

# T-Series Air Conditioners

T70, 5 TON 460 V, 3 Phase Model

Instruction Manual



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**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 Equipment Protection if further information is required.

## WARRANTY AND RETURN POLICY

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[HOFFMAN.nVent.com/en-us/cooling-warranty-registration](http://HOFFMAN.nVent.com/en-us/cooling-warranty-registration)

## 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.
- Means for disconnection must be incorporated in the fixed wiring in accordance with the wiring rules.
- 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.

## 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.

### 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.

### 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. Minimum circuit ampacity should be at least 125% of the amperage shown in the 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.

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.

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

The compressor is provided with automatic reset thermal overload protection. This thermo-switch is located within the

hermetic compressor shell. 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.

## HOW TO READ MODEL NUMBERS

T70	60	2	6	G150
1	2	3	4	5

1. Identifies the type/family of air conditioner and the approximate height (i.e. T70 = Outdoor family about 70 inches high).
2. This is the air conditioners listed capacity in BTU/Hr. at rated conditions. (i.e. 60 = 60,000 BTU/Hr. at 126/126°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.

## INSTALLATION INSTRUCTIONS

1. Inspect the air conditioner and verify correct functionality before mounting the air conditioner. See HANDLING AND TESTING THE AIR CONDITIONER on page 3.
2. Using the mounting gasket kit provided with the unit, install gaskets to the air conditioner. See Mounting Cutout Dimensions in this manual.
3. 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. 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:

- 72" from front
- 8" from right side
- 8" from left side
- 6" from top

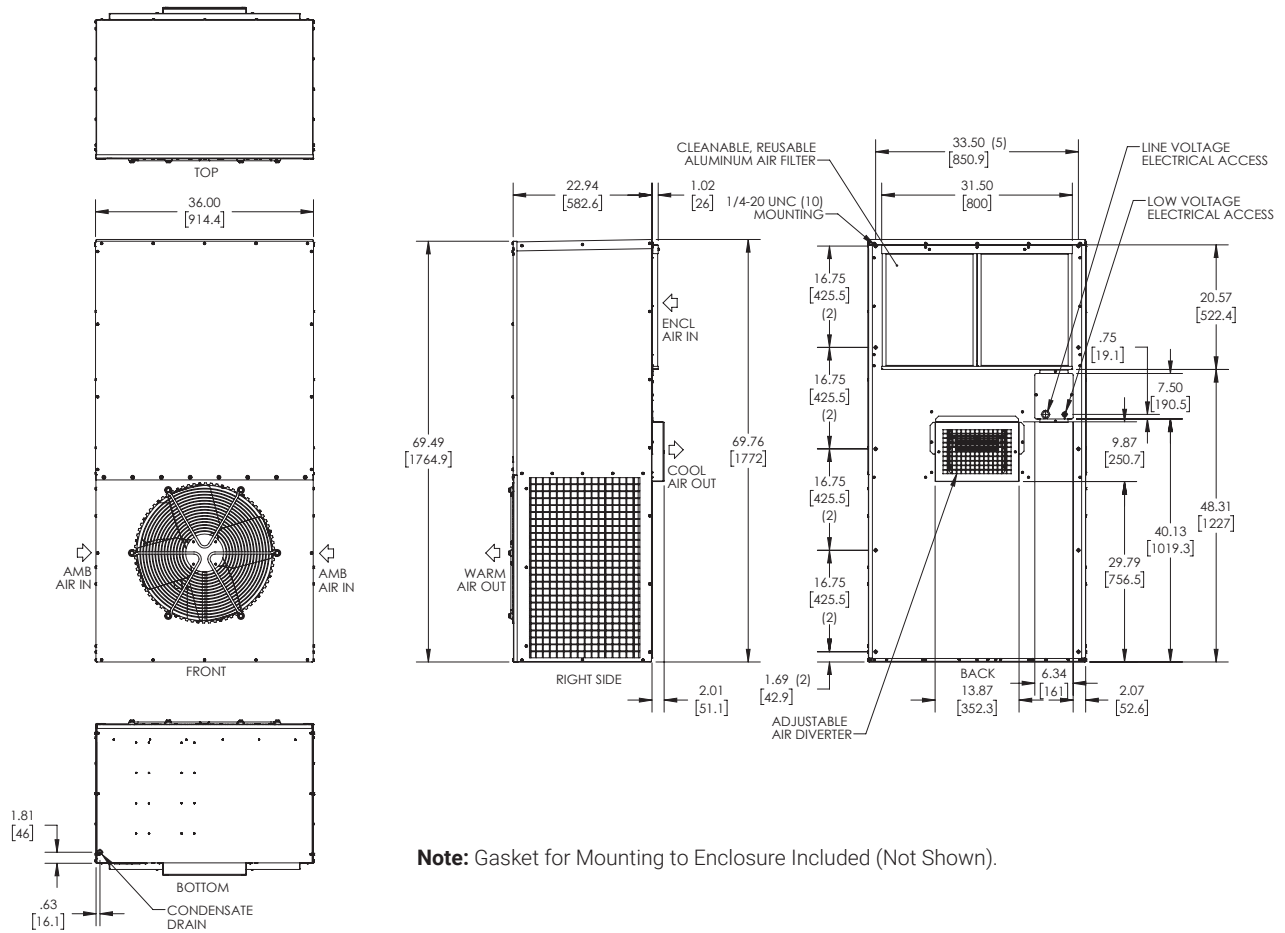
Local fire codes may have different requirements; please observe applicable regulations for the location of the air conditioner.

