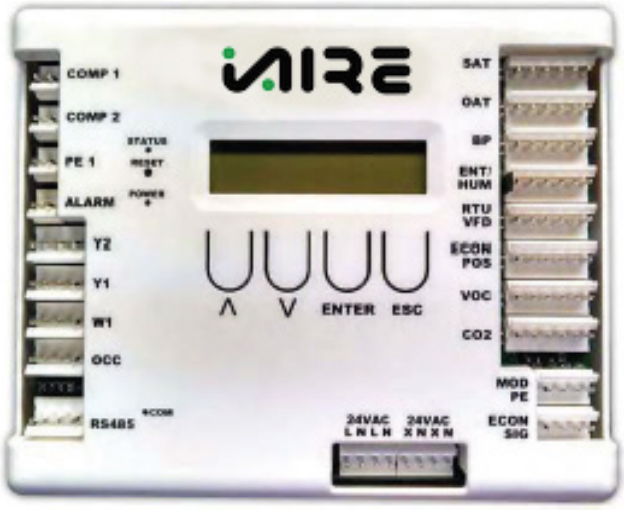
Allows the occupant to set a schedule across the 7 day, 24 hour week to schedule set back temperatures at night to conserve energy.

UNOCCUPIED HOURS

Allows the occupant to set a schedule across the 7 day, 24 hour week to schedule the unit off to conserve energy.

NAVIGATING ON AN iAIRE CONTROLLER





POWER ON THE CONTROLLER AND THE FIRST MENU IS **STATUS MENU**. TO NAVIGATE THROUGH THE OPTIONS, PRESS THE **UP ARROW** KEY. PRESS **ENTER** TO MAKE CHANGES IN ANY SUB MENU. TO GO BACK TO THE MAIN STATUS MENU, PRESS THE **ESC** BUTTON.

THE IAIRE CONTROLLER IN THERMOSTAT CONTROLLED ULTRADRY IS USED TO CONTROL THE COMPRESSOR VFD. THE SYSTEM IS TRYING TO CONTROL THE SYSTEM TO HAVE A CONSTANT SUCTION PRESSURE TO THE COMPRESSOR. THE PRESSURE IS USER SET.

MENU SCREENS BEGIN ON THE FOLLOWING PAGE.

STATUS MENU

COMP 1 STATUS

Comp 1 OFF
RANGE: OFF or Fan Speed (Slow) %

LIQUID PRESSURE STATUS (LIQUID CONFIG ONLY)

Heat: ***PSI
Cool: ***PSI
RANGE:
0-999 PSI

NOTE: Select Config Type in Version/Config Menu --> Config Settings-->

SUCTION PRESSURE STATUS (SUCTION CONFIG ONLY)

Heat: ***PSI
Cool: ***PSI
RANGE:
0-999 PSI

NOTE: Set Pressure Ctrl Operation (Default: Suction 1 SP)

OUTSIDE AIR TEMP STATUS

Outside Temp: ***.* F

INPUT 1 STATUS

Y1: 0
O/W1:0
RANGE: 0 = OFF / 1 = ON

ALARM STATUS

Raw: **** (Range: 0000-9999
Volt: *.* (Range: 0.0 - 9.9V)
Status: OK (Range: OK or Fault)

DEFROST STATUS

Defrost Off, Time to OAT Chk 3600S

TEST MODE MENU

TEST MODE ENABLE/DISABLE

DEFAULT: Test Mode: Disabled

AO1 TEST

AO1 output ***%
Default: 000%
Range: 0-100%

AO2 TEST

AO2 output ***%
Default: 000%
Range: 0-100%

DO1 TEST

DO1 output OFF
Default: OFF
Range: On / Off

DO2 TEST

DO2 output OFF
Default: OFF
Range: On / Off

DO3 TEST

DO3 output OFF
Default: OFF
Range: On / Off

DO4 TEST

DO4 output OFF
Default: OFF
Range: On / Off

SETPOINT MENU

COOL PRESSURE SETPOINT

Cool Press. SP ***
Default: 170
Range: 0-450

DEFROST START TEMP

Def Start Temp **F
Default: 45F
Range: 0-50F

DEFROST RUN TIME

Def Run Time ** Min
Default: 05 Min
Range: 1-30 Min

HP RUN TIME

HP Run Time ** Min
Default: 60 Min
Range: 05-90 Min

CRANKCASE SETPOINT

Crankcase SP **F
Default: 45F
Range: 0-55F

COMPRESSOR START SPEED

Comp. Setpoint ***%
Default: 078%
Range: 039-100%

COMPRESSOR LOW LIMIT

Comp. Setpoint ***%
Default: 075%
Range: 001-100%

LOW LIMIT TIME

Low Limit Time *** Min
Default: 030 Min
Range: 001-120 Min

OIL RETURN TIME

Override Time ** Min
Default: 03
Range: 00-60 Min

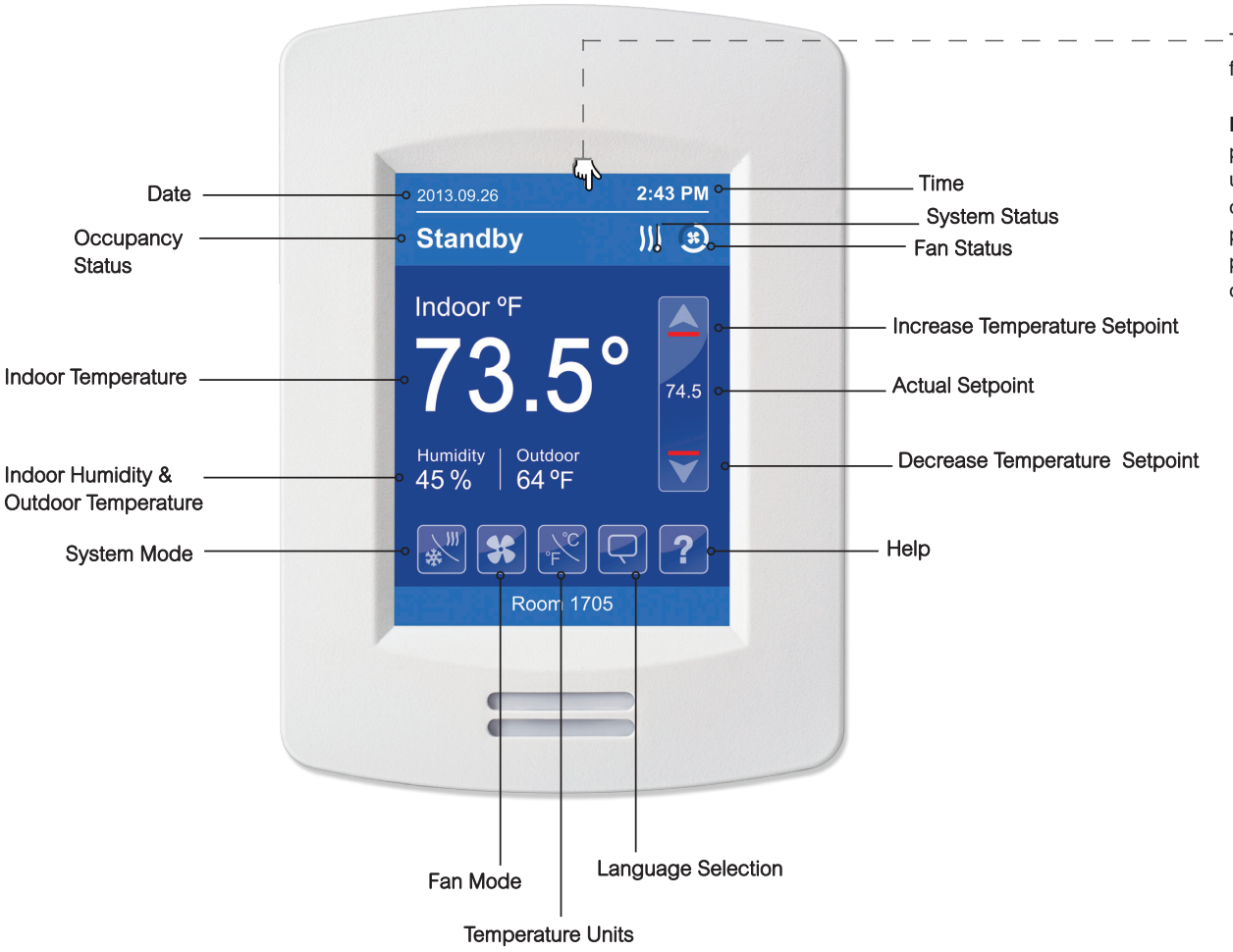
VERSION/CONFIG MENU

VERSION *.**

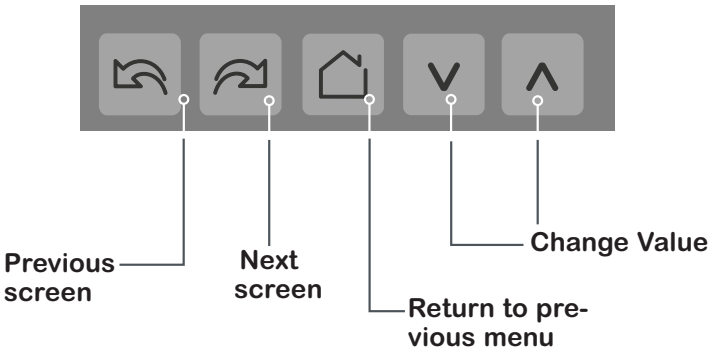
CONFIG SETTINGS

Controller Mode Configuration:
Res HP (Enabled)
Range: Res HP / Res Cool / Commercial
Configure Sec X Min:
# of Seconds per Min **
Range: 10 - 60
Oil Return:
Oil Return Off Enabled
Range: On / Off
BAS Config:
No BAS (Enabled)
Range:
No BAS
Yes, BAS Active
Load Defaults:
Are You Sure????:
Set Fast Rate:
X * .25 Sec
*** <setting>
Default: 002
Range: 001 - 100
Set Slow Rate:
X * .25 Sec
*** <setting>
Default: 010
Range: 001 - 50
Set Slow Point:
Slow Point ***
Default: 020
Range: 0-100%
Set Pressure Ctrl Operation:
Suction 1 SP [Enabled]
Range:
Liquid / Suction 1 SP

NAVIGATING ON VICONICS THERMOSTAT:

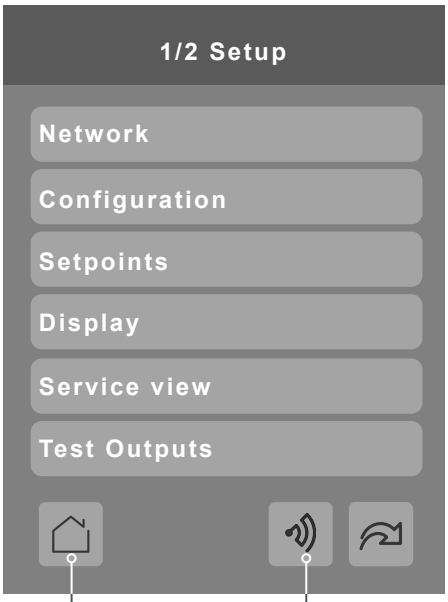


ADVANCED MENU NAVIGATION:



ADVANCED MENU

SETUP MENUS:



Return to previous menu

Discover Mode shows wireless ZigBee network. Icon not shown if ZigBee communication module not installed

THERMOSTAT MOD HEAT

DEFAULT SETTINGS TABLE:

SETUP OPTION	SUB-OPTION	PAGE	MENU OPTIONS	DEFAULT SETTING
Network	-	1/1	Onboard prot.	None
			Optional prot.	None
			Wired protocol	BAC MSTP
	BACnet Network	1/2	COM address	254
			Network units	Imperial
			Network lang.	English
			Baud rate	Auto
			BACnet status	Offline
			BACnet PRate	4
			BACnet Network Code	86253
Configuration	-	1/11	UI16 config	None
			UI17	None
			UI19	None
			UI20	RS
			Setpoint func	Attach SP
			Mode button	Normal

DEFAULT SETTINGS TABLE: (CONT.)

