

# OPERATION & SAFETY INSTRUCTIONS

## ELECTRIC VORTEX A/C UL TYPE 4/4X

Models 70xxEB, 70xxEBF, 70xxES, 70xxESF, 77xxEB, 77xxEBF, 77xxES, 77xxESF  
(xx = 15, 25 or 35) (Includes all BSP versions of models listed above)



### IMPORTANT

Please read all instructions **BEFORE** attempting to use this product



10125 Carver Road, Cincinnati, OH 45242  
Phone: 513-891-7474 • Fax: 513-891-4092  
Toll Free: 800-441-7475  
[www.vortec.com](http://www.vortec.com) • [techsupport@vortec.com](mailto:techsupport@vortec.com)

## GENERAL SAFETY CONSIDERATIONS

### **WARNING: COMPRESSED AIR COULD CAUSE DEATH, BLINDNESS OR INJURY.**

1. Do not operate an Electric Vortex A/C at compressed air pressures above 100 psig (6.9 bar).
2. Do not operate at compressed air temperatures above 120°F (49°C).
3. Avoid direct contact with compressed air.
4. Do not direct compressed air at any person.
5. When using compressed air, wear safety glasses with side shields.

### **Introduction**

The Electric Vortex A/C enclosure cooler is designed to use filtered compressed air to cool industrial control enclosures without the use of any refrigerants. Hot air in the enclosure is vented to the surroundings through a built-in vent in the Electric Vortex A/C. Noise generated by the Electric Vortex A/C is comparable to normal speech levels. The Electric Vortex A/C is controlled by an electric thermostat to monitor and maintain the desired temperature in the enclosure. To operate, simply install on the enclosure, connect to the compressed air source and plug the power cord into either a 120 volt (models 70xxEB, 70xxES, 77xxEB, 77xxES) or a 240 volt (models 70xxEBF, 70xxESF, 77xxEBF, 77xxESF) power source. Set the thermostat to the desired temperature. When the set temperature is reached, the Electric Vortex A/C will automatically turn on and start cooling the enclosure.

### **Compressed Air Supply**

The compressed air supply must be filtered (5 micron maximum particle size) to remove water and dirt. A 5 micron filter is supplied for this purpose on models 77xxEB, 77xxES, 77xxEBF, and 77xxESF. If oil is present in the compressed air supply, a 0.01 micron coalescing filter is required. (See the filter recommendations given in Table 1.) If an oil removal filter is necessary, install it downstream of the 5 micron filter. Change the filter elements as needed (see "Maintenance").

The appropriate size of compressed air supply line should be selected to ensure optimal performance of the Vortec product. Please refer to Table 2 to determine what supply line size is recommended for your application. Contact Vortec at 1-800-441-7475 for further assistance.

### **Internal Enclosure Pressure**

The Electric Vortex A/C, when operating at 100 psig (6.9 bar) will maintain a positive internal enclosure pressure. When the Electric Vortex A/C is not cooling (when the thermostat senses acceptable temperatures), the Electric Vortex A/C is not pressurizing the enclosure.

## Installation

To maintain the UL Type 4 and 4X rating, the Electric Vortex A/C MUST be installed in one of the following configurations on a UL Type 4 or 4X enclosure:

