nVent | HOFFMAN

We connect and protect

Extreme AC Air Conditioner

X2302 Model

Instruction Manual

R513A

P/N 89215748 Rev F

TABLE OF CONTENTS

Note: Some of the information in this manual may not apply if a special unit was ordered. If additional drawings for a special unit are necessary, they have been inserted. Contact nVent HOFFMAN if further information is required.

WARRANTY AND RETURN POLICY

https://HOFFMAN.nVent.com/en-us/cooling-warranty-registration

https://nVent.widen.net/s/s8xgmxhvk2/89153291

GENERAL SAFETY INSTRUCTIONS

Observe the following general safety instructions for installation and operation of this product:

- This appliance is for installation only in locations not accessible to the general public.
- This appliance is not intended for use by persons, including children, with reduced physical, sensory, or mental capabilities, or lack of experience and knowledge, unless they have been given supervision or instruction concerning the use of the appliance by a person responsible for their safety.
- Children should be supervised to ensure that they do not play with the appliance.
- This appliance should be installed in accordance with national wiring regulations.
- Follow all precautions detailed in the following sections during transportation, receiving, testing, operation and maintenance.
- This appliance is intended for altitudes up to 10,000 ft (3,048 m) from sea level. For every additional 1000 ft of elevation, the capacity of this unit is derated by 1%.

RECEIVING THE AIR CONDITIONER

Inspect the air conditioner. Check for concealed damage that may have occurred during shipment. Look for dents, scratches, loose assemblies, evidence of oil, etc. Damage evident upon receipt should be noted on the freight bill. Damage should be brought to the attention of the delivering carrier — NOT to nVent Equipment Protection — within 15 days of delivery. Save the carton and packing material and request an inspection. Then file a claim with the delivering carrier.

nVent Equipment Protection cannot accept responsibility for freight damages; however, we will assist you in any way possible.

⚠ CAUTION

Do not attempt to operate the air conditioner while it is horizontal or on its side, back or front. The refrigeration compressor is filled with lubricating oil. This will cause permanent damage to the air conditioner and also voids the warranty.

HANDLING AND TESTING THE AIR CONDITIONER

If the air conditioner has been in a horizontal position, be certain it is placed in an upright, vertical or mounting position for a minimum of five (5) minutes before operating.

TEST FOR FUNCTIONALITY **BEFORE** MOUNTING THE AIR CONDITIONER TO THE ENCLOSURE.

Refer to the nameplate for proper electrical current requirements. If cord-connected, connect the power cord to a properly grounded power supply. If permanently connected, wire the unit to a properly grounded power supply using copper conductors only. Power supply wiring should be restrained after field installation to ensure no contact with internal fan. Minimum circuit ampacity should be at least 125% of the amperage shown in design data section for the appropriate model. No other equipment should be connected to this circuit to prevent overloading. The air conditioner is rated for operation at 50 and 60 Hz. No action is necessary to adjust the appliance operation at the rated frequencies.

Operate the air conditioner for five (5) to ten (10) minutes. No excessive noise or vibration should be evident during this run period. The condenser blower (ambient air), the evaporator blower (enclosure air), and the compressor should be running.

Condenser air temperatures should be warmer than normal room temperatures within a few minutes.

The compressor is provided with automatic reset thermal overload protection. This thermo-switch is located and mounted inside the plastic enclosure clipped to the compressor. The switch operates when the compressor overheats due to clogged or dirty inlet air filter or if ambient air temperatures exceed nameplate rating or if enclosure dissipated heat loads exceed the rated capacity of the air conditioner. The thermal overload switch will actuate and stop compressor operation. The blowers will continue to operate and the compressor will restart after it has cooled to within the thermal overload cut-in temperature setting.

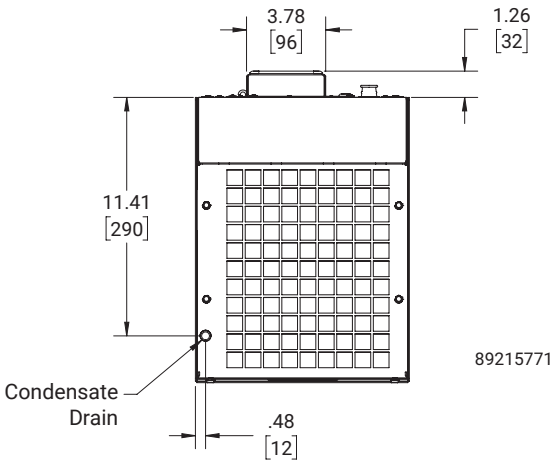
INSTALLATION INSTRUCTIONS

1. Inspect air conditioner and verify functionality before mounting the air conditioner, “HANDLING AND TESTING THE AIR CONDITIONER” see on page 4.
2. Using the appropriate cutout dimensions, see Mounting Cutout Dimensions on page 7 of this manual, prepare the enclosure opening and mounting bolt hole pattern for enclosure. Select an installation location that will allow for adequate ventilation and clearance for service. Clearance between the air conditioner with or without a supplementary heater and adjacent structures (another enclosure, air conditioner, wall, or combustible surface) must be at least:

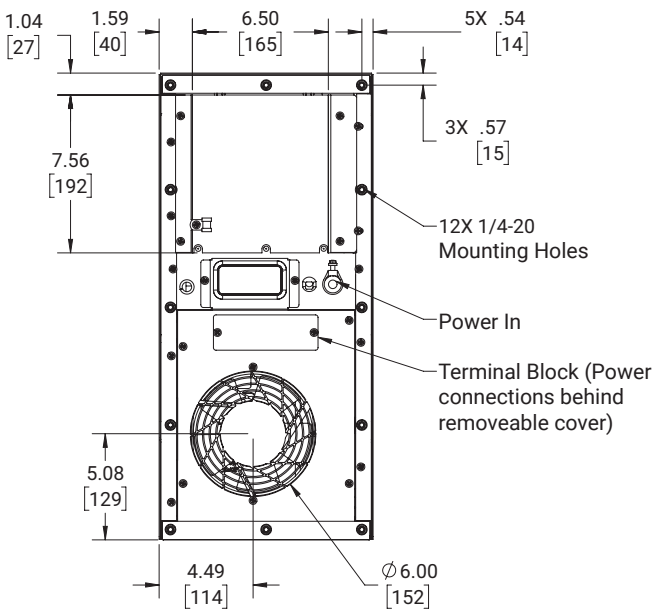
   - 24" from front
   - 12" from right or left side
   - 3" from top
   - 12" from bottom

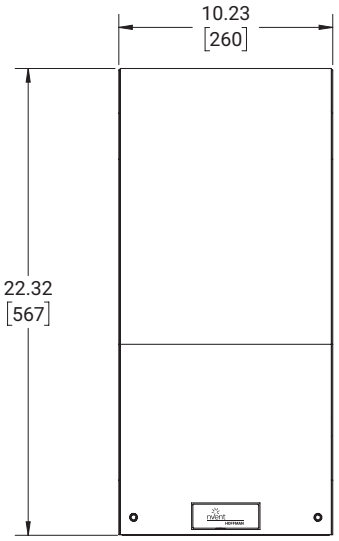
   Local fire codes may have different requirements; please observe applicable regulations for the location of the air conditioner.
   The distance between the air conditioner and the electronic components and other equipment installed inside the enclosure must be at least 3" to ensure adequate air circulation. At minimum clearance levels, an air baffle between the inlet and outlet may be necessary to prevent recirculation.
3. Using the gasket kit provided, install gaskets to the air conditioner enclosure using the cutout and bolt hole pattern as a guide.
4. Mount air conditioner on enclosure using mounting bolts and washers provided to secure unit to enclosure. Torque bolts to 22.5 in-lb (2.5 Nm). Allow unit to remain upright for a minimum of five (5) minutes before starting. Caution! Air conditioner must be in upright position during operation.
5. To avoid cross-threading mounting inserts, start bolts by hand before tightening with a wrench or ratchet driver.
6. Refer to the top of the nameplate for electrical requirements. Connect power from a properly grounded power supply by following applicable national wiring regulations. Use of an extension cord is not recommended. Electrical circuit should be fused with a time delay fuse or HACR circuit breaker per the MOPD rating in the Design Data table on page 12.
7. When the unit is equipped with an automatic temperature controller, the controller is preset at the factory for your convenience and should not require adjustment.

