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# INSTALLATION AND MAINTENANCE MANUAL FOR AN, AS, AND AT SERIES AIR CONDITIONING UNITS



**Air Conditioners with Capacity of  
2,000 to 12,000 BTU/HR Nominal**

**115VAC & 208/230VAC Models**



\* A more recent revision may be available at [www.voltaresys.com](http://www.voltaresys.com) or the QR Code in the top right corner of every page.



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## 1. IMPORTANT INFORMATION TO REVIEW PRIOR TO INSTALLATION, OPERATION AND MAINTENANCE

- **READ THE ENTIRE MANUAL PRIOR TO INSTALLING AND MAINTAINING** the VoltAire Systems Air Conditioners. Do not install or perform maintenance on the air conditioner if you do not understand all of the instructions. Contact VoltAire Systems at (407) 378-7482 with any questions or concerns.
- The air conditioner should be fully inspected on initial delivery. Open the packaging completely at the time of initial delivery and verify there is no hidden or concealed damage. Shipping damage, including concealed damage, is not covered under warranty.
- **WARNING: IMPROPER INSTALLATION AND OPERATION MAY CAUSE PROPERTY DAMAGE, PERSONAL INJURY OR LOSS OF LIFE.** The air conditioner shall only be installed and serviced by a certified professional in strict accordance with the requirements within this manual, in accordance with all local/state/federal codes, and per industry standards. Remove power from the unit during maintenance and installation, as line voltage may be dangerous, hazardous and lethal.
- In the event of a conflict, code requirements shall take precedence over the instructions provided within this manual. The installer shall be aware of all code requirements and shall comply fully.
- Use care when transporting and lifting the air conditioner. The unit should be maintained in the upright position at all times. If the unit has been mistakenly laid on its side stand the unit up and wait at least 24 hours before applying power.
- **WARNING: WEAR PROPER PERSONAL PROTECTION EQUIPMENT, INCLUDING BUT NOT LIMITED TO SAFETY GLASSES, GOGGLES, AND GLOVES. EDGES MAY BE SHARP.**
- A field provided time delay fuse or breaker must be provided by the installer with the power supply circuit serving the air conditioner. The installer shall size this fuse / breaker and wire in accordance with all applicable codes. Verify wire terminals and voltage prior to plugging into the Air Conditioner, otherwise you may damage the electrical components.
- **IMPORTANT NOTE:** Valve service ports are provided with rubber gasketed caps that are used to fully seal the service ports. If the caps are removed for service, they must be put back following service to prevent any potential leakage through the valves.
- These instructions should be retained by the owner and/or with the unit.



## 2. PARTS SHIPPED LOOSE AND TOOLS/MATERIALS PROVIDED BY THE INSTALLER

Materials shipped loose in addition to this manual are as follows:

a) Mounting Gasket Field Kit

UNIT	PART NUMBER
AT04/AT06	B6F0004LAA
AT08/AT10/AT12 and AS10/AS12	B6F0005LAA
AN02 and AS02	B6F0034LAA
AN04 and AS04	B6F0035LAA
AN06 and AS06	B6F0036LAA
AN08 and AS08	B6F0037LAA

b) M6x25 Mounting Bolts

Unit	Quantity
AT04/AT06	10
AT08/AT10/AT12 and AS10/AS12	12
AN02 and AS02	6
AN04 and AS04	10
AN06 and AS06	10
AN08 and AS08	12

### Required Tools and Materials provided by Installer:

- Fuse and/or breaker
- Exterior rated silicone sealant
- Phillips head screw driver
- M6 HEX head screw driver (Allen head screw driver for AS models)
- M6 nut driver/wrench
- Torque wrench
- Personal Protection Equipment
- Wire-Stripper

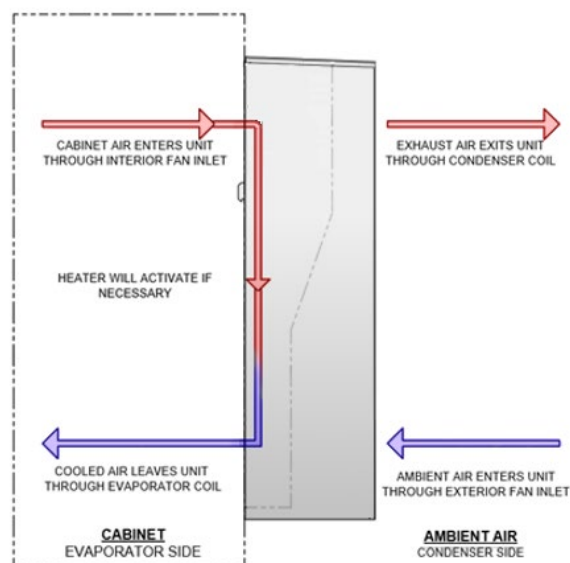
### 3. PRODUCT DESCRIPTION

VoltAire Systems AN, AS, and AT Series Air Conditioning Units are designed for high efficiency and high performance heat management of electronic enclosures or equipment. This product is an active thermal management system with an internal refrigerant system and is designed for electronic environments. This product is designed to function in extreme temperatures ranging from 131°F (55 °C) to -40°F(-40°C).

Figure 1 shows the side of the AC unit and its intake and exhaust points for both the interior and exterior airflow path. Exterior air enters the unit at the bottom, side, or bottom-front and discharges air through the condenser coil at the top-front of the unit. The interior air enters through the top-back of the unit and discharges conditioned air through the evaporator coil on the bottom-back of the unit. Airflow on the interior/evaporator side can be actively heated with an optional electric heater.

The units are designed and manufactured for exterior use and certified by UL per UL Type 4 Standards such that they may be used on telecommunication cabinets requiring GR-487 compliance. The units are safety certified by UL per UL Standard 484, Special Purpose Air Conditioners. The refrigeration circuit uses R-134A refrigerant, a stable high temperature refrigerant with no o-zone depleting effect.

The unit is controlled with a control board that provides an easy to use interface to operate a Test Mode for startup and diagnosis (optional digital display with Ethernet connection – See Ethernet Controller Addendum), configure operating parameters for temperature and alarm set points, provide anti-short cycling, monitor operating pressure(s), provide visual alarms and diagnosis, and provides a HVAC trouble/temperature alarm dry contact output.