The distance between the air conditioner and the electronic components and other equipment installed inside the enclosure must be at least 12" to ensure adequate air circulation.

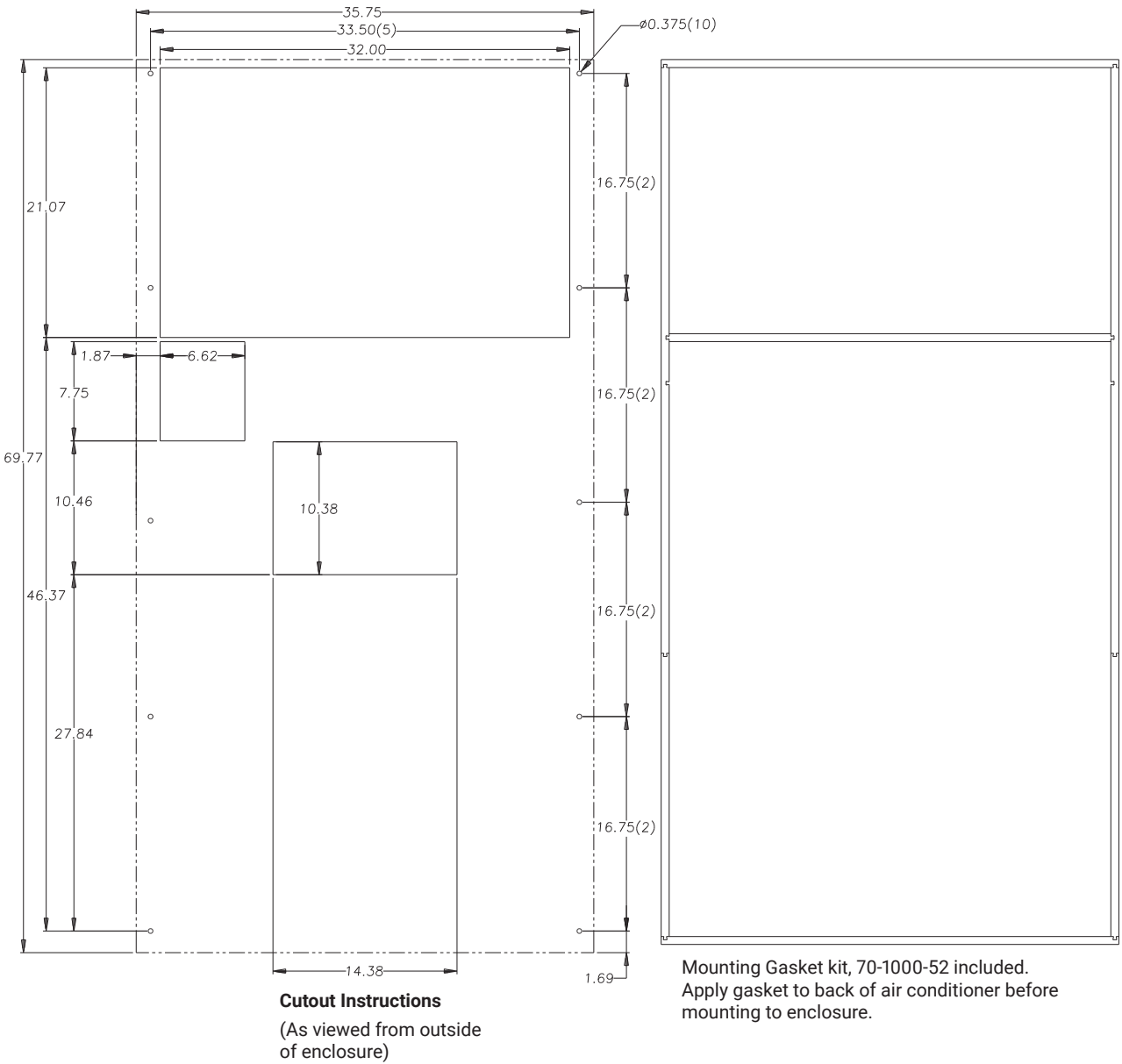
4. To avoid cross-threading mounting inserts, start bolts by hand before tightening with a wrench or ratchet driver.
5. Allow unit to remain upright for a minimum of five (5) minutes before starting. Caution! Air conditioner must be in upright position during operation.
6. Refer to the nameplate for electrical requirements. Wire the unit to a properly grounded power supply by following applicable national wiring regulations. Electrical circuit should be fused with slow blow or HACR circuit breaker per the MOPD rating in the Design Data table see page 7.
7. Some air conditioners require a remote mounted thermostat. Wire the thermostat outputs to the appropriate terminals on the 24 VAC terminal strip (note locations on the wiring diagram).
8. Set thermostat for required cabinet temperature. Refer to Sequence of Operation for thermostat adjustment & operation.