SETUP OPTION	SUB-OPTION	PAGE	MENU OPTIONS	DEFAULT SETTING
Configuration (cont.)	-	2/11	Fan Cont. Heat	On
			Fan Delay	On
			Standby Mode	Absolute
			Standby Diff.	4.0° F
			Power-up Delay	10 Seconds
			Occupancy Source	Motion
	-	3/11	Standby Time	0.5 hrs
			Unoccupied Time	0.0 hrs
			Temp. Occ. Time	2.0 hrs
			Temp. Sensor	Internal
			Deh. Hysteresis **(*1)**	2% RH
			Dehum. Function **(*2)**	Enable
	-	4/11	Cooling CPH **(*3)**	4
			Heating CPH **(*4)**	4
			Frost Protection	Off
			B01 Aux. Configuration	No
			Anti Short Cycle	2 Minutes
			Min Supply Heat	64.0° F
	-	5/11	Prop. Band	3
			Heat Stages	2
			Cool Stages	2
			Econo. Config.	Off
			Changeover SP	55.0° F
			Mech. Cooling	Off
	-	6/11	Heat Lockout	120.0° F
			Cool Lockout	-40.0° F
			Discharge HL	120.0° F
			DIscharge LL	45.0° F
			SH Lockout	32.0° F
			FA Range	0 CFM
	-	7/11	Econo. Min. Pos.	0%
			Econo. Max. Pos.	100%
			Min. Fresh Air	0 CFM
			Max. Fresh Air	0 CFM
			Min. CO2	800 PPM
			Max. CO2	1200 PPM
	-	8/11	Application	Rooftop
			High BP	90.0 ° F
			Low BP	-12.0° F
			Comfort Or Economy	Comfort
			Reversing Valve	0
			Comp. Interlock	Off

*** NOTE: See notes on page 19.**

DEFAULT SETTINGS TABLE: (CONT.)

SETUP OPTION	SUB-OPTION	PAGE	MENU OPTIONS	DEFAULT SETTING
Configuration (cont.)	-	9/11	Main Password	0
			User Password	0
			Schedule Menu	Enabled
			USB Access	Enabled
			Smart Recovery	Off
	-	10/11	Calibration Temp.	0.0 ° F
			Calibration OS Temp.	0.0 ° F
			Calibration Humidity	0.0% RH
			RH Sensor	Internal
			CO2 Source	Local
	Reinitialization	11/11	Erase All?	No
			Are You Sure?	No
Setpoints	-	1/2	Unoccupied Cool	80.0 ° F
			Standby Cool	78.0 ° F
			Occupied Cool	74.5 ° F
			Occupied Heat	71.5 ° F
			Standby Heat	69.0 ° F
			Unoccupied Heat	62.0 ° F
	-	2/2	Default Heat	72.0 ° F
			Min. Deadband	3.0 ° F
			Max. Heating	90.0 ° F
			Min. Cooling	54.0 ° F
			Supply Air SP	55.0 ° F
			Dehum. SP	50% RH
Display	-	1/3	User HMI	0
			Color	Orange
			Main Display	Temp.
			Standby Screen	No
			Lock Screen	No
			Contrast	-2
	-	2/3	Language	English
			Units	F
			Low Backlight	60%
			Night Backlight	5%
			RH Display	Disabled
			CO2 Display	Disabled
	-	3/3	Fan Status	Enabled
			SYstem Status	Enabled
			Help Button	Enabled

DEFAULT SETTINGS TABLE: (CONT.)

SETUP OPTION	SUB-OPTION	PAGE	MENU OPTIONS	DEFAULT SETTING
Service View	-	1/10	Room Temperature	89.5° F
			UI20 Temperature	-40.0° F
			Outdoor Temperature	-40.0° F
			Supply Temperature	40.0° F
	-	2/10	Effective Occ.	Occupied
			PI Cool Demand	100%
			PI Heat Demand	0%
			Cool Dem. Limit	0%
			Heat Dem. Limit	0%
			Econo. Demand	0%
	-	3/10	UI16 Binary	Not Activated
			UI17 Binary	Activated
			UI19 Binary	0.0 Vdc
			Airflow Level	0 CFM
	-	4/10	Window Alarm	Off
			Service Alarm	Off
			Filter Alarm	Off
			CO2 Alarm	Off
			Low Air Alarm	Off
	-	5/10	Frost Alarm	Off
			Recovery	Off
			Local Motion	No Motion
			Deh. Status	Off
			Room Humidity	77% RH
	-	6/10	UO9 Configuration	Analog
			UO10 Configuration	Analog
			UO11 Configuration	Analog
			UO12 Configuration	Analog
	-	7/10	UI19 Type	Voltage
			UI20 Type	Voltage
			UI22 Type	Therm.
			UI23 Type	Therm.
			UI24 Type	Voltage
	-	8/10	CO2 Eff. Source	None
			CO2 Err. Code	0x0000
			CO2 Level	0 PPM
			CO2 FW Rev.	-
			CO2 S/N	-
	-	9/10	Eff. System Mode	Cool
			Eff. Setpoint	71.5° F

DEFAULT SETTINGS TABLE: (CONT.)

SETUP OPTION	SUB-OPTION	PAGE	MENU OPTIONS	DEFAULT SETTING
Test Outputs	-	1/2	BO1 Aux. Out	Off
			G Fan Status	On
			Y1 Status	On
			Y2 Status	On
			W1 Status	Off
			W2/OB Status	Off
	-	2/2	UO10 Analog	0.0 Vdc
			UO11 Analog	0.0 Vdc
			UO12 Binary	Off
Language Selection	-	1/4	French	Disabled
			Spanish	Disabled
			Chinese	Disabled
			Russian	Disabled
			Arabic	Disabled
			Czech	Disabled
	-	2/4	Danish	Disabled
			Dutch	Disabled
			Finnish	Disabled
			German	Disabled
			Hebrew	Disabled
			Hungarian	Disabled
	-	3/4	Indonesian	Disabled
			Italian	Disabled
			Japanese	Disabled
			Norwegian	Disabled
			Polish	Disabled
			Portugese	Disabled
	-	4/4	Slovak	Disabled
			Swedish	Disabled
			Turkish	Disabled
Clock - Schedule	Clock	1/2	Time Format	AM-PM
			Time	10:43 AM
			Year	2000
			Month	Jan.
			Day	6
			Weekday	Saturday
		2/2	Time Source	None
	Schedule	1/1	Occupied 1	--:--
			Unoccupied 1	--:--
			Occupied 2	--:--
			Unoccupied 2	--:--
			Occupied 3	--:--
			Unoccupied 3	--:--
	Options	1/1	Occupancy Cmd	Occupied
			Schedule Type	7 Days

DEFAULT SETTINGS TABLE: (CONT.)

SETUP OPTION	SUB-OPTION	PAGE	MENU OPTIONS	DEFAULT SETTING
ADR	-	1/1	Permission	Off
			Shed Status	Off
			Shed Demand	Off
			Shed Offset	4.0 °F
			Shed Override	Off
Lua (Custom menu containing VFD speed setpoint and HGRH min. and max.)	-	2/4	Program Cmd	Run
			Program Status	Running
			Program Error	No Error
	-	3/4	VFDSpeed %	95
			HGRH Min. %	2
			HGRH Max. %	75
			SatOffsetDeg **(*5)**	3
			DehClgOffset **(*6)**	0
			SatPBand	-
	-	4/4	OatHumid%	0
			Param. H AV226	0
			Param. I AV227	0
			Param. J AV228	0
			Param. K AV229	0
			Param. L AV230	0

*** NOTES:**

1: Dehumidification deadband. Dehum Enables at setpoint then stays active to Dehum SP – Deh. Hysteresis

2: Enable = Hot Gas Reheat Enable - Disable = Hot Gas Reheat Disable

3: Number of maximum cycles per hour

4: Number of maximum cycles per hour

5: Hot gas reheat or “dehumidification” = “active”. This is the DAT setpoint offset from room temperature. If SATOffsetDeg = 1 and room temperature setpoint = 75, when in dehumidification discharge air setpoint will be equaled to 75degF minus 1, thus 74 degF.

Setpoint to be 0 to 10 deg offset.

6: This is how far past setpoint it will still enable and keep dehumidification active. This allows to enable and stay in dehumidification below room temperature setpoint.

THERMOSTAT CONTROL - BACNET POINTS LIST

OBJECT ID	Description	Point Type	BacNET Name	BacNET Object	Object Type	Read Access
1	Occupancy Command	MULTI	Occupancy Command	MULTI_STATE_VALUE:10	MSV	READ / WRITE
2	Control System Mode	MULTI	System Mode	MULTI_STATE_VALUE:16	MSV	READ / WRITE
3	Fan Control Mode	MULTI	Fan Mode	MULTI_STATE_VALUE:17	MSV	READ / WRITE
4	Thermostat Time Source	MULTI	Time Source	MULTI_STATE_VALUE:325	MSV	READ / WRITE
5	Occupancy Status	MULTI	Effective Occupancy	MULTI_STATE_VALUE:33	MSV	READ ONLY
6	Supply/Discharge Air Temp	ANALOG	UI22 Supply Temperature	ANALOG_VALUE:102	AI	READ ONLY
7	Thermostat Room Temperature	ANALOG	Room Temperature	ANALOG_VALUE:100	AI	READ / WRITE
8	VFD Speed Setpoint	ANALOG	Lua Parameter A (AV25)	ANALOG_VALUE:25	AO	READ / WRITE
9	User Password (change SP & Mode)	ANALOG	User Password	ANALOG_VALUE:57	AI	READ / WRITE
10	Main Password (change configuration)	ANALOG	Main Password	ANALOG_VALUE:56	AI	READ / WRITE
11	Dehumidifcation Setpoint	ANALOG	Dehumidifcation Setpoint	ANALOG_VALUE:71	AI	READ / WRITE
12	Occupied Cool Setpoint	ANALOG	Occupied Cool Setpoint	ANALOG_VALUE:40	AI	READ / WRITE
13	Occupied Heat Setpoint	ANALOG	Occupied Heat Setpoint	ANALOG_VALUE:39	AI	READ / WRITE
14	Unoccupied Cool Setpoint	ANALOG	Unoccupied Cool Setpoint	ANALOG_VALUE:44	AI	READ / WRITE
15	Unoccupied Heat Setpoint	ANALOG	Unoccupied Heat Setpoint	ANALOG_VALUE:43	AI	READ / WRITE
16	Hot Gas Reheat Output	ANALOG	UO12 Analog Output	ANALOG_OUTPUT:124	AO	READ ONLY
17	Dehumidificaiton Status	ANALOG	Dehumidificaiton Status	BINARY_VALUE:38	BO	READ ONLY
18	W2 or OB Output Status	ANALOG	W2/OB Status	BINARY_OUTPUT:29	BO	READ ONLY
19	W1 Output Status	ANALOG	W1 Status	BINARY_OUTPUT:28	BO	READ ONLY
20	Y2 Output Status	ANALOG	Y2 Status	BINARY_OUTPUT:27	BO	READ ONLY
21	Y1 Output Status	ANALOG	Y1 Status	BINARY_OUTPUT:26	BO	READ ONLY
22	G Output Status	ANALOG	G Fan Status	BINARY_OUTPUT:25	BO	READ ONLY
23	Fan Input Status	ANALOG	UI16 Binary Input	BINARY_INPUT:29	BI	READ ONLY
24	Thermostat Room Humidity	ANALOG	Room Humidity	ANALOG_VALUE:103	AO	READ ONLY

9. Troubleshooting

9.1. Control logic description

1. Display board button function

▲ button：check button、setting button“+”

▼ button：check button、setting button “-”