**Figure 1 – Airflow**



## 4. GENERAL PRODUCT DATA

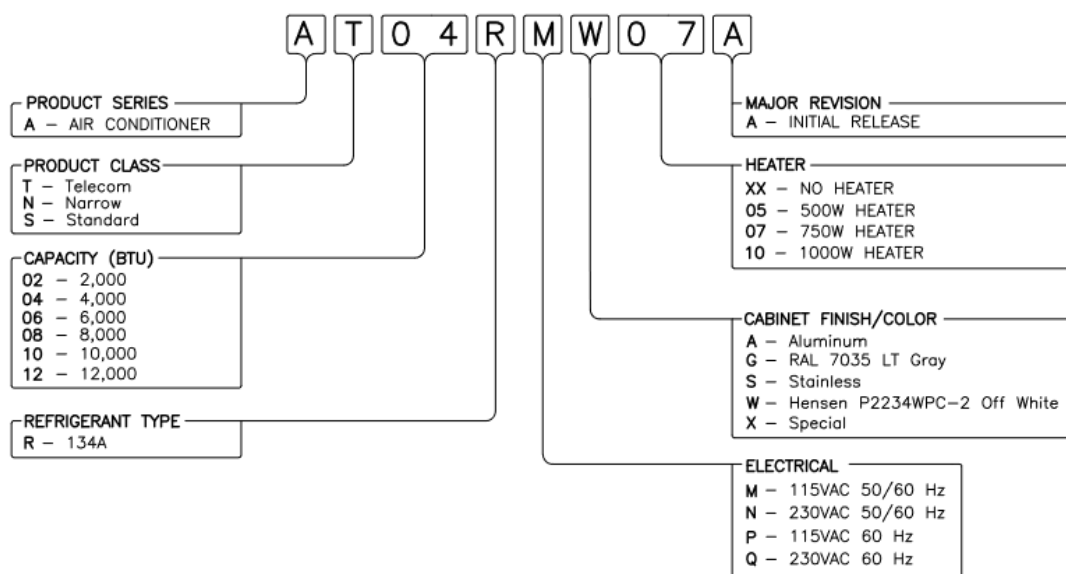
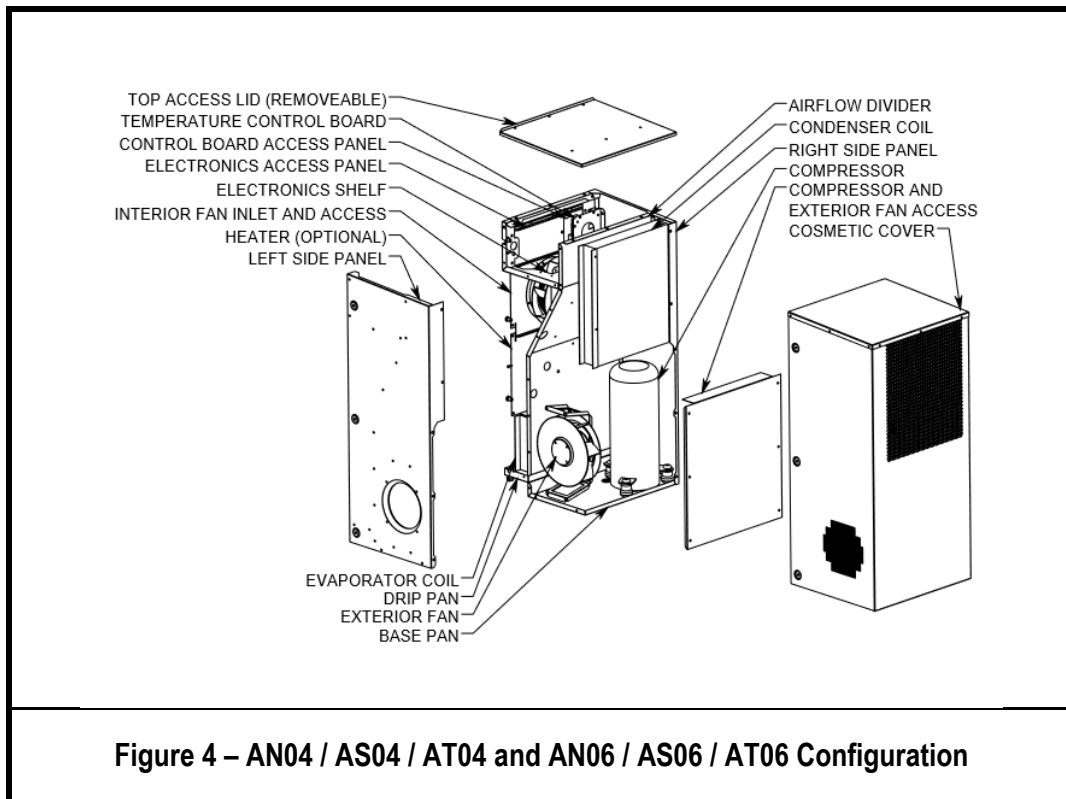
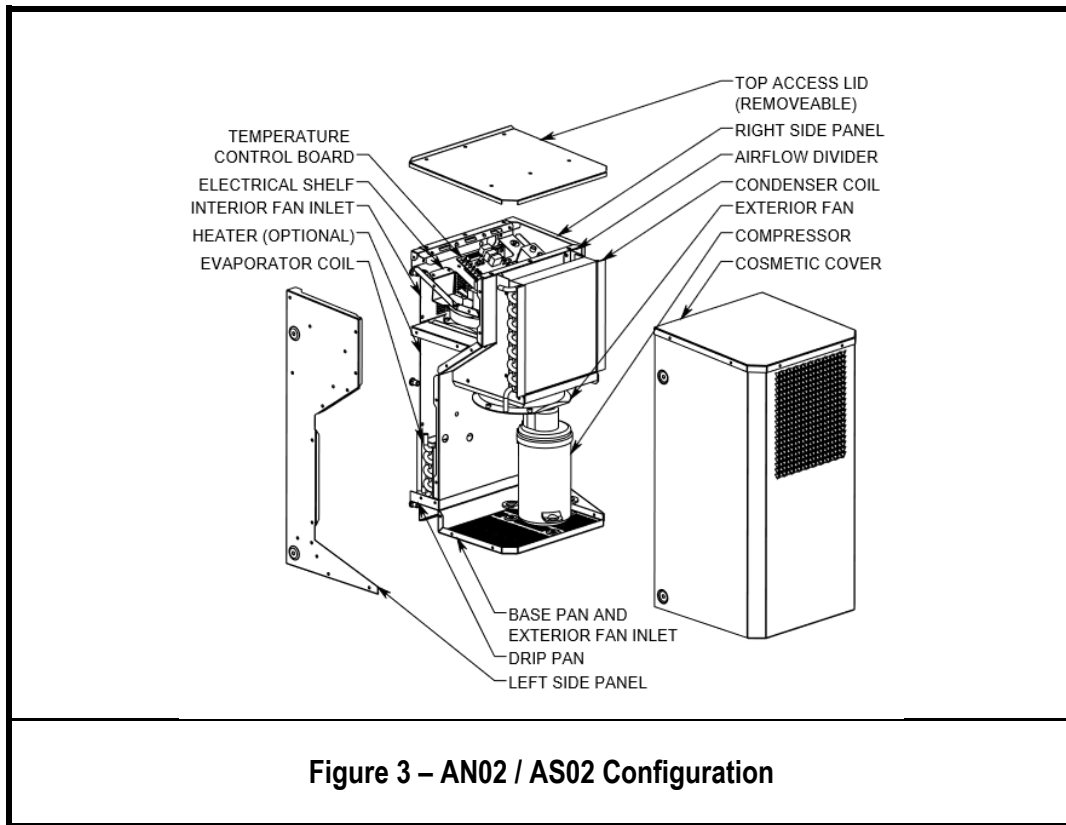