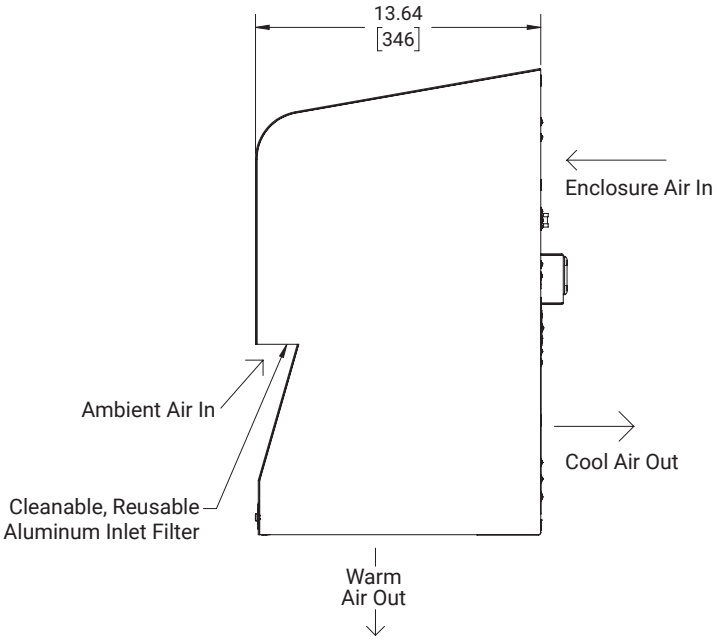
DIMENSION DRAWING



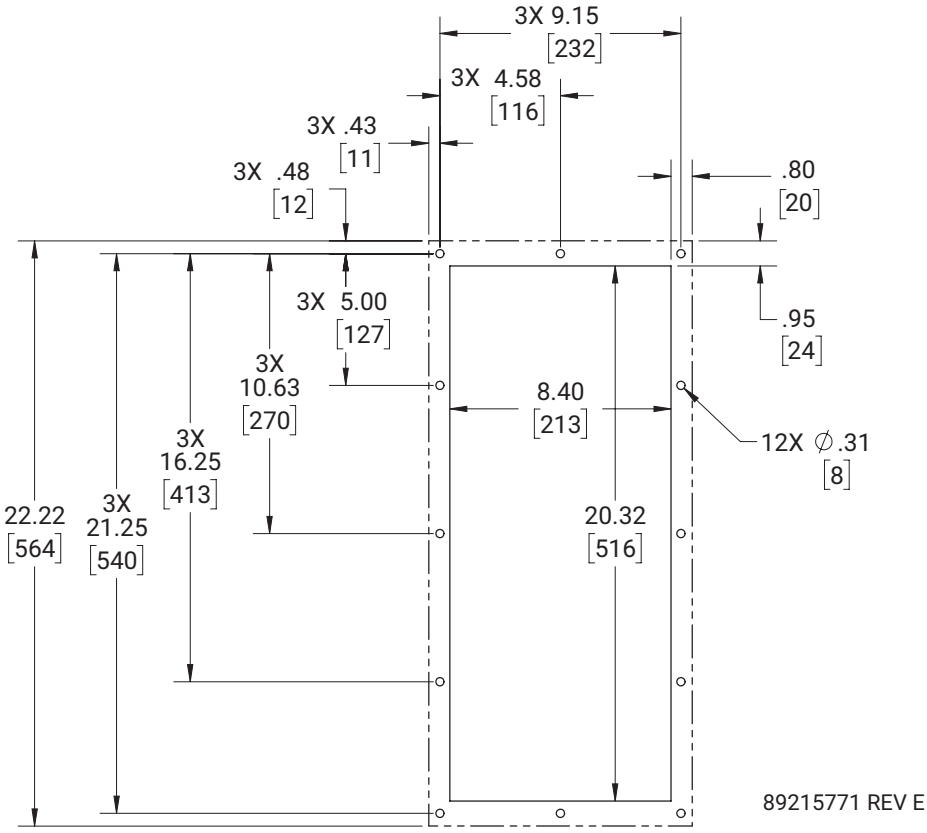
View of Underside of Unit



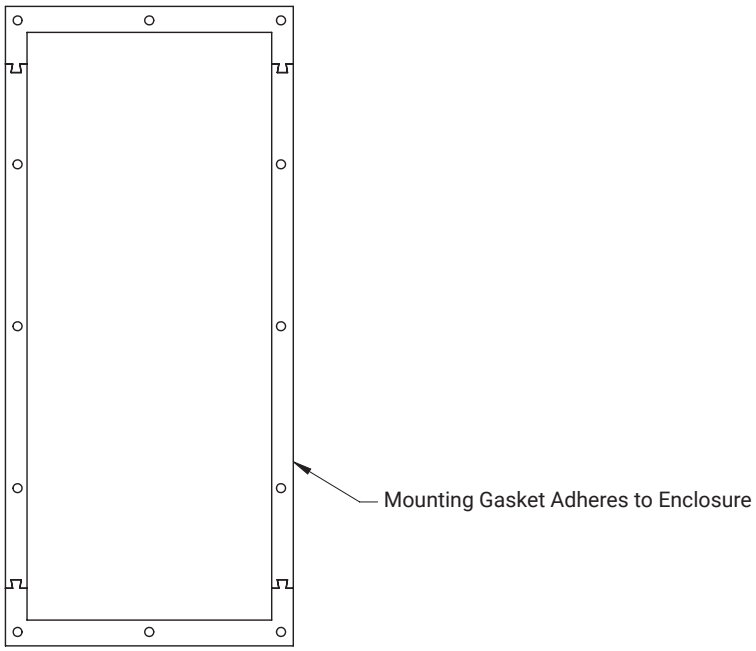




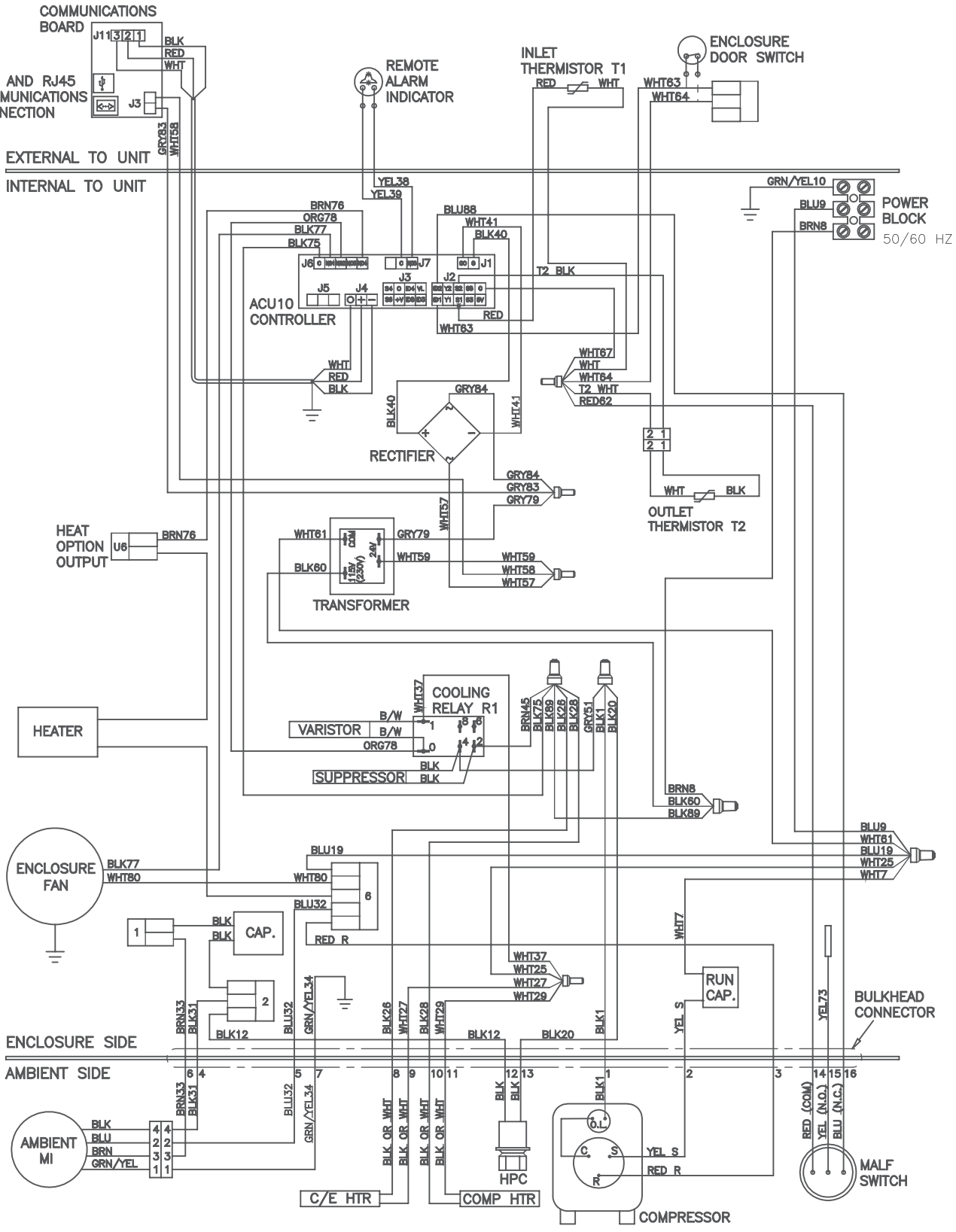
MOUNTING CUTOUT DIMENSIONS



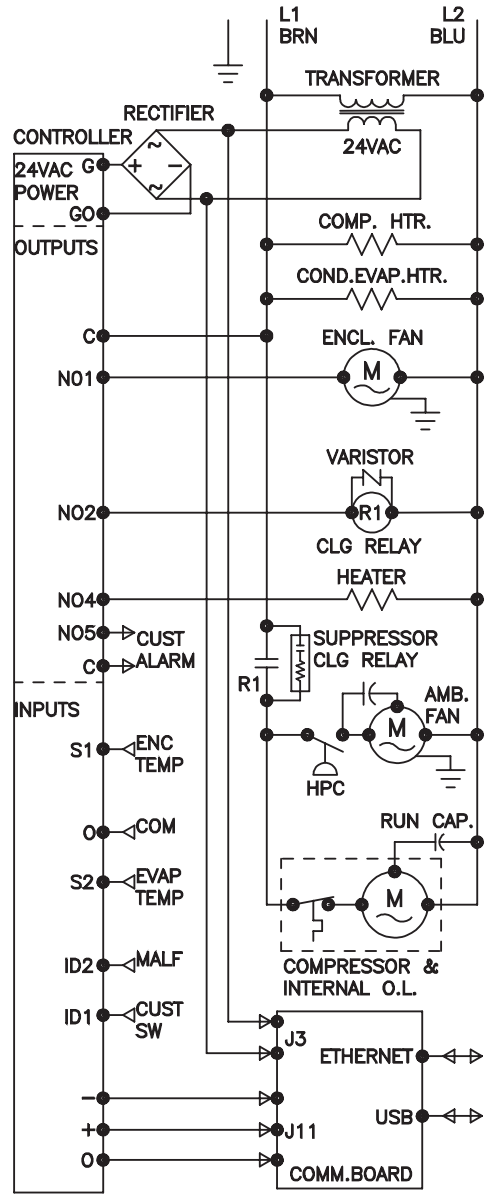
Cutout Dimensions



X23 Wire Diagram



X23 Schematic



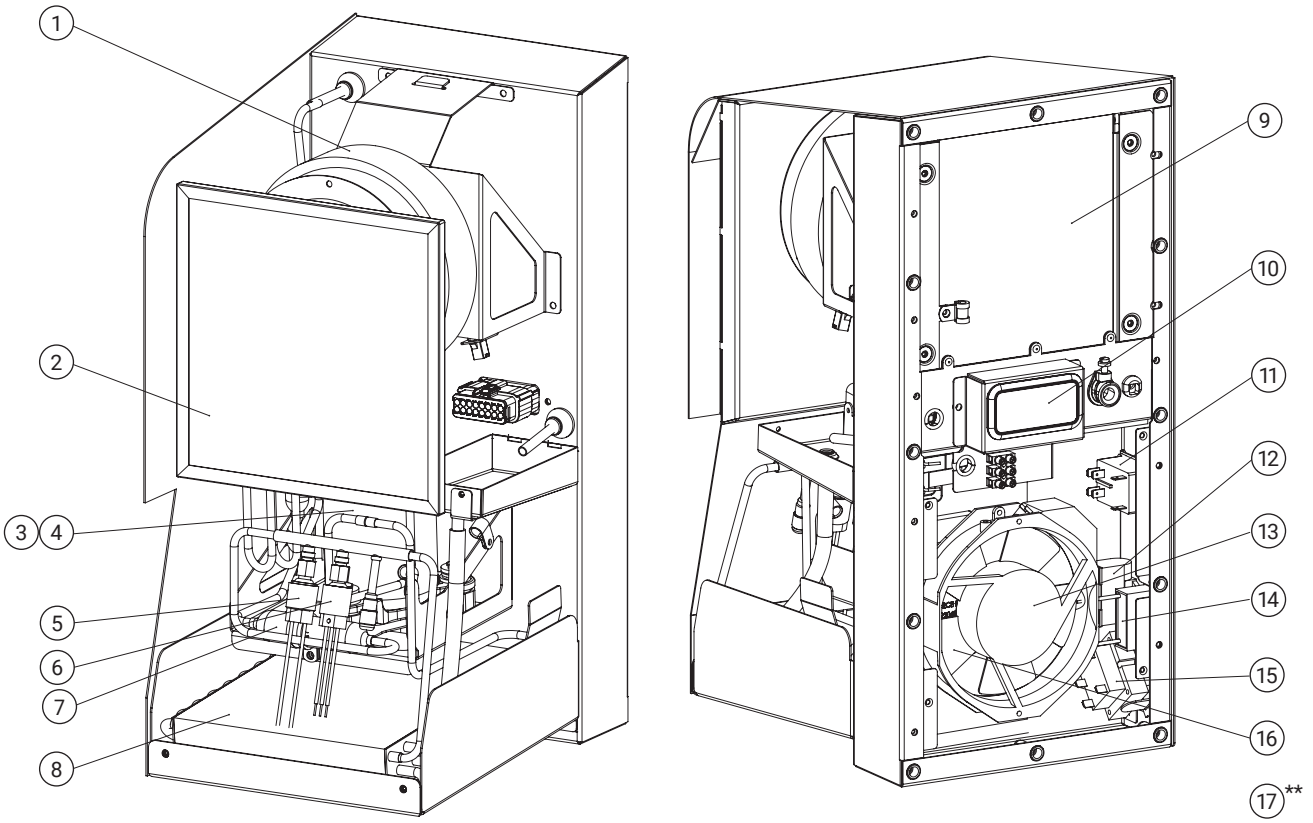
ELECTRICAL SCHEMATIC

89206866 REV.C

COMPONENT LIST

Part Description	X230216GXXX 115 Volt 1-Phase 50/60 Hz 2300 BTU	X230226GXXX 230 Volt 1-Phase 50/60 Hz 1890 BTU
Capacitor, Compressor Run	89107709SP	89106525SP
Capacitor, Condenser Fan	52603215SP	52603214SP
Compressor	89243075SP	89243074SP
Fan, Condenser	89206390SP	89206391SP
Fan, Evaporator	12101201SP	12101202SP
Overload, Compressor Thermal	89109877SP	89109878SP
Relay, Cooling	10100535SP	10100534SP
Transformer, Control	10100694SP	10100693SP
Heater, 350W (Optional)	89206006SP	89206007SP
Controller, Basic	89202719	89202719
Thermistor	89075654	89075654
Bridge Rectifier	89087424	89087424

PARTS LIST



** MOUNTING GASKET NOT SHOWN

Reference	Part description	Part Number
1	Fan, Condenser	See Components List
2	Filter, Air, Reusable	89203781SP
3	Compressor	See Components List
4	Overload, Compressor Thermal	See Components List
5	Switch, Head Pressure Control	89083016SP
6	Switch, Malfunction	89096948SP
7	Filter, Drier, Refrigerant	52602803SP
8	Coil, Condenser	20102001SP
9	Coil, Evaporator	89204519SP
10	Controller, Smart	89202719SP
11	Relay, Cooling	See Components List
12	Capacitor, Compressor	See Components List
13	Fan, Evaporator	See Components List
14	Capacitor, Condenser Fan	See Components List
15	Transformer, Control	See Components List
16	Heater, 350 W (Optional)	See Components List
17	Gasket, Mounting*	89202697SP

*Mounting Gasket not shown.

TECHNICAL INFORMATION

Design Data

Model	Voltage	Hz	Phase	MOPD Amps	Full Load Cooling Amps	BTU/HR @ Max Ambient Temperature °F/°C	Max Ambient Temperature °F/°C	Shipping Weight lb/kg
X230216GXXX	110/115	50/60	1	15	6.8/6.3	2100/2300	131/55	60/27
X230226GXXX	220/230	50/60	1	15	2.8/2.9	1760/1890	131/55	60/27

Note: -XXX will be replaced with a three-digit number designating all desired options. Consult the factory for specific model numbers.

WASHDOWN NOTE

Testing has confirmed that with the cover in place the X2302 Air Conditioner will successfully withstand a clean water washdown procedure while the unit is energized. If the washdown procedure is performed with the cover removed the unit must first be de-energized, and must be allowed to dry completely before the cover is reinstalled and power is reapplied.

PRINCIPLES OF OPERATION

- If electrical power to the air conditioner is interrupted and reapplied immediately (within 3 to 5 seconds), the compressor may not restart due to the high back pressure of the compressor. It takes a minimum of one (1) minute after shut-down for the compressor suction and discharge pressures to equalize in order for the air conditioner to restart.
- Operating the air conditioner below the minimum ambient temperature or above the maximum ambient temperatures indicated on the nameplate voids all warranties.
- It is recommended that the warranty section of this manual be read in order to familiarize yourself with parameters of restricted operation.
- The moisture that the enclosure air can contain is limited. If moisture flows from the drain tube continuously this can only mean that ambient air is entering the enclosure. Be aware that frequent opening of the enclosure's door admits humid air which the air conditioner must then dehumidify.

SMART CONTROLLER

- All Model X2302X6 Air Conditioners are equipped with a Smart Controller.
- A Remote Access Control (RAC) optional accessory is available. The RAC can be ordered along with the X2302X6, or if desired, it can be ordered separately as an upgrade at some later date. The RAC is packaged and shipped separately from the air conditioner since it cannot fit inside the unit. The RAC is field installable.