■ button：

A、Short press: force cooling mode， display board will show “dH”；

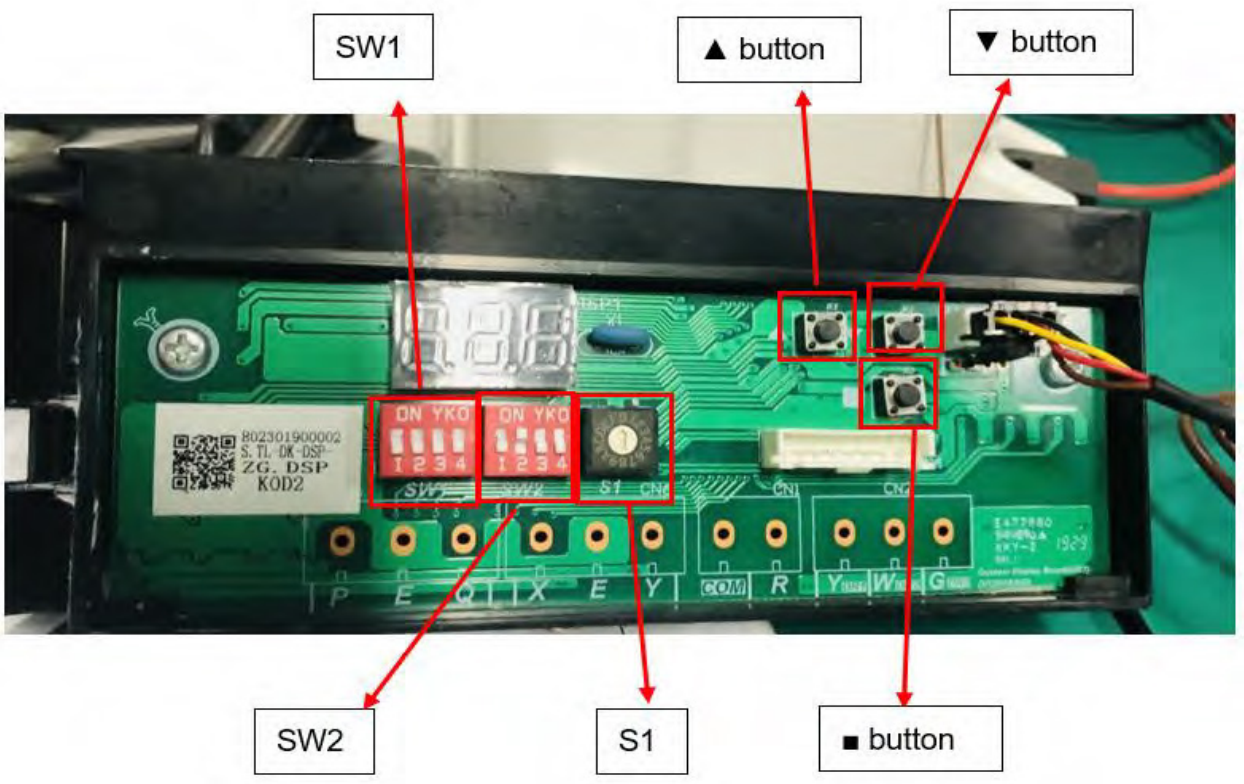
B、Long press： entering test mode, and you can change unit parameter manually：

When it show “Sc.”， then you can set Compressor Frequency manually, using “▲” and “▼”to change frequency.

Then press “■” button, display board will show “SF.”， then you can set fan speed manually, using “▲” and “▼”to change fan speed.

Then press “■” button, display board will show “SL.”， then you can set expansion valve open degree manually, using “▲” and “▼”to change expansion valve opening degree.

Then press “■” button, display board will show “SP.”，then you can set PFC switch manually,（0 means OFF，1 means ON）， using “▲” and “▼” to set PFC switch ；



Residential Split Troubleshooting (cont'd)

SW1:

1st bit	2nd bit	3rd bit	4th bit
Outdoor unit control logic(target evaporator temperature and target condensation temperature) setting, manufacture only.			ON: EXV throttling in cooling mode OFF: Piston throttling in cooling mode The function will be active after unit power off and power on.

SW2:

1st bit	2nd bit	3rd bit	4th bit
ON: Manually defrost. OFF: Automatic defrost The function will be active immediately after bit change.	ON: Display as Fahrenheit OFF: Display as Celsius The function will be active after unit power off and power on.	Reserved	ON: EXV throttling in heating mode OFF: Piston throttling in heating mode The function will be active after unit power off and power on.

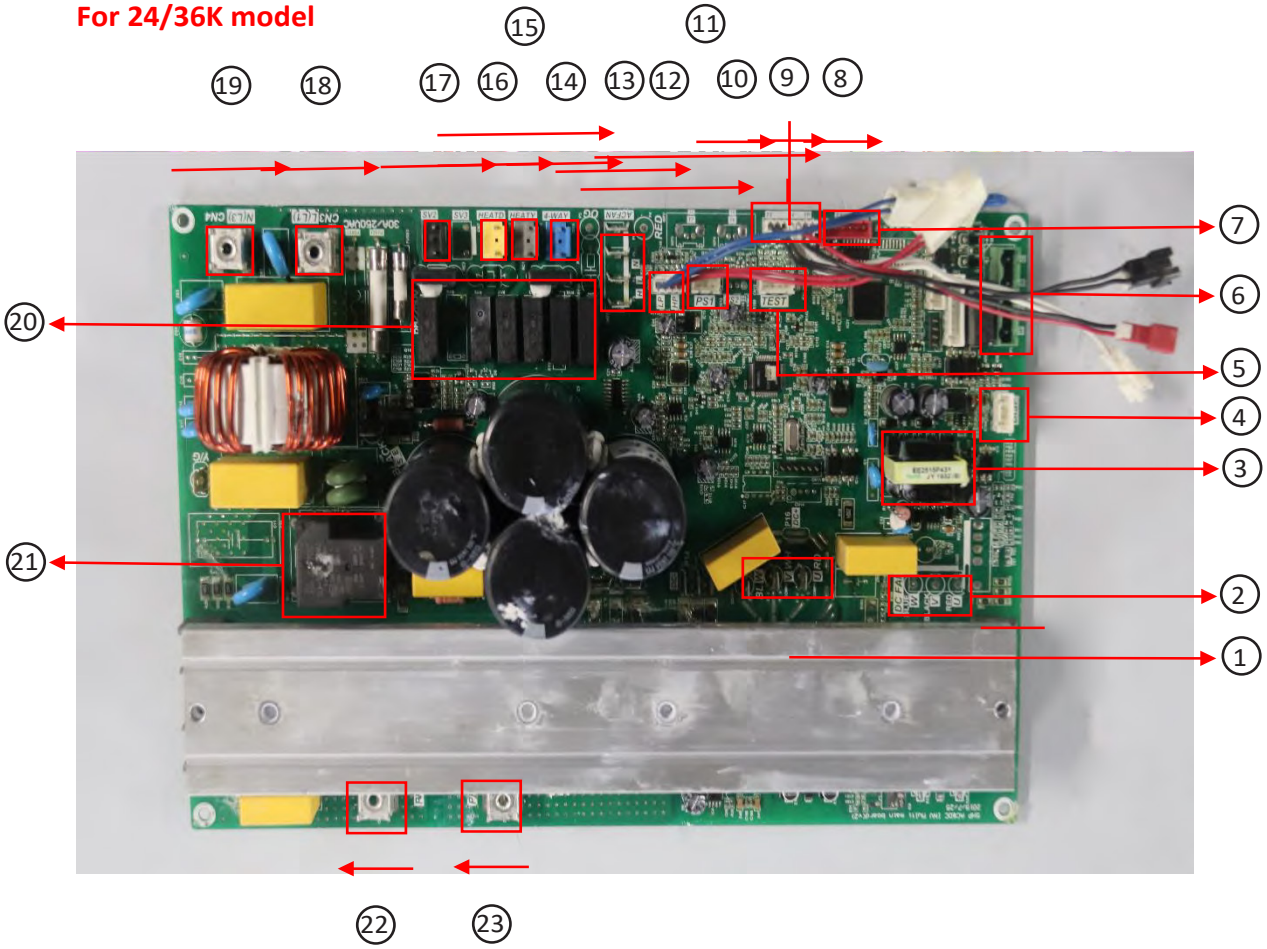
S1: Reserved

Residential Split Troubleshooting (cont'd)

9.2 Parameter point check table

1). Top discharge outdoor unit

For 24/36K model

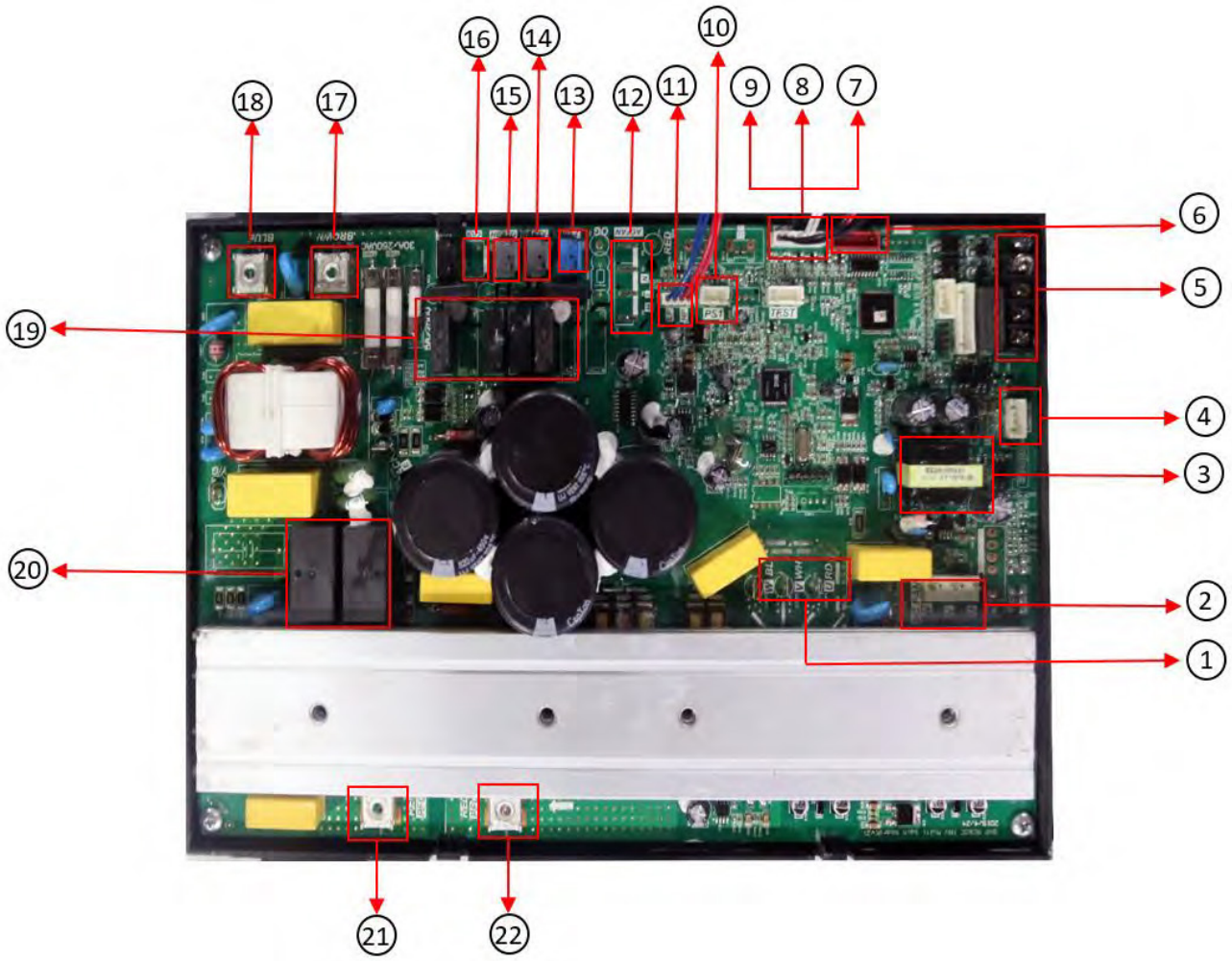


Function description for the corresponding position:

No.	Content	No.	Content
1	Compressor wiring terminal	12	High/Low pressure switch ports
2	DC fan motor wiring terminal	13	AC fan motor wiring terminal
3	Transformer	14	Four-way valve control port
4	Outdoor display board wiring terminal	15	Crankcase Heating zone control terminal
5	Reserved	16	Chassis Electric Heater control terminal
6	24V wire controller interface	17	Solenoid valve2 control terminal
7	EXV drive port	18	Power supply connecting terminal
8	Exhaust temperature sensor port(T5)	19	Power supply connecting terminal
9	Outdoor ambient temperature sensor port(T4)	20/21	Relay
10	Condenser temperature sensor port(T3)	22	Inductor wiring terminal 1
11	Pressure sensors ports	23	Inductor wiring terminal 2

Residential Split Troubleshooting (cont'd)

For 48/60K model



Function description for the corresponding position:

No.	Content	No.	Content
1	Compressor wiring terminal	12	AC fan motor wiring terminal
2	DC fan motor wiring terminal	13	Four-way valve control port
3	Transformer	14	Crankcase Heating zone control terminal
4	Outdoor display board wiring terminal	15	Chassis Electric Heater control terminal
5	24V wire controller interface	16	Solenoid valve control terminal
6	EXV drive port	17	Power supply connecting terminal
7	Exhaust temperature sensor port(T5)	18	Power supply connecting terminal
8	Outdoor ambient temperature sensor port(T4)	19	Relay
9	Condenser temperature sensor port(T3)	20	Relay
10	Pressure sensors ports	21	Inductor wiring terminal 1
11	High/Low pressure switch ports	22	Inductor wiring terminal 2

Residential Split Troubleshooting (cont'd)

9.3 Error codes

CODE	FAULT DESCRIPTION
E4	T4 Outdoor ambient temperature sensor error
E5	T5 Discharge temperature sensor error
E6	T3 Condenser temperature sensor error
E9	AC under voltage protection
E10	EEPROM error
E12	IPM modular sensor error
E13	HLP Pressure sensor error
E14	T3 or T5 sensor disconnect error
E15	High pressure switch error
H0	Communication error of main chip and IPM chip
H1	T3 sensor high temperature error(In cooling mode) (20 times P5 error within 180mins)
H2	High pressure switch error(20 times P1 error within 150 mins)
H3	High pressure abnormal in heating mode (20 times P13 error within 180 mins)
H4	IPM modular high temp error (20 times P8 within 120 mins)
H5	Low pressure error (20 times P2 within 100 mins)
H6	Discharge temperature abnormal error(20 times P4 within 100 mins)
H7	Wet operation error (20 times P12 within 200 mins)
H8	T3 condenser sensor disconnect error (20 times E14 within 100 mins)
H12	Discharge temp sensor disconnect error(20 times E14 within 180 mins)
P1	High pressure protection
P2	Low pressure protection
P3	DC over current protection
P4	T5 Discharge temperature abnormal error
P5	T3 Condenser sensor high temp protection(In cooling mode)
P6	IPM module protection
P8	IPM high temperature protection (Ft)M high temperature protection (Ft)
P9	DC fan motor error
P12	Wet operation error
P13	High pressure abnormal error(In heating mode)
P14	High compression ratio protection
P15	Low compression ratio protection
L1	DC cable bus low voltage protection

Residential Split Troubleshooting (cont'd)

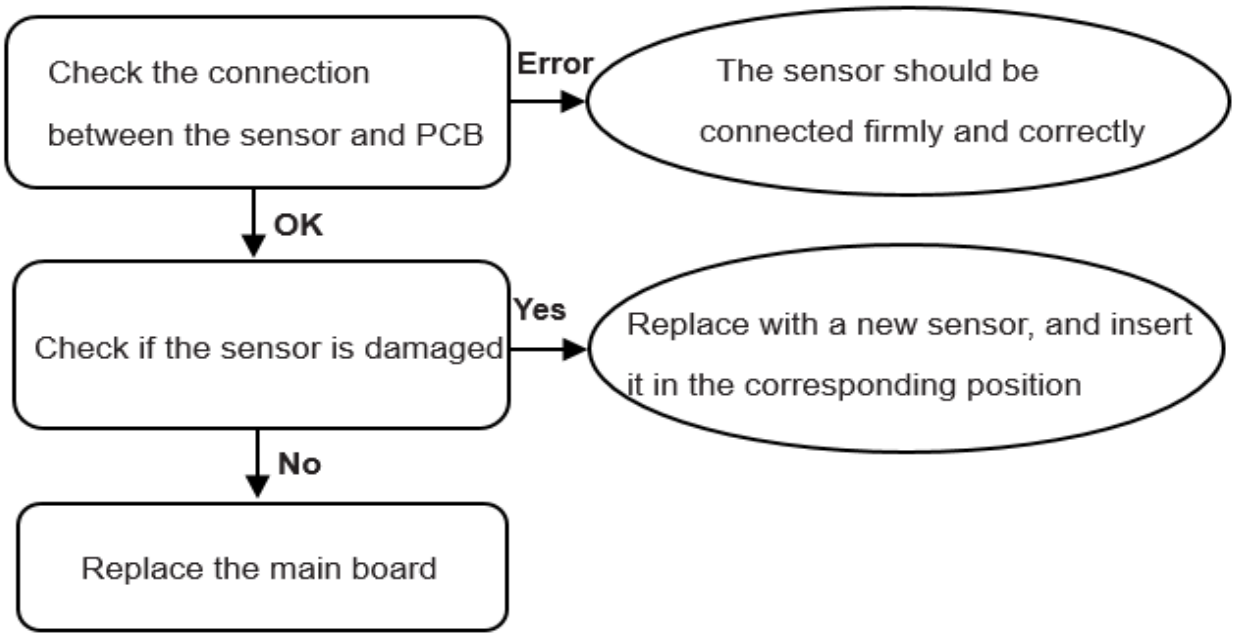
9.3 Error codes continued

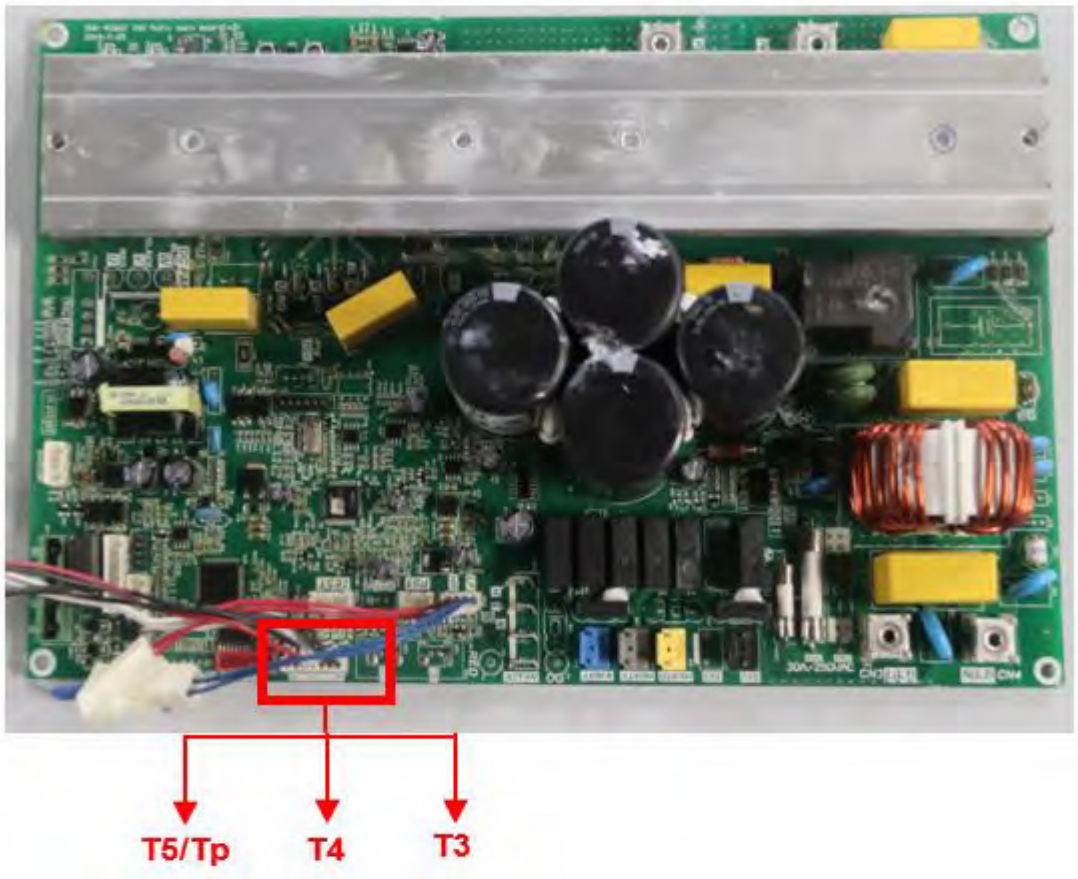
L2	DC cable bus high voltage protection
L4	MCE fault / sync / closed loop
L5	Zero speed protection
L7	Compressor phase loss protection ratio protection
L8	Compressor stalls
L9	Frequency limitation or decline by high pressure
LA	Frequency limitation by voltage
LC	Frequency limitation by condenser temp.
LD	Frequency limitation by discharge temp
LE	Frequency limitation by IPM modular high temp
LF	Frequency limitation by current
d0	Oil return
dF	Defrost
dH	Force cooling

Residential Split Troubleshooting (cont'd)

9.4 Troubleshooting guidelines

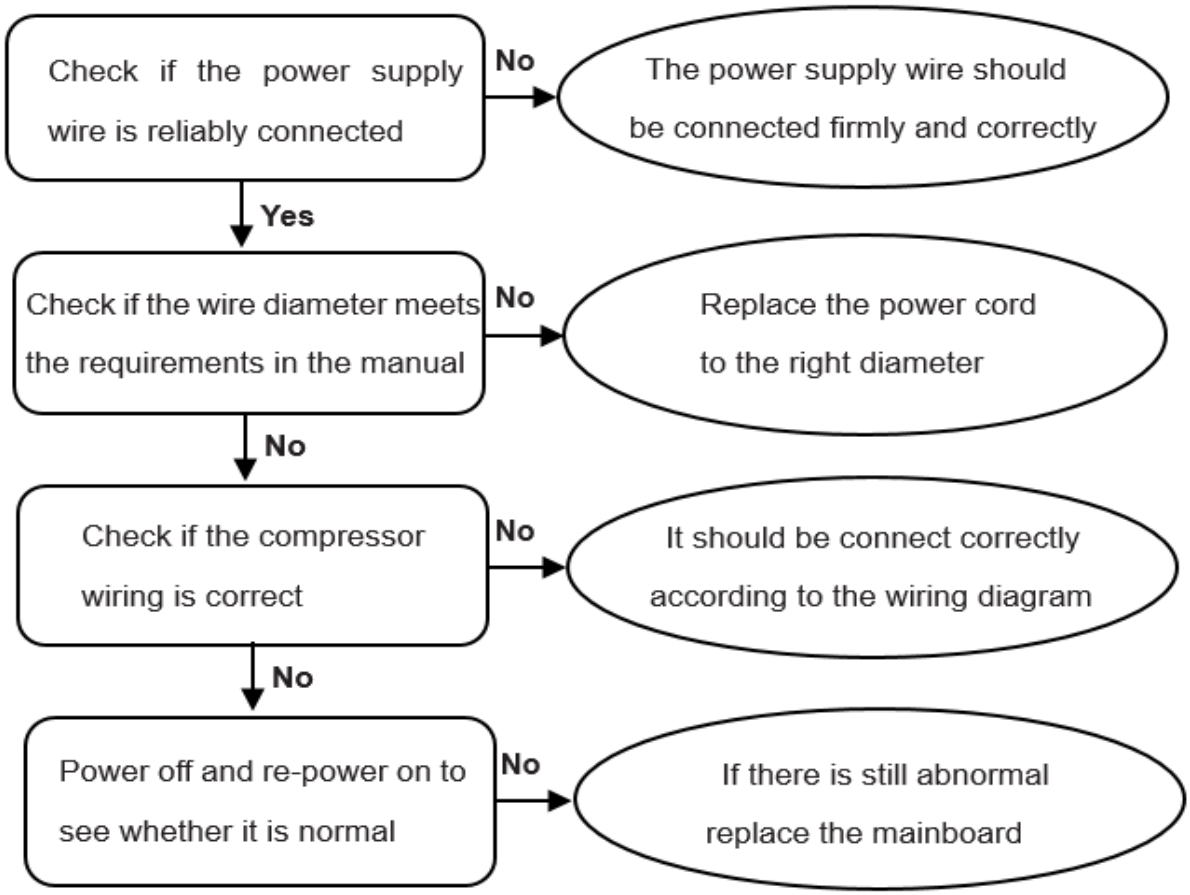
E4/E5/E6 (T4/T5/T3 temperature sensors error)