DIMENSIONAL DRAWINGS

5 TON



**MOUNTING CUTOUT DIMENSIONS**



**Note:** Dashed lines represent air conditioner.

## TECHNICAL INFORMATION

### Sequence of Operation

The air conditioner comes standard with two internally mounted thermostats. There are two modes of operation; heating and cooling. During heating and cooling modes the evaporator fan will be running.

#### Heating

When the enclosure temperature is below the heating thermostat setpoint, power is applied to the heater. When the enclosure temperature is 10 degrees above the setpoint the heater is powered off.

#### Cooling

When the enclosure temperature is above the cooling thermostat setpoint, power is applied through the dual pressure control, then to the time delay relay. After the delay time the contactor is energized and the compressor starts. The condenser fan will start once the condenser discharge air temperature gets above 70°F. 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.

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

#### Thermostat

T70 air conditioners that incorporate a thermostat use our standard 10-1061-16 thermostat. The thermostat setpoint equals the temperature that the air conditioner turns off. The thermostat has a 10°F differential from setpoint until it calls for cooling or heating. An example of operation is shown below.

#### For Cooling (75–100°F Range):

- Thermostat setpoint = 80°F
- Cooling turns on at 90°F
- Cooling turns off at 80°F

#### For Heating (55–65°F Range):

- Thermostat setpoint = 55°F
- Heating turns on at 55°F
- Heating turns off at 65°F

**Note:** For testing purposes only, the thermostat stop screw may be removed (on units so equipped) to allow settings below 70°F. After testing, replace the stop screw and verify that the thermostat can not be set below 70°F. Extended operation below 70°F can cause coil freeze ups resulting in reduced load and/or unit damage.

#### Low Pressure Control

Low pressure cutout is 15 psi.

The low pressure control will prevent the compressor from operating when the system experiences low pressure (i.e. loss of charge). The low pressure cutout is an automatic reset.

#### Time Delay Relay

Factory set for 5 minutes.

The purpose of the time delay relay is to prevent short cycling of the compressor.

