

SPECTRACOOOL

AIR CONDITIONER, HAZARDOUS LOCATIONS

NHZ28 MODEL

INSTRUCTION MANUAL



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GENERAL SAFETY INFORMATION

Please observe the following general safety instructions when assembling and operating the unit:


- Assembling, installing and servicing must only be performed by properly trained specialists.
- When transporting the enclosure with the cooling unit externally mounted, always use an additional shipping brace to support the cooling unit.
- Do not attempt to operate the air conditioner while it is horizontal or on its side, back or front.
- Operation of air conditioner in areas containing airborne caustics or chemicals can rapidly degrade sealing properties of materials, deteriorate filters, refrigeration coils, blowers and motors. Contact nVent Equipment Protection for special recommendations. See Maintenance on page 21.

 DANGER	
	<p>Danger: explosion hazard - do not energize, disconnect, or troubleshoot equipment unless power has been switched off or the area is known to be non-hazardous.</p> <p>Unit to be installed and maintained by properly trained personnel only.</p> <p>Danger : Risque d'explosion – Ne pas alimenter, déconnecter ni dépanner l'équipement si l'alimentation n'a pas été coupée ou si la zone n'est pas reconnue comme non dangereuse.</p>

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 MISE EN GARDE	
<p>This air conditioner is suitable for use in Class 1, Division 2, Groups A,B,C, D T4A hazardous locations, or non-hazardous locations only. It is meant to be installed in an enclosure such that the field wiring and controls are only accessible with the use of a tool.</p> <p>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.</p>	
<p>Ce climatiseur peut être utilisé dans des zones dangereuses de Classe 1, Division 2, Groupes A, B, C, D T4A ou des zones non dangereuses uniquement. L'installation doit être effectuée dans une armoire de telle sorte que le câblage et les commandes sur le terrain ne soient accessibles qu'à l'aide d'un outil.</p> <p>Ne pas essayer de faire fonctionner le climatiseur en position horizontale, ou posé sur le côté, l'arrière ou l'avant. Le compresseur de réfrigération est rempli d'huile lubrifiante. Cela endommagerait le climatiseur de manière permanente et annulerait la garantie.</p>	

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, and then 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 on the unit nameplate. No other equipment should be connected to this circuit to prevent overloading

Immediately after applying power, the evaporator blower (enclosure air) should start running. Operate the air conditioner with the compressor running for five (5) to ten (10) minutes. You will need to set the cooling thermostat or controller setpoint below the ambient temperature to operate the compressor.

Condenser air temperatures should be warmer than normal room temperatures within a few minutes after the condenser impellers start.

See Sequence of Operation on page 4 for specifics on how the unit operates when powered up.

HOW TO READ MODEL NUMBERS

NHZ28	04	2	6	G300
1	2	3	4	5

1. Identifies the type/family of air conditioner and the approximate height (i.e. NHZ28 = Narrow Hazardous Location family about 28 inches high).
2. This is the air conditioner's listed capacity in BTU/Hr. at rated conditions. (i.e. 06=6,000 BTU/Hr. at 131/131 F)
3. 1 = 115 Volt, 2 = 230 Volt, 4 = 460 Volt.
4. 6 = 50/60 Hz or 60 Hz only.
5. Unique set of numbers for each air conditioner which identifies the accessories on a model.

TECHNICAL INFORMATION

GENERAL

Sensor 2 monitors the enclosure return air temperature to prevent ice buildup on the evaporator coil. If the air temperature drops below -1 C, the compressor and condenser air mover(s) shut off. They turn back on when the temperature rises above 15 C.

The compressor and the air movers are equipped with overload protection to guard against excess current and temperatures.

SEQUENCE OF OPERATION

The air conditioner comes standard with smart controller. During cooling modes, the evaporator fan will be running.

COOLING

When the enclosure temperature is above the cooling set-point plus the cooling differential, the smart controller will call for cooling. The compressor is then energized through a solid state relay or contactor. The condenser impellers will start immediately if the unit is not equipped with an optional head pressure control switch. If the unit is equipped with an optional head pressure control switch, the condenser impellers will start once the refrigerant pressure reaches the pressure setting of the switch. Component specific information is listed below.

Operating the air conditioner below the minimum ambient temperature or above the maximum ambient temperatures indicated on the nameplate voids all warranties. DO NOT adjust cooling set-point to a temperature lower than 70 F. Doing so can increase the likelihood of frost buildup on the evaporator coil.

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 that the air conditioner must then dehumidify.

STANDARD AND OPTIONAL COMPONENT OPERATION

SMART CONTROLLER

The standard NHZ28 air conditioner uses our standard smart controller. The setpoint equals the temperature that the air conditioner turns off. The controller has a 7 F differential from setpoint until it calls for cooling. An example of operation is shown below.

FOR COOLING (75-100 F RANGE)

- Thermostat setpoint = 80 F
- Cooling turns on at 87 F
- Cooling turns off at 80 F

REMOTE ACCESS CONTROL (OPTIONAL)

See Remote Access Control on page 17

HEAD PRESSURE CONTROL (OPTIONAL)

Unit is set at the factory, no adjustment necessary.

At a saturated condenser temperature of 85 F (95 psig), the condenser fans will power off. At a saturated condenser temperature of 117 F (165 psig), the condenser fans will power on.

115V/230V TO 10V TRANSFORMER (OPTIONAL)

This transformer powers the thermal display.

DOOR SWITCH

Several door switches may be connected in series and operated on one cooling unit. The door switch only supports a floating connection, no external voltages. Remove jumper from terminals 3 and 4 of the connector and connect the door switch to the two terminals if a door switch is available.

ACTIVE CONDENSATE MANAGEMENT

At low temperatures and high humidity levels inside the enclosure, condensation may form on the evaporator coil.

The air conditioner will continuously evaporate the water that may be in the drain pan due to condensation from the evaporator coil into the external air stream. Excess condensate is routed downwards out of the air conditioner via a tube fitting at the bottom of the condenser side of the unit. A 10 mm inside diameter tube can be attached to the fitting and routed to a nearby drain.

WHEN USED WITH PURGE AND PRESSURIZED ENCLOSURES

This air conditioner will operate safely in a Class 1 Division 2 Groups A, B, C and D hazardous location on both exterior and interior sides. It does not require a purge and pressurized enclosure, but if it is to be installed on one, the following should be considered.

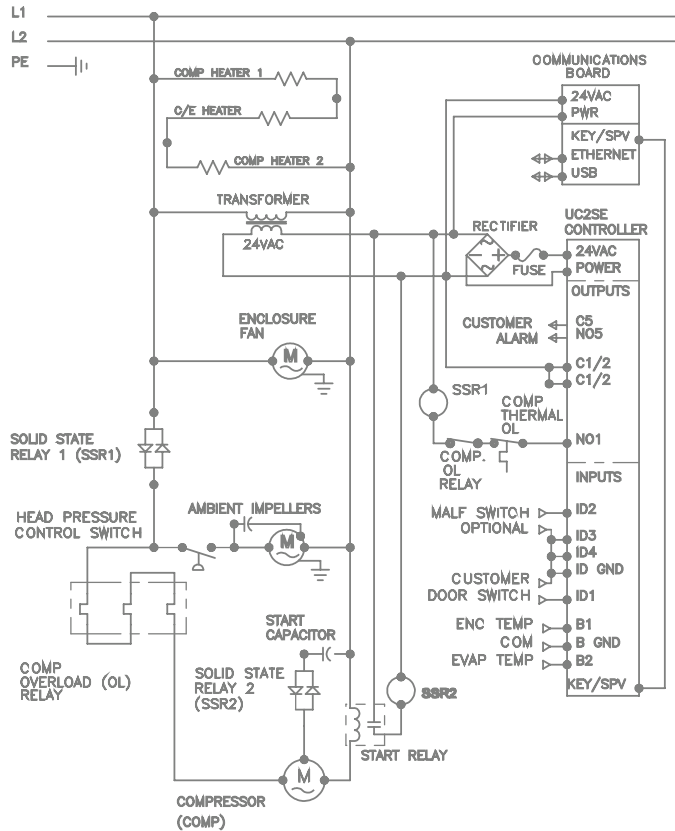
The active condensate management system functionally described above is possible due to a drain trap directly connecting and routing condensation from the evaporator coil pan to the ambient side where it collects in the condensate evaporator pan.

During initial purging of an enclosure or after long periods of operation in a pressurized system utilizing a dry protective and/or inert gas supply, the drain trap can eventually dry out and allow a small amount of protective gas to leak outward of the enclosure through the drain trap. A leakage should not immediately be associated with a hazardous condition. If continuous positive pressure is maintained inside an enclosure, the protective gas will leak out to ambient and prevent hazardous gasses from entering. A typical enclosure pressurization system can compensate for this and maintain proper enclosure pressure.