Overview

The smart controller is a parametric controller for the complete management of air conditioners. All settings are pre-programmed at the factory. Cooling/heating setpoint, cooling/heating differential and high/low temperature setpoint are designed to be adjustable by the operator. All alarms are outputted through the alarm relay. See “AIR CONDITIONER UNIT REMOTE COMMUNICATION FEATURES” on page 18 for remote input and output capabilities.

Energizing the Controller

The digital controller is wired and programmed at the factory to operate when power is applied to the air conditioner. In normal condition, the evap fan starts operating after the completion of the self-evaluation which is less than 30 seconds and fan icon should be illuminated along with the inlet and outlet temperature data (if an option outlet temperature sensor is installed).

Control Status Indication

The display has numerous symbols to indicate the various controller functions such as cooling, heating, alarming, evaporator fan, and heating. Indicators (icons) are steady illuminated on screen when active.

Keypad

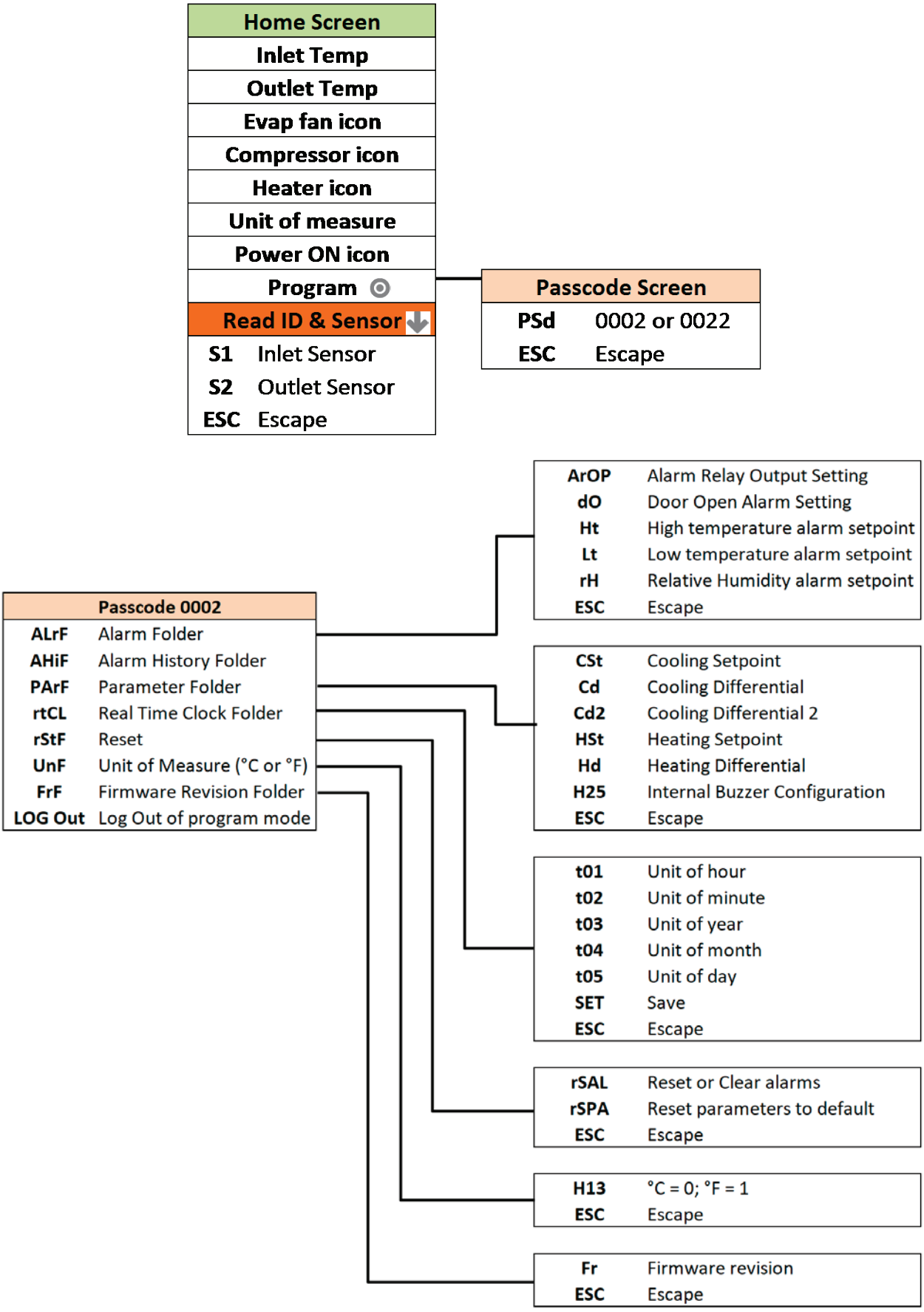
Symbol	Color	Icon Indication	Icon Status
	Red	Alarm – active when alarm is detected	Flashing when alarm is detected
	White	Keypad **Select** – access to passcode, hold 5 sec to turn unit ON/OFF, parameter menu, parameter setting, write or save to EEPROM, and hold for 3 sec to return to main screen	ON
	White	Keypad **Up** – navigate to previous parameter and increasing parameter variable	ON only when reviewing parameters
	White	Keypad **Down** – navigate to next parameter and decreasing parameter variable, all inputs, unit status.	ON

Main field

Symbol	Color	Icon Indication	Icon Status
°C	White	When operating temperature in degrees Celsius	ON
°F	White	When operating temperature in degrees of Fahrenheit	ON
Main Field Line 1	White	Display inlet temperature	ON
Main Field Line 2	Orange	1. Display outlet temperature in standalone mode if outlet sensor is present 2. Displays device ID for primary-secondary mode up to 10 units, 1:10 … 10:10 or lead-lag mode up to 2 units, 1:2… 2:2	ON

Icons

Symbol	Color	Icon Indication	Icon Status
	White	Compressor Running	• Flashing while waiting for compressor to turn ON • Steady ON while compressor is running
	White	Evaporator Running	ON
	White	Electric heater ON	ON
	White	Primary and/or lead controller	ON
	White	Freeze control	Compressor and Condenser fan OFF while illuminated
	White	Power ON	ON


Home Screen
Inlet Temp
Outlet Temp
Evap fan icon
Compressor icon
Heater icon
Unit of measure
Power ON icon
Program
Read ID & Sensor
S1 Inlet Sensor
S2 Outlet Sensor
ESC Escape
Passcode Screen
PSd 0002 or 0022
ESC Escape
Passcode 0002
ALrF Alarm Folder
AHiF Alarm History Folder
PArF Parameter Folder
rtCL Real Time Clock Folder
rStF Reset
UnF Unit of Measure (°C or °F)
FrF Firmware Revision Folder
LOG Out Log Out of program mode
ArOP Alarm Relay Output Setting
dO Door Open Alarm Setting
Ht High temperature alarm setpoint
Lt Low temperature alarm setpoint
rH Relative Humidity alarm setpoint
ESC Escape
CSt Cooling Setpoint
Cd Cooling Differential
Cd2 Cooling Differential 2
HSt Heating Setpoint
Hd Heating Differential
H25 Internal Buzzer Configuration
ESC Escape
t01 Unit of hour
t02 Unit of minute
t03 Unit of year
t04 Unit of month
t05 Unit of day
SET Save
ESC Escape
rSAL Reset or Clear alarms
rSPA Reset parameters to default
ESC Escape
H13 °C = 0; °F = 1
ESC Escape
Fr Firmware revision
ESC Escape

Displaying and changing program settings

To view or access the settings

To access folder menus:

1. Press button to display passcode screen, the screen displays **PSd** on line 1 and **0000** on line 2.
2. Press button to access to passcode, the first digit of **0000** is flashing and press 3 more times until the last digit of **0000** flashes.
3. Press arrow two times to change the 0 to 2. Press for access to folder menus.