### Phase Monitor

This product is equipped with Phase/Voltage Protection. It is located behind the front cover panel. Please verify correct phasing and voltage before operating. Note the fans may still operate if phasing is incorrect, but the compressor will not, so the unit will not cool. Illuminated light on Phase Monitor indicates phase is correct. If the light is blinking, disconnect power from the unit and swap any two power leads at the terminal block. This should correct the phasing. The light should now illuminate when power is reapplied.

### Head Pressure Control

Unit is set at the factory, no adjustment necessary.

At condenser saturated discharge temperatures below 70°F, the condenser fan is not powered and the LED's are not lit. At saturated condensing temperatures between 70–100°F the yellow LED is lit and the fan is being regulated under full speed. At temperatures above 100°F the green LED is lit and the fan is operating at full speed.

### 460 V to 230 V Transformer

The 230 V from this transformer powers the fans and controls. 460 V 3-phase is only used to run the compressor.

### 230 V to 24 V Transformer

This transformer is used to power the head pressure speed control, compressor contactor, bypass timer and lockout relay.

### Contactor

This unit uses a 24 V coil on the compressor contactor.

### Refrigerant Properties (407°C)

°F	°C	Bubble Point	Dew Point
–40	–40	2.9	4.5
–35	–37.2	5.2	.7
–30	–34.4	7.9	1.7
–25	–31.7	10.7	4
–20	–28.9	13.9	6.5
–15	–26.1	17.3	9.3
–10	–23.3	21.1	12.4
–5	–20.6	25.2	15.8
0	–17.8	29.6	19.5
5	–15	34.4	23.6
10	–12.2	39.6	28
15	–9.4	45.2	32.7
20	–6.7	51.3	37.9
25	–3.9	57.8	43.6
30	–1.1	64.7	49.6
35	1.7	72.2	56.2
40	4.4	80.2	63.2
45	7.2	88.7	70.7
50	10	97.8	78.8
55	12.8	107.5	87.5
60	15.6	117.7	96.8
65	18.3	128.7	106.7
70	21.1	140.2	117.2
75	23.9	152.5	128.4

°F	°C	Bubble Point	Dew Point
80	26.7	165.5	140.4
85	29.4	179.2	153.1
90	32.2	193.6	166.5
95	35	208.8	180.8
100	37.8	224.9	195.8
105	40.6	241.8	211.8
110	43.3	259.6	228.7
115	46.1	278.2	246.5

°F	°C	Bubble Point	Dew Point
120	48.9	297.8	265.3
125	51.7	318.3	285.2
130	54.4	339.9	306.1
135	57.2	362.4	328.2
140	60	386	351.4
145	62.8	410.7	375.9
150	65.6	436.5	401.7

## 59000 BTU/HR. Unit Characteristics

	Model
	T706046G46X
<b>Dimensional Data</b>	
Height	69.8" / 1772 mm
Width	35.9" / 911 mm
Depth	22.9" / 583 mm
Unit Weight	419 lbs / 191 kg
Unit Protection Rating	Type 12, 4
<b>Cooling Data</b>	
Refrigerant	R-407c
Refrigerant Charge	140 oz / 3969 g
Cooling Capacity at 95°F Enclosure 95°F Ambient (BTU/Hr) (50/60 Hz)	49,117 / 53,995
Cooling Capacity at Max Conditions (BTU/Hr) (50/60 Hz)	52,993 / 60,317
Maximum Ambient Temp	119°F / 48°C
Minimum Ambient Temp	-40°F / -40°C
Enclosure Airflow	1,629 cfm
External Airflow	2,931 cfm
Condensate Management	Hose discharge
<b>Heating Data</b>	
Max Heater Watts	5000 W
<b>Electrical Data</b>	
Rated Voltage (50/60 Hz)	400/460
Rated Frequency	50 / 60 Hz
Voltage Range	-6% / +10% of rated
Cooling Amps at Max Conditions (50/60 Hz)	14/16
Max Heating Power	5000 W
Compressor RLA / LRA	11.0 / 63 A
Evaporator Fan RLA*	3.7 A
Condenser Fan RLA*	1.2 A
Max. Overcurrent Protection (Cooling) (A at 50/60 Hz)	25/30