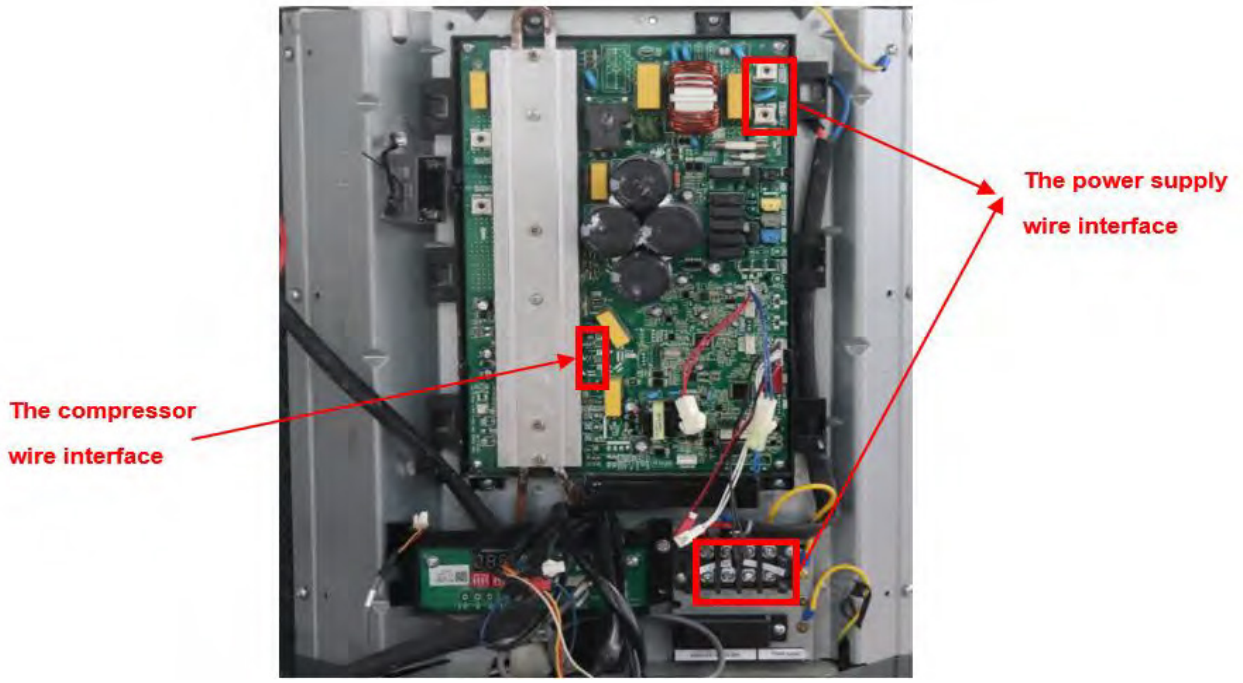




Residential Split Troubleshooting (cont'd)

E9 (AC under voltage protection)





Residential Split Troubleshooting (cont'd)

E10 (EEPROM failure）

Power off and re-power on to see whether it is normal → If there is still abnormal replace the mainboard

E12 (IPM modular sensor error）

Power off and re-power on to see whether it is normal → If there is still abnormal replace the mainboard

E13 (HLP Pressure sensor error)

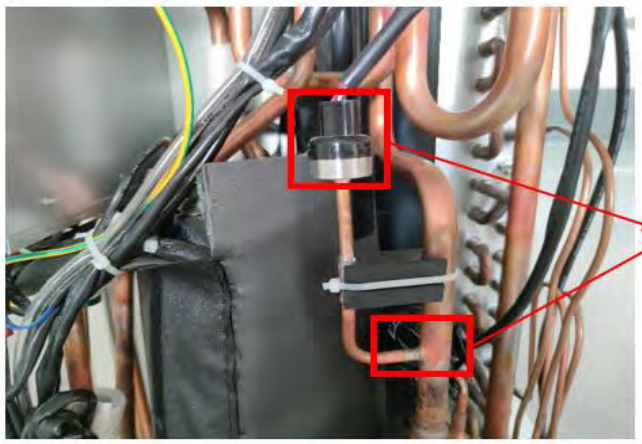
Check the connection between the sensor and PCB → Error → The sensor should be connected firmly and correctly

OK ↓

Measure the value of outdoor unit pressure sensor Compare it with the pressure value of the pressure gauge → If the difference is large, replace with a new sensor, and weld in the correct position

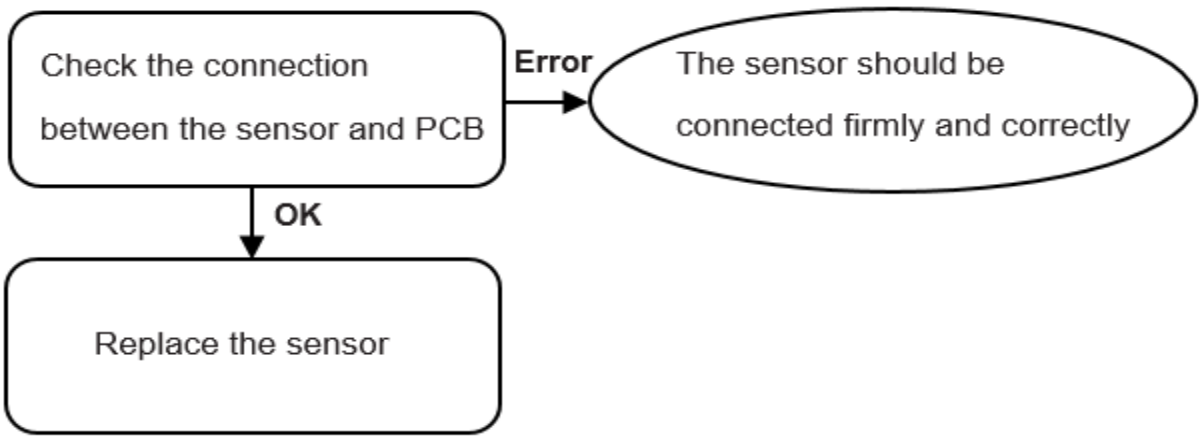
↓

If the difference is small, replace the mainboard

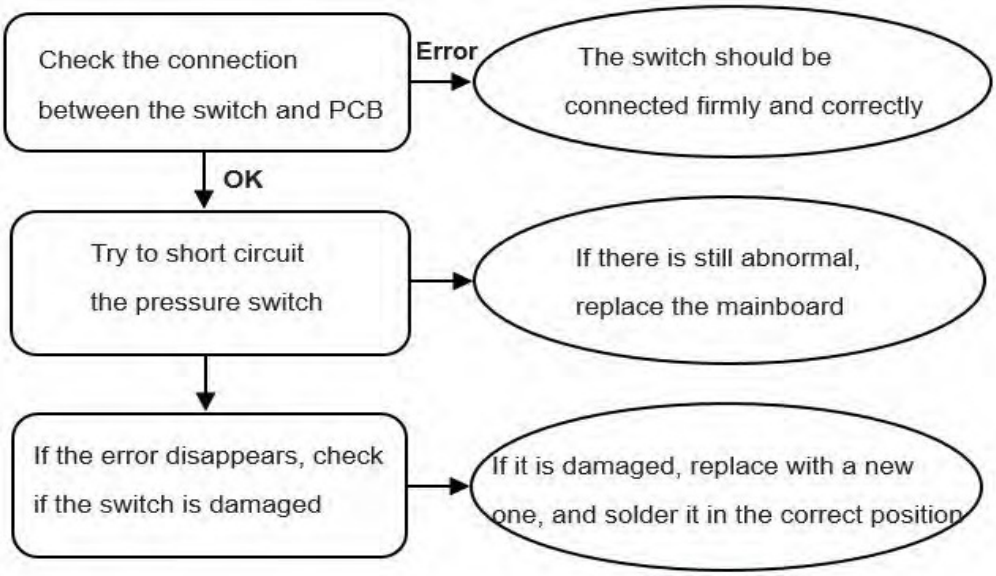


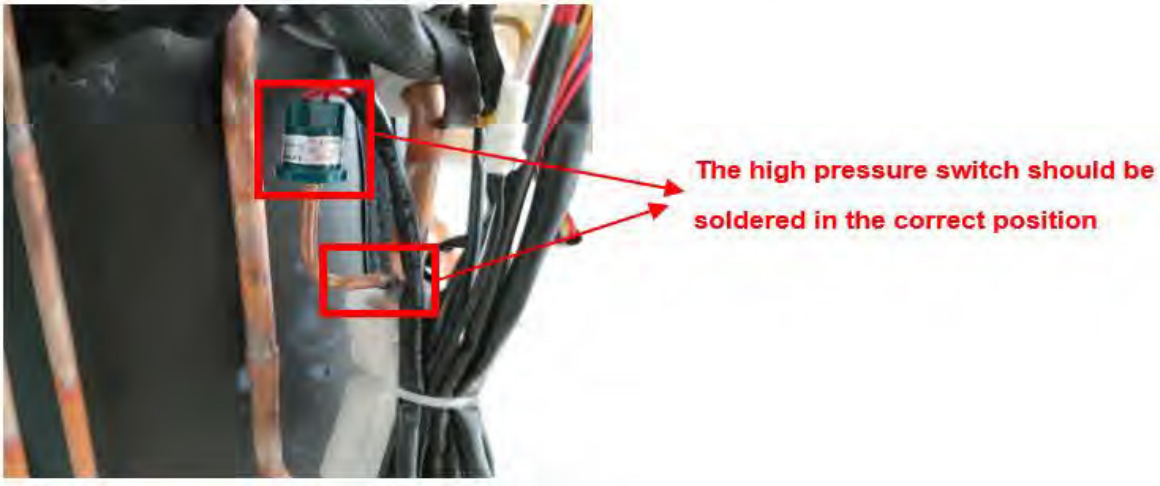
Residential Split Troubleshooting (cont'd)

E14/H8/H12 (T3 or T5 sensor disconnect error)



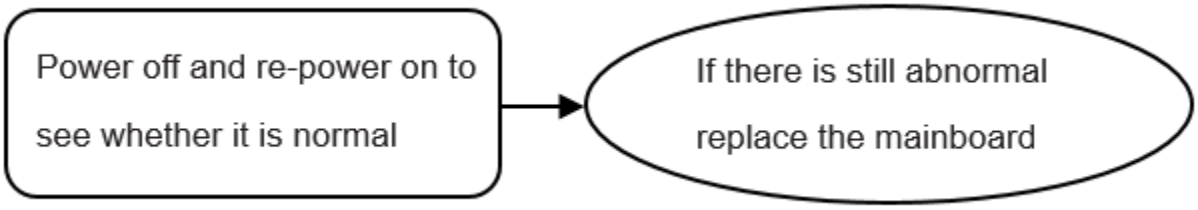
E15 (High pressure switch error)