Note: to exit the security level to the main screen wait one minute with no action or Press arrow until **LOG Out** message displays, then press button.

To change a parameter setting

1. Once in the folder menu navigate to the desired setting to be changed using the arrow to scroll and button to access a menu or parameter.
2. To change a parameter Press button and parameter value will begin to flash.
3. Press / arrow to the desire value.
4. Press button to save the setting and the screen will revert to the parameter mnemonic.

Note: if button is not pressed, the new setpoint is not saved.

To exit the parameter settings to the main screen wait one minute with no action or Press arrow few times until **ESC** displays, then press button to return to **UoF** screen. From the **UoF** screen Press arrow few times until **LOG Out** message displays, then press button to return to the main screen.

Selecting **ESC** returns to folder menu.

Selecting **LOG out** returns to main screen.

Heat/cool operating parameters

Mnemonic Parameter	Description	Default Value	Range
CSt[1]	Cooling setpoint	80°F 26.7°C	72°F to 120°F 22.2 to 48.9°C
Cd (Cd1)[1]	Cooling differential	7°F 3.9°C	2°F to 25°F 1.1 to 13.9°C
Cd2[4]	Cooling differential 2	15°F 8.3°C	–
HSt[2 3]	Heating setpoint	50°F 10.0°C	45°F to 60°F 25.0 to 33.3°C
Hd[3]	Heating differential	7°F 3.9°C	2°F to 25°F 1.1 to 13.9°C

[1] Compressor or cooling turns ON at CSt + Cd and OFF at CSt
[2] Heater or heating turns ON at HSt and OFF at HSt + Hd
[3] Heating mode is only applied to a unit with heater option
[4] Cooling differential 2 is only applied to 2-stage compressor and lead-lag application

Alarm parameters

Mnemonic Para	Description	Default value
Ht	High temperature alarm setpoint	125°F 51.7°C
Lt	Low temperature alarm setpoint	40°F 4.4°C
dO	Door open alarm setting	NC
ArOP	Alarm relay output	NO

Note: (4) The alarm relay output logic is designed to be configurable

View alarms

Alarms may be viewed when the alerting icon ⚠ is flashing.

1. On the main screen, press the alerting icon ⚠ button.
2. The screen displays the most recent or newest alarm where the alarm code display on line 1 and the alerting icon ⚠ is now in steady
3. Press ↑ arrow to view next alarm if there are more than one.
4. Press ↓ arrow to display **ESC**, then press ◎ button to return to the main screen.

View the alarms in the alarm history folder

1. Follow instructions above to enter the passcode and open the alarm history folder **(AHiF)**.
2. Press ◎ button to access to the alarm history.
3. Press ↓ arrow to display the mnemonic alarm on line 1 and time, month, and day display on line 2. For example, low temp alarm **(Lt)** displays on line 1 and 09:24 and 0706 display on line 2 in sequence. Note that the time, and date recorded in the alarm history is based on the local real-time-clock if configured after installation.
4. Press ↓ arrow to view next alarm. The controller is able to retain up to 25 events.
5. Press ↑ ↓ arrow until the screen displays **ESC**, then press ◎ button to return to the main screen or if no action for longer than 60 seconds the screen will be automatically revert to the main screen.

Note: if no alarms are present then only **ESC** will be displayed in the folder.

There are seven possible alarms (non-latching) detectable by the controller and are indicated on the controller display. All alarms are accessible locally. If a nVent HOFFMAN network card (RAC module) is used, alarms are also accessible remotely through the Ethernet and USB connection.

Mnemonic Alarm	Description	Cause	Result	Alarm Relay Output
dO	Door open alarm	Enclosure door opens or not properly close	Compressor and evap fan turn OFF in duration of alarm	Closed
S1F	Inlet temperature sensor fault	Inlet temp probe failed	No effect on function, controller continue operating as normal using outlet sensor with setpoint of 50°F (10°C)	Closed
S2F	Outlet temperature sensor fault	Outlet temp probe failed	No effect on function but loss freeze protection	Closed
LA	Malfunction alarm	MALF high pressure switch opens	No effect on function	Closed
Ht	High temp warning	Enclosure air exceeds high temp alarm setpoint	No effect on function	Closed
Lt	Low temp warning	Enclosure air drops below low temp alarm setpoint	No effect on function	–
FA	Frost alarm	Evaporator coil freezes	Compressor and condenser fan turns OFF for the duration of alarm. Alarm clears when the outlet temperature sensor reaches 59°F (15°C)	Closed

To reset the alarms in alarm history folder

The controller is designed with ability to reset or clear the alarm history

1. Follow instructions above to enter the passcode and open the reset folder **(rStF)**.
2. The screen displays **rSAL** on line 2 and **nO** on line 1, press button the **nO** is flashing.
3. Press arrow to change **nO** to **YeS**, then press button reset the alarms. The screen flashes once and returns to **rSAL** with **nO** one line 2.
4. Press arrow to navigate to **ESC**, then press to returns to **rStF** screen.
5. Press arrow to navigate to **LOG Out**, then press button to return to the main screen or if no action for longer than 60 seconds the screen will be automatically reverted to the main screen.

To reset parameters to factory default

This option is ONLY applied if the operator wants to reset all control parameters back to factory default.

1. Follow instructions above to enter the passcode and open the reset folder (rStF).
2. The screen displays rSAL, press arrow to navigate to rSPA and then press button.
3. The screen displays rSPA one line 1 and the word nO on line 2 in steady state, press button and then the word nO is flashing and ready to change.
4. Press arrow to change nO to YES. Press button the screen displays PSd with 0000 on line 2.
5. Press button to enter to passcode. Press button few times until the last digit of 0000 flashing.
6. Press arrow to change 0 to 2, press button to authorize the reset of the parameters.
7. The screen returns to rSPA screen in steady state.
8. Press arrow to navigate to ESC, then press to returns to rStF screen.
9. Press arrow to navigate to LOG Out, then press button to return to the main screen or if no action for longer than 60 seconds the screen will be automatically reverted to the main screen.

Displaying temperature data on screen

There are two temperature probes in the air conditioner where one is reading the enclosure air temperature incoming to the air conditioner and other is reading the cooled air leaving the air conditioner and entering the enclosure. Both temperature data are displayed on the screen where line 1 is the reading of the inlet temperature and line 2 is the reading of the outlet temperature.

Compressor restart time delay

A factory set 3 minute (180 seconds) restart delay exists to reduce residual back pressure before allowing the compressor to restart. The compressor will stay off for the entire restart duration after the compressor is disabled. A flashing compressor icon on the display indicating that the unit is in a compressor restart delay mode while calling for cooling or waiting for compressor to turn ON.

Alarm output contact

The digital controller has a normally open dry contact alarm output with a resistive load rating of 250 VAC @ 5 amps max. The two yellow 18 AWG wires located at the back of the air conditioner provide a connection to this output. **Note: do not apply power to this normally open dry contact (two yellow 18 AWG wire).** This alarm relay output is configurable and provides user with the ability to change the configuration to support their external device. Parameter C21 controls the alarm relay output logic and can be accessed through security code “0022” in the PArF folder.

Parameter	Description	Configuration
C21	Alarm relay output logic	0 = normally open (NO) – factory default 1 = normally closed (NC)

Alarm input connection

The digital controller can accept a dry contact/switch input via the two 18 AWG white wires located at the back of the air conditioner. This input is associated with the controller display alarm mnemonic dO (door open). To use this feature, remove the splice connector, and connect the two white wires to customer supplied enclosure door switch in its place.

Note: do NOT apply power to this dry contact input.

Primary-secondary (PS) mode

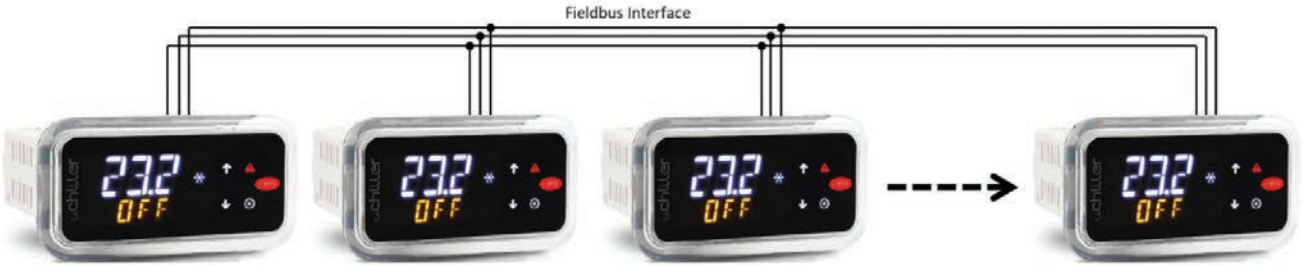
Note: during normal operation, in both the primary-secondary (PS) and lead-lag (LL) operating modes, line 2 displays the device ID, not the outlet temperature. The outlet temperature can be viewed on line 1 by pressing ↓ arrow.

Primary-secondary (PS) mode shares the same hardware and source code as standalone mode, but offers more functionality and features. The controller ships from the factory in Standalone Mode. PS mode is configured manually in the field after the installation. This option allows the user to operate the air conditioner in a group network with up to 10 units. To support PS mode, three parameters, **H01**, **H02**, and **H03** need to be configured. **H01** specifies the operating mode, **H02** specifies the device ID, and **H03** specifies the total number of the units in the group network.

