



Supreme Air Products Corp. The next generation of compressed air products do more, and do it better.

Vortex Tube

Installation & Maintenance Guide

Vortex Tubes are an effective, low cost solution to a wide variety of industrial spot cooling and process cooling needs. With no moving parts, and no refrigerants, the vortex tube spins compressed air to separate the air into cold and hot air streams.



Version 1.0



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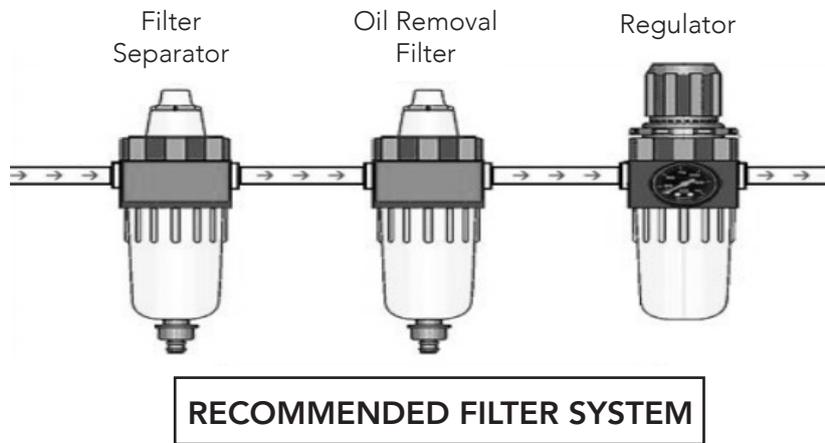
01 How to maintain optimal performance

02 Recommended Hose Runs

01 How to maintain optimal performance

A clean dry source of compressed air is the single most important aspect to achieve the optimal performance of your Vortex Tube. Filtration to keep clean air is necessary at the rate of 25 microns or less.

The performance of your Vortex Tube deteriorates with back pressure on the cold air exhaust. Low back pressure, up to 2 PSIG (.1 BAR), will not change performance. 5 PSIG (.3 BAR) will change performance by approximately 5°F (2.8°C). Mufflers for both the hot and cold air discharge are available. Normally, muffling is not required if the cold air is ducted.



02 Recommended Hose Runs

Your compressed air lines should be properly sized to keep pressure drops to a minimum. Fittings such as 'quick connects' should not be used as they can be restrictive. The following gives suggested compressed air line sizes for hose & pipe:

SMALL Vortex Tubes

(Model VT02B, VT04B, VT08B, VT02C, VT04C, VT08C)

| LENGTH OF RUN | SIZE OF PIPE/HOSE |
|---------------|--------------------------------|
| 1 - 10ft | Use 1/8" pipe or 1/4" air hose |
| 10 - 50ft | Use 1/4" pipe or 3/8" air hose |
| 50 - 100ft | Use 1/4" pipe or 3/8" air hose |

MEDIUM Vortex Tubes

(Model VT10B, VT15B, VT25B, VT30B, VT40B, VT10C, VT15C, VT25C, VT30C, VT40C)

| LENGTH OF RUN | SIZE OF PIPE/HOSE |
|---------------|--------------------------------|
| 1 - 10ft | Use 1/4" pipe or 3/8" air hose |
| 10 - 50ft | Use 3/8" pipe or 1/2" air hose |
| 50 - 100ft | Use 1/2" pipe or 5/8" air hose |

03 Using the Vortex Tube

Both the B & C Vortex Tube will produce a number of flow rates which are determined by an internal brass part called the 'generator'. Each generator will be marked with a number followed by a 'C' or 'B' (ex. 25B, 15B, 2B, etc).

- The 'C' provides the lowest cold air temperatures, but at a lower cold airflow. These are typically used in applications such as component testing, cooling parts, gas or liquid samples to subzero temperatures. They will produce temperatures 45°C to 70°C (113°F to 158°F) below compressed air supply temperature.

NOTE: The cold end could plug up if a temperature drop greater than 28°C (50°F) is desired.

- The 'B' optimizes airflow and temperature drop to produce maximum cooling power or Btu/hr. (Kcal/hr). These are used for most applications producing temperatures down to -18°C (0°F). By setting the Vortex Tube to 39°C (71F) below compressed air supply temperature will be a 70% cold fraction, essentially meaning that 70% of the air will exhaust out the cold end. Please refer to the 'Specifications' area under 'Vortex Tubes Systems' at www.supremeairproducts.com for additional details.

** The Vortex Tube will have one generator that has been pre-installed from the factory. If you require a different capacity, other generators can be purchased.

04 Using the Vortex Tube

To set your Vortex Tube to the desired temperature simply insert a thermometer at the cold end and adjust the slotted valve at the hot air exhaust. Closing this valve will increase cold air flow at cold end, but with less cold air. Opening the valve will decrease cold air flow at cold end, but produce more cold air.

The optimum cooling will be reached when the difference from the cold air and compressed air temperature drop is 28°C (50°F); if the inlet air is say 45°C (80°F).

05 Troubleshooting & Maintenance

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If your Vortex Tube is not performing up to par, check for these common problems:

1. **No Cold Flow** – If you set your Vortex Tube to more than 28°C (50°F) drop from compressed air supply temperature, the cold end could freeze up; therefore blocking the cold end exhaust. See the following:
 - (a) Turn off Vortex Tube for 5 to 10 minutes; it will thaw.
 - (b) Turn off Vortex Tube and blow compressed air into the cold end.
 - (c) Use dry air with an atmospheric dew point of -40° or less.
2. **Back Pressure** – Back pressure over 2 PSIG (0.1 BAR) will reduce the performance of the Vortex Tube. A 5 PSIG (0.3 BAR) will affect performance by approximately 2.8°C (5°F). If ducting is used on the cold air exhaust, ensure that the total cross-sectional area is equal to or greater than the area of the cold end exhaust on the Vortex Tube.
3. **Inlet Temperature** – The Vortex Tube will only drop the temperature based on the temperature from supply compressed air. Often times the compressed air supply temperature will be warmer than usual due to compressed air lines running near furnaces, across ceilings, direct sunlight, etc.
4. **Inlet Pressure** – Inlets pressures below 80 to 100 PSIG will cause poor performance. Restrictions in the compressed air supply lines will negatively affect performance and cause excessive pressure drops. Be sure to measure the PSIG (BAR) at the inlet of the Vortex Tube while operating.
5. **Cold Cap/Muffler Loose** – The cold muffler and cap will cause poor performance if loose. Ensure tight!!