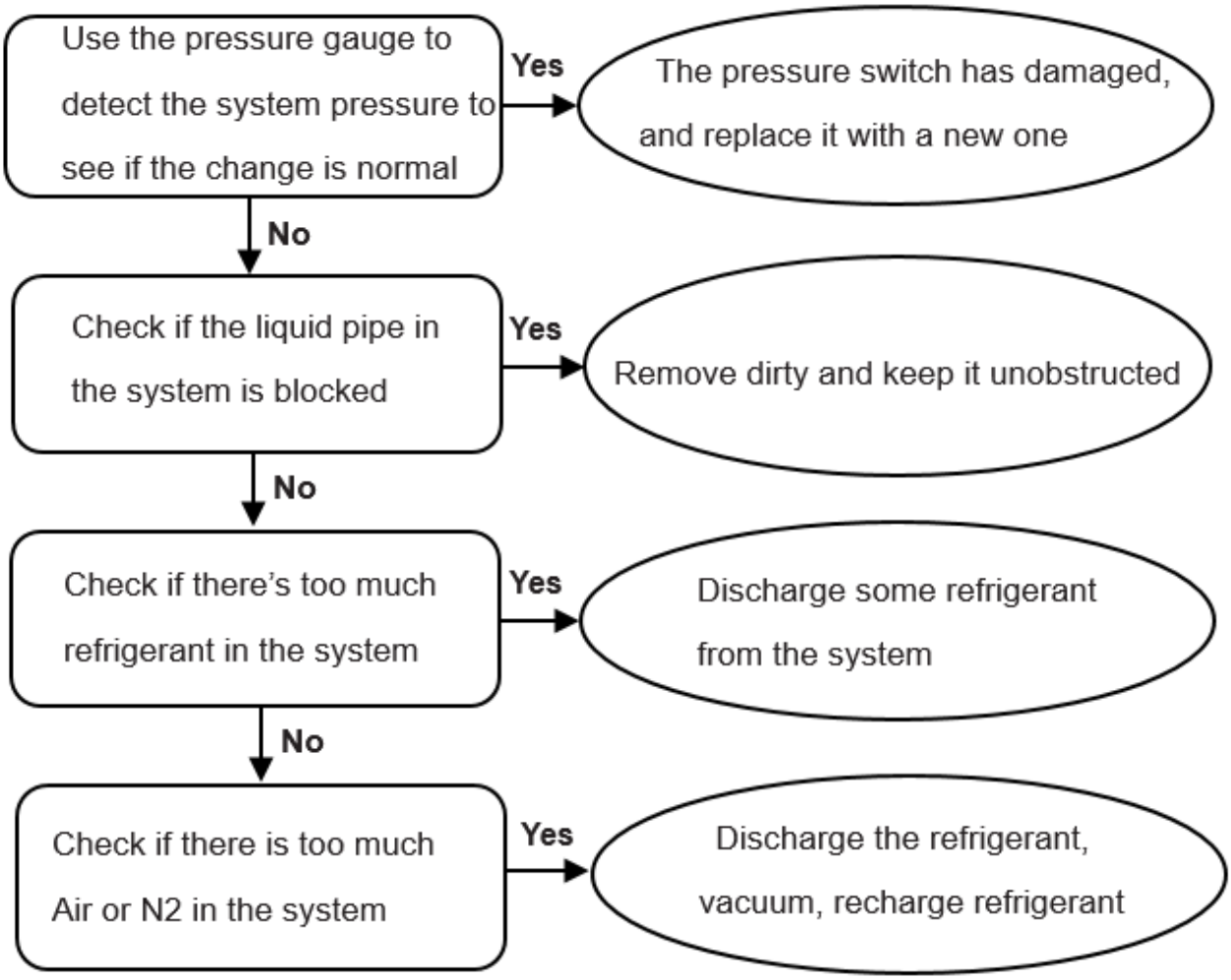


Residential Split Troubleshooting (cont'd)

H0 (Communication error of main chip and IPM chip)

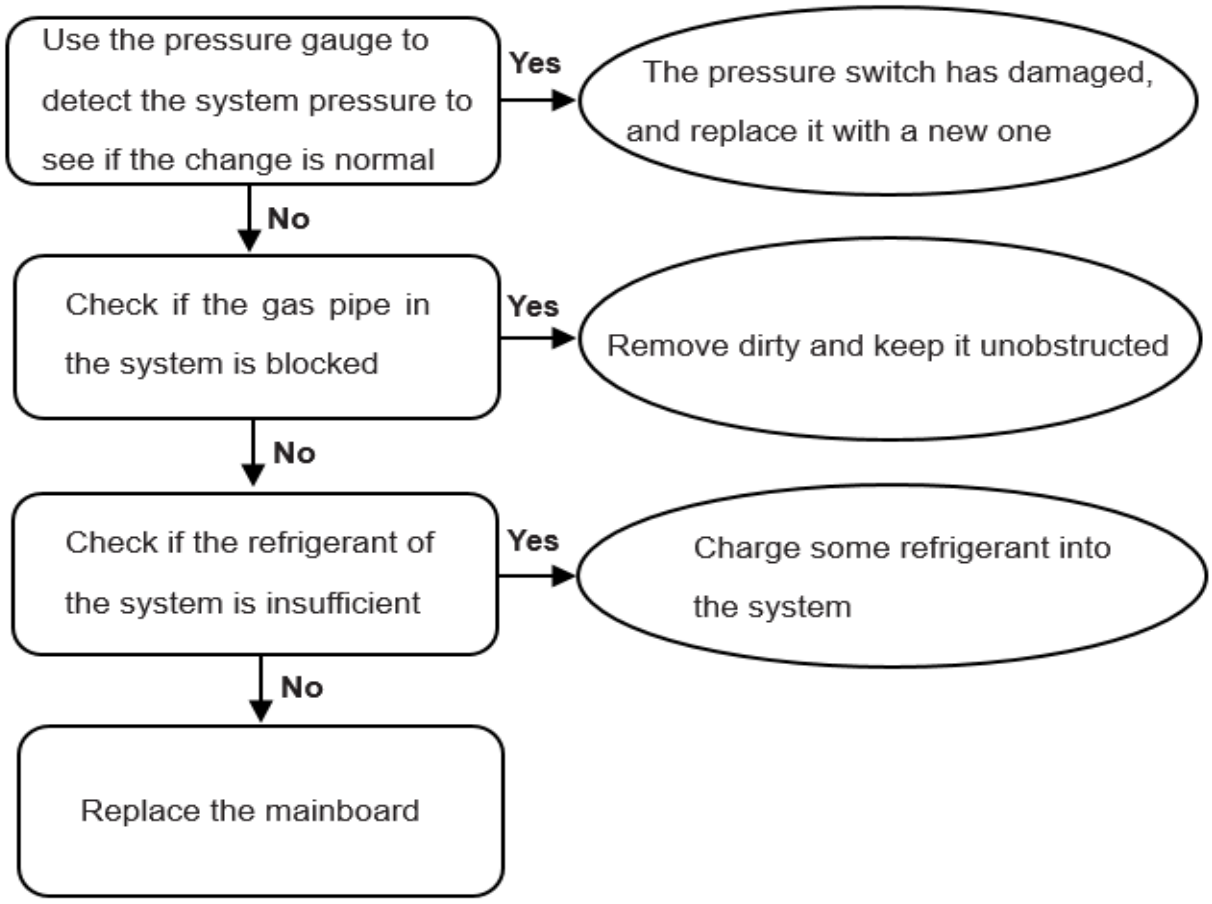


P1/H2 (High pressure switch protection)

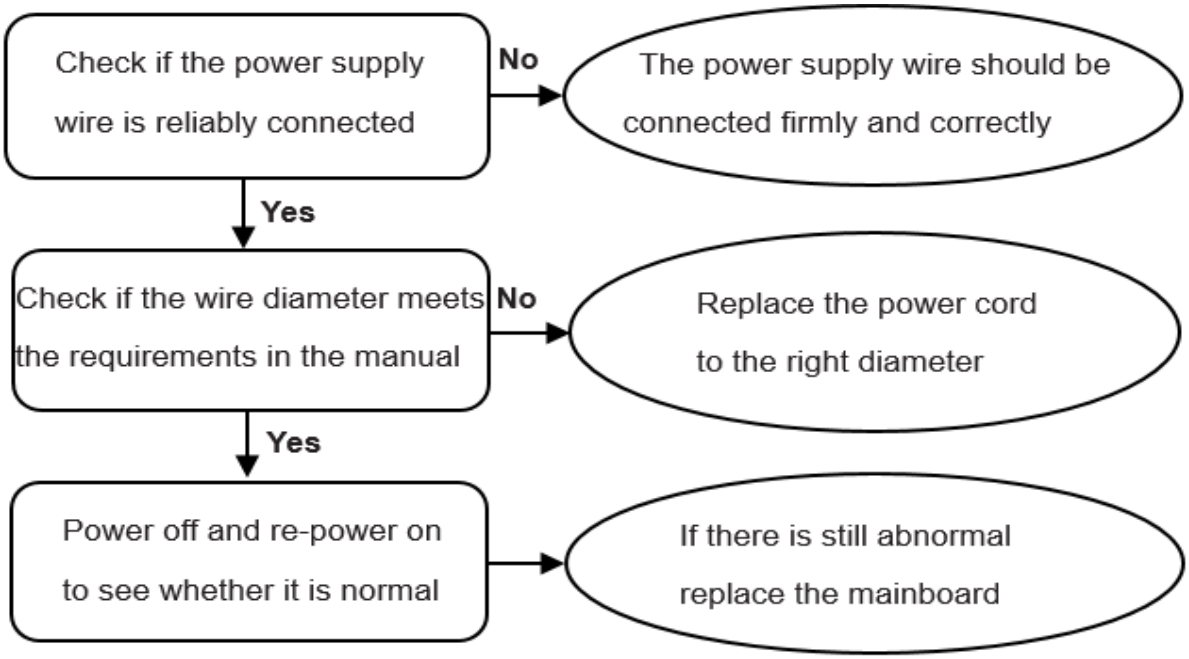


Residential Split Troubleshooting (cont'd)

P2/H5 (Low pressure switch protection)

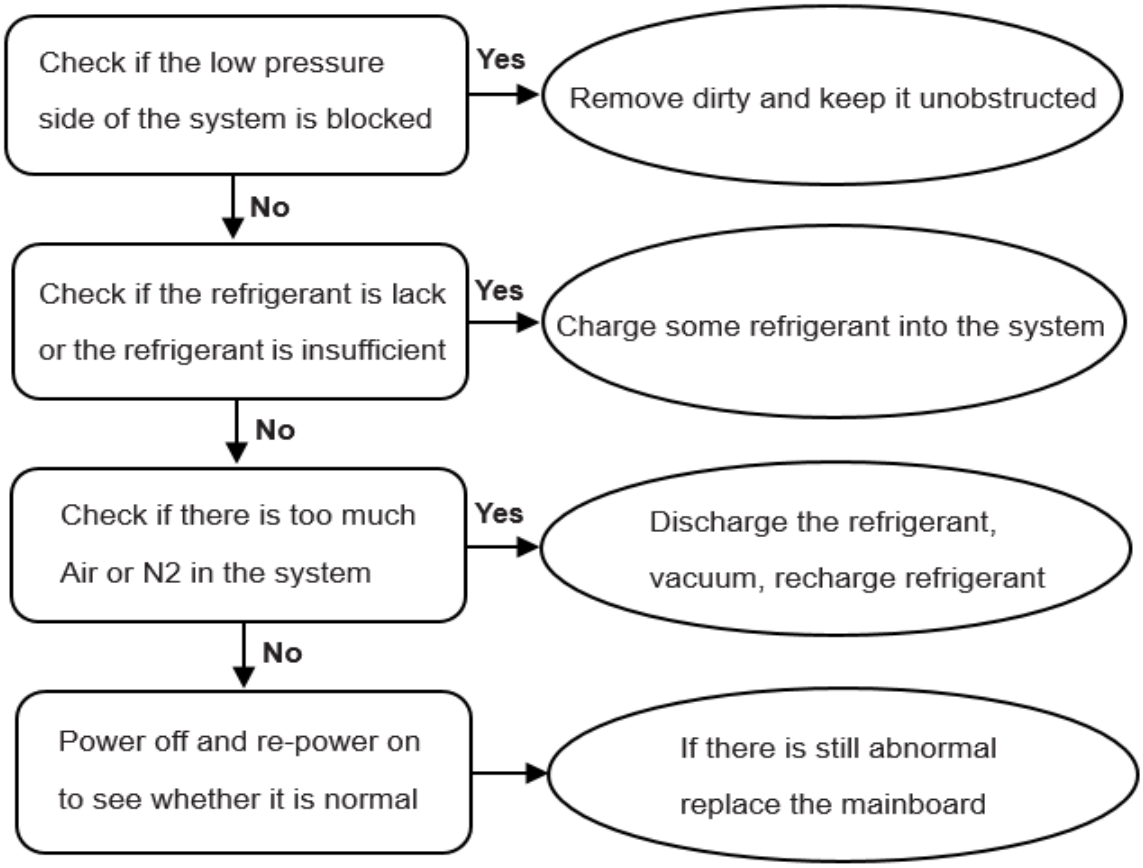


P3(Inverter over current protection)