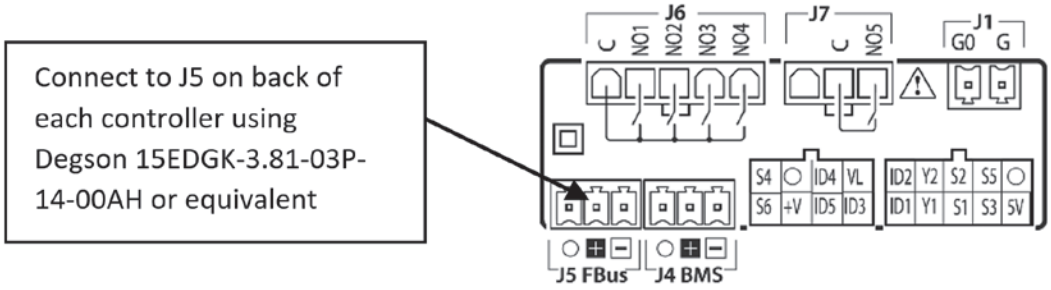
Before configuring to operate in PS mode, the user should understand the functionality of the PS mode.

1. In the PS mode, all units operate off the cooling/heating setpoint and differential of the primary unit. The system prevents setpoint changes from secondary units.
2. The primary unit monitors the enclosure temperatures of all the units and manages the ON/OFF status of cooling and heating based on the unit reporting the highest temperature.
3. When cooling is initiated the primary unit energizes first. Secondary units are energized sequentially at 10 second intervals. When heating is initiated all units turn on heat together. When cooling or heating is satisfied all units turn off together.
4. If the number of units communicating on the network doesn't match the value in H03 then the primary unit will display alarm LC, and the secondary units will display alarm LC1 until the communication re-established.
5. Any unit that loses communication with the primary unit will enter standalone mode and continue operating based on its own temperature probe until communication is re-established.
6. All temperature setpoints and alarms can be viewed remotely if one of the ACUs is equipped with nVent HOFFMAN network card (RAC module).
7. Best recommendation is to configure the ACU that has nVent HOFFMAN network card to be the primary one.

Connecting units together in primary/secondary mode



Primary – Device ID 1 | Secondary – Device ID 2 | Secondary – Device ID 3 | Secondary – Device ID 10



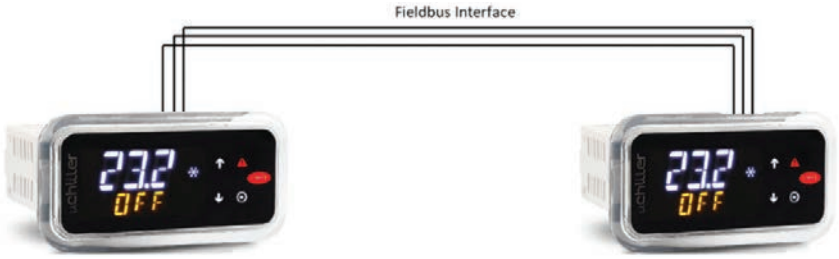
To configure the controller from single mode to PS mode, simply follow below procedures

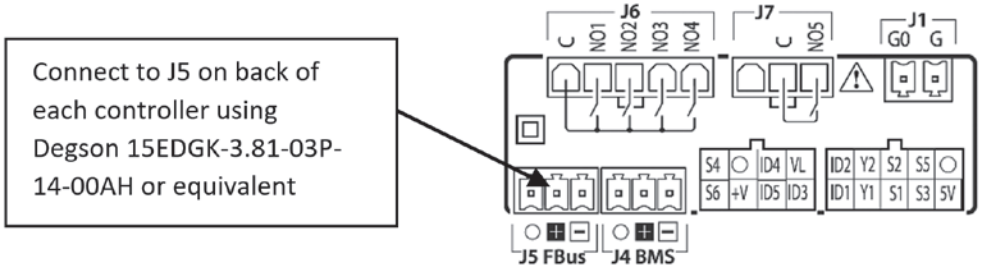
1. Before proceeding the PS mode configuration for each controller, make sure that the communication cable is connected from one ACU to another using a shielded cable with the shield grounded.
2. Press button to display passcode screen, the screen displays **PSd** on line 1 and **0000** on line 2.
3. Press button to access to passcode, the first digit of 0**000** is flashing and press 2 more times until the third digit 0000 flashes. Press arrow two times to change **0** to **2**, then press button to move to the last digit **002**0.
4. Press arrow two times to change the 0 to 2.
5. Press button to access to folder menu and then, the screen displays **ALrF.**
6. Press arrow to navigate to **PArF**, then press button to access to parameter menu.
7. The screen displays **C**, press arrow to navigate to parameter **H** and then, press button to access to parameter **H** menu.

Parameter	Description	Available Range	PS Settings	Default
H01	Mode	SA (stand alone) PS (primary-secondary) LL (lead-lag)	PS (primary-secondary)	SA
H02	Device ID	1 up to 10	1 up to H03	1
H03	Total number of the units in the group network	1 up to 10	2 up to 10	1

8. Set parameter **H01** to **PS** (primary-secondary).
   Note: that after **H01** = **PS**, the snowflake icon is illuminated and line 2 changes its display information from outlet temperature to device ID, for example, line 2 displays **01:02** where 01 indicates controller #1 and 02 indicates the total number of the controllers in a group network. Keep in mind that the snowflake icon only illuminates on primary controller.
9. Set parameter **H02** (device ID) to 1 to 10. This device ID will be different for each controller that is connected. The controller set to 1 will be the primary controller. Use numbers sequentially and don't skip using a number.
10. Set parameter **H03** (total number of controllers connected) to 1 to 10.

Connecting units together in lead/lag mode





To configure the controller from single mode to LL mode, simply follow below procedures. Perform this configuration for both air conditioners.

1. Before proceeding the LL mode configuration for each controller, make sure that the communication cable is connected from one ACU to another using a shielded cable with the shield grounded.
2. Press button to display passcode screen, the screen displays **PSd** on line 1 and **0000** on line 2.
3. Press button to access to passcode, the first digit of 0**000** is flashing and press 2 more times until the third digit **00**0**0** flashes. Press arrow two times to change **0** to **2**, then press button to move to the last digit **002**0.
4. Press arrow two times to change the 0 to 2.
5. Press button to access to folder menu and then, the screen displays **ALrF**.
6. Press arrow to navigate to **PArF**, then press button to access to parameter menu.
7. The screen displays **C**, press arrow to navigate to parameter **H** and then, press button to access to parameter **H** menu.

Parameter	Description	Available Range	LL Settings	Default
H01	Mode	SA (stand alone) PS (primary-secondary) LL (lead-lag)	LL (lead-lag)	SA
H02	Device ID	1 up to 10	1 or 2	1
H03	Total number of the units in the group network	1 up to 10	2	1
H14	LL strategy selection	0-250	0 (Alternate each cycle) 1-250 (Alternate hours)	0

8. Set parameter **H01** to **LL** (lead-lag).
9. Set parameter **H02** (device ID) to 1 for one unit and 2 for the other unit.
10. Set parameter **H03** (total number of controllers connected) to 2.
11. Set parameter H14 (LL strategy selection) to 0 to 250. This is the run time in hours before ACU1 and ACU2 will alternate being the lead unit. When set to zero ACU1 and ACU2 will automatically alternate every cycle.

AIR CONDITIONER UNIT REMOTE COMMUNICATION FEATURES

Air conditioners that include the optional nVent HOFFMAN network card (RAC module) have remote communication capabilities utilizing SNMP, Modbus TCP, EtherNet/IP, Profinet Protocol via Ethernet connection, and Modbus RTU protocol via USB connection. nVent provides Windows interface application software that is available to download free from nVent support link https://www.nVent.com/en-us/HOFFMAN/remote-access-control. The Windows interface application software supports both Ethernet and USB communication.

USB communication

This communication mode allows direct connection from a laptop (or PC) to the air conditioning unit using a Mini-b USB cable. As stated above, Modbus RTU is used to communicate between the two devices via USB connection.

Ethernet communication

This communication mode allows remote connection to the air conditioning unit utilizing SNMP, Modbus TCP, EtherNet/IP, and Profinet protocol. Customers that use their own software can download an MIB file for SNMP, EDS or EtherNet/IP Object file for EtherNet/IP, Coil Register file for Modbus TCP, and Data Point for Profinet.

Note: the Ethernet card (RAC module) has a default IP Address of 192.168.1.2

Both Ethernet and USB communication allow the ability to:

- Read ACU inlet and outlet air temperature
- Read and change cooling and cooling differential setpoints
- Read and change heating and heating differential setpoints
- Read and change the high and low temperature alarm settings
- Read and change the Gateway IP address, Device IP address, Subnet MASK, Trap IP address, and community string
- Read and change unit identification
- Read and change the state of IP address from static to dynamic or vice versa
- Read and change the air temperature unit of measure (from F to C or vice versa)
- Read current alarm status
- Evaporator fan control setting
- Read and change the control of door open switch

Software and configuration file downloads

As stated above, the PC interface tool, MIB file, EDS and EtherNet_IP Object file, Coil Register file, and Data Point file can be downloaded from remote access control support center link, https://www.nVent.com/en-us/HOFFMAN/remote-access-control.

USING NVENT HOFFMAN PC INTERFACE TOOL

nVent HOFFMAN PC Interface Tool gives the user the ability to communicate with nVent HOFFMAN air conditioning unit as to read and write air temperature data, high and low temperature alarm setting, active alarms, and other information from the controller remotely using either Ethernet or USB connection. With nVent HOFFMAN PC Interface Tool a user has the ability to remotely manage and monitor hundreds of nVent HOFFMAN air conditioners both domestically and globally at one central location at user's own pace, so long as all air conditioners are configured in the same subnet in the network. nVent HOFFMAN PC Interface Tool also supports text message and email alerting to a service technician when an alarm occurs. In addition, the tool also provides data logging capability for data analysis.

USB communication mode

Note: before connecting the unit to the PC, make note of Comm Ports present. After the unit is connected to the PC, a new Comm Port will be added to the list. Recommend using the new Comm Port.

- In the nVent HOFFMAN A.C. Monitor main screen, click on **Tools** and uncheck Use **Ethernet**
- Click on **Tools** menu again, the **Comm Port** menu is now enabled
- Put the mouser icon to the **Comm Port** and to the right there is small box with dropdown arrow
- Click on the dropdown arrow next to the small box to view the list of the Comm Port
- Write down the list of the Comm Port
- Connect the Mini-b USB cable from the PC or laptop to the A/C unit
- Click on **Tools** menu and point the mouser icon to the **Comm Port**, the small box with dropdown arrow presents to the right
- Click on the dropdown arrow and select the newest or higher number of the Comm Port

To view the controller data information from the A/C unit

- In the nVent HOFFMAN A.C. Monitor main screen, select **Single ACU Monitor** tab.
- Click on **Enable Comm** button, then the screen will be displayed the enclosure air temperature and other temperature settings information include the unit of measure.
- The **Enable Comm** text on the button now changes to **Disable Comm**.
- To stop the communication, click on the **Disable Comm** button and it will change to Enable Comm.

To change the temperature settings to the controller

- In the nVent HOFFMAN A.C. Monitor main screen, select **Single ACU Settings** tab.
- **Note:** the **Change Settings** button is disable and all settings are grayed out. Click on **Read Settings** button, all settings are now displayed on screen and the **Change Settings** button is now enable.
- To change any of the temperature setting, Unit ID, or Station Name, simply click up/down arrow on right of the box or highlight the current value and type the new value in the box.
- Check the box on the left, then click on **Change Setting** buttons to save the new setpoint.
- Click on **Read Settings** again to verify the new setpoint.
- Select **Single ACU Monitor** tab and click on **Enable Comm** to read the new temperature settings from the controller.
- Each of the setpoint should match the new variables that just entered from the **Single ACU Settings** tab.