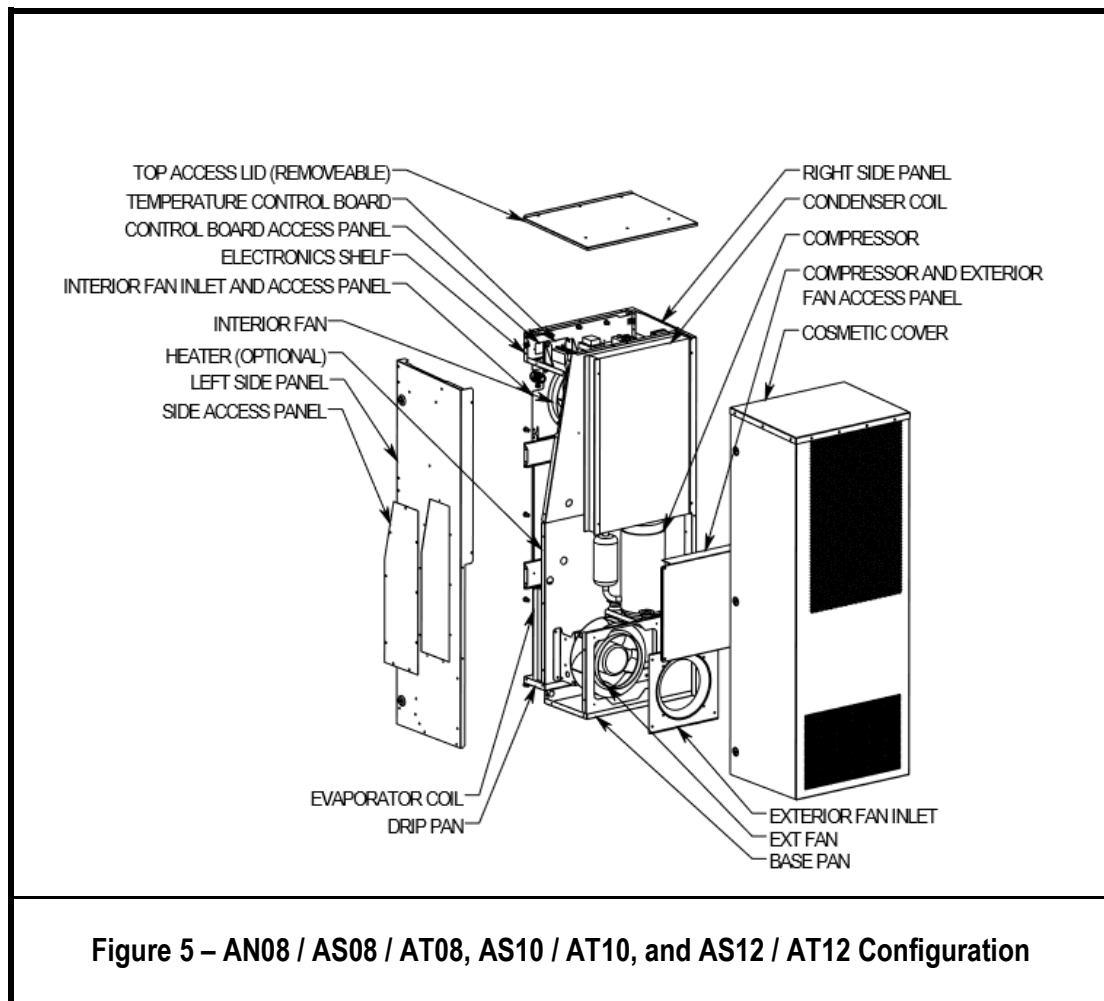
Figure 2 – Model Nomenclature

MODEL NUMBER (__ is SERIES AN, AS, or AT)	NOMINAL CAPACITY <sup>1</sup> (BTU/HR SENSIBLE)	RATED VOLTAGE (SGL Ø AC 50/60HZ)	MINIMUM CIRCUIT AMPACITY (AMPS)	MAX BREAKER / FUSE SIZE / MOCP (AMPS)	WEIGHT (lbs.)	NOMINAL SIZE W x H x D (in.)
__02RM	2,000	115	6.4	10	AN/AS: 36.8	AN/AS: 10.4 x 20.4 x 10.0
__02RN		208/230	2.8	10		
__04RM	4,000	115	15.9	25	AT: 74.7	AT: 17.4 x 29.6 x 12.9 AN/AS: 14.1 x 30.0 x 12.3
__04RN		208/230	5.3	10	AN/AS: 65.6	
__06RM	6,000	115	10.2	15	AT: 74.7	AT: 17.4 x 29.6 x 12.9 AN/AS: 14.1 x 33.0 x 12.3
__06RQ		208/230 (60Hz Only)	5.3	10	AN/AS: 74.7	
__08RM	8,000	115	16.4	25	AT: 94.6	AT: 16.1 x 43.6 x 12.2 AN/AS: 14.1 x 44.0 x 12.3
__08RN		208/230	8.7	15	AN/AS: 84.7	
__10RM	10,000	115	18.5	30	AT/AS: 94.6	AT/AS: 16.1 x 43.6 x 12.2
__10RN		208/230	10.1	15		
__12RM	12,000	115	18.8	30	AT/AS: 96.9	AT/AS: 16.1 x 43.6 x 12.2
__12RN		208/230	10.7	15		