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

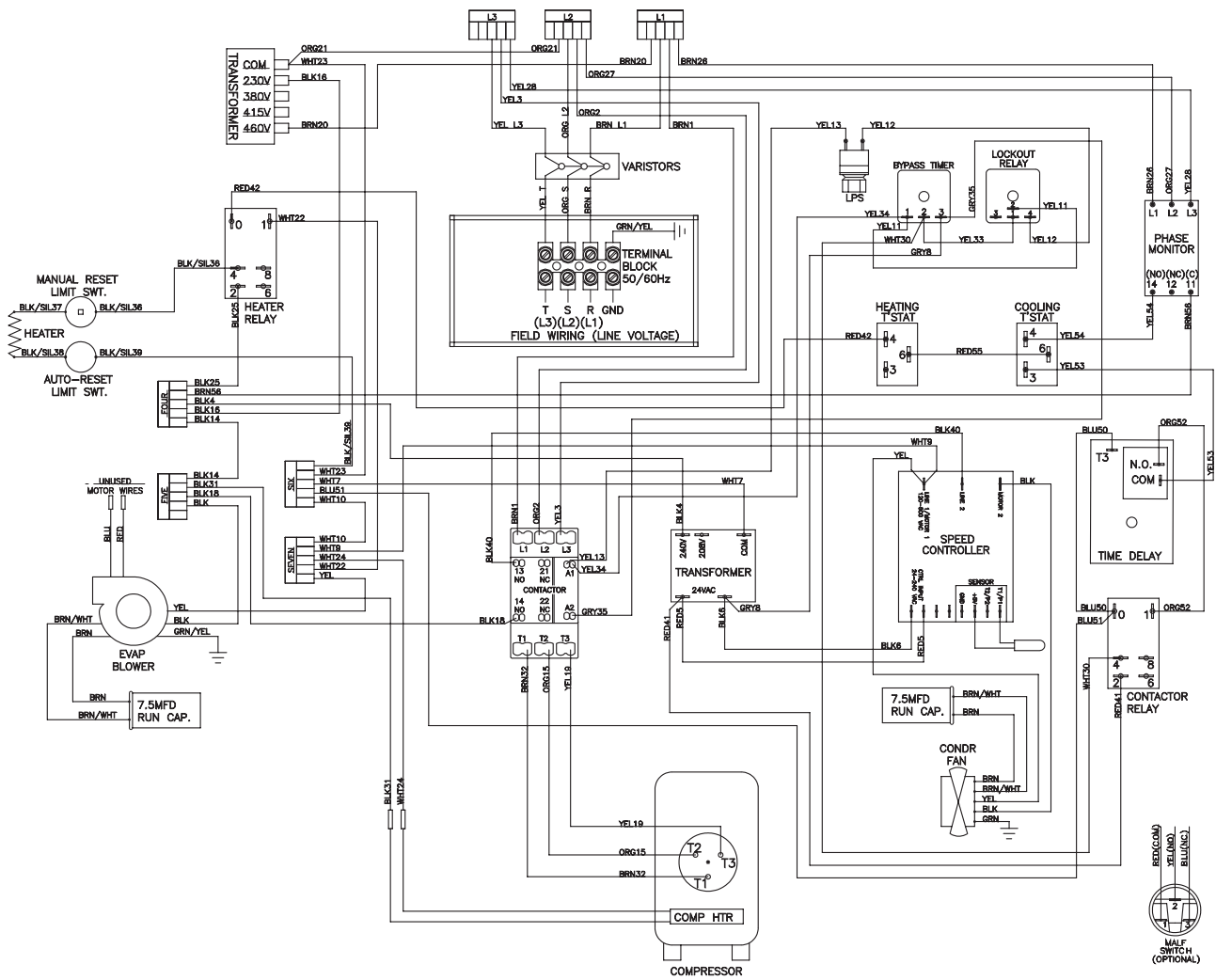
## Functional Data (60 Hz)

### 5 Ton Unit

Evaporator Air In (°F)	Unit Amps (A)	Evaporator Pressure (psi)	Condenser Pressure (psi)	Evaporator Delta (°F)	Condenser Delta (°F)
65-80	9.5-12.7	41-68	181-293	24-40	19-34
80-100	10.4-15.1	56-98	239-422	26-48	22-35