To view and change the ethernet card (RAC) information

- In the nVent HOFFMAN A.C. Monitor main screen, select **Single ACU Ethernet Info** tab and notice that the **Reprogram ACU** button is disabled.
- Click on **Read Ethernet Info** button, the Ethernet information will be displayed and the **Reprogram ACU** button is enable.
- To change the Ethernet configuration such as Device IP Address, Gateway IP, and Trap IP, make sure to change the **Community** string to **private** from **public**. Note that case is very sensitive. The wording must be lower case only.
- Enter the new network configuration to Device IP address, Gateway IP, and Trap IP, then click on **Reprogram ACU** button to write to the network card.
- In order to be recognized the new networking configurations in local network, cycle power to the A/C unit is required.

To change the static network to dynamic network mode

- In the **Single ACU Ethernet Info** tab screen, click on **Read Ethernet Info** button to read the network card information.
  Note: the **Reprogram ACU** button is now enabled.
- Check the box next to the **Use DHCP Server** on the upper left corner of the screen.
- Click on **Reprogram ACU** button. Now the network is switched to dynamic from static mode.
- To change the dynamic mode to static mode, in the **Single ACU Ethernet Info** tab window click on **Read Ethernet** Info button.
- Uncheck the box next to the **Use DHCP Server** on the upper left corner of the screen.
- Click on **Reprogram ACU** button to switch to static mode.

Ethernet communication mode

- In the nVent HOFFMAN A.C. Monitor screen, click on **Tools** on the main menu.
- In the dropdown window, check the **Use Ethernet** and notice that **Comm Port** is now disabled.
- Select **Single ACU Monitor** tab, in the window click on the **Device IP** box and type the IP address that need to communicate to the network card.
- Click on the **Community** box and then type the word **private**.
  Note: there are two community strings where one is for read ONLY and one is for read/write. The word “public” allows to read ONLY and “private” allows to read and write.
- Click on **Enable Comm** button to communicate to the network card and read the temperature information from the controller.
- Now the temperature settings information in the controller present on the screen.
- To view and change the temperature setpoints, Ethernet card configurations, static and dynamic networking mode, simply follow the same procedures that define for the USB communication mode above.

To monitor multiple A/C units in the network

With the Ethernet networking mode, it provides user with the ability to manage and monitor hundreds of the A/C units from distance domestically and globally at one central location as long as all A/C units configure in the same subnet in the network. Refer to remote access control (RAC) Instruction Manual for configuring multiple units and with text message and email capability in nVent HOFFMAN A.C. Monitor software. The remote access control Instruction Manual, P/N: 89091002 can be downloaded from nVent support center link, https://www.nVent.com/en-us/HOFFMAN/remote-access-control.

Alarm log accessible with support protocol

- Using custom software with below supporting file gives the user the ability to view a log of the last 25 alarms
  - MIB file for SNMP protocol
  - Register and Coil file for Modbus TCP protocol
  - EDS and/or EtherNet_IP Objects file for EtherNet/IP protocol
  - Profinet Data Point file for Profinet protocol

Remote access control pin-out

	FUNCTION	NAME	PIN#	WIRE#
J6	RETURN	C	1	BLK75
	ENCL MI	NO1	2	BLK77
	COOL	NO2	3	ORG78
	NA	N03	4	–
	HEAT	NO4	5	BRN76
J7	RETURN	C	2	YEL39
	ALARM RELAY OUTPUT	NO5	3	YEL38
J1	GROUND	G0	1	BLK40
	POWER (24 VAC)	G	2	WHT41
J2	NA	5V	1	–
	NA	S3	2	–
	INLET TEMP PROBE	S1	3	RED
	NA	Y1	4	–
	DOOR OPEN SWITCH	ID1	5	WHT63
	GROUND	O	6	WHT
	RESERVED	S5	7	–
	OUTLET TEMP PROBE	S2	8	RED45
	NA	Y2	9	–
	MAL-FUNCTION ALARM	ID2	10	BLU88
J3	RESERVED	ID3	1	–
	UNIT REMOTE ON/OFF	ID5	2	–
	NA	+V	3	–
	RESERVED	S6	4	–
	NA	VL	5	–
	RESERVED	ID4	6	–
	GROUND	O	7	–
	RESERVED	S4	8	–
J4	DATA (–)	–	1	BLK
	DATA (+)	+	2	RED
	GROUND	O	3	WHT
J5	DATA (–)	–	1	–
	DATA (+)	–	2	–
	GROUND	O	3	–

MAINTENANCE

Performing preventative maintenance (PM) helps to keep your nVent HOFFMAN AC unit operating at the highest most efficient levels. Maintenance should be performed at least twice a year, more frequently when in challenging conditions, such as dusty, high humidity, high heat, oily or corrosive environments.

Product failures due to lack of maintenance may impact warranty coverage.

Condenser and evaporator air movers (FANS)

Fan motor requires no maintenance. All bearings, shafts, etc. are lubricated for the life of the motor during manufacturing.

Compressor

The compressor requires no maintenance. It is hermetically sealed, properly lubricated at the factory and should provide years of satisfactory operating service. Visually inspect the compressor for proper operation, mounting, visible signs of exposure to high heat.

Should the refrigerant charge be lost, recharging ports (access fittings) on the suction and discharge sides of the compressor are provided for recharging and/or checking suction and discharge pressures.

Under no circumstance should the access fitting caps/covers be loosened, removed or tampered with unless by authorized refrigeration repair service personnel. Breaking of seals on compressor access fittings during warranty period will void warranty on hermetic system.

Recharging ports are provided for the ease and convenience of reputable refrigeration repair service personnel for recharging the air conditioner.

Inlet air filter

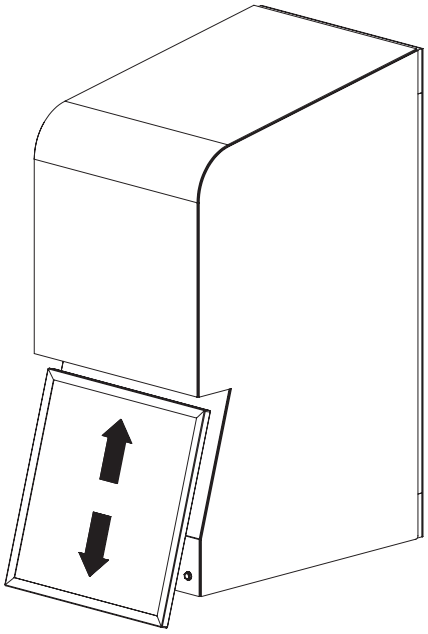
Proper maintenance of the ambient air filter is critical to normal operation of the air conditioner. If filter maintenance is delayed or ignored, this can result in decreased performance and/or premature failure of the compressor and other air conditioner components.

Do not run the air conditioner for extended periods of time with the filter removed. Particles of dust, lint, etc., can plug the fins of the condenser coil which will give the same reaction as a plugged filter. The condenser coil is not visible through the filter opening, so protect it with a filter. Continued operation under the above conditions can and will damage and shorten compressor life.

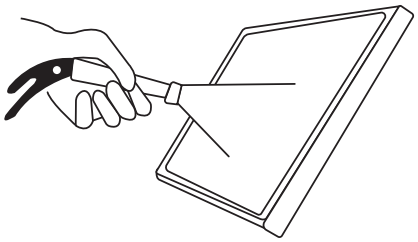
How to remove, clean or install a new inlet air filter

Research Products (RP) aluminum washable air filters are designed to provide excellent filtering efficiency with a high dust holding capacity and a minimum amount of resistance to air flow. Since they are constructed entirely of aluminum, they are lightweight and easy to service. Optimum filter performance is maintained by recoating the filters after washing with RP Super Filter Coat adhesive. To achieve maximum performance from your air handling equipment, air filters should be cleaned on a regular basis.

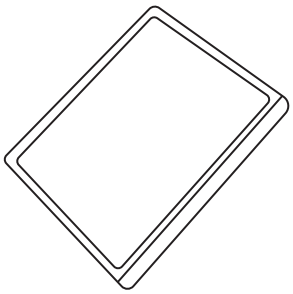
The inlet air filter is located up inside the front panel of the unit cover. To remove the filter, lift up to clear the support tabs, and pull out and down. The filter may now be cleaned or a new filter installed.



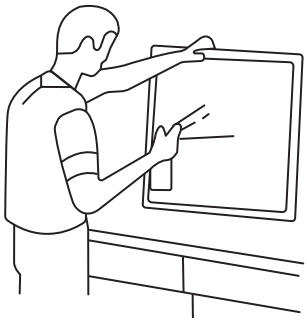
Cleaning Instructions:



1. Flush the filter with warm water from the exhaust side to the intake side. **Do not use caustics**.



2. After flushing, allow filter to drain. Placing it with a corner down will assure complete drainage.



3. Recoat the filters with RP Super Filter Coat adhesive. When spraying filter do so from both sides for maximum concentration of adhesive.

⚠ CAUTION

Operation of the air conditioner in areas containing airborne caustics or chemicals can rapidly deteriorate filters, condenser coils, blowers and motors, etc.

Contact nVent Equipment Protection for special recommendations.