If the pressurization system cannot compensate for the additional leakage, a drain trap seal can be created by priming the air conditioner drain. This can be done by de-energizing and opening the enclosure for access to the evaporator coil, and carefully pouring clean water (approx. 1 cup) into the face of the coil. With water present, the drain trap should be fully primed and sealed. Opening the enclosure can also introduce humidity back into the enclosure which will eventually condense on the evaporator coil and become part of the seal in the drain trap.

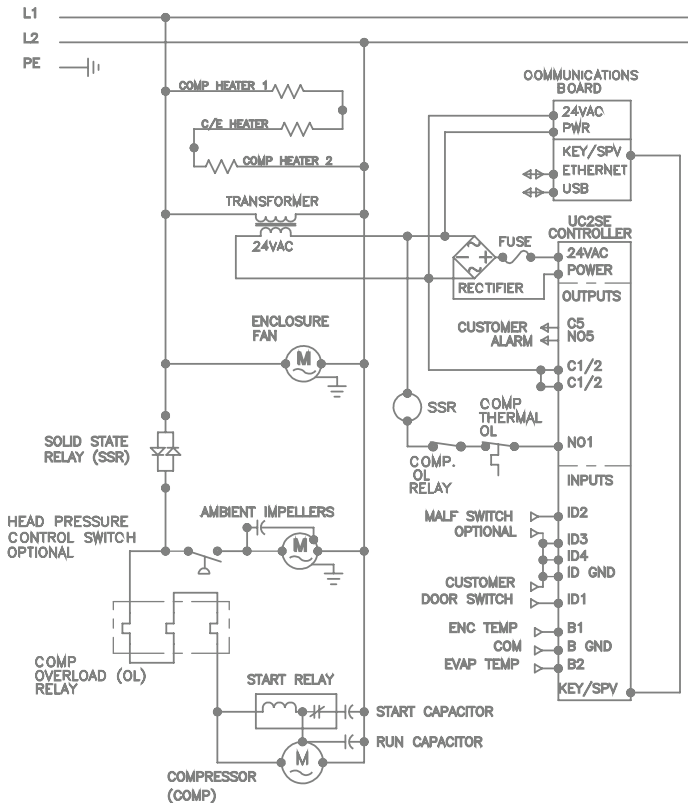
SCHEMATICS AND WIRING DIAGRAMS

GENERIC 115V SCHEMATIC (ACTUAL UNIT OPTIONS MAY VARY)



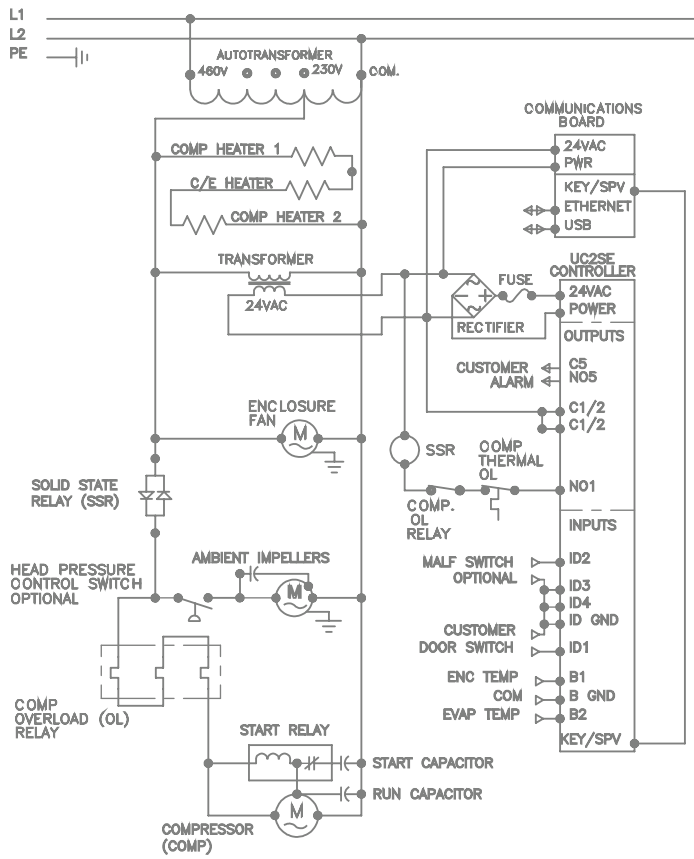
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GENERIC 230V SCHEMATIC (ACTUAL UNIT OPTIONS MAY VARY)



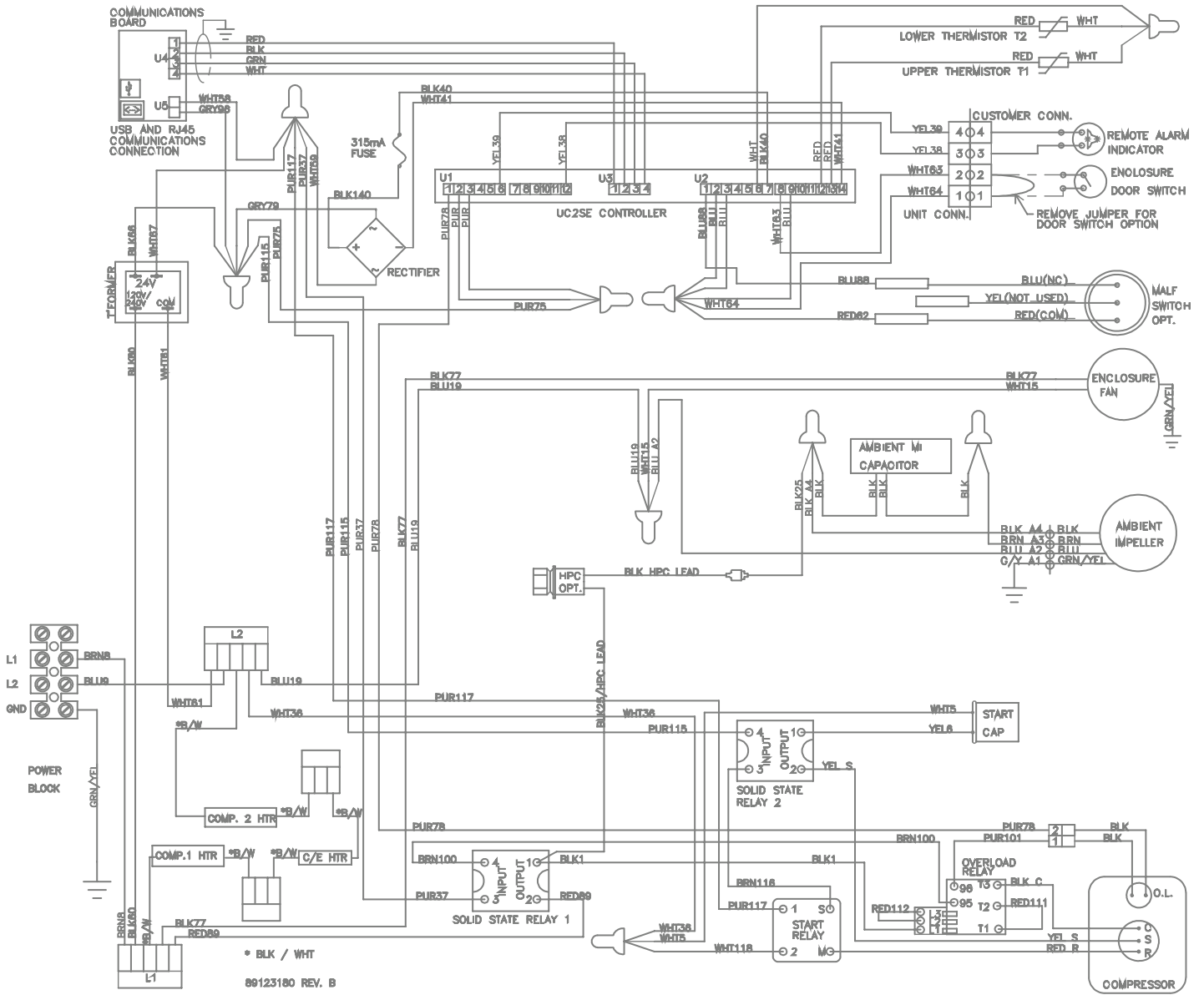
89123186 REV. A

GENERIC 460V SCHEMATIC (ACTUAL UNIT OPTIONS MAY VARY)