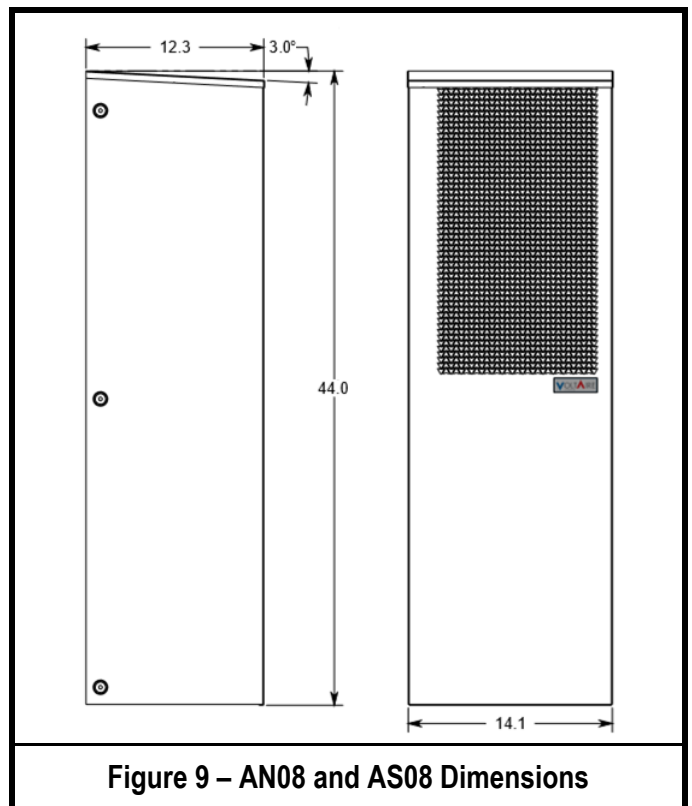
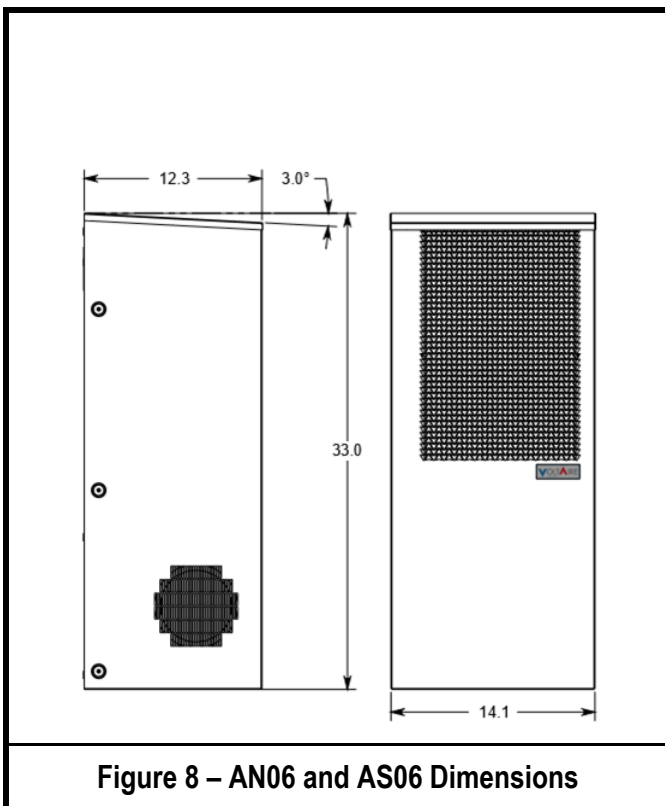
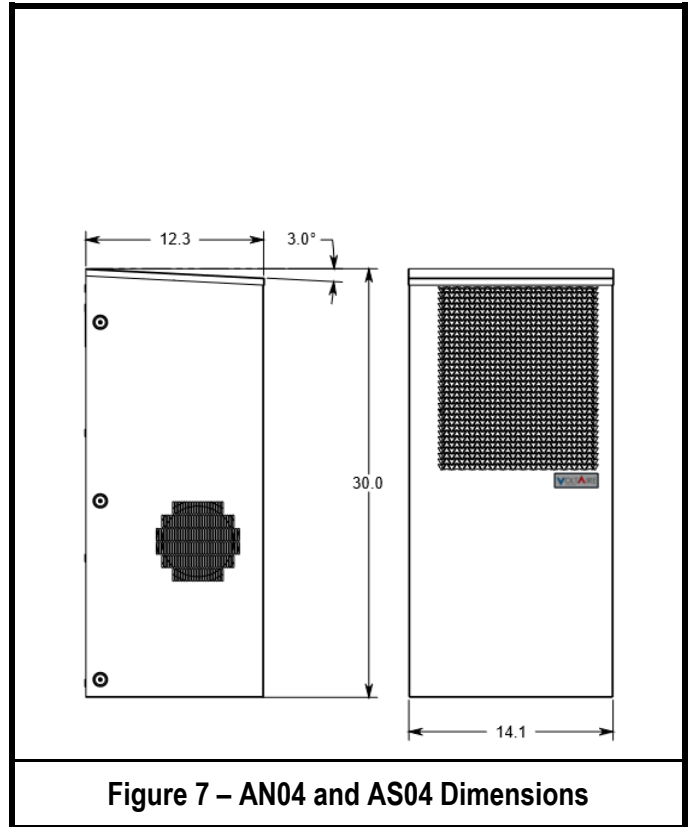
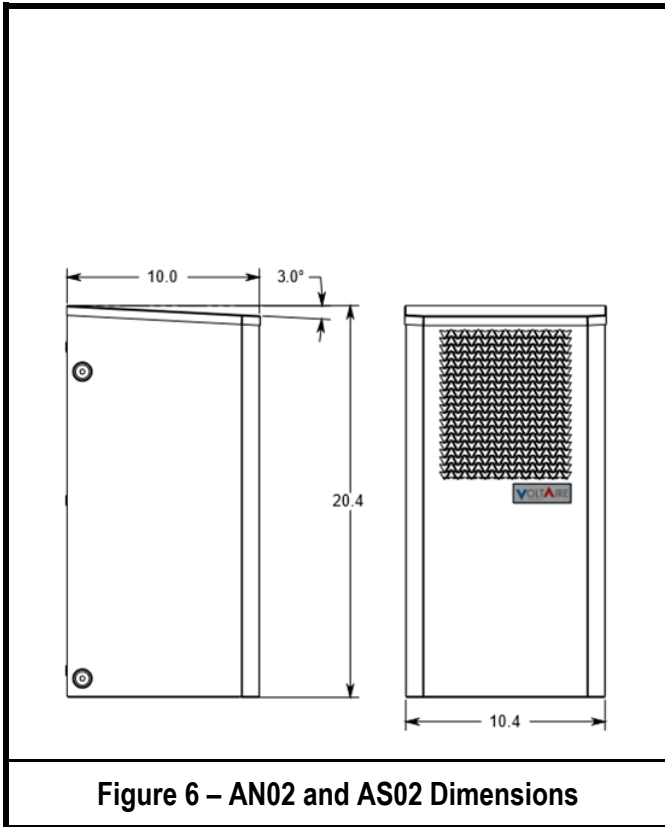
<sup>1</sup> Capacity is nominal based upon free airflow without restrictions; Locating the air conditioner where airflow is restricted may reduce capacity; Nominal capacity is at exterior temperature of 131°F (55°C) and interior temperature of 131°F (55°C)

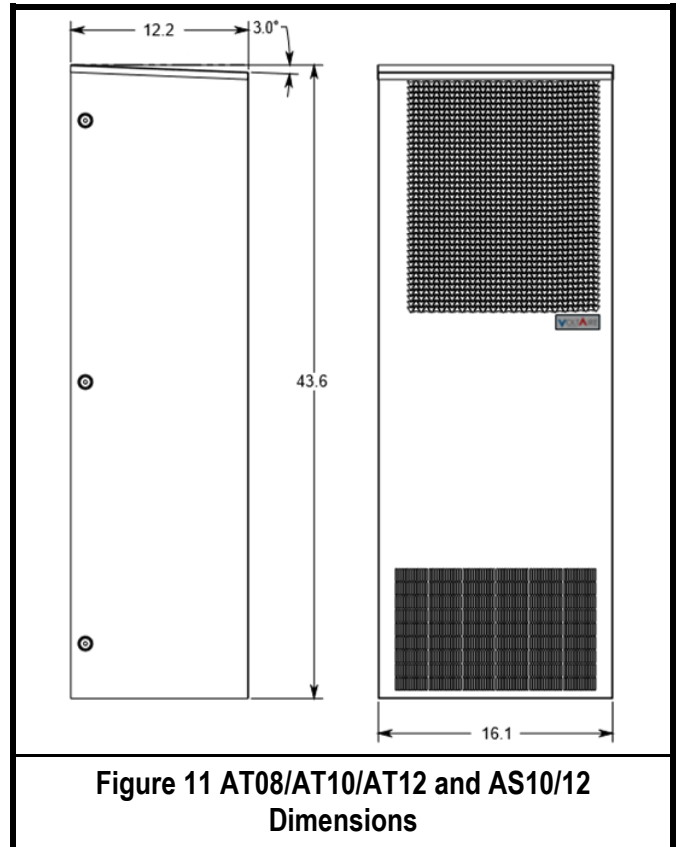
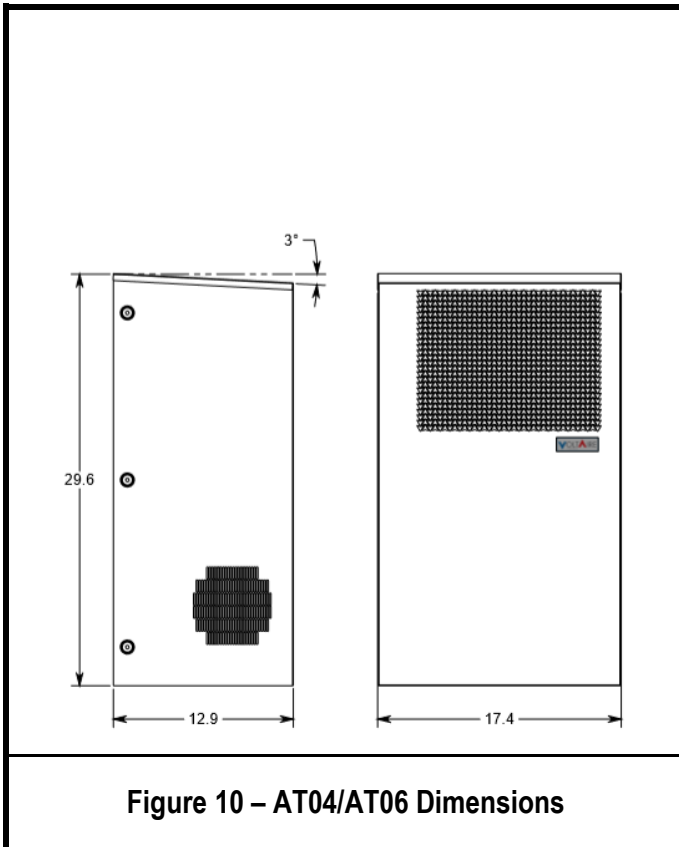
Table 1 – General Product Specifications









