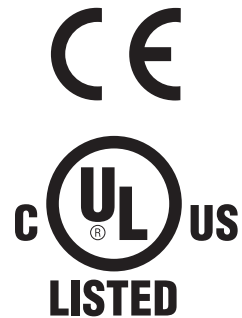




# OPERATION & SAFETY INSTRUCTIONS

## VORTEX A/C ENCLOSURE COOLER UL TYPE 4/4X

Models VA091604X, VA151604X, VA251604X



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

### Pentair Equipment Protection

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**TABLE 1: FILTER RECOMMENDATIONS**

FILTER AND REPLACEMENT PART ITEM NUMBERS		
Hoffman Model #	Oil Removal Filter	Replacement Generator Kits (5 pc)
VA091604X	VC-OF17	VAGK09
VA151604X	VC-OF17	VAGK15
VA251604X	VC-OF25	VAGK25

**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

## GENERAL SAFETY CONSIDERATIONS

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

1. Do not operate a Vortex A/C at compressed air pressures above 150 psig (10.3 bar).
2. Do not operate a Vortex A/C at line temperatures above 110°F (43°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

A Vortex A/C enclosure cooler is designed to use filtered compressed air to cool industrial control cabinets without the use of any refrigerants. Hot air in the cabinet is vented to the surroundings through a built-in vent in the Vortex A/C. Noise generated by the Vortex A/C is comparable to normal speech levels. The Vortex A/C has a built-in mechanical thermostat that requires no electricity. To operate, simply install on your enclosure and connect the compressed air source.

## COMPRESSED AIR SUPPLY

The compressed air supply must be filtered (5 micron maximum) to remove water and dirt. A 5 micron filter is supplied for this purpose (Hoffman model VAAF15 or VAAF25). If oil is present in the compressed air supply, remove the oil using an optional 0.01 micron coalescing filter (Hoffman model VC-OF17 or VC-OF25). Filter recommendations are 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 Hoffman product. Please refer to Table 2 to determine what supply line size is recommended for your application. Contact Pentair Equipment Protection for assistance, phone #763.422.2211.

## INTERNAL CABINET PRESSURE

The Vortex A/C, when operating at 100 psig (6.9 bar), will maintain the internal enclosure pressure at approximately 35" (889 mm) of water column. When the Vortex A/C is not cooling (when the thermostat senses acceptable temperatures), the Vortex A/C is not pressurizing the enclosure. If you desire a constant positive internal enclosure pressure, even when the Vortex A/C is not cooling, this may be accomplished by removing a set screw that is adjacent to the mechanical thermostat on the bottom of the unit. By removing this set screw with a 3/32" (2 mm) hex key), a small amount of air (3 cfm or 85 lpm) will pressurize the sealed enclosure to approximately 1.5" (38 mm) water column. This "pressurization air" will run continuously, regardless of the thermostat operation, until the set screw is re-installed.

## MAINTENANCE

The only maintenance involved with the Vortex A/C is normal element changes to the compressed air filter. The filter element should be changed when there is a noticeable decrease in performance or when pressure drop across the filter exceeds 5 psig (0.3 bar). The Vortex A/C has only one moving part (the mechanical thermostat/valve) which is not serviceable in the field. Do not disturb the setting of the thermostat. Evidence of tampering with the thermostat may void the warranty.

If it is suspected that the compressed air filter has not been maintained after an extended period of operation, there may be dirt in the Vortex A/C. If the Vortex A/C 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 outlet of the Vortex A/C and unscrew (with a 1" (25 mm) open end wrench) the cold air outlet. Remove the O-ring. Remove the white nylon washer(s). Then remove the red (model VA091604X) or the blue (model VA151604X) or the brown (model VA251604X) generator. Inspect the six slots in the generator for dirt and clean if necessary. Clean the cavity in the Vortex A/C that the generator was located in if necessary. Reassemble in reverse order. Tighten the 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 Vortex A/C.

## INSTALLATION

To maintain the UL Type 4 and 4X rating, the 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 and vertical orientation, on a flat horizontal surface (as shown)
  - b. Side mounted, on a flat vertical surface of the enclosure, with the compressed air inlet pointing upward, or with the stainless steel shroud facing downward to the floor.
1. Position the Vortex A/C on the top or side of your enclosure so that there is sufficient clearance for the internal mechanical thermostat and cold air outlet, and, so that the entire mounting "footprint" of the Vortex A/C is supported by the enclosure. (A 4-3/4" wide x 3-3/8" deep (121 mm wide x 86 mm deep) area). Position the unit so that the metal shroud on the back of the Vortex A/C is away from personnel, if possible. Also, position so that no internal enclosure components obstruct air flow around the mechanical thermostat.
  2. Cut a 1-15/16" (49 mm) diameter hole (1-1/2" knockout size) in the selected location on the enclosure. De-burr any sharp edges around this hole.
  3. Remove the 1-1/2" electrical locknut from the Vortex A/C. Insert the threaded portion of the Vortex A/C into the 1-15/16" (49 mm) hole in the enclosure. (Be careful not to damage the mechanical thermostat during installation.)
  4. From inside the enclosure, screw the electrical locknut onto the threads of the Vortex A/C. Tighten the locknut securely to compress the 1/8" (3 mm) thick sealing gasket that is positioned between the enclosure and the Vortex A/C.