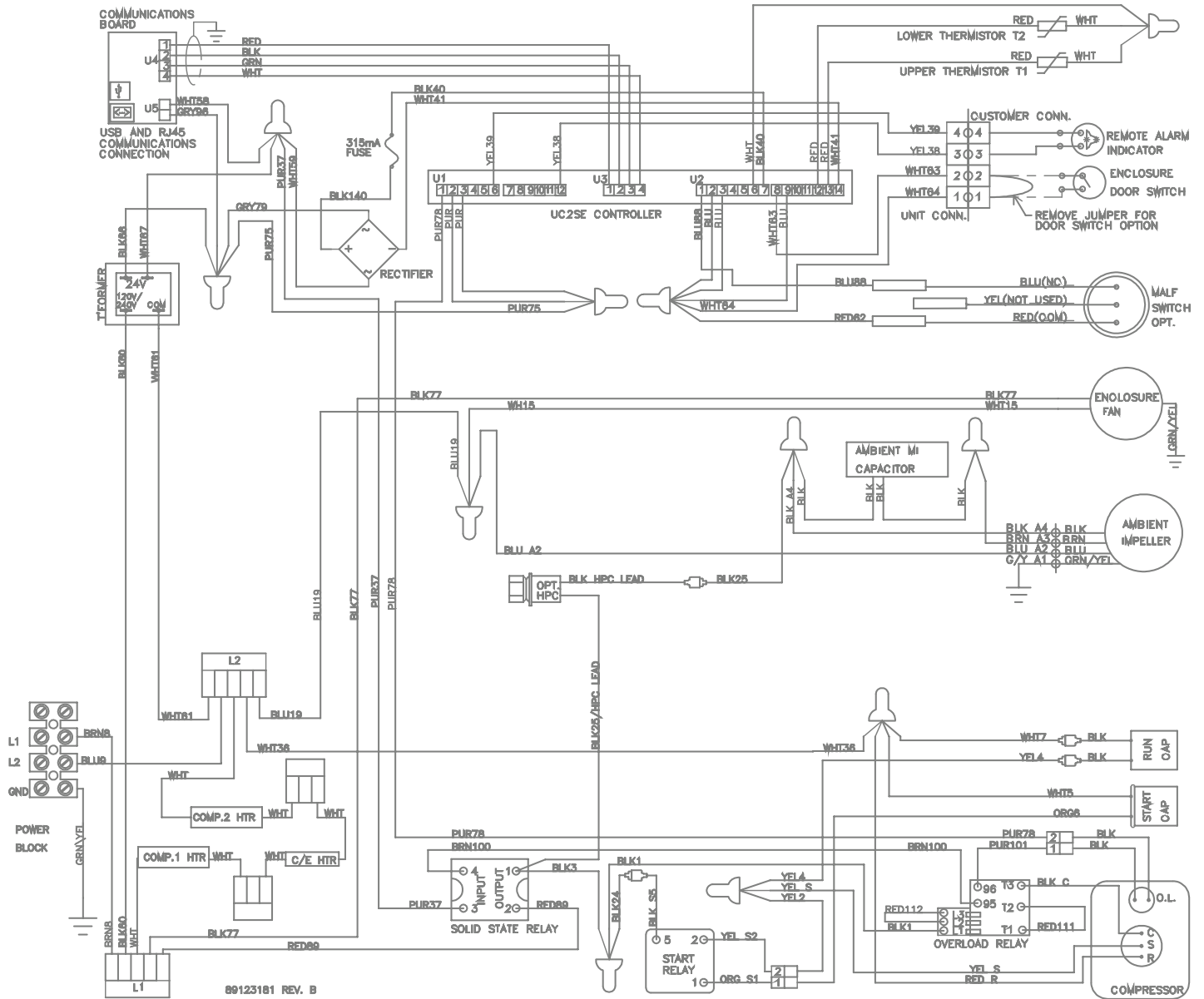


89123193 REV. A

GENERIC 115V WIRE DIAGRAM (ACTUAL UNIT OPTIONS MAY VARY)

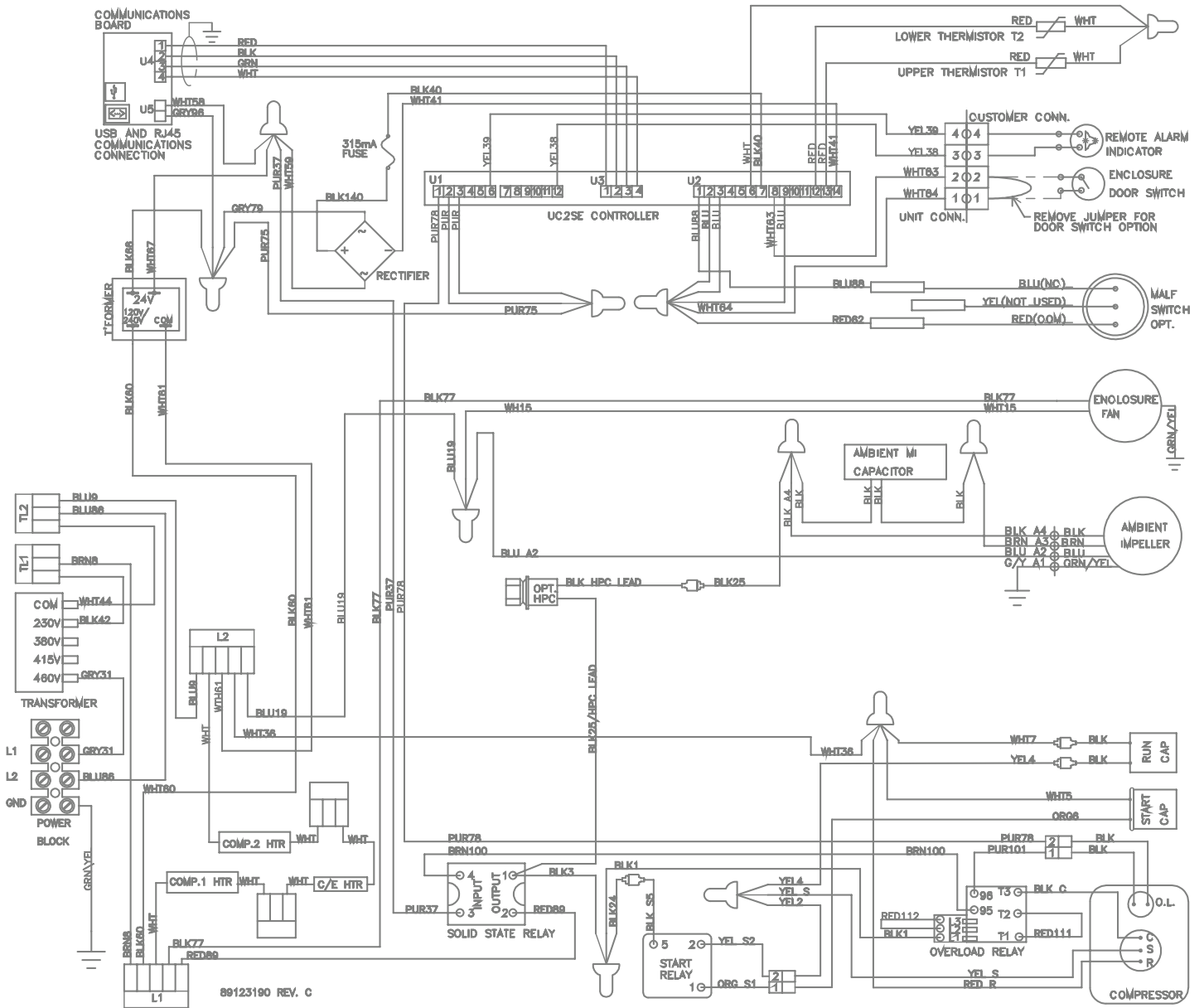


GENERIC 230V WIRE DIAGRAM (ACTUAL UNIT OPTIONS MAY VARY)

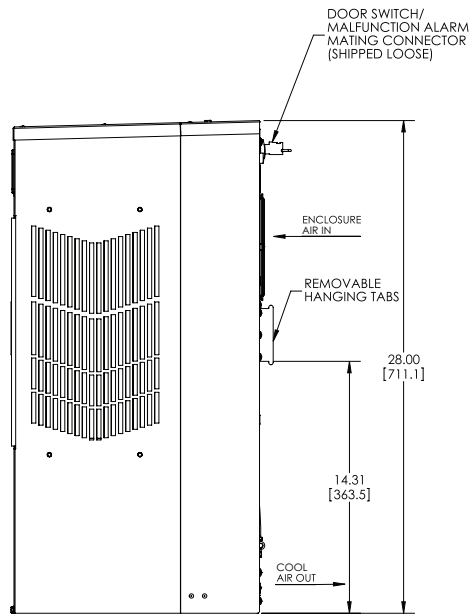
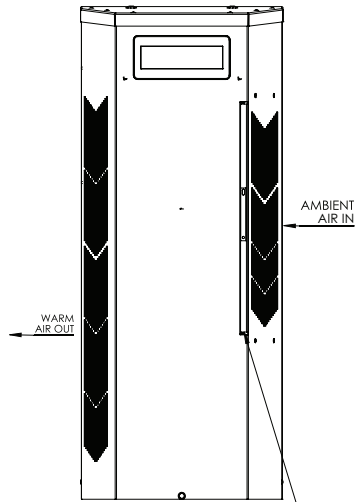
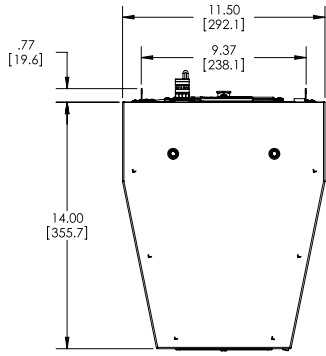