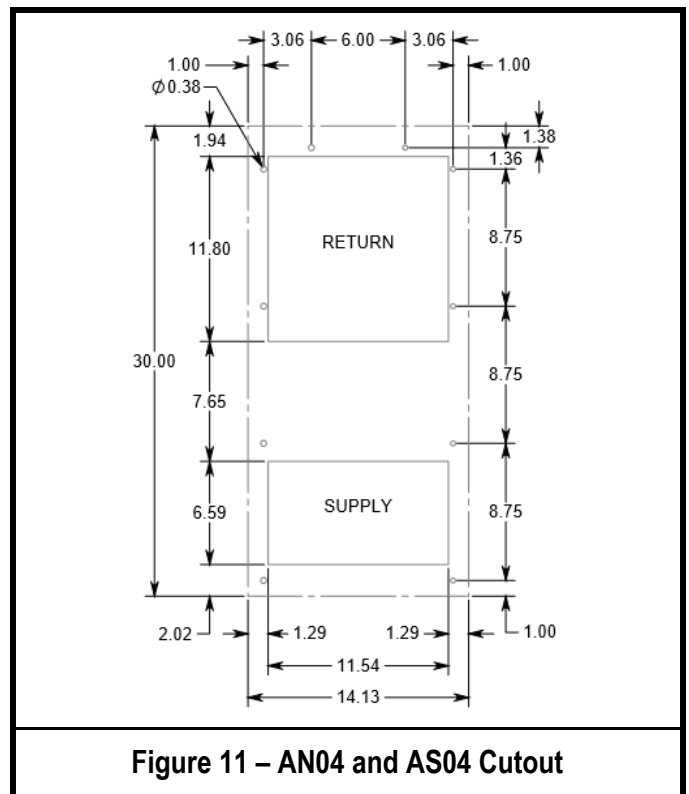
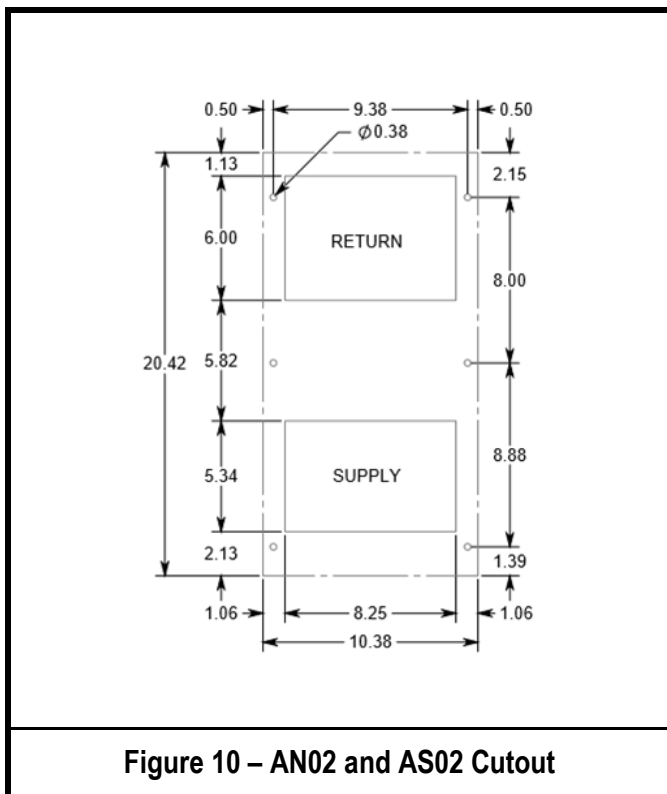


## 5. INSTALLATION INSTRUCTIONS

**WARNING: REVIEW THIS MANUAL COMPLETELY PRIOR TO BEGINNING INSTALLATION, OR SERVICE. FAILURE TO DO SO MAY RESULT IN IMPROPER OPERATION, UNIT DAMAGE, AND/OR PERSONAL/BODILY HARM.**

The unit may be installed on any flat vertical surface. Do not install the unit in a horizontal position and verify the unit is level. The unit should be located on a cabinet or equipment such that airflow is not restricted by obstructions of the interior or exterior airflow path, as obstruction of airflow will reduce capacity of the unit and may cause unit failure.

Using the cutout templates shown below in Figures 10 through 15, prepare the wall for the interior intake and discharge openings and fastener locations. Clean the mounting surface to remove any dust, grease, and/or debris, including removing any metal burrs resulting from metal cutting.