5. Determine a suitable location for the Cold Air Muffler inside the enclosure that is close to the cold air outlet of the Vortex A/C. (You will need a surface area of approximately 2" x 9" (50 mm x 229 mm) to mount the muffler. The Muffler can be mounted in any orientation, horizontal or vertical.) Using the supplied Muffler Mounting Clamp (with double sided tape), attach this Clamp at the desired location. Clean the mounting surfaces so that the double sided tape bonds securely. If desired, this Clamp can be permanently mounted to the enclosure using the supplied mounting hardware. Two 5/32" (4 mm) diameter holes positioned on 3/4" (19 mm) centers must be drilled to mount the Muffler Clamp. Use the plastic snap rivets to secure the Muffler Clamp to the panel.
6. Snap the Cold Air Muffler into the Mounting Clamp.
7. Cut a sufficient length of the 1/2" (13 mm) inside diameter vinyl tubing from the supplied VADK124X Cold Air Ducting Kit to connect the cold air outlet of the Vortex A/C to one of the hose barbs on the Cold Air Muffler. Attach this length of vinyl tubing so that it is free of sharp bends and kinks. Direction of cold air flow through the Muffler is not important.
8. Attach all (or a portion of) the remaining supplied vinyl tubing of the VADK124X Cold Air Ducting Kit to the opposite hose barb connection 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, at least sixteen 1/8" (3 mm) diameter holes should be 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.
9. Connect the compressed air filter (model VAAF15 or VAAF25) to the compressed air inlet on the side of the Vortex A/C with a short length of 3/8" pipe. Allow the filter to hang at the side of the enclosure as shown in the installation drawing. Use a 13/16" (21 mm) wrench to hold the air fitting on the side of the Vortex A/C stationary while tightening the pipe connections. Note the air flow direction arrow on top of the filter.
10. Connect the compressed air supply to the inlet of the air filter. See "Compressed Air Supply".

## OPERATION

Operate the Vortex A/C at 90 to 100 psig (6.2 to 6.9 bar) compressed air pressure. Do not operate at pressures above 150 psig (10.3 bar). Operation at pressures less than 90 psig (6.2 bar) and above 100 psig (6.9 bar) can affect the "on" and "off" temperatures at which the unit cycles. The Vortex A/C will cycle on and off to maintain temperatures between 80° to 90°F (27° to 32°C). The Vortex A/C will not work properly at pressures below 70 psig (4.8 bar).

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

## TROUBLESHOOTING

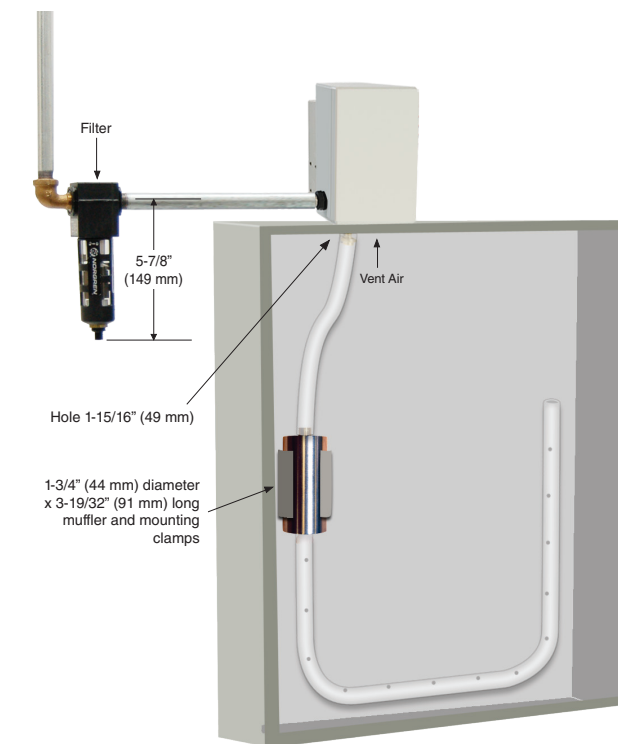
Insufficient cooling may be caused by the following:

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 cleaning.

If trouble persists, please contact Pentair Equipment Protection for assistance, phone #763.422.2211.

## LIMITED WARRANTY

Pentair Equipment Protection products will be replaced or repaired if found to be defective due to manufacture within one year from the date of invoice. Pentair makes no specific warranty of merchantability or warrant of fitness for a particular purpose.



**VORTEX A/C TYPE 4/4X**  
(SHOWN TOP MOUNTED ON CUSTOMER'S ENCLOSURE)