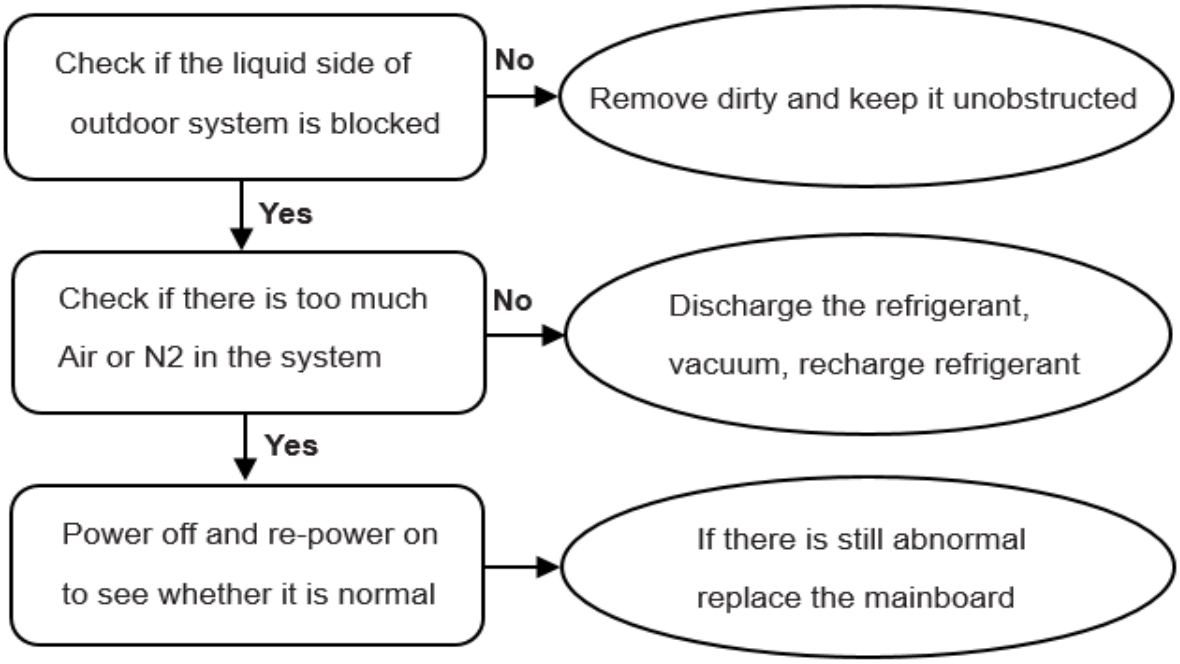


Residential Split Troubleshooting (cont'd)

P4/H6 (T5 Discharge temperature abnormal error)



P5/H1(T3 condenser sensor high temp protection)



Residential Split Troubleshooting (cont'd)

P6 (IPM module protection)

Power off and re-power on to see whether it is normal → If there is still abnormal replace the mainboard

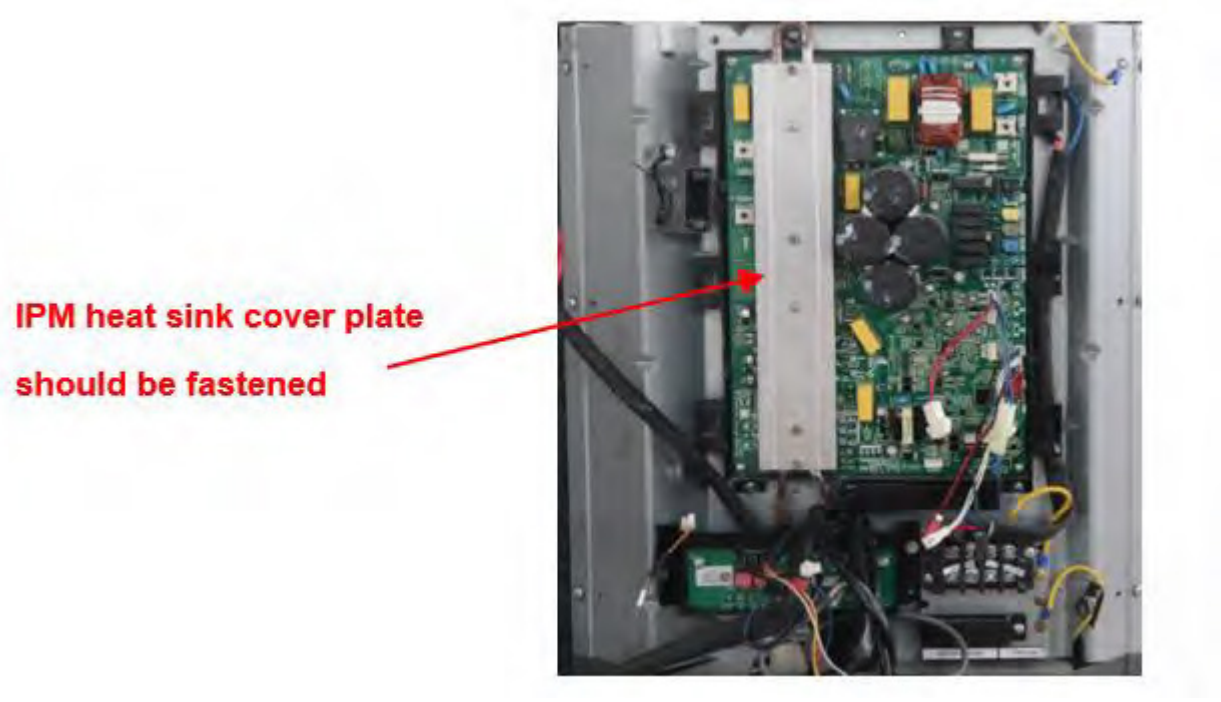
P8/H4 (IPM high temperature protection)

Re-power on to measure the temperature of the IPM board
Observe the temperature change

If the temperature changes normally, but the final temperature is too high, remove the IPM heat sink cover plate, apply heat dissipation silicone grease evenly again, then tighten the screws to fasten the cover plate

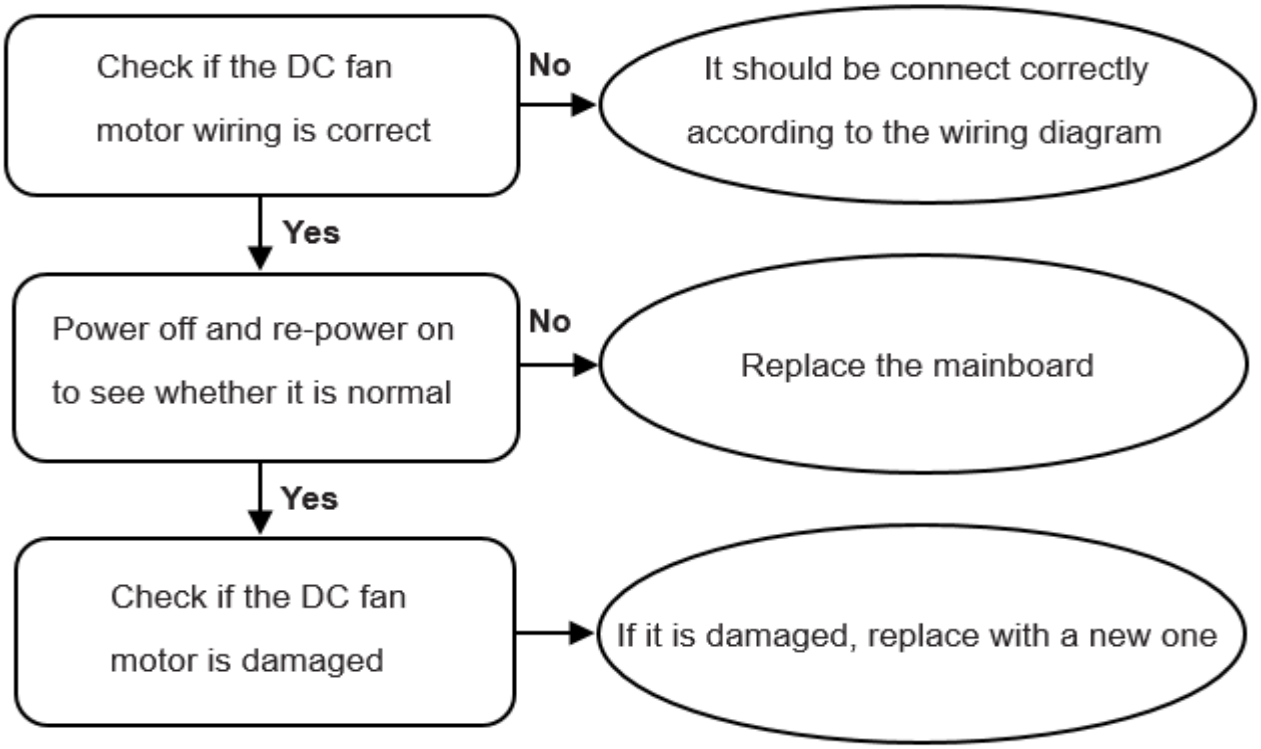
No

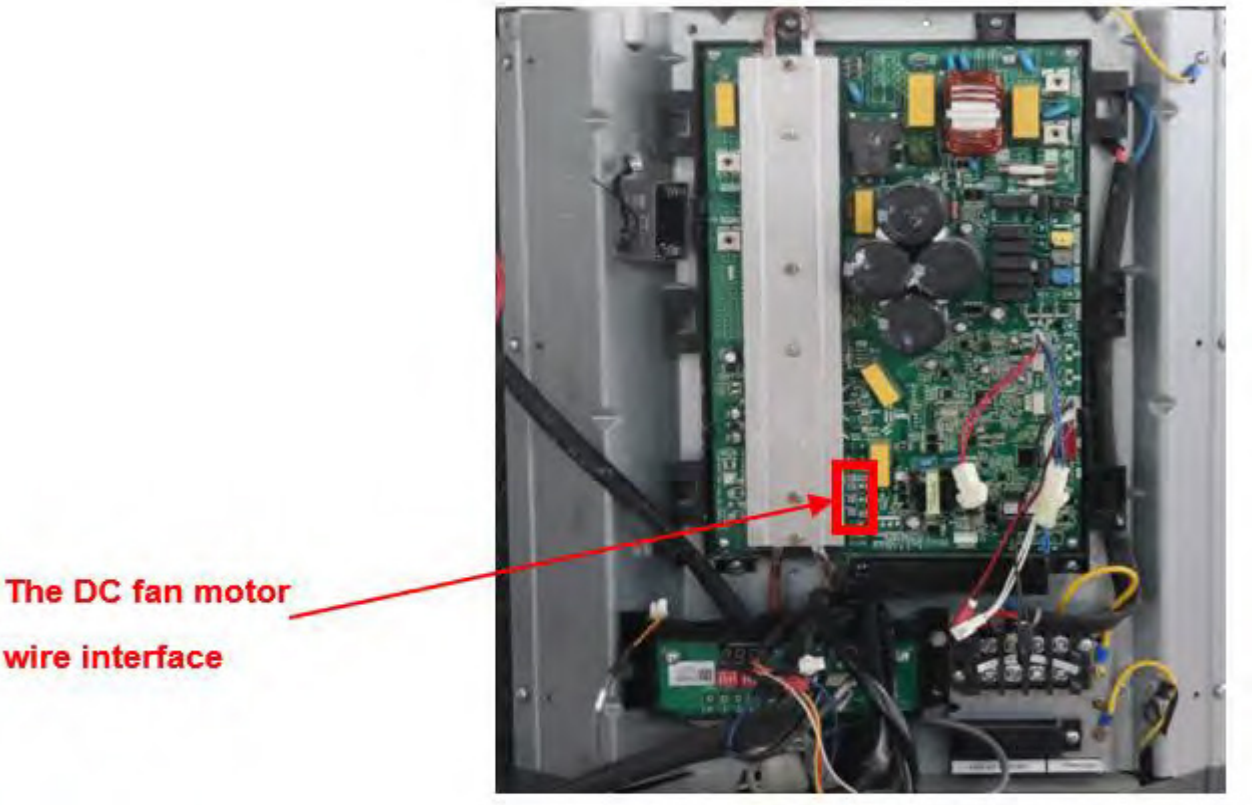
Replace the mainboard



Residential Split Troubleshooting (cont'd)