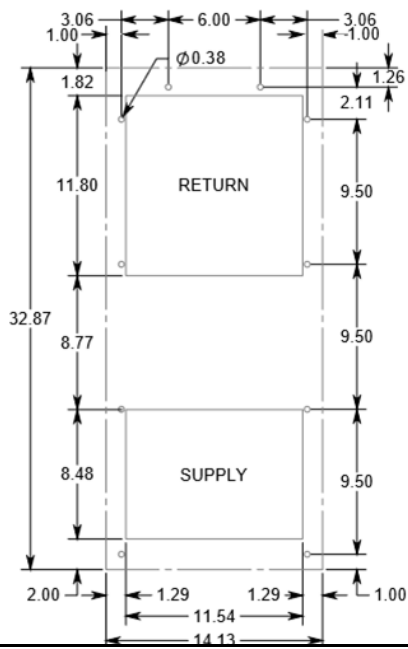


Figure 12 – AN06 and AS06 Cutout

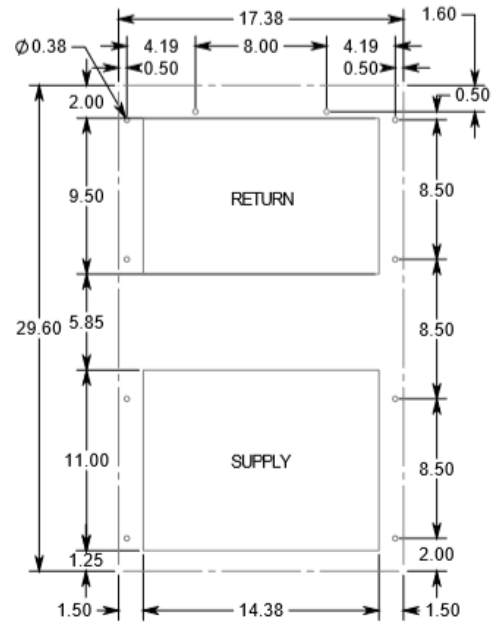


Figure 13 – AT04/AT06 Cutout

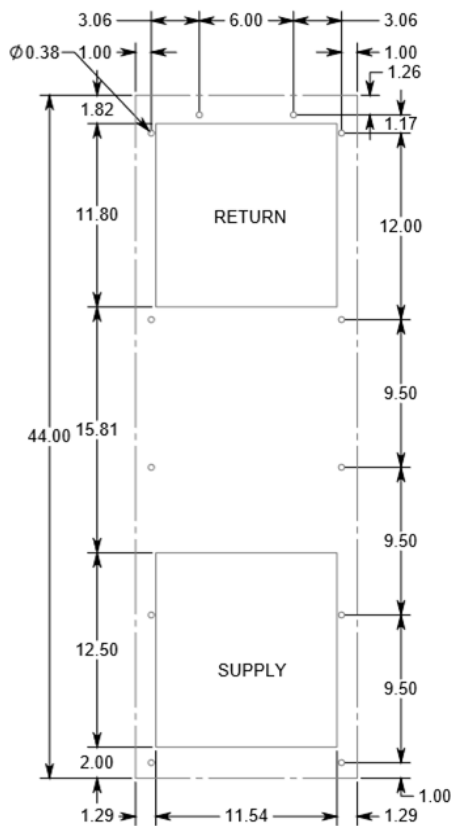


Figure 14 – AN08 and AS08 Cutout

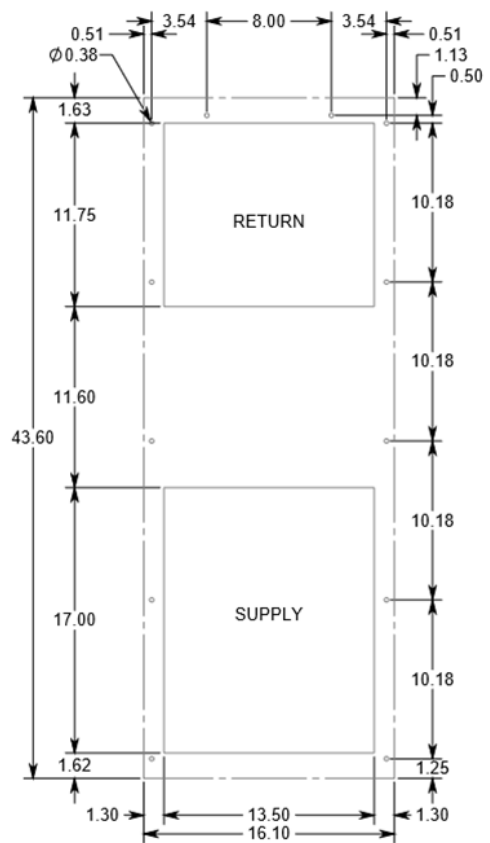
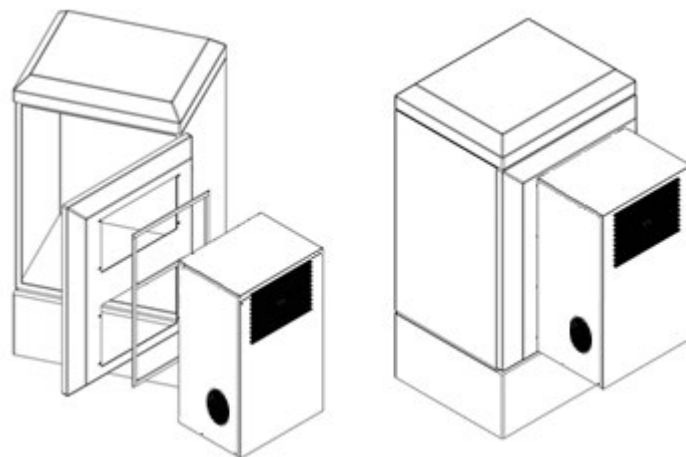


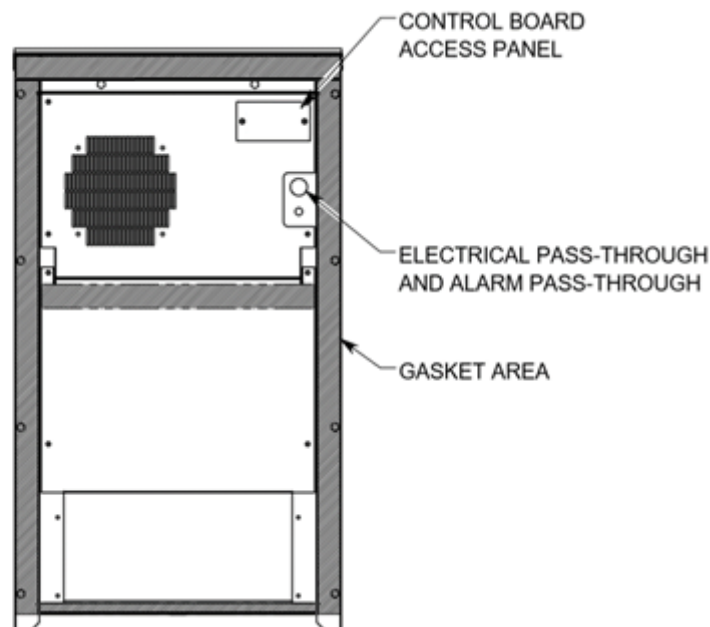
Figure 15 – AT08/AT10/AT12 and AS10/12 Cutout



A typical example of the gasket application is shown in Figure 16. The supplied gasket is compressed between the cabinet and the air conditioning unit to prevent external water from entering the cabinet through the supply and return openings as seen in Figures 10 through 15. Clean any dust or debris from the designated gasket area shown in Figure 17 to ensure that the gasket properly adheres to the unit. Using the provided gasket kit, place the gasket on the back of the AC Unit immediately abutting the mounting hole locations. The gasket should run across the width of the top of the unit, down both sides, with two cross pieces underneath the mounting hooks and the evaporator coil. Be sure to utilize the longer of the two shorter lengths for the top of the unit. This will maximize protection against water. Ensure there are no gaps in the gasket and verify the top has no gap to ensure proper protection of rain or water.



**Figure 16 – Gasket Application**



**FIGURE 17 – Gasket Area**



Remove the cover from the unit using a security T25 Torx driver (AT/AN) or Allen driver (AS). The unit is equipped with a set of mounting tabs to assist with temporary hanging during installation. Utilize the mounting tabs to place the unit in the proper location at the base of the upper cutout. Install the M6x25 bolts (quantities vary by model) at each of the mounting locations. Install the M6 nuts and washers on the M6 studs. Tighten the M6 mounting bolts/nuts on the M6 studs to 50 in-lbs torque. Do not over tighten.