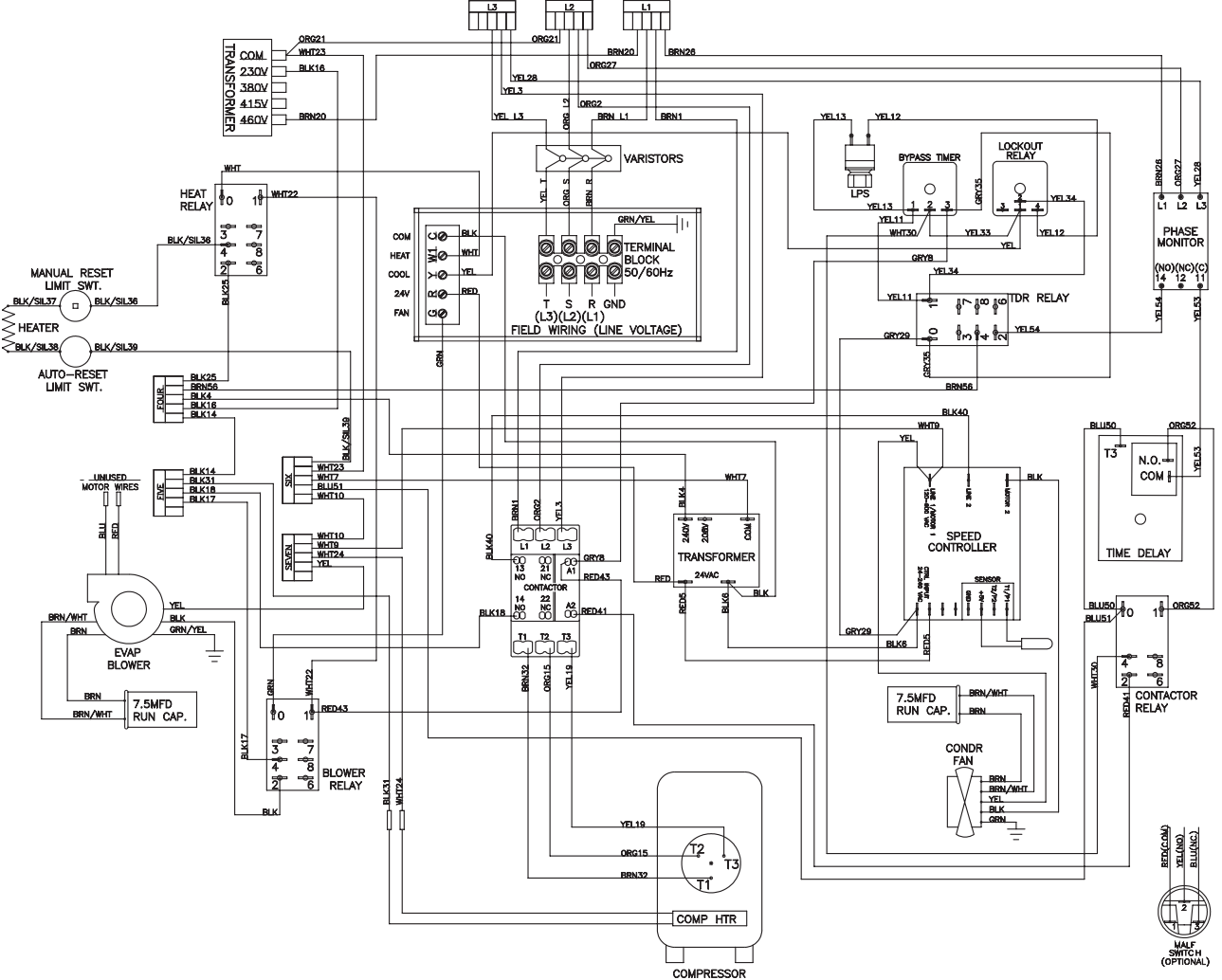
## Wire Diagrams

### Thermostat Wiring Option





Lead/Lag Wiring Option



## SERVICE DATA

### Component List

Part Description	Part Number
Blower Motor, Condenser	10-1020-80
Blower Motor, Evaporator	10-1020-27
Capacitor, Condenser Blower	52-6084-00
Capacitor, Evaporator Blower	52-6084-00
Relay, Phase Monitor	89245538
Time Delay Relay	89239579
Coil, Condenser	70-1001-21
Coil, Evaporator	70-1002-01
Compressor	89250773
Contact, Compressor	89251166
Controller, Head Pressure	89252089
Evaporator Inlet Filter (2 per unit)	10-1000-04
Evaporator Discharge Register	62-1020-00
Filter/Dryer	52-6028-09
Grille, Condenser Fan	13-1014-11
Prop, Condenser Fan	10-1072-79
Switch, Low Pressure	52-6104-38
Thermal Expansion Valve	10-1040-44
Transformer, 230 V/24 V	10-1006-143
Transformer, 460 V/230 V (Heater Package)	10-1006-125
Transformer, 460 V/230 V (No Heater Package)	Consult Factory
Thermostat	10-1006-112

## 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.

### Compressor

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

### Condenser and Evaporator Air Movers

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

### 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.

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. 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.

Refer to the data on the nameplate that 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. Technician must weigh in charge according to the nameplate specifications.**

## TROUBLE SHOOTING

### Basic Air Conditioning Trouble Shooting Check List

1. Check manufacturer's nameplate located on the unit for correct power supply.
2. Turn on power to the unit. The evaporator (Enclosure or "COLD" air) fan should come on. Is there airflow?

YES, proceed to step 3.		
NO, possible problem:		
<ul style="list-style-type: none"><li>• Open motor winding</li><li>• Stuck blower motor</li><li>• Obstructed blades</li></ul>		Repair or Replace defective part

3. Check thermostat setting and adjust thermostat to the lowest setting. This should turn the condenser fan and the compressor on. Did condenser fan and compressor come on when the thermostat was turned on?

YES, proceed to step 4.		
NO, possible problem:		