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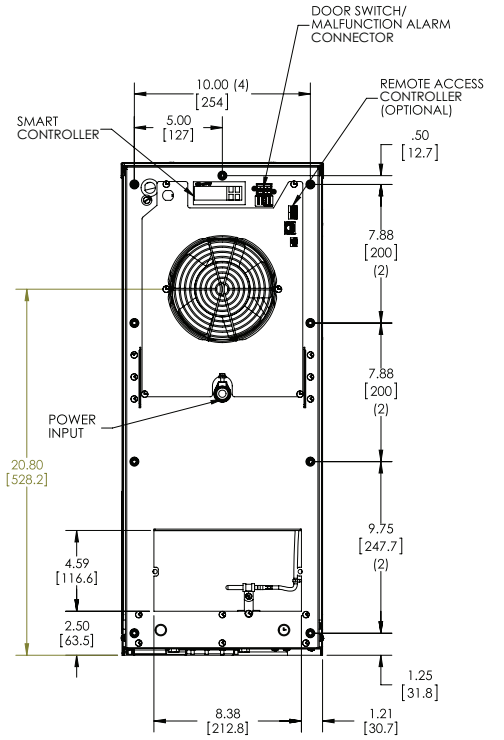
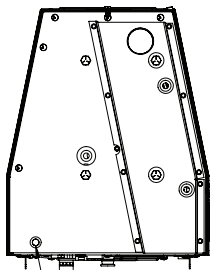
GENERIC 460V WIRE DIAGRAM (ACTUAL UNIT OPTIONS MAY VARY)



DIMENSIONAL DRAWING



CLEANABLE, REUSABLE
ALUMINUM INLET AIR FILTER
PULLS OUT FRONT



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- When transporting the enclosure with the cooling unit externally mounted, always use an additional shipping brace to support the cooling unit.
- Do not attempt to operate the air conditioner while it is horizontal or on its side, back or front.
- Operation of air conditioner in areas containing airborne caustics or chemicals can rapidly degrade sealing properties of materials, deteriorate filters, refrigeration coils, blowers and motors. Contact nVent Equipment Protection for special recommendations. See Maintenance on page 21.



DANGER



Danger: explosion hazard - do not energize, disconnect, or troubleshoot equipment unless power has been switched off or the area is known to be non-hazardous.

Unit to be installed and maintained by properly trained personnel only.

Danger: Risque d'explosion – Ne pas alimenter, déconnecter ni dépanner l'équipement si l'alimentation n'a pas été coupée ou si la zone n'est pas reconnue comme non dangereuse.

INSTALLATION INSTRUCTIONS

1. Refer to nameplate for hazardous location rating.
2. Install a suitable switch to de-energize the air conditioner for repairs or remove the fuse.
3. Inspect the air conditioner and verify correct functionality before mounting the air conditioner. See Handling and Testing the Air Conditioner on page 4.
4. Using the mounting gasket kit provided with the unit, install gaskets to the air conditioner.
5. When considering a location for the unit, it is recommended that a six (6) inch clearance be maintained on at least one side of the air conditioner. It is also recommended that twenty (20) inches of clearance be allowed from the front of the unit for cover removal.
6. Figure 1 and the cutout template included with the unit will assist in preparing the enclosure for installation of the unit. NOTE: Mount the unit within 3° from vertical.
7. Mount air conditioner on enclosure taking care not to damage the mounting gasket. The mounting gasket is the seal between the air conditioner and the enclosure. Avoid dragging the air conditioner on the enclosure with the mounting gasket attached as this could cause rips or tears in the gasket and risk losing the water tight seal.
8. Allow unit to remain upright for a minimum of five (5) minutes before starting. CAUTION! Air conditioner must be in upright position during operation.
9. Refer to the nameplate for electrical requirements. Wire the unit to a properly grounded power supply. Electrical circuit should be fused with slow blow or HACR circuit breaker.
10. Adjust the controller to the desired cabinet temperature. Refer to Displaying and Changing Program Variables on page 15 for controller adjustments and operation.



CAUTION

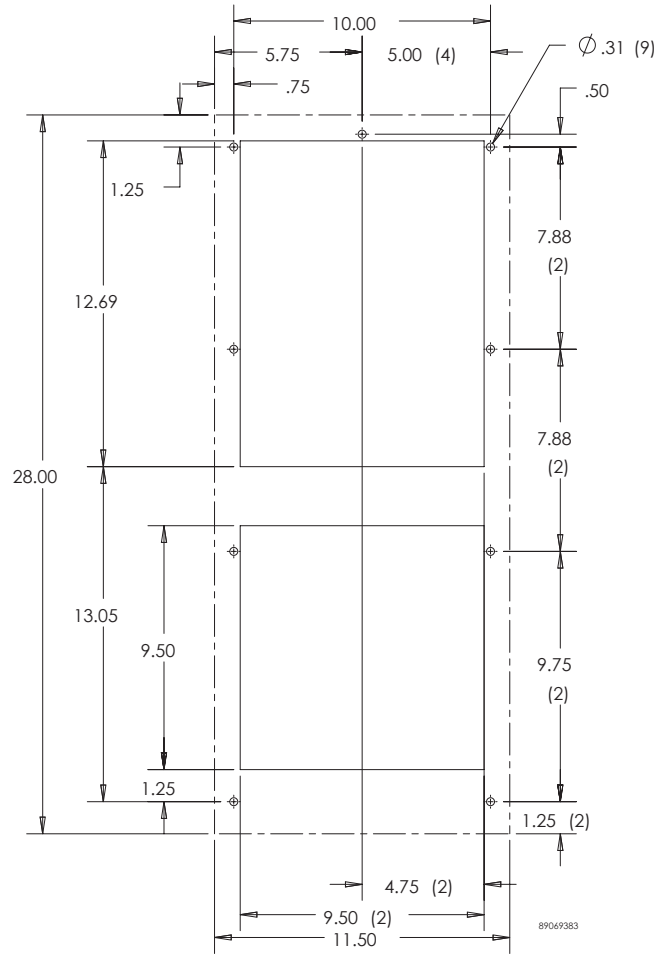
MISE EN GARDE

The unit is meant to be installed in an enclosure suitable for the environment listed previously and such that the field wiring and controls are only accessible with the use of a tool.

When installed on an enclosure, only the front/face side, ambient air in, and ambient air out can be exposed to the environment.

L'unité doit être installée dans une armoire adaptée à l'environnement susmentionné et de telle sorte que le câblage et les commandes sur le terrain ne soient accessibles qu'à l'aide d'un outil.

Lors d'une installation sur une armoire, seule la face avant/latérale, l'entrée d'air ambiant et la sortie d'air ambiant peuvent être exposées à l'environnement.