From the exterior, inspect the gasket to verify the gasket is tight and there are no visible leakage points. Using a field supplied sealant, seal around all four sides of the AC Unit. Note that the AC Unit is generally maintainable without removal from the cabinet/equipment. Therefore, use a liberal amount of sealant. If top access is required for maintenance purposes, sealant may be removed along the top edge to gain access but new sealant shall be reapplied following the maintenance service. Attach the cosmetic cover using the original Torx security or Allen screws.

The evaporator drain pan is provided with a 0.40" outside diameter drain. The drain is located on the positive side of the fan, therefore a trap is not required for positive drainage. If desired, this drain may be trapped by the installer using a field supplied hose or piping.

Install the field supplied fuse and/or breaker per all local/state/national codes, with electrical service rated per the size indicated in Table 1. Prior to starting the unit verify correct operating voltage, with operating voltage required to be within 10% of rated voltage. For nominal 208/230V units, the 24VAC transformer has two taps, 208V and 240V. The unit is shipped with the tapped at 240V, however adjust the transformer tap accordingly to the 208V tap if site voltage is lower than 220V. Failure to adjust the tap, if required, may result in improper operation.

Using the cord and plug provided with the unit, provide electric service to the unit with an electrical receptacle. Installation of the AC Unit is complete with the exception of testing the operation using the TEST Mode function of the controller.



## 8. RECOMMENDED / PREVENTATIVE MAINTENANCE

Although the VoltAire Systems Air Conditioners are designed to require minimal maintenance, it is recommended that the units be inspected periodically for proper operation. The frequency of maintenance is a function of the site conditions, such that dirtier sites may require more frequent maintenance to clean coils and/or filters. The following items can be reviewed during other routine maintenance of the cabinet/equipment:

- Verify operation of the interior and exterior fans. Use the control board test mode to verify operation of the compressor, heater (if applicable), and fans.
- Verify that the unit is sealed properly. The field sealing of the unit to the cabinet/equipment should be inspected to ensure proper sealing.
- Interior/evaporator and Exterior/condenser coil should be cleaned using a commercial available non-acidic HVAC coil cleaner.
- Clean the exterior condenser filter (optional item), if applicable

Table 2 can be used to assist in service / maintenance scheduling.

Maintenance Schedule			
	Maintenance Item	Quarterly / Semiannually	Yearly
1	Check for filter blockage (If Applicable)	✓*	
2	Condenser Coil Cleaning (Remove debris / blockages)	✓*	
3	Functionality Check (Test Mode)		✓
4	Fan rotation Check (Verify fans spin without issues)		✓
5	Evaporator Coil Cleaning (Remove debris / blockages)		✓
6	Cabinet Cleaning		✓
7	Condensate Drain Pipe (Clean and clear any blockage)		✓

\* Time may vary based on location conditions of installed unit. Monthly may be necessary for extraordinarily dirty sites.

**Table 2 – Maintenance Schedule**



## 9. TROUBLESHOOTING GUIDE

**WARNING: ELECTRICAL SHOCK HAZARD. DISCONNECT POWER FOR SERVICING. FAILURE TO DO SO COULD RESULT IN ELECTRICAL SHOCK OR DEATH.**

**CAUTION: ELECTRICAL AND REFRIGERATION SERVICE AND TROUBLESHOOTING SHOULD ONLY BE CONDUCTED BY CERTIFIED HVAC TECHNICIANS. TECHNICIANS SHALL FOLLOW ALL INDUSTRY STANDARDS FOR SAFETY. THE COMPONENTS IN THE UNIT ARE STANDARD INDUSTRY COMPONENTS, AND TOGETHER WITH THE INFORMATION PROVIDED WITHIN THIS MANUAL, THE TECHNICIAN SHALL USE STANDARD ELECTRICAL AND REFRIGERATION TROUBLESHOOTING, DIAGNOSIS AND REPAIR PROCEDURES. PLEASE NOTE THAT UNIT MAY CONTAIN CUT HAZARDS/SHARP EDGES AND GLOVES SHALL BE USED TO AVOID SHARP EDGES AND INJURY.**

**IMPORTANT: REVIEW THE MANUAL IN ITS ENTIRETY PRIOR TO SERVICING OR MAINTAINING THE EQUIPMENT.**

PROBLEM	POTENTIAL CAUSE	SOLUTION
Unit or components not powering on	No or improper supply voltage	Check power source voltage (shall be within +/- 10% of unit rating) and verify electrical connections at all terminals. Verify transformer voltage tap is set properly at either 208V or 240V and adjust as necessary as described within this manual.
	Control board not working	Remove power from the unit and check/verify all terminals are fully connected at control board, transformer, relays, contactor, and capacitors. Verify 24V supply power across control board R and C terminal on control board. Use Test Mode to verify proper operation of each component as described within this manual.
	Evaporator side entering air temperature less than 68F.	Verify functionality using the test mode.
Unit not reaching cooling capacity or satisfying heat load in cabinet	Dirty condenser or evaporator coil or exterior filter (optional feature)	Remove blockage by cleaning condenser/evaporator coil thoroughly with commercially available coil cleaner. Acidic based coil cleaner shall <u>NOT</u> be used. Clean exterior filter, if applicable.
	Bent fins on coil	Use coil comb to straighten out fins.
	Loss of refrigerant	Locate leak, repair or replace components, and recharge unit to initial specified charge specification by removing all charge, pumping down refrigerant circuit to remove moisture, verify caps on service ports, and weighing charge in with new R134A refrigerant.
	Verify free and clear airflow at both coils	Verify that airflow is not blocked or obstructed at evaporator and condenser coils. Adjust or divert air, and/or relocate equipment in cabinet that is obstructing airflow.
	Refrigeration metering device malfunction	TXV or capillary tube may be restricted or malfunctioning. See loss of refrigerant above then verify pressure and / or temperature drop and replace if malfunctioning.
	Unit undersized for load	Check heat load of cabinet and verify proper unit sizing.