- a. Top mounted in an upright orientation on a flat horizontal surface.
  - b. Side mounted, on a flat vertical surface of the enclosure, with the compressed air inlet pointing downward to the floor. If side mounted, locate the Electric Vortex A/C so that it is near the top of the enclosure.
1. Position the Electric Vortex A/C on the top or side of your enclosure so that there is sufficient clearance for the internal cold air muffler and so that the entire mounting "footprint" of the Electric Vortex A/C is supported by the enclosure. (A 9 1/2" wide x 3 1/2" deep (241 mm wide x 89 mm deep) area.) Position the unit so that the metal shroud on the back is away from personnel, if possible. Also, position so that no internal enclosure components obstruct air flow near the unit's vent air hole.
  2. Cut a 1 15/16" (49 mm) diameter hole (1 1/2" knockout size) in the selected location on your enclosure. De-burr any sharp edges around this hole.
  3. Install the large threaded portion of the Electric Vortex A/C into the hole of your enclosure, first by putting the cord-connected thermostat through the hole. For bottom power cord models, pull the 120 volt (or 240 volt) power cord through the hole.
  4. Next, from inside the enclosure, push the cord-connected thermostat through the steel 1 1/2" electrical locknut (supplied in a separate bag of parts). For bottom power cord models, push the power cord through the locknut.
  5. Screw the 1 1/2" electrical locknut onto the threaded portion of the Electric Vortex A/C. Tighten this locknut securely to compress the 1/8" (3 mm) thick gasket that is positioned between the enclosure and the Electric Vortex A/C.
  6. Screw the supplied 1/4" brass pipe elbow onto the white cold air outlet connection. Next, screw the cold air muffler onto the 1/4" pipe elbow. Ensure all pipe connections are tight so they do not leak.
  7. Attach one end of the vinyl tubing supplied in the 701M-43 Cold Air Ducting Kit to the white nylon hose barb on the cold air muffler. Holes can be punched or drilled into this 1/2" (13 mm) tubing to distribute the cold air evenly inside your enclosure, or, the entire cold air output can be directed to a heat sensitive component. If the end of the 1/2" (13 mm) vinyl tubing is plugged (with the cork provided), at least twenty-four 1/8" (3 mm) diameter holes must be drilled or punched into the tubing to allow the cold air to escape. Use the nine self-adhesive tubing clips provided in the kit to mount the tubing in the desired area of the enclosure.
  8. Mount the cord-connected thermostat in the desired location using the short length of 35 mm DIN rail provided. Typically it is best to position the thermostat near the top of the enclosure and near the vent air hole in bottom of the Electric Vortex A/C. The DIN rail is supplied with double sided tape for easy installation. Clip the thermostat onto the DIN rail.
  9. Plug the power cord into the appropriate electric supply inside the enclosure (120 volt AC for models 70xxEB, 70xxES, 77xxEB, and 77xxES; or 240 volt AC for models 70xxEBF, 70xxESF, 77xxEBF, and 77xxESF).
  10. Connect the compressed air filter (supplied on 77xxEB, 77xxES, 77xxEBF, and 77xxESF models) to the compressed air inlet on the side of the Electric Vortex A/C with a short length of 3/8" pipe. Use a 13/16" (21 mm) wrench to hold the air inlet fitting on the side of the Electric Vortex A/C stationary while tightening the pipe connections. Install the compressed air filter as close as possible to the Electric Vortex A/C, in a location where the temperature does not exceed 125°F (52°C). If the Electric Vortex A/C is mounted on the side of the enclosure, then a 3/8" pipe elbow must also be used so the filter is positioned in a vertical orientation. Note the air flow direction arrow on top of the filter.
  11. Connect the compressed air supply to the inlet of the compressed air filter. See "Compressed Air Supply".

## Operation

Maximum cooling capacity is created when the Electric Vortex A/C is operated at 100 psig (6.9 bar) or greater. However, do not operate at pressures above 150 psig (10.3 bar). Set the thermostat to desired internal enclosure temperature (typically 90 to 104°F (32 to 40°C)). Keep in mind that when the Electric Vortex A/C is cooling, it is also maintaining a slight positive pressure inside the enclosure. When it is not cooling, it is not maintaining a pressurized enclosure.

**CAUTION:** The metal shroud on the back of the Electric Vortex A/C becomes hot during operation and can remain hot for a period of time after the unit has cycled off. Note the warning label precaution and avoid direct contact with this area of the unit during or after operation.

## Maintenance

The only maintenance involved with the Electric Vortex A/C is normal filter element changes to the compressed air filter. The filter element should be changed when there is a noticeable decrease in performance or when the pressure drop across the filter exceeds 5 psig (0.3 bar). It is recommended to install pressure gauges in the piping before and after the compressed air filter so that the pressure drop can be monitored. The Electric Vortex A/C has no moving parts (except for the internal solenoid valve components).