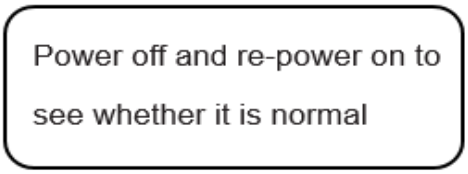
P9 (DC fan motor error)



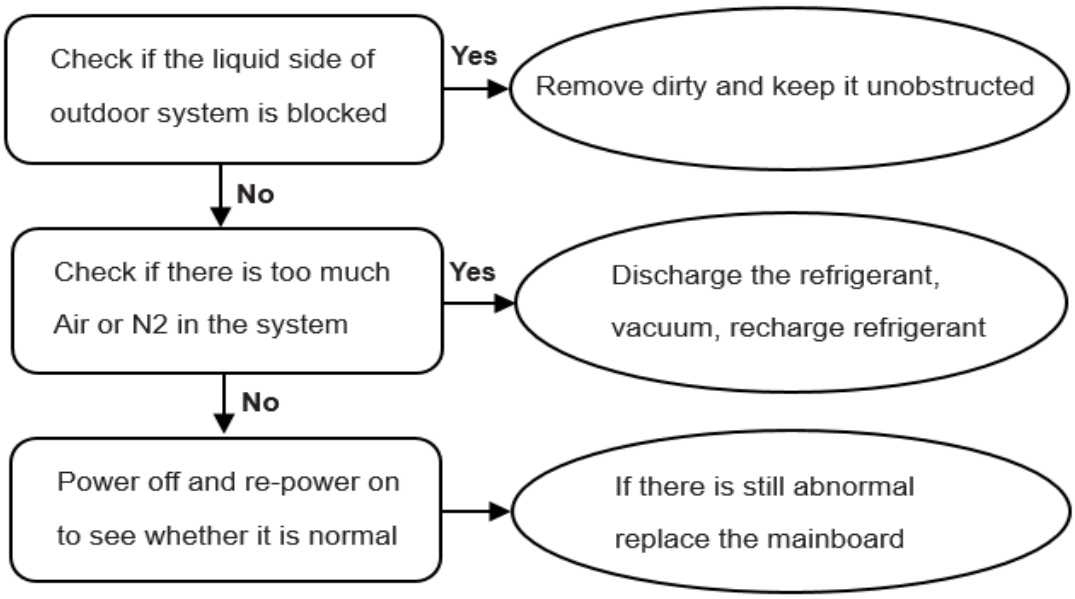


Residential Split Troubleshooting (cont'd)

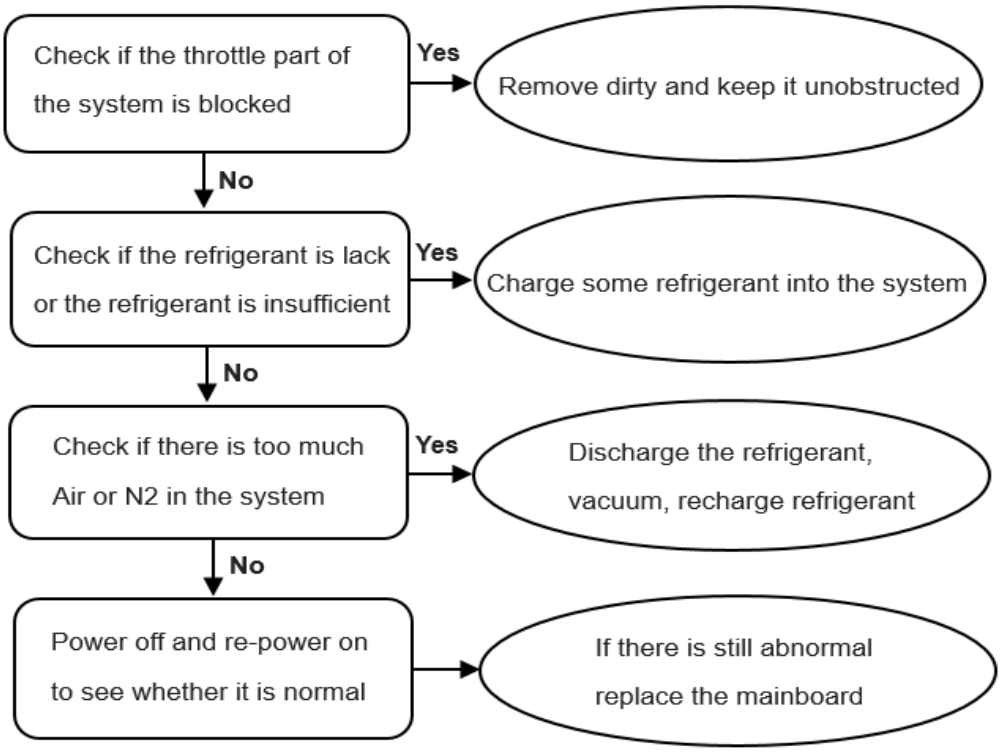
P12/H7 (Wet operation error)



P13/H3(High pressure abnormal error-In heating mode)

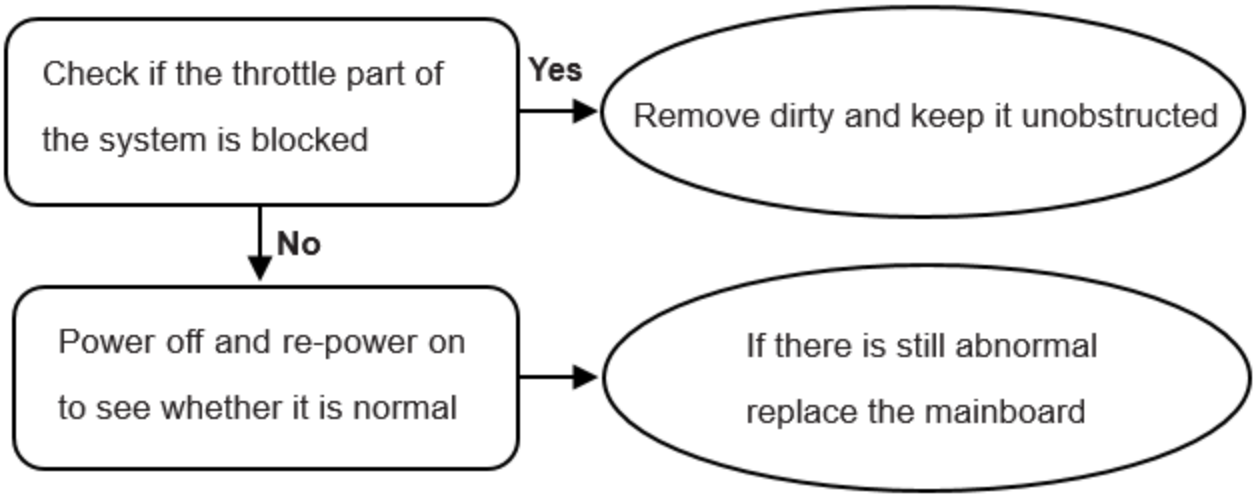


P14 (High compression ratio protection)

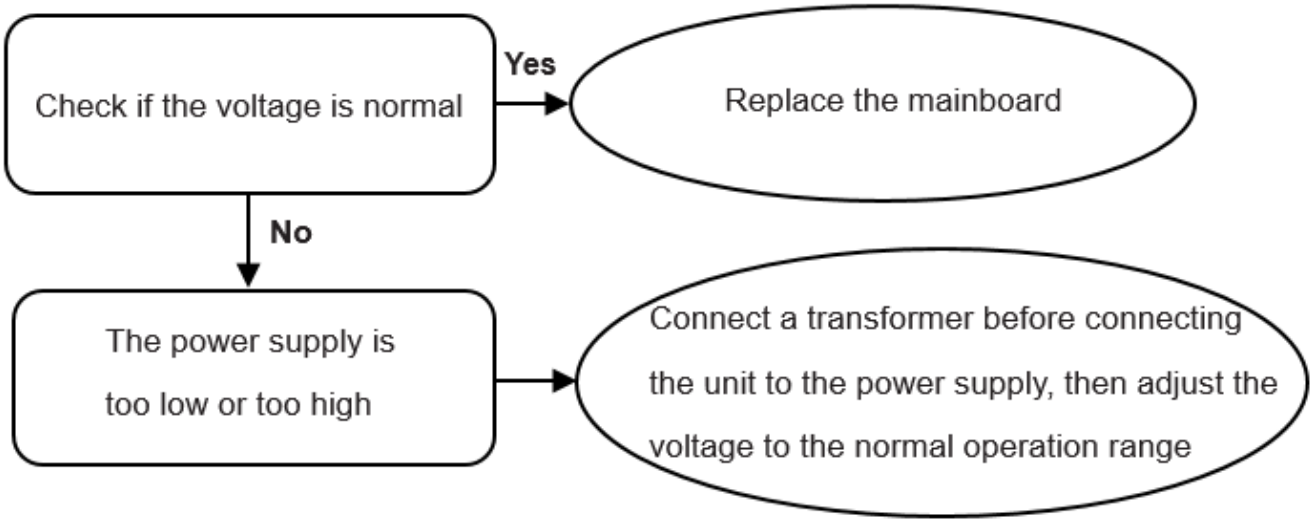


Residential Split Troubleshooting (cont'd)

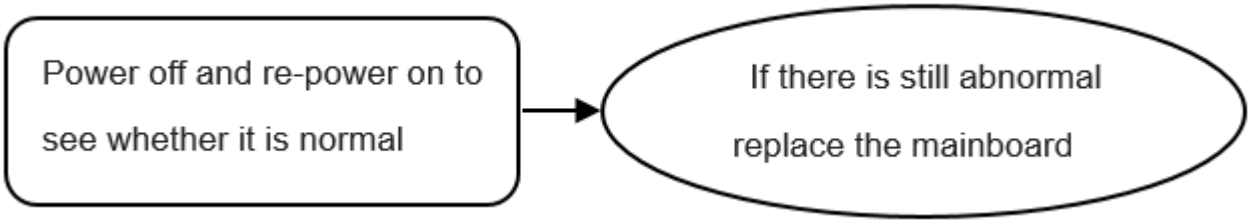
P15 (Low compression ratio protection)



L1/L2(DC cable bus low/high voltage protection)



L4-L8 (IPM module subdivision protection)



L9-LE (Frequency limitation protection, not error）

SEE IOM-0035 O/M APPENDICES MANUAL FOR MORE INFORMATION ON INSTALLATION AND SET UP OF PERIPHERAL DEVICES

NOTES:

NOTES: