OPERATION & SAFETY INSTRUCTIONS

VORTEX TUBES

Models 106, 208, 208SS, 308 and 328 series (Includes all BSP versions of models listed above)



IMPORTANT

Please read all instructions BEFORE attempting to use this product



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GENERAL SAFETY CONSIDERATIONS

WARNING: COMPRESSED AIR COULD CAUSE DEATH, BLINDNESS OR INJURY

- 1. Do not operate a Vortex Tube at compressed air pressures above 150 psig (10.3 Bar).
- 2. Do not operate a Vortex Tube 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 Tube is a device which, when supplied with filtered compressed air at 100 psig (6.9 Bar) and 70°F (21°C), converts the air into two streams. One stream is adjustable up to 250°F (121°C) and the other is adjustable down to -50°F (-48°C). Models ranging in air consumption from 2 SCFM to 100 SCFM are available.

Compressed Air Supply

The compressed air supply must be filtered to remove water and dirt using a 5 micron or smaller filter. Failure to use a filter may cause clogging (and freezing) of the compressed air paths inside the Vortec product. Filter recommendations are given in Table 1.

Filter elements must be changed on a regular basis. Frequency of change is determined by the condition of the compressed air supply. Filters should be installed in the compressed air supply line as close as possible to the Vortec product.

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.

When the desired cold air stream temperature is less than 32°F (0°C), a compressed air dryer may be necessary to prevent ice formation on the inside of the Vortec product.

Installation

Vortex Tubes can be installed by directly plumbing to the appropriately-sized, hard piped, compressed air source that does not exceed 150 psig (10.3 Bar).

Operation

Vortex Tubes vary in air consumption from 2 SCFM to 100 SCFM. For help in selecting the appropriate Vortex Tube for your exact need, contact your local distributor or Vortec.

The cold air temperature and volume can be changed by adjusting the valve at the hot end of the Vortex Tube. Turning the valve counterclockwise will decrease the temperature and volume of cold air. Correspondingly, the flow of hot air will increase but its temperature will decrease.

Maximum refrigeration (cooling capacity) is created when the valve is adjusted to produce 60 to 70% cold air flow and 30 to 40% hot air exhaust.

Maintenance

Vortex Tubes have no moving parts and can be disassembled for cleaning. When reassembling the Vortex Tubes, be sure to tighten the cold cap to 100 inch pounds of torque.

Troubleshooting

Insufficient airflow may be caused by the following:

- 1. Undersized compressed air line size.
- 2. Compressed air pressure too low.
- 3. Partial or complete blockage of internal compressed air path, due to dirt. See Maintenance section for cleaning instructions; and Compressed Air Supply section for filter recommendations.

Insufficient cold air temperature may be caused by:

- 1. Compressed air line temperature too high.
- 2. Water vapor in the compressed air supply.
- 3. Loose cold cap. This may occur if not tightened properly after disassembled for cleaning.

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

Limited Warranty

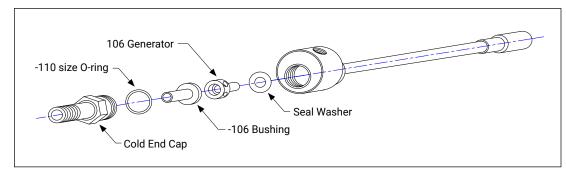
Vortec compressed air products manufactured by ITW Air Management will be replaced or repaired if found to be defective due to manufacture defect within ten years from the date of invoice.

Refer to our website **www.vortec.com** for full warranty details and limitations. ITW Air Management makes no specific warranty merchantability or warrant of fitness to a particular purpose.

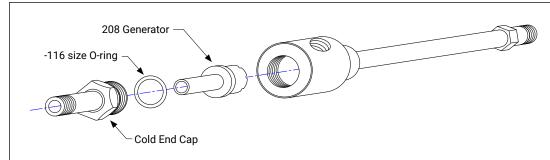
Vortex Tube Assembly

(Drawings shown below are not to scale)

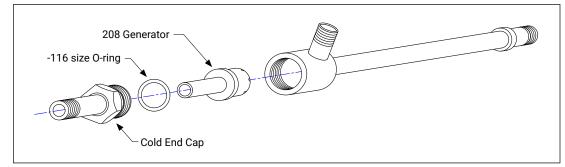
Model 106



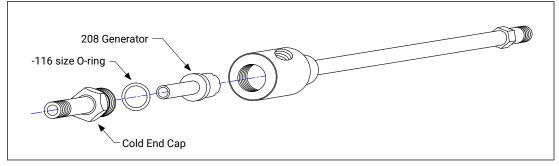
Model 208



Model 208SS



Model 308



Model 328

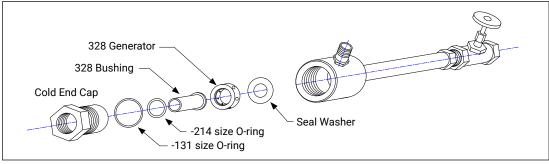


Table 1: Filter Recommendations

| FILTER AND REPLACEMENT PART ITEM NUMBERS | | | | | | | | | |
|--|------------------------|-----------------------|------------------|--|--------|---------------------------------------|--|--|--|
| Vortec Model | 5 micron Air Filter | Oil Removal Filter | Cold Air Muffler | Hot Exhaust Magnetic Muffler Mounting Base | | Replacement Generator Kits (5 pcs) | | | |
| 106 series | 701S-24A | 701S-48 | 106MC | 208MH | 620-26 | 106GK-2H, -4H, -8H | | | |
| 208 series | 701S-24A | 701S-48 | 208MC | 208MH | 620-26 | 208GK-11H, -15H, -25H | | | |
| 208SS | 701S-24A | 701S-48 | 208MC | 208MH | 620-26 | 208GK-11H, -15H, -25H | | | |
| 308 series | 701S-36A | 701S-54 | 208MC | 308MH | 620-26 | 208GK-35H | | | |
| 328-50-H | 701S-36A | 701S-54 | 328M | 328M | - | 328GK-50H* | | | |
| 328-75-H | 701S-40A | - | 328M | 328M | - | 328GK-75H* | | | |
| 328-100-H | 701S-40A | - | 328M | 328M | - | 328GK-100H* | | | |

^{*328} Generator Kits consist of one generator and one bushing of the indicated size.

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 | Pipe Size (Nominal) - Schedule 40 | | | | | | | | |
| (Feet) | 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 | | | | Pipe Size | (Nominal) - So | Nominal) - Schedule 40 | | | | | |
| (Meters) | 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