Refrigerant loss

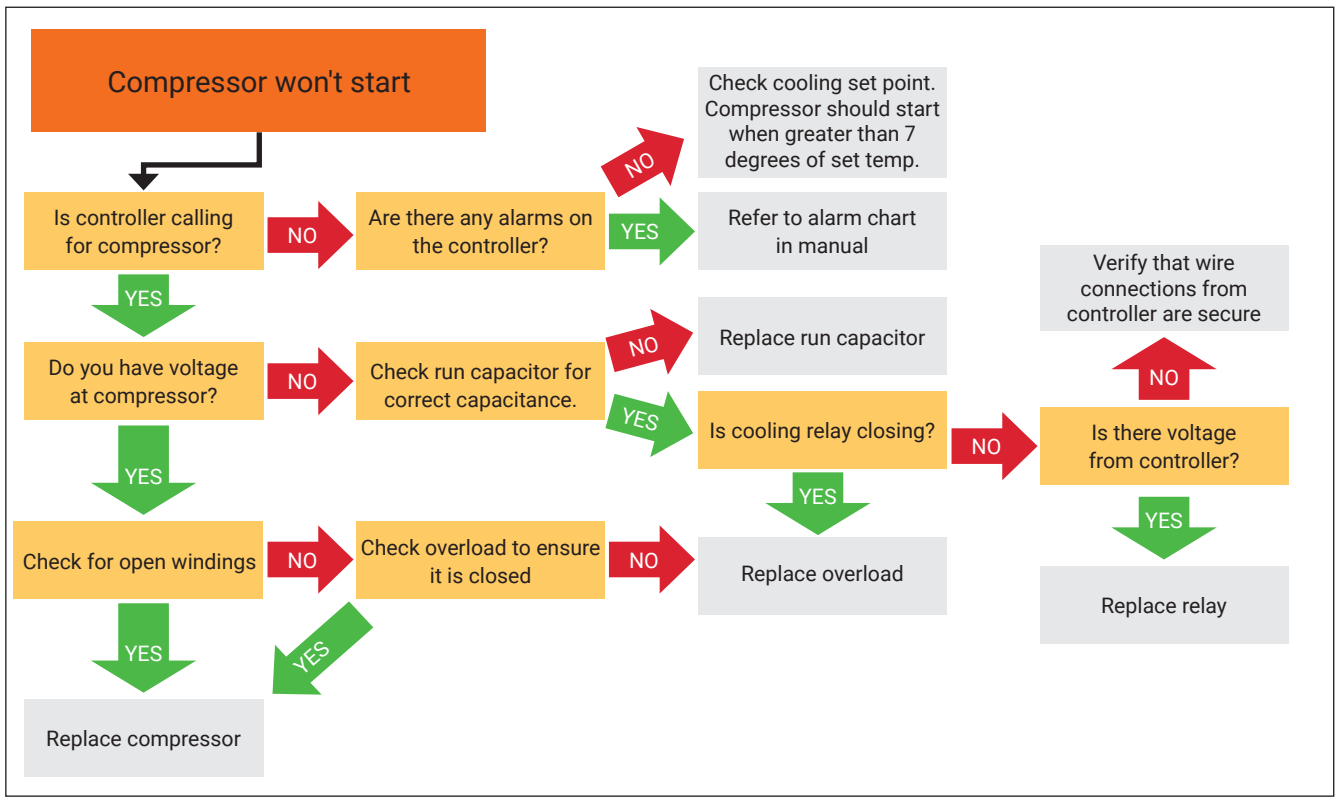
Each air conditioner is thoroughly tested prior to leaving the factory to insure against refrigeration leaks. Shipping damage or microscopic leaks not found with sensitive electronic refrigerant leak detection equipment during manufacture may require repair or recharging of the system. This work should only be performed by qualified professionals, generally available through a local, reputable air conditioning repair or service company.

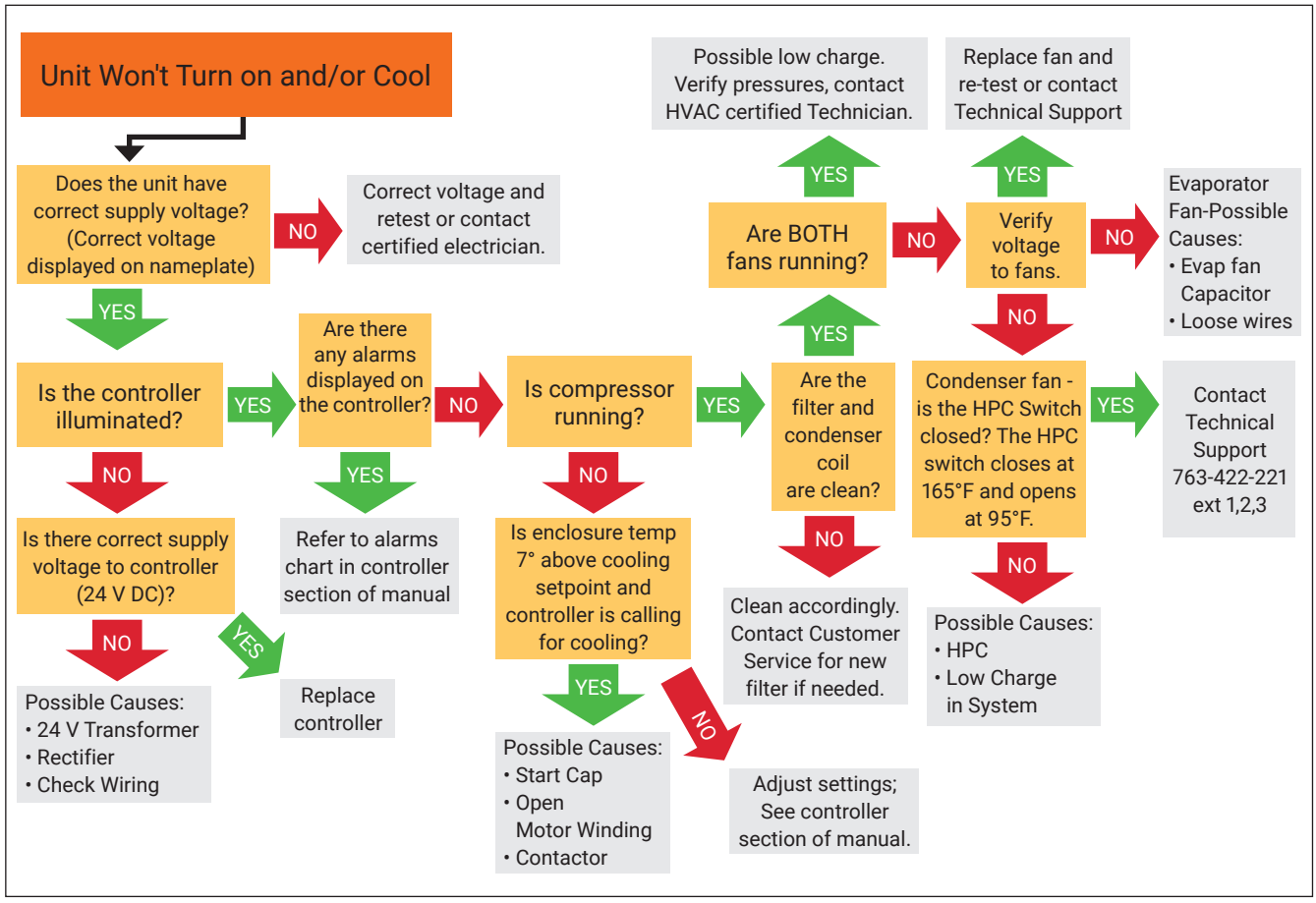
Refer to the data on the nameplate which specifies the type of refrigerant and the charge size in ounces.

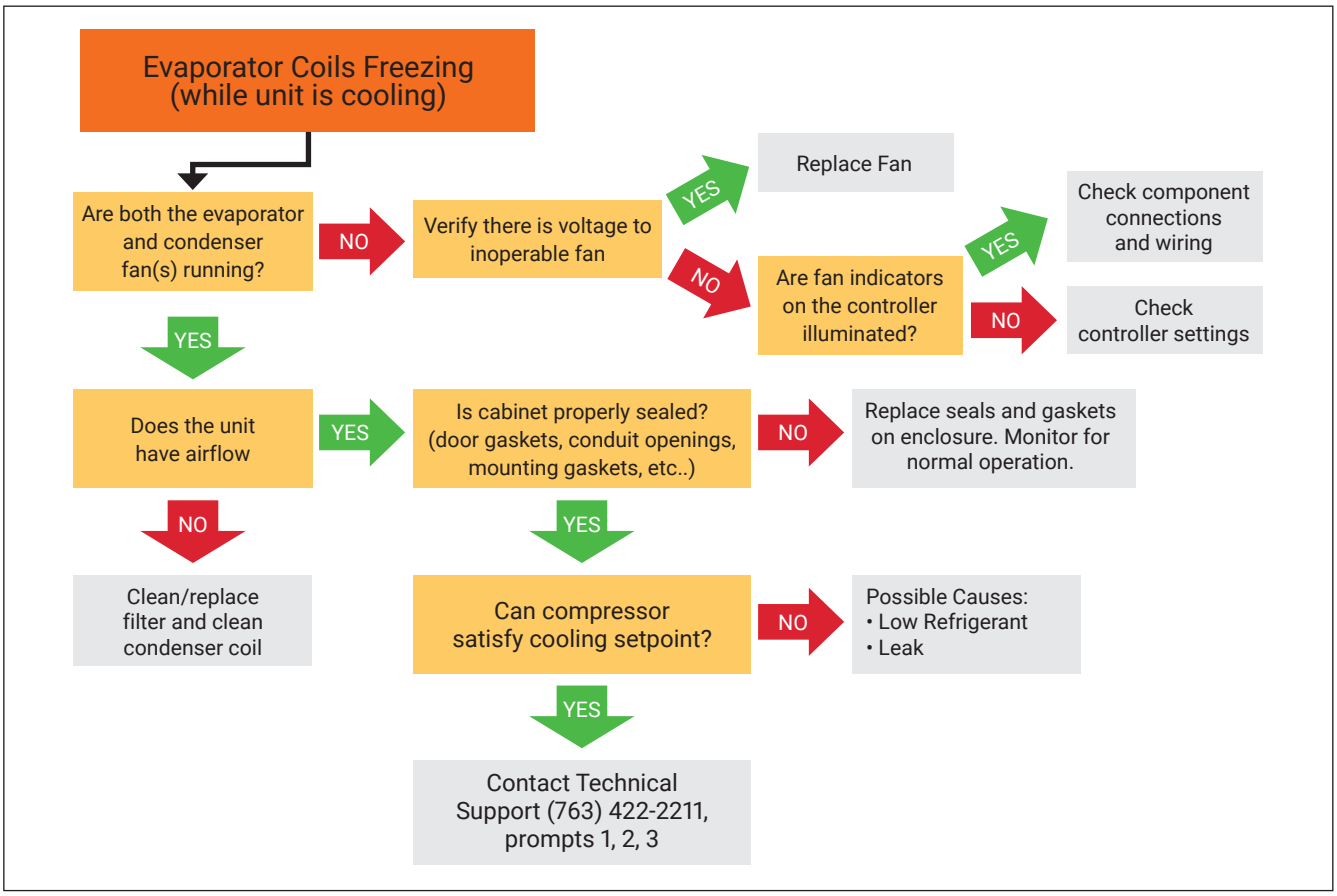
Before recharging, make sure there are no leaks and that the system has been properly evacuated into a deep vacuum.