Surface Mount

Figure 1
Cut-out Drawing

SMART CONTROLLER

INTRODUCTION

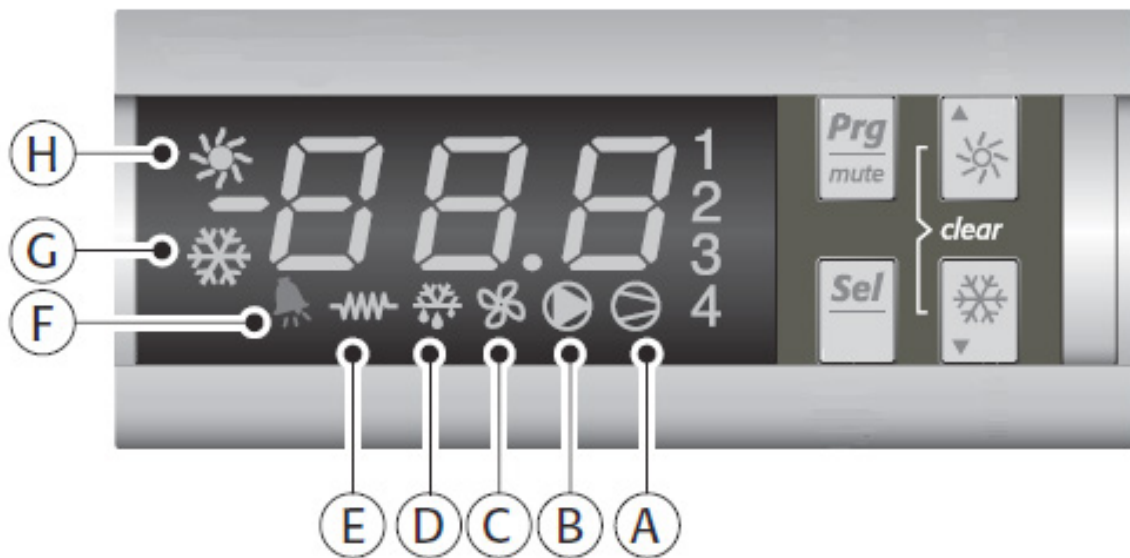
The smart controller is a parametric controller for the complete management of air conditioners. All settings are pre-programmed at the factory. Cooling set-points, cooling differential and high/low temperature alarm set-points can be adjusted by the user. Alarms are outputted through a relay contact.

ENERGIZING THE CONTROLLER

The controller is wired and programmed at the factory to be energized when power is supplied to the air conditioner.

CONTROL STATUS INDICATION

The display has numerous symbols that indicate if the controller is cooling or alarming, if the compressor is enabled, and if the ambient fan is enabled. The 3 alpha-numeric characters further describe alarms and show the cabinet temperature by default.



SYMBOL	COLOR	ICON ON	ICON FLASHING
1	AMBER	Compressor On	Start-up Request
2,3,4	AMBER	Not Used	Not Used
A	AMBER	Compressor On	Not Used
B	AMBER	Evaporator Fan On	Not Used
C	AMBER	Not Used	Not Used
D	AMBER	Not Used	Not Used
E	AMBER	Heater Active	Not Used
F	RED	Alarm Active	Not Used
G	AMBER	Controller Active	Not Used
H	AMBER	Not Used	Not Used

DISPLAYING AND CHANGING PROGRAM VARIABLES

Access: To view and/or change parameters, press and hold the Prg and Sel buttons for greater than 5 seconds. Press the up or down arrow buttons until "22" is displayed, then press Sel button. When "S-P" is displayed, press Sel.

Navigation: Press up or down arrows to display sub-menus then press Sel to select the desired sub-menu. In the sub-menu, use up or down arrows to display parameters for viewing or changing and press Sel. Use Prg button to back out of menu levels as desired.

Adjust: Use the up or down arrows to change the parameter value then push Sel to save that setting. If Sel is not pressed, the change to the value will not be saved. Navigate to and change other parameters as desired. When finished, push Prg to back out of the sub-menus to the main menu.

NOTE: The display will revert to normal temperature display mode if no buttons are pressed for 60 seconds.

OPERATING PARAMETERS

Parameter	Default Value	Range	Description
r01	80 F	72 F to 120 F	Cooling set-point
r02	7 F	-	Cooling differential
A04	50 F*	32 F to 60 F	Heating set-point*
A05	7 F*	-	Heating differential*

Cooling turns on at r01 + r02, and off at r01

Heating turns on at A04, and off at A04 + A05

*Functional only on units with heater option

ALARM PARAMETERS

Parameter	Default Value	Description
P16	125 F	High Temperature Alarm
P19	40 F	Low Temperature Alarm

DISPLAYING TEMPERATURE SENSOR #2

Sensor number 2, the air outlet or condenser coil sensor, can be viewed at any time by pressing the up or down arrow button on the front panel of the controller display. The display will revert to displaying temperature sensor number 1 (the AC inlet temperature) after 60 seconds. Both sensors can also be read through the Ethernet and USB connections.

COMPRESSOR RESTART TIME DELAY

A factory set 6 minute (360 second) 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 one (1) on the controller display will indicate the unit is in a compressor restart delay while calling for cooling. If the time delay is reduced to less than five (5) minutes, this may cause reduced compressor life.

ALARM OUTPUT CONTACT

The smart controller has a normally open, dry contact, alarm output with a resistive load rating of 24 VAC at 261 mA. A connector located on the enclosure side of the unit provides a 2-pin connection to this output marked YEL/ALARM.

ALARM INPUT CONNECTION

The smart controller can accept a dry contact/switch input via the connector terminals marked WHT/DS1 and WHT/DS2 located on the enclosure side of the unit. This input is associated with the controller display alarm mnemonic TP (door open and/or smoke detected). To use this feature, remove the jumper wire connecting terminals DS1 and DS2 and replace with customer supplied wires from the enclosure door switch to DS1 and DS2 terminals.

ALARM CONDITION DISPLAY

There are seven possible non-latching alarm conditions detectable by the controller and are indicated on the controller display. All alarms can also be accessed through the Ethernet and USB connections with the optional communications board.

Alarm Mnemonic	Description	Cause	Result	Alarm Relay
TP	General Alarm	Door open and/or smoke detected	Unit turns off for duration of alarm	Relay Contacts Close
LA	High Pressure Warning	MALF high pressure switch opens	No effect on function	N/A
E1	Air Inlet Temperature Sensor Alarm	Sensor Failure	Unit turns off for duration of alarm	Relay Contacts Close
E2	Air Outlet Temperature Sensor Alarm	Sensor Failure	Unit turns off for duration of alarm	Relay Contacts Close
Ht	High Temperature Alarm Default = 125 F	Cabinet over temperature Alarm clears at default setting -2 F	No effect on function	Relay Contacts Close
Lt	Low Temperature Alarm Default = 40 F	Cabinet under temperature Alarm clears at default setting +27 F	No effect on function	Relay Contacts Close
A1	Frost Alarm	Evaporator coil frozen Alarm clears at 59 F	Compressor fan off for duration of alarm	Relay Contacts Close

REMOTE ACCESS CONTROL

AIR CONDITIONER UNIT COMMUNICATION FEATURES

Air conditioner units equipped with communication capabilities provide SNMP, EtherNet/IP, Modbus TCP and Profinet protocols through Ethernet and Modbus RTU protocol via USB. Hoffman Cooling has a PC Interface Tool available for download that can utilize either mode to communicate with the air conditioner unit.

USB COMMUNICATION

This communication mode allows direct connection of a PC to the air conditioner unit. The protocol supported is Modbus RTU. Use the PC Interface Tool to communicate with the air conditioner unit. A MINI-b USB connection is provided.

ETHERNET COMMUNICATION

This communication mode allows remote connection to the air conditioner unit using SNMP, EtherNet/IP, Modbus TCP and Profinet protocols. Customers using their own software can download a MIB file for SNMP, EDS file or EtherNet_IP Object file for EtherNet/IP and Coil_Register file for Modbus TCP and GSDML file for Profinet.

Note: ACU has a default IP Address of 192.168.1.2

Both Ethernet and USB communication modes allow the ability to:

- Read ACU inlet and outlet air temperatures
- Read and change Cooling Set-point and Cooling Differential
- Read and change Heating Set-point, Heating Differential
- Read and change High and Low Temperature Alarm Settings
- Read and change Gateway IP Address, Device IP Address, Subnet Mask, Trap IP Address and Community
- Read and change Unit Identification
- Read and change the state of IP addressing (static or dynamic)
- Read current Alarm Status

SOFTWARE AND CONFIGURATION FILE DOWNLOADS

The PC Interface Tool, MIB file, EDS file, EtherNet_IP Object file, Coil_Register file and GSDML file for Profinet can be downloaded from:

www.nvent.com/HOFFMAN/en/na/Product-Enclosure-Cooling-Heating

USING THE PC INTERFACE TOOL

The PC Interface Tool gives the user the ability to communicate with the air conditioner unit to read/write parameters using either Ethernet or USB connections.

USB COMMUNICATION MODE

NOTE: Before connecting unit to the PC, make note of the comm ports present. After the unit is connected to the PC, a new comm port will be added to the list. Use this new comm port.

