Two-Stage Cooling (continued)

primary source of heat within the enclosure (PLC's, VFD's, transformers, etc.), and the second stage ducting could be drilled (as described earlier) and routed for overall distribution of cold air throughout the panel. This configuration might allow the first cooler to mitigate the heat load, reducing the need or operating time for the unit to run at full cooling capacity and conserving energy. Or, you may want to direct the cold air flow from the first stage outlet to a heat sensitive component in the cabinet to ensure maximum thermal protection of that component.

Sealing out Dust and Debris

The Vortex A/C, when operating at 100 psig, will maintain your internal enclosure pressure at approximately 35" of water column. When the Vortex A/C is not cooling (when the thermostat senses acceptable temperatures), the Vortex A/C is not pressurizing your 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 the set screw that is adjacent the mechanical thermostat on the bottom of the each unit. By removing the set screw (with a 3/32" hex key), a small amount of air (3 scfm per unit) will pressurize your sealed enclosure to approximately 1.5" 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 10 psig.

The Vortex A/C has only two moving parts (the mechanical thermostat/valves) which are not serviceable in the field. There are no other user serviceable items. Do not disturb the setting of the thermostats. Evidence of tampering with the thermostats may void the warranty.

If it is suspected that the compressed air filter has not been maintained after an extended period of operation and the 7770 is not cooling sufficiently, there may be dirt in the "generators" of the unit. To check, pull the 1/2" ID vinyl tubing off the cold air outlets of the 7770 and unscrew the cold air outlets with a 1" open-end wrench. Remove the O-Rings. Remove the white nylon washers and the brown generators. Inspect the six slots in the generators for dirt and clean if necessary. The slots should be clean and smooth. Clean the cavities in the Vortex A/C that the generators were located in, if necessary. Reassemble in the reverse order of disassembly. Tighten the cold air outlet fittings to 100 in-lbs. Ensure a supply of clean (filtered to 5 micron) and oil free compressed air to the unit.

Limited Warranty

The Vortex A/C enclosure cooling product 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 itwvortec.com for full warranty details and limitations. ITW Air Management makes no specific warranty of merchantability or warrant of fitness for a particular purpose.

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VORTEX A/C

Models 7770, 7770BSP
Two-Stage Cooler, 5000 BTUH
UL Type 4, 4X

Operation & Safety Instructions

General Safety Considerations

Warning – 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.

VORTEC

IMPORTANT
Please read all instructions BEFORE attempting to operate this product.

Introduction

The Vortex A/C is designed to use filtered compressed air to cool industrial control cabinets without the use of any refrigerants. The Vortex A/C converts the filtered compressed air into a low pressure refrigerated air stream that is distributed throughout the user's enclosure, or, directed to heat sensitive components. Hot air in the cabinet is vented to the surroundings through built in vents in the Vortex A/C. Noise generated by the Vortex A/C is comparable to normal speech levels. The Vortex A/C has built in mechanical thermostats that require no electricity. Simply install on your enclosure and connect the compressed air source…nothing else is required.

Installation

To maintain the UL type 4 and 4X rating, the Vortex A/C must be installed on the top of the NEMA 4/4X enclosure on a flat horizontal surface, or, can be installed on the side of the enclosure, on a flat vertical surface. If installed on the side of the enclosure, the compressed air inlet of the model #7770 must be pointing down to the floor to maintain the NEMA 4/4X rating.

1. Position the model # 7770 on the enclosure so that there is sufficient clearance for the internal mechanical thermostats and cold air outlets, and so the entire mounting "footprint" of the 7770 is supported by the enclosure (9 1/2" wide x 3 1/2" deep.) 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 thermostats. If side mounted, position the Vortex A/C so that it is near the top of the enclosure.

2. Cut two 1 15/16" diameter holes (1 1/2" knockout size) on 4" centers in the selected location on the flat surface of the enclosure. Debur any sharp edges around these holes.

3. Remove the two 1 1/2" electrical locknuts from the 7770. Insert the threaded portions of the Vortex A/C into the 1 15/16" holes in the enclosure. (Be careful not to damage the mechanical thermostats during installation.)

4. From inside the enclosure, screw the two 1 1/2" electrical locknuts onto the threads of the 7770. Tighten the locknuts securely to compress the 1/8" thick sealing gaskets that are positioned between your enclosure and the unit.

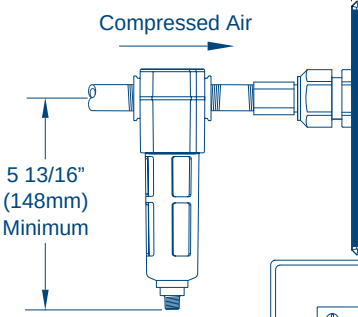
5. Determine a suitable location for the two Cold Air Mufflers inside your enclosure that are close to the cold air outlets of the 7770. (You will need a surface area of approximately 2" x 9" to mount each muffler.) The Mufflers can be mounted in any orientation-horizontal or vertical. Attach the Muffler Mounting Clamps at the desired locations using the supplied mounting hardware or double-sided tape. Snap the Cold Air Mufflers into the Mounting Clamps.

6. Cut a sufficient length of the 1/2" I.D. vinyl tubing from the supplied #701M-43 Cold Air Ducting Kits to connect the cold air outlets of the 7770 to the hose barbs on the Cold Air Mufflers. Attach these lengths of vinyl tubing so they are free of sharp bends and kinks. The direction of cold air flow through the mufflers is not important.

7. Attach the remaining supplied vinyl tubing, as needed, onto the opposite hose barb connection on the Cold Air Muffler. Holes can be punched or drilled into this 1/2" tubing to distribute the cold air evenly inside your enclosure, or the entire cold air output can be directed to specific components (see "Two-Stage Cooling"). If the end of the 1/2" vinyl tubing is plugged, at least 16 holes (1/8" diameter) should be punched into each piece of tubing to allow the cold air to escape. Use the self adhesive tubing clips provided in the kits to mount the tubing.

8. Connect the compressed air filter (model 701S-36A) to the compressed air inlet on the Vortex A/C with a short length of 3/8" pipe (and a 3/8" pipe elbow if the unit is side mounted). The filter must be positioned so that it is vertical, with the condensate drain opening at the bottom, regardless of the position of the Vortex A/C. Use a 13/16" wrench to hold the air fitting on the Vortex A/C stationary while tightening the pipe connections. Note the air flow direction arrow on top of the filter.

9. Connect the compressed air supply to the inlet of the air filter. See "Compressed Air Supply" and "Pipe Size Requirements" below.



Compressed Air Supply

The 7770 may require up to 70 scfm of compressed air at 90 to 100 psig when both stages of the unit are engaged. The compressed air supply must be filtered (5 micron maximum) to remove water and dirt. A 5 micron filter is supplied for this purpose (Vortec model 701S-36A). If oil is present in the compressed air supply, remove the oil using an optional 0.01 micron coalescing filter (Vortec model 701S-54). If an oil removal filter is necessary, install it downstream of the 5 micron filter. Change the filter elements as needed (see maintenance).

Pipe Size Requirements

Supply compressed air to the Vortex A/C with 3/8" schedule 40 pipe, if the pipe length from the main header is no longer than 10 feet. If pipe length exceeds 10 feet but is less than 30 feet, use 1/2" size pipe. If pipe length exceeds 30 feet but is less than 100 feet, use 3/4" size pipe. Use appropriate pipe reducing fittings when terminating the supply pipe at the Vortex A/C (both the 7770 and the 701S-36S compressed air filter have 3/8"-18 female NPT inlets).

Operating Pressure / Operation

Operate the Vortex A/C at 90 to 100 psig compressed air pressure. Do not operate at pressures above 150 psig. Operation at pressures less than 90 psig and above 100 psig will affect the factory-set "on" and "off" temperature points when the unit cycles. The Vortex A/C will cycle on and off to maintain temperatures between 80 to 90 degrees F (when operated at 100 psig). Pressures greater than 100 psig will delay the unit turning on until higher enclosure temperatures are reached; pressures less than 90 psig will allow the unit to cycle on at lower temperatures. Excessively low pressure will prevent the unit from cycling off.

Two-Stage Cooling

Under normal operation, the first stage cooler (the cold outlet that is nearest to the compressed air inlet) will activate first. This will either reduce the rate of temperature rise in the enclosure, or it will begin to reduce the enclosure temperature, depending on the total heat load in the enclosure. If the total heat load is significant and the temperature continues to rise, the second stage cooler will activate, doubling the amount of cooling air. In locating the two cold air outlets of the model 7770, consideration should be given to the two-stage cooling capability of the unit. The dual cold air outlets and ducting tubes provide for increased flexibility in directing refrigerated air in the cabinet. For example, the first stage cooler's output could be directed at a

Front View