<ul style="list-style-type: none"><li>• Defective thermostat</li></ul>		Replace Part

4. Are both blowers and the compressor running? If not the unit will not cool properly.
5. Check condenser (Ambient or "HOT" air) fan for airflow. Is there airflow?

YES, proceed to step 6.		
NO, possible problem:		
<ul style="list-style-type: none"><li>• Defective thermostat</li><li>• Open motor winding</li><li>• Stuck blower motor</li><li>• Obstructed wheels/blades</li></ul>		Repair or Replace defective part

6. Carefully check the compressor for 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, then proceed to step 7.		
NO, possible problem:		
<ul style="list-style-type: none"><li>• Defective thermostat</li><li>• Defective capacitor</li><li>• Defective overload</li><li>• Defective relay</li></ul>		Repair or Replace defective part

7. Make sure the coils are clean. Then check evaporator "air in" and "air out" temperatures. If the temperatures are the same:

<ul style="list-style-type: none"><li>• Possible loss of refrigerant</li><li>• Possible bad valves in the compressor</li></ul>		Repair or Replace defective part
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8. To check for a bad thermostat, turn power to the unit off. Remove the control box cover and place both thermostat wires onto one terminal (replace control box cover for safety). This will activate the switch in the thermostat. Turn the power on and if both blowers and the compressor come on, the thermostat needs to be replaced.

## Symptoms and Possible Causes:

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

### For additional technical support:

- Call 763-422-2211 or
- Email [cooling.service@nVent.com](mailto:cooling.service@nVent.com) or
- Download Field Service Request (FSR) from: [HOFFMAN.nVent.com/en-us/cooling-field-service-request](https://hoffman.nVent.com/en-us/cooling-field-service-request)

## F-GAS INFORMATION

	T706026GXXX T706046GXXX
Refrigerant Kühlmittel Chłodziwo	R407C
GWP	1774
Factory Charge Füllmenge durch Hersteller Opłata Fabryczna	3969 Grams 3969 Gramm 3969 Gramów
CO <sub>2</sub> Equivalent CO <sub>2</sub> Equivalent CO <sub>2</sub> Ekwilalent	7.04 Tons 7,04 Tonnen 7,04 Tony

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