- From **Tools** menu select **Use Ethernet**
- When **Use Ethernet** is unchecked, then **Comm Port** menu is enabled, **Device IP** and **Community** boxes are not shown, and USB communication can be used
- To set the comm port, choose **Comm Port** from the **Tools** menu and then select the comm port from the combo box

VIEWING AIR CONDITIONER UNIT VALUES

To view Air Conditioner Unit values

- Select the **ACU Values** tab
- Select the **Enable Comm** button (the PC Interface will now be communicating with unit)
- To stop communication select the **Disable Comm** button

CHANGING AIR CONDITIONER UNIT VALUES

To change **ACU Values**

- Select the **Settings** tab
- Select the value to change
- Make the change to the value
- Select the **Change Setting** button
- Change can be verified in **ACU Values** tab

VIEWING AND CHANGING ETHERNET INFORMATION

To view and change Ethernet Information

- Select **Ethernet Info** tab

To view Ethernet Information

- Click **Read Ethernet Info** button

To change to dynamically assigning IP Address Mode

- Check **Use DHCP Server** checkbox
- Enter Trap IP Address and Community
- Click **Load Ethernet Info** button

To change to statically assigning IP Address Mode

- Uncheck **Use DHCP Server** checkbox
- Enter Device IP Address, Subnet Mask, Gateway IP Address, Trap IP Address and Community
- Click **Load Ethernet Info** button

ETHERNET COMMUNICATION MODE

- From **Tools** menu select **Use Ethernet**
- When **Use Ethernet** is checked, **Comm Port** selection is disabled, **Device IP** and **Community** boxes are shown and Ethernet communication can be used.
- Enter unit's IP Address and Community string in **Device IP** and **Community** boxes at the bottom of the PC Interface Tool.

Each unit has two community strings. One is a Read/Write community string (defaulted to 'private') that can be changed by the customer (must be 4 to 8 characters long). The other is a Read-Only community string ('public') and cannot be changed.

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- Uncheck **Use DHCP Server** checkbox
- Enter Device IP Address, Subnet Mask, Gateway IP Address, Trap IP Address and Community
- Click **Load Ethernet Info** button

ALARM LOG ACCESSIBLE WITH SNMP

- Using custom software with the provided MIB file gives the ability to view a log of the last 25 alarms

REMOTE ACCESS CONTROL PIN-OUT

	FUNCTION	NAME	PIN #
U1 OUTPUTS	COOL	No1	1
		C1/2	2
		C1/2	3
	ALARM RELAY OUTPUT	No5	12
		C5	6
U2 INPUTS	ENCLOSURE DOOR SWITCH	ID1	8
	MALFUNCTION NC SWITCH	ID2	1
	NA	ID3 (na)	9
	NA	ID4 (na)	2
	DIGITAL INPUT GROUND	ID GND	3
	T1, EVAP IN THERMISTOR	B1	13
	T2, EVAP OUT THERMISTOR	B2	12
	T1, T2 GND	GND	6
	NA	B3	11
	CONTROLLER POWER	G	7
	CONTROLLER POWER	G0	14
U3 DATA	POWER		1
	GROUND		2
	DIRECTION		3
	DATA		4

GENERAL SAFETY INFORMATION

Please observe the following general safety instructions when assembling and operating the unit:

- Assembling, installing and servicing must only be performed by properly trained specialists.
- When transporting the enclosure with the cooling unit externally mounted, always use an additional shipping brace to support the cooling unit.
- Do not attempt to operate the air conditioner while it is horizontal or on its side, back or front.
- Factory-supplied replacement parts must be used.
- Repaired/replaced components must be located and wired in the identical location as the original components.
- Hazardous Location rating may be compromised if the above are not followed.
- Operation of air conditioner in areas containing airborne caustics or chemicals can rapidly degrade sealing properties of materials, deteriorate filters, refrigeration coils, blowers and motors. Contact nVent Equipment Protection for special recommendations.



DANGER



Danger: explosion hazard - do not energize, disconnect, or troubleshoot equipment unless power has been switched off or the area is known to be non-hazardous.

Unit to be installed and maintained by properly trained personnel only.

Danger: Risque d'explosion – Ne pas alimenter, déconnecter ni dépanner l'équipement si l'alimentation n'a pas été coupée ou si la zone n'est pas reconnue comme non dangereuse.

MAINTENANCE

COMPRESSOR

The compressor requires no maintenance. It is hermetically sealed, properly lubricated at the factory and should provide years of satisfactory operating service.

Under no circumstances should the access fitting covers be loosened, removed or tampered with.

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

This air conditioner was designed with a dust resistant condenser coil. This allows it to be run filterless in most applications. The air conditioner is shipped with a filter in place for your convenience. For filterless operation, simply remove the filter. Should you decide the filter is necessary in your application, regular maintenance to clean this filter will assure normal operation of the air conditioner. The easily removable inlet air filter is located behind the inlet of the front cover. If necessary filter maintenance is delayed or ignored, the maximum ambient temperatures under which the unit is designed to operate will be decreased.

If the compressor's operating temperature increases above designed conditions due to a dirty or clogged filter (or plugged condenser coil), the air conditioner's compressor will stop operating due to actuation of the thermal overload cut-out switch located on the compressor housing. As soon as the compressor temperature has dropped to within the switch's cut-in setting, the compressor will restart automatically. However the above condition will continue to take place until the filter or coil has been cleaned. It is recommended that power to the air conditioner be interrupted intentionally when abnormally high compressor operating temperature causes automatic shut-down of the unit. The above described shut-down is symptomatic of a clogged or dirty filter, thus causing a reduction in cooling air flow across the surface of the compressor and condenser coil.

HOW TO REMOVE, CLEAN OR INSTALL A NEW INLET AIR FILTER

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. Because they are constructed entirely of aluminum they are lightweight and easy to service. To achieve maximum performance from your air handling equipment, air filters should be cleaned on a regular basis.

The inlet air filter is located behind the condenser air inlet grille. To access the filter, simply slide it out. 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.

CONDENSATE MANAGEMENT AND DRAIN TRAP MAINTENANCE

The drain trap can be cleaned by pouring soapy water into the face of the evaporator coil. An alternate method is to remove the panel underneath the condenser coil, locate the drain trap above the condensate evaporator pan, and blow compressed air through the tube.

CONDENSER AND EVAPORATOR AIR MOVERS

Impeller motors require no maintenance. All bearings, shafts, etc. are lubricated during manufacturing for the life of the motor.

If the condenser impeller motors (ambient impellers) should fail, it is not necessary to remove the air conditioner from the cabinet or enclosure to replace the blower. The condenser impeller is mounted on its own bracket and is easily accessible by removing the front cover.

If the evaporator impeller motor should fail, it may require dismounting the unit from the enclosure because access to the evaporator is through the enclosure side. After it is repaired, refer to Installation Instructions on page 12 for mounting the unit back onto the enclosure. Replace the mounting gasket if damaged.



CAUTION MISE EN GARDE

Operation of air conditioner in areas containing airborne caustics or chemicals can rapidly degrade sealing properties of materials, deteriorate filters, refrigeration coils, blowers and motors.

Contact nVent Equipment Protection for special recommendations.

Le fonctionnement du climatiseur dans des espaces contenant des produits caustiques ou chimiques en suspension dans l'air peut rapidement dégrader les propriétés d'étanchéité des matériaux, détériorer les filtres, les serpentins du condenseur, les ventilateurs et les moteurs.

Communiquer avec nVent Equipment Protection pour connaître les recommandations spéciales.

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.

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

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.

REFRIGERANT PROPERTIES CHART (R134A)

°F	°C	Pressure		°F	°C	Pressure
-40	-40	-14.7		60	15.6	58
-35	-37.2	-12.3		65	18.3	64
-30	-34.4	-9.7		70	21.1	71.5
-25	-31.7	-6.8		75	23.9	78
-20	-28.9	-4		80	26.7	86.7
-15	-26.1	0		85	29.4	95
-10	-23.3	2		90	32.2	105
-5	-20.6	4		95	35	113.3
0	-17.8	7.5		100	37.8	125
5	-15	9		105	40.6	135
10	-12.2	12		110	43.3	146.7
15	-9.4	15		115	46.1	157.5
20	-6.7	18.5		120	48.9	170
25	-3.9	22		125	51.7	185
30	-1.1	26				
35	1.7	30				
40	4.4	35				
45	7.2	40				
50	10	45.5				
55	12.8	51.5				

UNIT CHARACTERISTICS

	Model		
	NHZ280416GXXX	NHZ280426GXXX	NHZ280446GXXX
Dimensional Data			
Height	28" / 711.2 mm		
Width	11.5" / 292.1 mm		
Depth	14" / 355.6 mm		
Unit Weight	84 lbs / 38 kg	84 lbs / 38 kg	98 lbs / 44 kg
Unit Protection Rating	Type 12/4/4X/3R Class 1 Division 2 Groups A, B, C, D T4A		
Cooling Data			
Refrigerant	R134a		
Refrigerant Charge	10 oz.	11 oz.	11 oz.
Cooling Capacity at 95 F Enclosure 95 F Ambient (BTU/Hr.)	3300/3500	3690	3690
Cooling Capacity at Max Conditions (BTU/Hr.)	3487/3680	4279/4681	4279/4681
Maximum Ambient Temp	125 F / 52 C		
Minimum Ambient Temp	-40 F / -40 C		
Enclosure Airflow	143 CFM		
External Airflow	288 CFM		
Condensate Management	Hose discharge / Optional powered C/E		
Electrical Data			
Rated Voltage (50/60 Hz)	115 V	230 V	460 V
Rated Frequency	50 / 60 Hz	50 / 60 Hz	50 / 60 Hz
Voltage Range	+/- 10% of rated		
Cooling Amps at Max Conditions	10.2/9.4	4.9/5.0	2.4/2.5
Compressor RLA / LRA	8.1/40.0	24.5	24.5
Evaporator Fan RLA	.38/.36	.19	.19
Condenser Fan RLA	.78/.93	.53	.53

FUNCTIONAL DATA

Unit	Evaporator. Air In(°F)	Amps(A)	Condenser Delta(°F)	Evaporator Delta(°F)
NHZ280416GXXX	65-80	7.3-8.9	15-23	22-31
	80-100	7.9-9.9	17-26	25-31
NHZ280426GXXX	65-80	4.7-5.8	14-23	21-32
	80-100	4.8-6.3	17-28	26-38
NHZ280425GXXX	65-80	3.2/4.5	14-22	19-29
	80-100	3.5/5.2	16-26	23-35
NHZ280446GXXX	65-80	2.4-2.9	14-23	21-32
	80-100	2.4-3.2	17-28	26-38

SERVICE DATA

COMPONENTS LIST

Part Description	Part Number		
	115 V	230 V	460 V
Capacitor, Compressor, Start	89074579SP	89074578SP	89074578SP
Capacitor, Condenser Impeller	52603213SP	52603214SP	52603214SP
Coil, Condenser	89068416SP	89068416SP	89068416SP
Coil, Evaporator	89068414SP	89068414SP	89068414SP
Coil, Evaporator E-coated	89106893SP	89106893SP	89106893SP
Compressor (see note below)	89111751SP	89111752SP	89111752SP
Filter, Air, Reusable	89068420SP	89068420SP	89068420SP
Filter/Dryer	52602800SP	52602800SP	52602800SP
Head Pressure Control Switch	89112571SP	89112571SP	89112571SP
Impeller, Condenser	89114225SP	89114226SP	89114226SP
Fan, Evaporator	12101201SP	12101202SP	12101202SP
Relay, Compressor Start	89115078SP	89114206SP	89114206SP
Capillary Tube	99054039SP	99064045SP	99064045SP
Transformer, Input Power	N/A	N/A	101006111SP
Controller, Basic	89099443SP	89099443SP	89099443SP
Thermistor	89075654SP	89075654SP	89075654SP
Bridge Rectifier	89087424SP	89087424SP	89087424SP
Controller Wires with pins (24)	89083091SP	89083091SP	89083091SP
Communication Board	89109039SP	89109039SP	89109039SP
Communication Cable	89080313SP	89080313SP	89080313SP
Fuse, Controller (315mA)	89085114SP	89085114SP	89085114SP
Encapsulated Compressor Overload	89114216SP	89114217SP	89114217SP
Solid State Relay	89114223SP	89114223SP	89114223SP
Overload Relay	89115269SP	89115544SP	89115544SP
Mounting Gasket	89114209SP	89114209SP	89114209SP
Mounting Kit	89068421SP	89068421SP	89068421SP
Stainless Steel Mounting Kit	89116252SP	89116252SP	89116252SP



DANGER



Danger: explosion hazard - Substitution or incorrect installation of components may void the suitability for hazardous location use.

Danger: Risque d'explosion – Le remplacement ou une mauvaise installation des composants peuvent rendre l'équipement inadapté à une utilisation en zone dangereuse.

Note: This design utilizes an encapsulated compressor overload, which is mounted on the side of the compressor body. If the compressor is replaced, the standard overload (included with the compressor) must be discarded and not used. An encapsulated overload must be mounted and wired identical to the original.

NHZ280416GXXX PRESSURE TABLES

NHZ280416GXXX 50hz		L = Suction (± 5 PSIG); H=Head (-10/+20PSIG)															
Ambient Temperature (°F)	Enclosure Temperature (°F)																
	°F	70		80		90		95		100		113		120		125	
		L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
	70	23	118	25	121	27	124	28	125	28	127	31	131	32	133	33	134
	80	25	145	27	149	29	153	30	154	31	156	34	161	35	163	36	165
	90	28	173	30	177	32	181	33	183	34	185	37	190	39	193	40	195
	95	29	186	31	191	34	195	35	197	36	199	39	205	41	208	42	210
	100	30	200	32	205	35	209	36	212	37	214	40	220	42	223	43	226
	113	33	235	36	241	39	246	40	249	41	252	45	259	47	263	48	265
120	35	254	38	260	40	266	42	269	43	272	47	280	48	284	50	287	
125	36	268	39	274	41	280	43	283	44	287	48	295	50	299	51	302	

NHZ280416GXXX 60hz		L = Suction (± 5 PSIG); H=Head (-10/+20PSIG)															
Ambient Temperature (°F)	Enclosure Temperature (°F)																
	°F	70		80		90		95		100		113		120		125	
		L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
	70	22	122	23	124	24	127	24	128	25	129	26	132	27	134	27	135
	80	24	149	25	153	26	156	27	157	27	159	29	163	29	165	30	166
	90	26	177	27	181	29	184	30	186	30	188	32	193	33	195	34	197
	95	27	191	29	194	30	198	31	200	32	202	34	207	35	210	36	212
	100	28	204	30	209	31	213	32	215	33	217	35	223	36	226	37	228
	113	31	240	33	245	35	250	36	253	37	255	39	262	41	266	42	268
120	32	259	34	265	36	271	37	273	39	276	41	284	43	287	44	290	
125	33	273	35	279	38	285	39	288	40	290	43	298	45	302	46	305	

NHZ280426GXXX PRESSURE TABLES

NHZ280426GXXX 50hz		L = Suction (± 5 PSIG); H=Head (-10/+20PSIG)															
Ambient Temperature (°F)	Enclosure Temperature (°F)																
	°F	70		80		90		95		100		113		120		125	
		L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
	70	25	119	29	125	32	131	34	134	36	136	41	144	43	148	45	151
	80	28	145	32	152	35	158	37	162	39	165	44	173	47	178	48	181
	90	31	171	35	179	38	186	40	190	42	193	47	203	50	208	52	211
	95	32	184	36	192	40	200	42	204	44	207	49	217	52	223	54	226
	100	34	198	38	205	42	213	44	217	46	221	51	231	54	237	55	241
	113	37	232	41	240	46	249	48	253	50	258	55	269	58	275	60	280
120	39	250	43	259	47	268	50	273	52	278	57	290	60	296	62	301	
125	41	263	45	273	50	282	52	287	54	292	59	304	62	311	64	316	

NHZ280426GXXX 60hz		L = Suction (± 5 PSIG); H=Head (-10/+20PSIG)															
Ambient Temperature (°F)	Enclosure Temperature (°F)																
	°F	70		80		90		95		100		113		120		125	
		L	H	L	H	L	H	L	H	L	H	L	H	L	H	L	H
	70	23	124	26	130	29	135	31	138	32	141	36	148	38	152	40	155
	80	26	151	29	157	32	163	34	167	36	170	40	178	42	183	44	186
	90	28	177	32	185	35	192	37	196	39	199	43	209	46	214	47	217
	95	30	191	33	198	37	206	38	210	40	214	45	224	47	229	49	233
	100	31	204	35	212	38	220	40	224	42	228	47	239	49	244	51	248
	113	35	239	39	248	42	257	44	262	46	266	51	278	54	284	56	289
120	37	258	40	267	44	277	46	281	48	286	53	298	56	305	58	310	
125	38	271	42	281	46	291	48	296	50	301	55	314	58	321	60	326	


NOTES

TROUBLE SHOOTING


BASIC AIR CONDITIONING TROUBLE SHOOTING CHECK LIST - SMART CONTROLLER

1. Check manufacturer's nameplate located on the unit for correct power supply.
2. Turn on power to the unit. The controller will display a start up sequence then revert to the normal temperature display mode. Is the correct enclosure temperature displayed?

Note: The temperature may be alternating with an alarm code.

YES, proceed to step 3.	
NO, possible problem: <ul style="list-style-type: none">» Open controller fuse» Controller in alarm condition. See Alarm Condition Display on page 16.» Defective controller» Defective thermistor - check by blowing warm air across the thermistor. If display temperature rises, thermistor is operable.	
	Replace part


3. The cooling status indication (symbol G) should be on. Is the symbol on? If not, press and hold the lower right "snowflake" button for greater than five seconds. Is the cooling mode symbol now on?

YES, proceed to step 4.	
NO, possible problem: <ul style="list-style-type: none">» Defective controller	
	Replace part

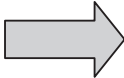
4. The evaporator (Enclosure or "COLD" air) fan/impeller should turn on. Is there airflow?

YES, proceed to step 5.	
NO, possible problem: <ul style="list-style-type: none">» Controller in alarm condition. See Alarm Condition Display on page 16.» Open motor winding» Stuck fan/impeller» Obstructed blades/wheel» Defective motor capacitor	
	Repair or Replace defective part

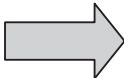
5. Start the cooling cycle by changing the cooling setpoint parameter (r01) to the low limit of 72 F (22 C). Symbol 1 should be displayed indicating a call for cooling. If symbol 1 is flashing, the unit is in Restart Time Delay mode. Within 6 minutes, symbol 1 should display without flashing. Is symbol 1 displayed without flashing?

YES, proceed to step 8.	
NO, possible problem: <ul style="list-style-type: none">» Unit still in Recycle Time Delay mode» Enclosure temperature below cooling setpoint temperature	
	Wait and/or heat enclosure thermistor T1

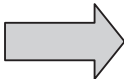
6. The compressor and the condenser (Ambient or "HOT" air) impeller(s) should turn on. Is there adequate airflow?

YES, proceed to step 7.	
NO, possible problem:	
<ul style="list-style-type: none"> » Open motor winding(s) » Stuck impeller(s) » Obstructed wheel(s) » Defective motor capacitor(s) 	
	Repair or Replace defective part

7. Carefully check the compressor for proper operation - motor should cause slight vibration and the outer case of the compressor should be warm. Is the compressor showing signs of this?

YES, wait 5 minutes, proceed to step 8.	
NO, possible problem:	
<ul style="list-style-type: none"> » Defective start or run capacitor » Defective overload » Defective start relay » Defective contactor » Defective compressor » Tripped overload relay 	
	Reset, Repair or Replace defective part

8. Make sure the coils are clean then check the evaporator “air in” and “air out” temperatures. If the temperatures are the same:

<ul style="list-style-type: none"> » Possible loss of refrigerant » Possible bad valves in compressor 		Repair or Replace defective part
---	---	---

SYMPTOMS AND POSSIBLE CAUSES - REMOTE ACCESS CONTROL VERSION

SYMPTOM	POSSIBLE CAUSE
Unit won't cool	Clogged fins on coil(s)
	Dirty filter
	Impellers not running
	Compressor not running
	Compressor runs, but has bad valves
	Loss of refrigerant
Compressor tries to start but won't run	Low line voltage at start. Should be +/-10% rated voltage.
	Compressor motor stuck
	Bad contactor
	Bad overload switch
	Bad run/start capacitor
Unit blows breakers	Undersized breaker/fuse or not time delayed
	Short in system
Getting water in enclosure	Drain plugged
	Drain tube kinked
	Enclosure not sealed (allowing humidity in)
	Mounting gasket damaged

For additional technical support, contact nVent Equipment Protection at 800-896-2665.

WARRANTY

nVent Equipment Protection warrants that the Goods manufactured by nVent Equipment Protection will be free from defects in material and workmanship for a period of one (1) year from the date of shipment by nVent Equipment Protection, subject to the following conditions and exclusions:

- A. Conditions. All Goods must be installed and operated according to the following specifications:
1. Maximum voltage variation no greater than plus or minus 10% of nameplate nominal rating;
 2. Maximum frequency variation no greater than plus or minus 3 Hz of nameplate nominal rating;
 3. Must not exceed minimum and maximum stated temperatures on the nameplate;
 4. Must not exceed (BTU/Hr) rating, including any heat sink as indicated on the nameplate;
 5. Refrigerant bearing Goods must not be restarted for a period of one (1) minute after intentional or accidental shut-off;
 6. The filters (if applicable) must be cleaned regularly;
 7. The Goods and any parts thereof must not be modified, unless prior written authorization is received from nVent Equipment Protection; and
 8. All Goods must be installed and grounded in accordance with all relevant electrical and safety codes, as well as the National Electric Code and OSHA rules and regulations.
 9. All Goods must be installed in a stationery application, free of vibration.

A violation of any one of these conditions shall render the warranty hereunder void and of no effect.

- B. Exclusions. This warranty shall be void if product is misapplied in any way or:
1. Buyer specified product is inappropriate for system or environment in which it is operating.
 2. Goods are not installed in accordance with nVent Equipment Protection specifications.
 3. Removal or modification of nVent Equipment Protection label affixed to product without written nVent Equipment Protection approval.

nVent Equipment Protection must be notified of a claim in writing not later than fourteen (14) days from the date when Buyer has become aware of such occurrence, or where the defect is such that it may cause damage, immediately, such notice containing a description of how the defect manifests itself. Failure to provide such prompt notice to nVent Equipment Protection shall result in forfeiture of Buyer's rights under this warranty.

In the event of a warranty claim, Buyer is to return defective goods to nVent Equipment Protection in accordance with nVent Equipment Protection Return Policy. Warranty period for repaired goods remains at 1 year from shipment of original goods. nVent Equipment Protection sole obligation to Buyer under this warranty will be, at nVent Equipment Protection option:

- A. Repair or replace nVent Equipment Protection products or parts found to be defective in material or workmanship.
- B. Issue credit for the purchase price paid by Buyer relating to such defective Goods or part.

THIS WARRANTY CONSTITUTES THE ENTIRE WARRANTY WITH RESPECT TO THE GOODS AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY AND IMPLIED WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

RETURN AND REPAIR POLICY

nVent Equipment Protection products that: (i) are made to order, (ii) have been modified by Buyer, (iii) have special finishes, or (iv) are determined by nVent Equipment Protection to constitute "custom" products that cannot be returned to stock or resold to other Buyers, will not be accepted for return by nVent Equipment Protection.

All returns require a Return Material Authorization number (RMA #), regardless of reason for return, whether it be for warranty or out of warranty repair. Returns without an RMA # will be refused by our Receiving Department. An RMA # is valid for 30 days.

- A. An RMA # will be issued by our Product Return Department in Anoka, MN at 763-422-2211. Buyer should have following information available at time of RMA request:
1. Complete Model Number, Serial Number and description of damaged unit being returned.
 2. Original Buyer Purchase Order number and date product was received by Buyer.
 3. Quantity to be returned and a brief description of failure for each unit, if different.
 4. Contact information of Buyer that must include: name of company, billing and shipping address, phone, number, fax number, freight carrier and the name and phone number of a Buyer contact who can elaborate on the claimed defect in detail.
 5. Buyer must provide a Repair Purchase Order number for both warranty and out of warranty repairs. The PO will not exceed 50% of a new unit. Buyer will be notified of repair charges that exceed approved PO amount.
- B. All returns to nVent Equipment Protection must be securely packed, using original cartons if possible. All returns must have the RMA number visible on the outside of the carton. nVent Equipment Protection is not responsible for material damaged in transit. Any refrigerant-bearing Goods must be shipped upright for return.
- C. Shipping cost for all non-warranty repairs is the responsibility of the sender and must be shipped prepaid. Shipping costs for all warranty related repairs will be covered by nVent Equipment Protection provided the goods are returned using a nVent Equipment Protection approved carrier. If after diagnoses the product is determined by nVent Equipment Protection not be covered under warranty, Buyer will be responsible for all shipping charges and will be billed accordingly.
- D. Non-warranty repairs are subject to a \$105 minimum analysis fee. If approval is not received within 30 days, material will be scrapped and all shipping expenses and corresponding analysis fees will be billed to Buyer.
- E. At Buyer's request, Failure Analysis can be provided by nVent Equipment Protection for warrantable goods at no charge. Failure analysis for non-warranty repairs are subject to a \$150 per hour Engineering charge plus any other incurred testing costs.
- F. All returned merchandise must be sent to the following address: nVent Equipment Protection, 2100 Hoffman Way, Anoka, MN 55303-1745.
- G. Credit for accepted returns shall be at the original selling price or the current selling price, whichever is lower, less the restocking charge indicated as follows:
1. Within 60 days of invoice date - 20% of applicable selling price.
 2. Within 61-120 days of invoice date - 30% of applicable selling price.
 3. Within 121-180 days of invoice date - 40% of applicable selling price.
 4. Beyond 180 days - subject to individual review by nVent Equipment Protection.
- If product being returned for credit requires repair or modification, the cost of any labor or material necessary to bring product into saleable condition will be deducted from credit. Buyer may not take credit against returns without prior written nVent Equipment Protection approval.

LIMITATION OF LIABILITY

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