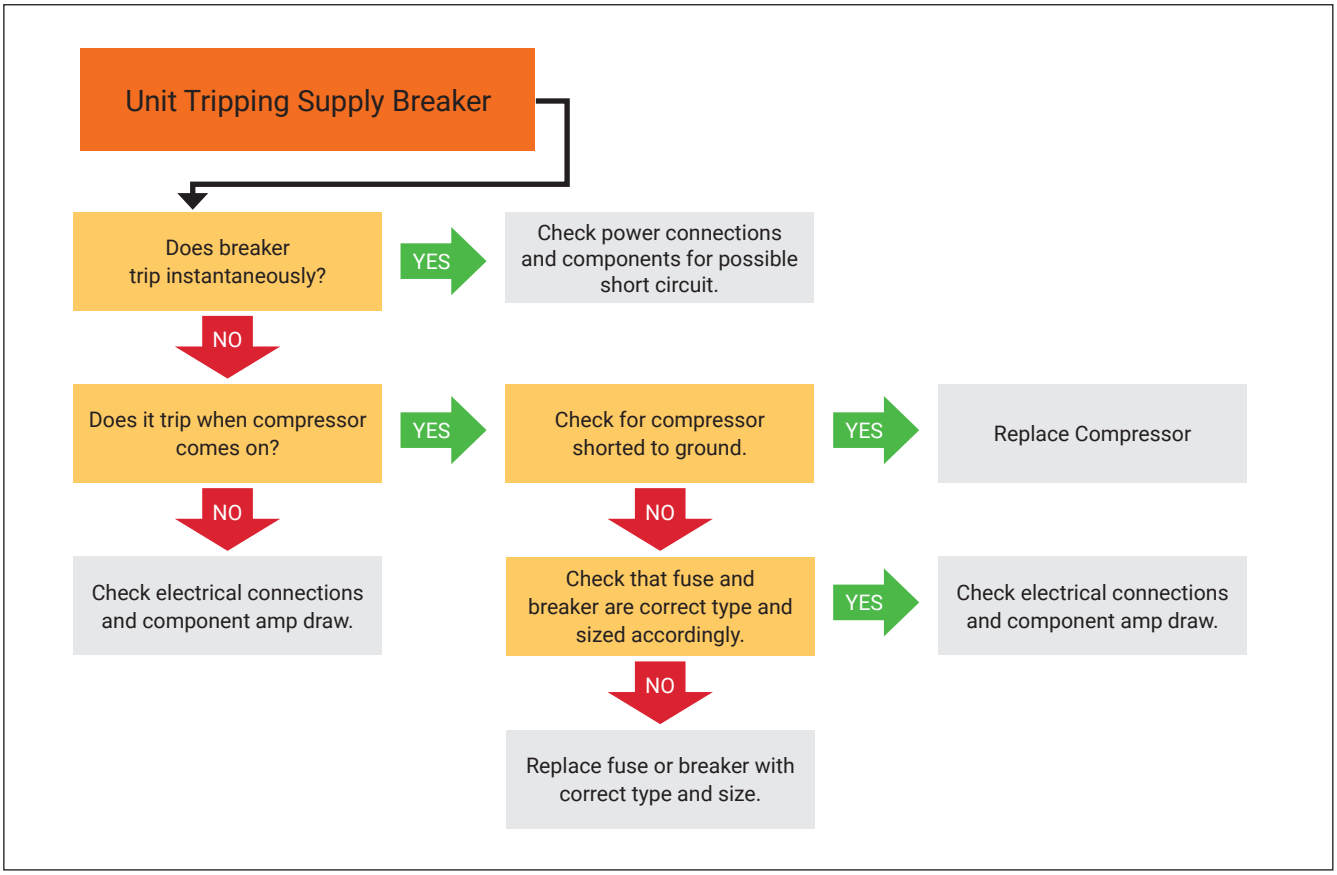
PREVENTATIVE MAINTENANCE/INSPECTION

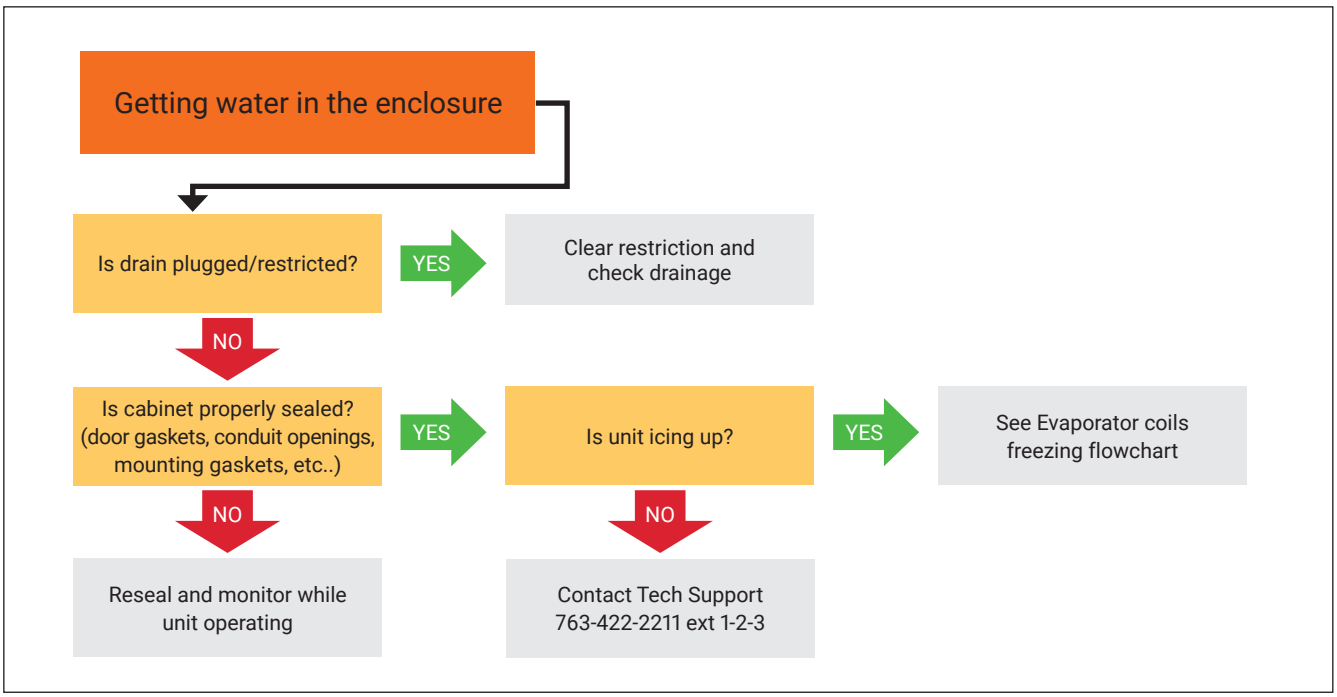
Maintenance/Inspection Recommendations (Perform at least 2 times per year – more frequently as required by operational environment)		Last Completed			
Check Point	**Description**	**Date**	**Date**	**Date**	**Date**
Operational Inspection	Run unit through all modes of operation and record temperatures, voltages, and amperes Comments:				
Visual Inspection	Visually inspect unit for damage, cleanliness, missing, loose, or broken parts Comments:				
Filter Maintenance	Inspect, clean, and replace filter as necessary Comments:				
Clean Unit	Inspect and clean coils, fans/blowers, louvers, air inlets/outlets, interior and exterior of unit as required Comments:				
Controller Cycle Sequence	Cycle the controller through all modes of operation to ensure proper cycling and temperature setpoint operation. Adjust to proper setting (Typically 25°-30°) Comments:				
Air Flow and Circulation	Inspect AC unit, cabinet, and surrounding area to ensure adequate airflow to and from the unit on both the inlet and outlet air channels for the ambient and cabinet air Comments:				
Seals, Gaskets, and Leaks	Inspect and repair the seals, gaskets, and access holes around the unit and/or cabinet that show signs of leaking air and/or moisture Comments:				
Condensate and Drains	Inspect and clean the condensate pans and drains to ensure proper drainage and dissipation of moisture Comments:				
Electrical/Wiring	Inspect for loose, damaged, corroded, or chaffing wiring and connections. Tighten, insulate, or tie-up wires as required Comments:				
Options and Accessories	Check operation and functionality of optional and accessory items such as digital display/controller, door switches, alarm switches, air baffles/deflectors, etc. Comments:				
Refrigeration System	Inspect refrigeration tubing/lines for signs of leaks, rubbing, corrosion, or damage. Check the compressor for proper operation, mounting, and visible signs of exposure to high heat Comments:				
Maintenance Records	Update maintenance records on the unit and in the management system Comments:				


Compressor won't start
Is controller calling for compressor?
NO
Are there any alarms on the controller?
NO
Check cooling set point. Compressor should start when greater than 7 degrees of set temp.
YES
Refer to alarm chart in manual
YES
Do you have voltage at compressor?
NO
Check run capacitor for correct capacitance.
NO
Replace run capacitor
YES
Is cooling relay closing?
NO
Is there voltage from controller?
NO
Verify that wire connections from controller are secure
YES
Replace relay
YES
Check for open windings
NO
Check overload to ensure it is closed
NO
Replace overload
YES
YES
Replace compressor


Unit Won't Turn on and/or Cool
Does the unit have correct supply voltage? (Correct voltage displayed on nameplate)
NO
Correct voltage and retest or contact certified electrician.
YES
Is the controller illuminated?
YES
Are there any alarms displayed on the controller?
NO
Is compressor running?
YES
Are the filter and condenser coil are clean?
NO
Clean accordingly. Contact Customer Service for new filter if needed.
NO
Is there correct supply voltage to controller (24 V DC)?
NO
Possible Causes:
• 24 V Transformer
• Rectifier
• Check Wiring
YES
Replace controller
YES
Refer to alarms chart in controller section of manual
NO
Is enclosure temp 7° above cooling setpoint and controller is calling for cooling?
YES
Possible Causes:
• Start Cap
• Open Motor Winding
• Contactor
NO
Adjust settings; See controller section of manual.
YES
Are BOTH fans running?
NO
Verify voltage to fans.
NO
Evaporator Fan-Possible Causes:
• Evap fan Capacitor
• Loose wires
YES
Possible low charge. Verify pressures, contact HVAC certified Technician.
YES
Replace fan and re-test or contact Technical Support
YES
NO
Condenser fan - is the HPC Switch closed? The HPC switch closes at 165°F and opens at 95°F.
YES
Contact Technical Support 763-422-221 ext 1,2,3
NO
Possible Causes:
• HPC
• Low Charge in System


Evaporator Coils Freezing (while unit is cooling)
Are both the evaporator and condenser fan(s) running?
NO
Verify there is voltage to inoperable fan
YES
Replace Fan
NO
Are fan indicators on the controller illuminated?
YES
Check component connections and wiring
NO
Check controller settings
YES
Does the unit have airflow
YES
Is cabinet properly sealed? (door gaskets, conduit openings, mounting gaskets, etc..)
NO
Replace seals and gaskets on enclosure. Monitor for normal operation.
NO
Clean/replace filter and clean condenser coil
YES
Can compressor satisfy cooling setpoint?
NO
Possible Causes:
• Low Refrigerant
• Leak
YES
Contact Technical Support (763) 422-2211, prompts 1, 2, 3


Unit Tripping Supply Breaker
Does breaker trip instantaneously?
YES
Check power connections and components for possible short circuit.
NO
Does it trip when compressor comes on?
YES
Check for compressor shorted to ground.
YES
Replace Compressor
NO
Check electrical connections and component amp draw.
NO
Check that fuse and breaker are correct type and sized accordingly.
YES
Check electrical connections and component amp draw.
NO
Replace fuse or breaker with correct type and size.



For additional technical support:
- Call 763-422-2211 or
- Email cooling.service@nVent.com or
- Download Field Service Request (FSR) form from: https://HOFFMAN.nVent.com/en-us/cooling-field-service-request

F-GAS INFORMATION

	X230216GXXX	X230226GXXX
Refrigerant Kühlmittel Chłodziwo	R513A	R513A
GWP	573	573
Factory Charge Füllmenge durch Hersteller Opłata Fabryczna	227 Grams 227 Gramm 227 Gramów	184 Grams 184 Gramm 184 Gramów
CO_2 Equivalent CO_2 Equivalent CO_2 Ekwilalent	0.13 Tons 0,13 Tonnen 0,13 Tony	0.105 Tons 0,105 Tonnen 0,105 Tony

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nVent.com

Our powerful portfolio of brands:

CADDY ERICO HOFFMAN ILSCO RAYCHEM SCHROFF