If it is suspected that the compressed air filter has not been maintained after an extended period of operation, there may be dirt inside the Electric Vortex A/C. If the unit is not cooling sufficiently, there may be debris in the “generator” of the unit. To check, pull the 1/2” (13 mm) inside diameter vinyl tubing off the cold air muffler, remove the cold air muffler from the white nylon hex fitting and then unscrew the white hex fitting (cold air outlet) with a 1” (25 mm) wrench. Remove the white nylon spacer, the O-Ring and the generator. (A red generator in the 7x15E models, a blue generator in the 7x25E models and a brown generator in 7x35E models.) Inspect the six slots in the generator and clean if necessary. Clean the cavity in the Electric Vortex A/C that the generator was located in. Reassemble in the reverse order of disassembly. Tighten the white nylon cold air outlet to 100 inch-pounds (11 newton-meters) torque. Be sure to supply clean (filtered to 5 micron) and oil free compressed air to the Electric Vortex A/C.

## Limited Warranty

Electric Vortex A/C compressed air enclosure cooling products manufactured by ITW Air Management will be replaced or repaired if found to be defective due to manufacture within ten years from the date of invoice. Refer to our website [www.vortec.com](http://www.vortec.com) for full warranty details and limitations. ITW Air Management makes no specific warranty of merchantability or warrant of fitness for a particular purpose.

## Troubleshooting

Insufficient cooling may be caused by the following:

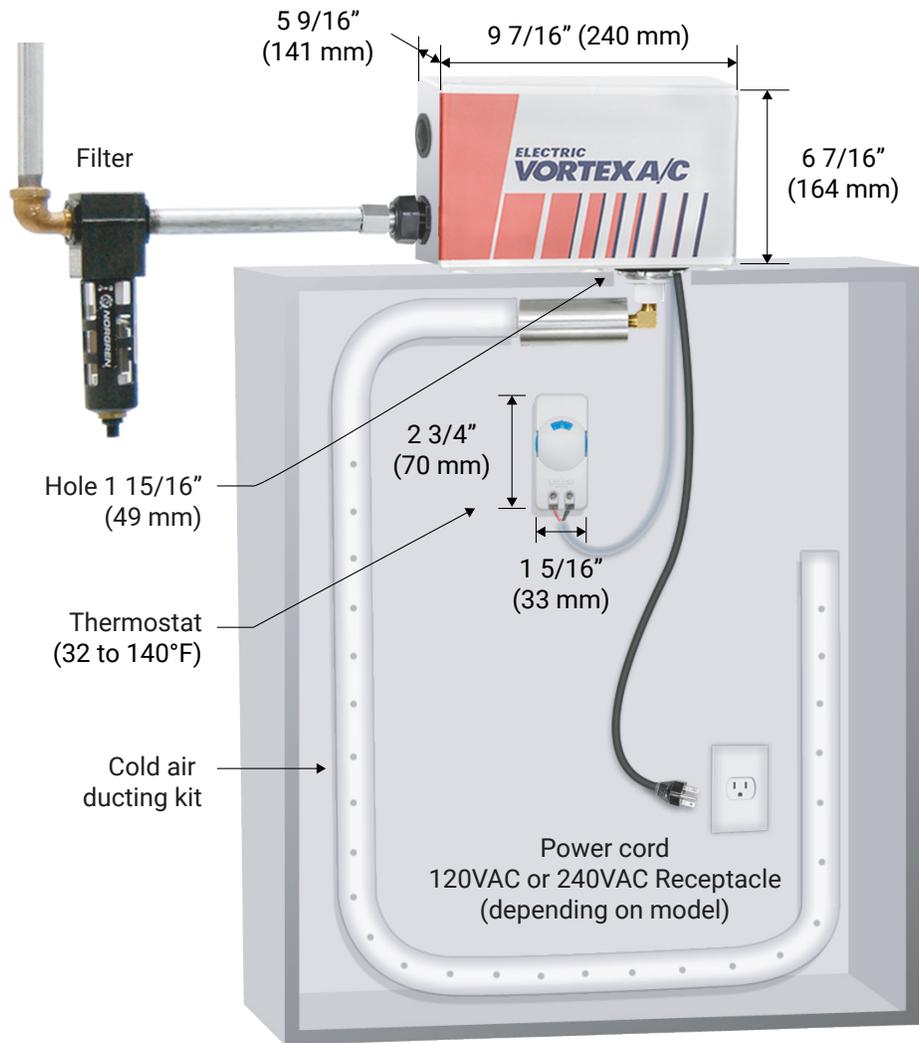
1. Undersized compressed air line size.
2. Compressed air pressure at the product is too low.
3. Partial or complete blockage of internal compressed air paths, due to dirt.
4. Water vapor in the compressed air supply.
5. Loose cold air outlet fitting. This may occur if not tightened properly after being disassembled for generator cleaning.