Evaporator/indoor coil ice buildup	Insufficient heat load	Reduce control board Hysteresis (HYS) to cycle compressor off more quickly and/or increase cooling set point to reduce run time. Unit possibly oversized and may need to be replaced with lower capacity unit.
	Insufficient interior airflow due to dirty evaporator coil	Remove blockage by cleaning evaporator coil thoroughly with commercially available coil cleaner. Acidic based coil cleaner shall <u>NOT</u> be used.
	Unit may be low on refrigerant	Locate leak and repair, and/or replace components, and recharge unit to initial specified charge specification by removing all charge, pumping down refrigerant circuit to remove moisture, and weighing charge in with new R134A refrigerant.
Fan failure	Bad capacitor	Check capacitance of capacitor and replace capacitor if operating outside of specified range.
	Verify operation of low ambient/head pressure control pressure switch	Condenser fan is powered through a head pressure control relay that closes at approx. 200psi and opens at approx. 110psi. Verify switch is closed at normal operating pressures. Replace switch if permanently open.
Compressor fails to run after startup or unit is operating with low and/or high pressure or compressor drawing abnormally high amps.	Bad run/start capacitor	Check capacitance of capacitors and replace capacitor(s) if operating outside of specified range.
	High pressure switch operation	Switch should be closed with standard operating pressure (or below). Replace bad switch.
	Low pressure switch operation (optional feature)	Switch should be closed with standard operating pressure (or above). Note that control board bypasses switch for 2 minutes after compressor start. Replace bad switch.
	Bad contactor	Verify voltage at contactor and replace contactor if not operating properly.
	Restricted liquid line filter drier	Verify proper pressure drop across liquid line filter drier, and replace if necessary.
	Start relay failure	Verify proper start relay operation and replace as necessary.
	Bad thermal overload switch	Replace overload switch.
Tripped breaker and/or fuse (both field supplied)	Undersized breaker/fuse	Replace with properly sized breaker/fuse and/or wire.
	Short in system	Locate and eliminate short.
	Unit drawing high amps on startup.	Check compressor windings and compressor startup components.
Water in enclosure	Evaporator drain clogged	Remove blockage and clean drain pipe.
	Enclosure not sealed	Properly seal off enclosure to prevent humidity entering unit.
	Mounting gasket damaged	Replace mounting gasket or replace sealant around unit.
<b>FOR ADDITIONAL TECHNICAL SUPPORT, PLEASE CONTACT VOLTAIRE SYSTEMS AT (407) 378-7482.</b>		



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## 10. SPARE PARTS

Refer to [www.voltairesys.com](http://www.voltairesys.com) or the QR code in the top right corner of the page

## 9. WARRANTY

### **VOLTAIRE SYSTEMS THERMAL UNITS NON-TRANSFERABLE STANDARD LIMITED WARRANTY, DISCLAIMERS, AND LIMITATIONS OF LIABILITY**

**(Applies to All Heat Exchangers, Pressurization Units,  
Fan Units, and Air Conditioners)**

The VoltAire Systems, LLC ("VoltAire") Non-Transferable Limited Warranty ("Limited Warranty") is applicable for 12 months following the shipment of the product to the original purchaser ("Purchaser") defined as the "Warranty Period". VoltAire warrants to the original purchaser during the Warranty Period that all materials and workmanship are free of defects of quality and operation that would impair the usefulness of the original air conditioner, fan unit, pressurization unit or heat exchanger (collectively herein referred to as "Product") during the Warranty Period. This Limited Warranty is for all components of the Product, except filters, when installed and operated under the following conditions:

- A. In strict accordance with the Product's Installation and Operation Manual, as may be revised from time to time with the latest version available at [www.voltairesys.com](http://www.voltairesys.com).
- B. Maximum voltage variation no greater than plus or minus 10% of nameplate nominal rating.
- C. Maximum frequency variation no greater than plus or minus 3 Hz. of nameplate nominal rating.
- D. Must not exceed minimum and maximum stated temperatures on the nameplate.
- E. Not to exceed (BTU/Hr.) rating, including any heat sink, as indicated on the nameplate.
- F. Installed per all local, State and Federal legal requirements.
- G. The unit must not be restarted for a period of five (5) minutes after intentional or accidental shut-off of a compressor. (This does not apply to heat exchanger or filter fan.)

The Limited Warranty is void and not applicable if:

- A. The Product is installed improperly
- B. The Product is not maintained properly, including prolonged operation with dirty filters or coils
- C. The Product is modified, abused and/or tampered
- D. The Product is applied in an incorrect manner, including operation within a corrosive atmosphere (including but not limited to coastal applications)
- E. The Product is used with the incorrect refrigerant (air conditioners)
- F. The Product is damaged and/or inoperable due to accidents or events beyond the reasonable control of VoltAire and Acts of God
- G. The Product is repaired with parts not provided by VoltAire
- H. The Product is installed and operated outside the United States, Mexico, and/or Canada.



Damage during freight is not included with this Limited Warranty. The Purchaser must insure the Product is installed by a competent, professional, qualified contractor, following all local, state, and national legal requirements and industry standards. The Purchaser must provide adequate maintenance (e.g. filter changes, coil cleanings).

The Limited Warranty covers the Product for the Purchaser only during the Warranty Period, and the Limited Warranty does not include any labor, freight, and/or consequential damages or loss. Upon Notification by the Purchaser, VoltAire solely reserves the right to either, as Purchaser's sole remedy:

- Ship replacement parts to the Purchaser for the Purchaser's infield replacement of the part. Infield replacement will require the Purchaser to provide a purchase order to VoltAire for the standard cost of the part and after infield replacement return the original part to VoltAire with freight cost by Purchaser. Within fourteen (14) days of receipt of the returned part VoltAire will review and analyze the returned part. If the part is found to be defective by VoltAire a credit will be issued to the Purchaser. Parts returned to VoltAire and found not to be defective will result in no credit applied to Purchaser's account and the Purchaser will be required to pay for the replacement part.
- Or, request the return of the Product for evaluation. Return of the Product must be preceded by the issuance of a VoltAire Return Merchandise Authorization (RMA). The RMA will require that shipping costs be paid by the Purchaser to return the Product to VoltAire. Within fourteen (14) days of receipt of the returned Product VoltAire will review and analyze the Product. If the Product is determined by VoltAire to be defective, VoltAire may repair or replace the Product, and will ship the Product to the Purchaser for the Purchaser's installation in the field with no labor costs reimbursed by VoltAire. If the Product is determined by VoltAire to NOT be defective, the Purchaser will be notified and a Purchase Order must be issued in the amount required for the Product to be packaged and returned to the Purchaser.

#### **DISCLAIMERS AND LIMITATIONS OF LIABILITY:**

THIS LIMITED WARRANTY CONSTITUTES THE ENTIRE WARRANTY FOR THE VOLTAIRE PRODUCT AND IS IN LIEU OF ALL OTHER WARRANTIES, EXPRESS AND IMPLIED, INCLUDING ANY WARRANTY OF MERCHANTABILITY AND WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE. THERE ARE NO WARRANTIES WHICH EXTEND BEYOND THE DESCRIPTION ON THE FACE HEREOF.

VOLTAIRE IS NOT RESPONSIBLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES OF ANY NATURE WHATSOEVER, INCLUDING, BUT NOT LIMITED TO, LOST PROFITS, ATTORNEYS FEES, AND LOSS OF USE DAMAGES.

VOLTAIRE EXCLUDES ALL LIABILITY FOR OR ARISING FROM ANY NEGLIGENCE ON ITS PART OR ON THE PART OF ANY OF ITS EMPLOYEES, AGENTS, OR REPRESENTATIVES IN RESPECT TO THE MANUFACTURE OR SUPPLY OF GOODS, INCLUDING THE PRODUCT, OR THE PROVISION OF SERVICES RELATING TO THE GOODS, INCLUDING THE PRODUCT.

THIS LIMITED WARRANTY, DISCLAIMER, AND LIMITATION OF LIABILITY SHALL SUPERSEDE ANY TERMS OF PURCHASE PROVIDED BY THE PURCHASER AT THE TIME OF THE PURCHASE, AND THE LIMITATION OF LIABILITY SHALL SURVIVE FROM THE DATE OF THE PURCHASE TO THE DATE OF DISCONTINUED USE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OF CONSEQUENTIAL DAMAGES MAY NOT APPLY.