If trouble persists, please contact Vortec at 1-800-441-7475.

## Electric Vortex A/C Assembly

(Drawings shown below are not to scale)

**Models 70xxEB, 70xxEBF, 77xxEB, 77xxEBF**  
(xx = 15, 25 or 35)



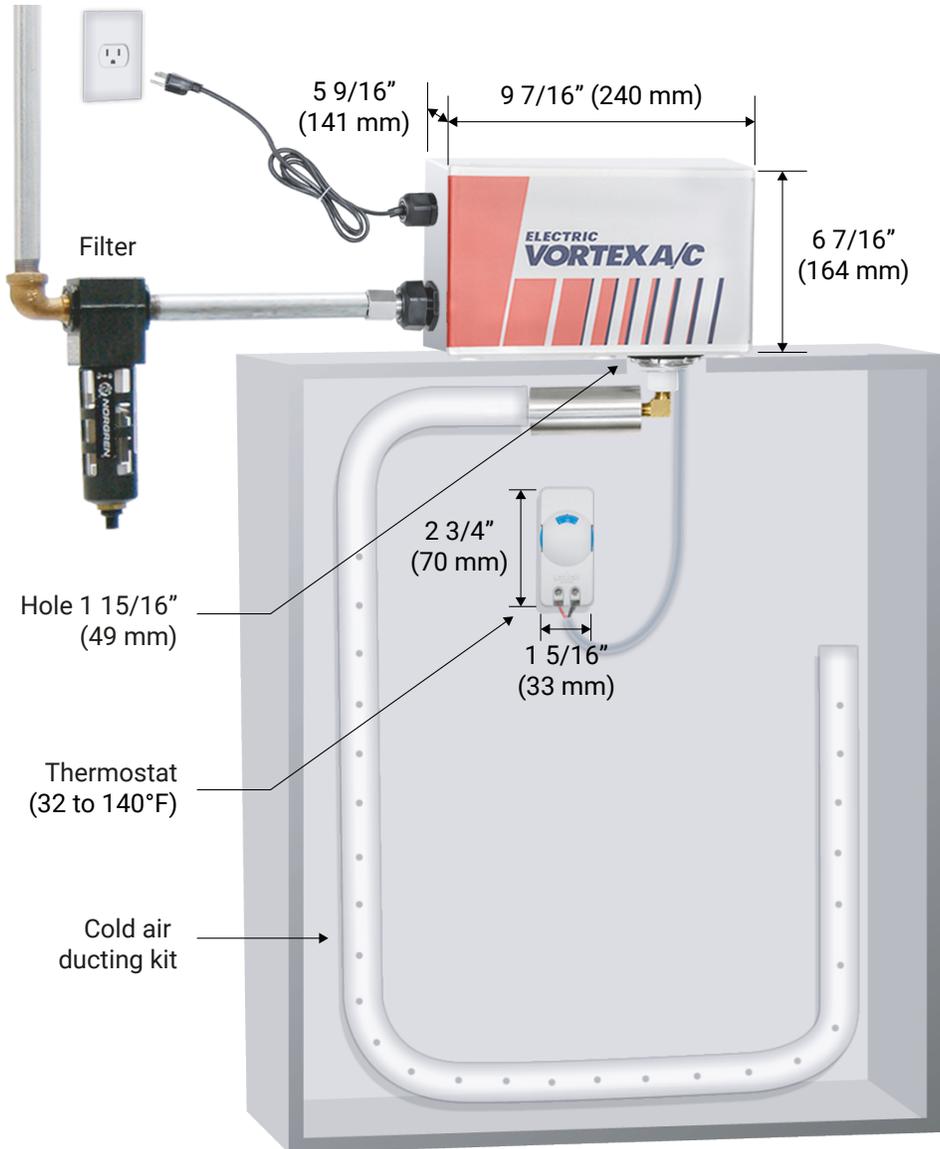
SHOWN TOP MOUNTED ON CUSTOMER'S ENCLOSURE  
PURGE SYSTEM SHOWN FOR REFERENCE ONLY

## Electric Vortex A/C Assembly

(Drawings shown below are not to scale)

**Models 70xxES, 70xxESF, 77xxES, 77xxESF**  
(xx = 15, 25 or 35)

Power cord  
120VAC or 240VAC Receptacle  
(depending on model)



SHOWN TOP MOUNTED ON CUSTOMER'S ENCLOSURE  
PURGE SYSTEM SHOWN FOR REFERENCE ONLY

**Table 1: Filter Recommendations**

FILTER AND REPLACEMENT PART ITEM NUMBERS		
Vortec Model	Oil Removal Filter	Replacement Generator Kits (5 pcs)
7015EB, 7015ES, 7015EBF, 7015ESF, 7715EB, 7715ES, 7715EBF, 7715ESF	701S-48	208GK-15H
7025EB, 7025ES, 7025EBF, 7025ESF, 7725EB, 7725ES, 7725EBF, 7725ESF	701S-48	208GK-25H
7035EB, 7035ES, 7035EBF, 7035ESF, 7735EB, 7735ES, 7735EBF, 7735ESF	701S-54	208GK-35H

**Table 2: Determining Compressed Air Line Size**

1. Calculate total product compressed air consumption (SCFM, SLPM).
2. Determine length of compressed air line required for connection to main supply.
3. Locate pipe length in left column and read to the right to find the compressed air requirements.
4. Locate pipe size at top of column.

MAXIMUM AIRFLOW (SCFM) THROUGH PIPE AT 5 PSIG PRESSURE DROP (100 PSIG AND 70°F)									
Pipe Length (Feet)	Pipe Size (Nominal) - Schedule 40								
	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2
10	29	65	120	254	480	978	1483	2863	4536
20	21	46	85	180	340	692	1049	2024	3208
30	17	37	70	147	277	565	856	1653	2619
40	15	32	60	127	240	489	792	1431	2268
50	13	29	54	114	215	437	663	1280	2029
60	12	26	49	104	196	399	606	1169	1852
70	11	25	46	96	181	370	561	1082	1715
80	10	23	43	90	170	346	524	1012	1604
90	10	22	40	85	160	326	494	954	1512
100	9	21	38	80	152	309	469	905	1435

MAXIMUM AIRFLOW (SLPM) THROUGH PIPE AT 0.3 BAR PRESSURE DROP (6.9 BAR AND 21°C)									
Pipe Length (Meters)	Pipe Size (Nominal) - Schedule 40								
	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2
3	821	1840	3396	7188	13584	27677	42117	81023	128369
6	594	1302	2406	5094	9622	19584	29687	57279	90786
9	481	1047	1981	4160	7839	15990	24225	46780	74188
12	425	906	1698	3594	6792	13839	20999	40497	64184
15	368	821	1528	3226	6085	12367	18763	36224	57421
18	340	736	1387	2943	5547	11292	17150	33083	52412
21	311	708	1302	2717	5122	10471	15877	30621	48535
24	283	651	1217	2547	4811	9792	14829	28640	45393
27	269	623	1132	2406	4528	9226	13980	26998	42790
31	255	594	1075	2264	4302	8745	13273	25612	40611

Rubber hose maximum airflow rating: 1/2" I.D. rubber hose = 3/8" pipe; 3/4" I.D. rubber hose = 1/2" pipe