

FRIGID-X™ VORTEX TUBES

**Produce cold air as low as minus 50°F (minus 46°C) from compressed air with no moving parts
to spot cool or cool enclosures with no electricity**

WHAT ARE THEY - REASONS TO USE

Vortex Tubes are devices that work on a standard compressed air supply. Air enters the vortex tube and is literally split into two parts - cold air at one end, and hot air at the other - all without any moving parts.

Vortex Tubes have an adjustable valve at the "hot" end which controls the volume of the air flow, and the temperature exiting at the cold end. By adjusting the valve, you control the "cold fraction" which is the percentage of total input compressed air that exits the cold end of the Vortex Tube. Our Vortex Tubes may also be supplied with a fixed preset "cold fraction" instead of an adjustable valve.

Inside is the interchangeable brass "generator" which can alter the air used in the Vortex Tube, and control the temperature ranges you wish to have at the cold and hot ends. There are several ranges of generators for compressed air capacity. There are also two basic types of generators - one to produce the extreme cold temperatures (maximum cold temperature out called the C generator) and one type to produce the maximum amount of cooling (maximum refrigeration called the H generator).



WHY THE FRIGID-X™ VORTEX TUBE OVER OTHERS :

The Frigid-X™ Vortex Tube is constructed of stainless steel and uses a generator and valve made of brass and sealed with viton o-rings to allow their use in the widest range of environments. This also allows for greater life and better consistency between Vortex Tubes made. In addition, it is usable in high temperature environments AS IT COMES with NO extra charge unlike many of our competitors.

Most competitors use plastic generators and standard Buna N O-Rings and charge extra for brass and high temperature-rings. The unique design and quality of materials used in Frigid-X™ products will deliver years of maintenance-free operation.

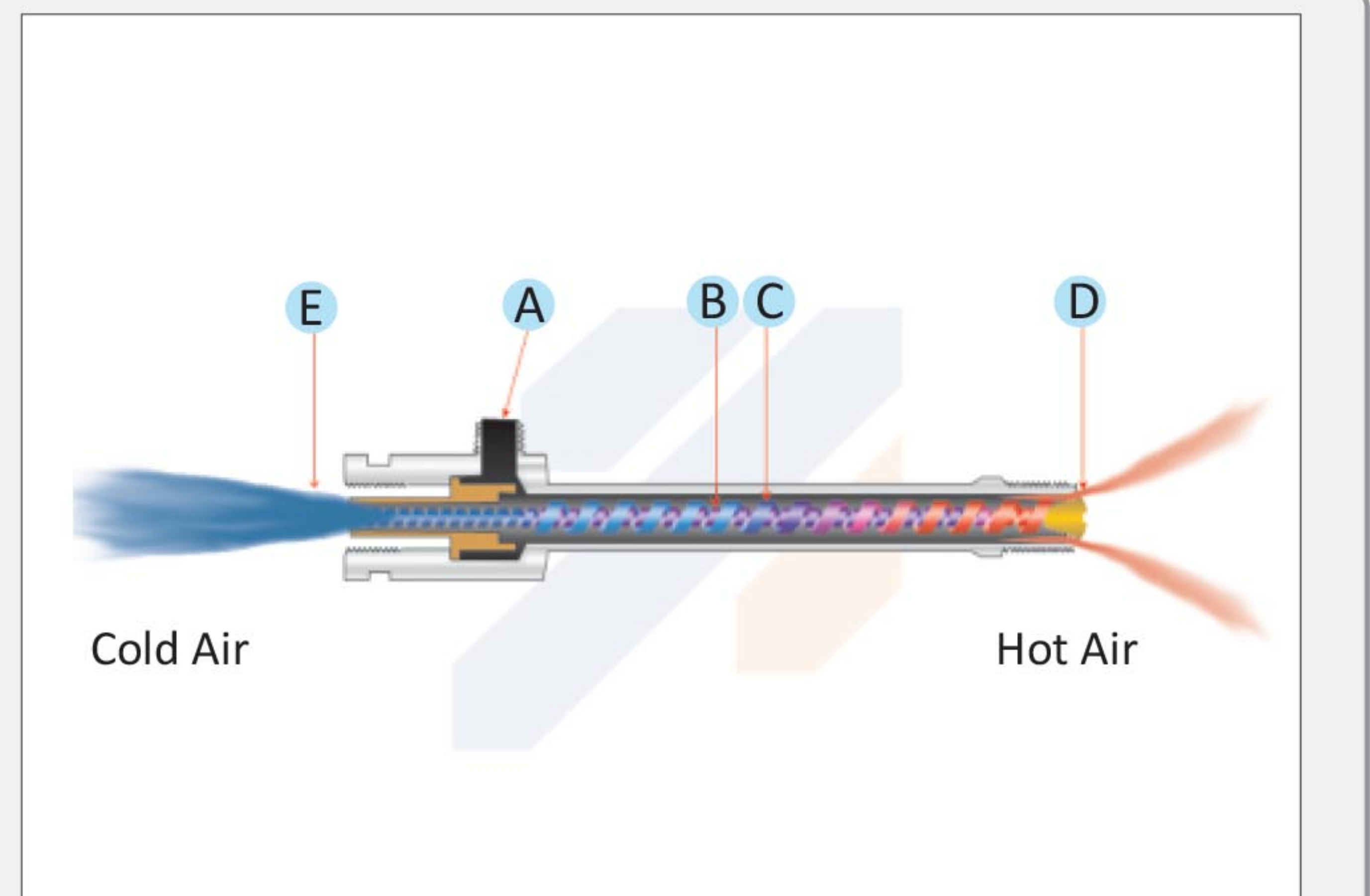
FRIGID-X™ VORTEX TUBE ADVANTAGES:

- ▶ No moving parts.
- ▶ Driven by air not electricity.
- ▶ Small and lightweight - portable.
- ▶ Low in cost compared to most others
- ▶ Superior design and performance
- ▶ Maintenance free operation
- ▶ Made of durable stainless steel and metal parts - no cheap plastic parts
- ▶ Adjustable temperature range
- ▶ Generators are interchangeable

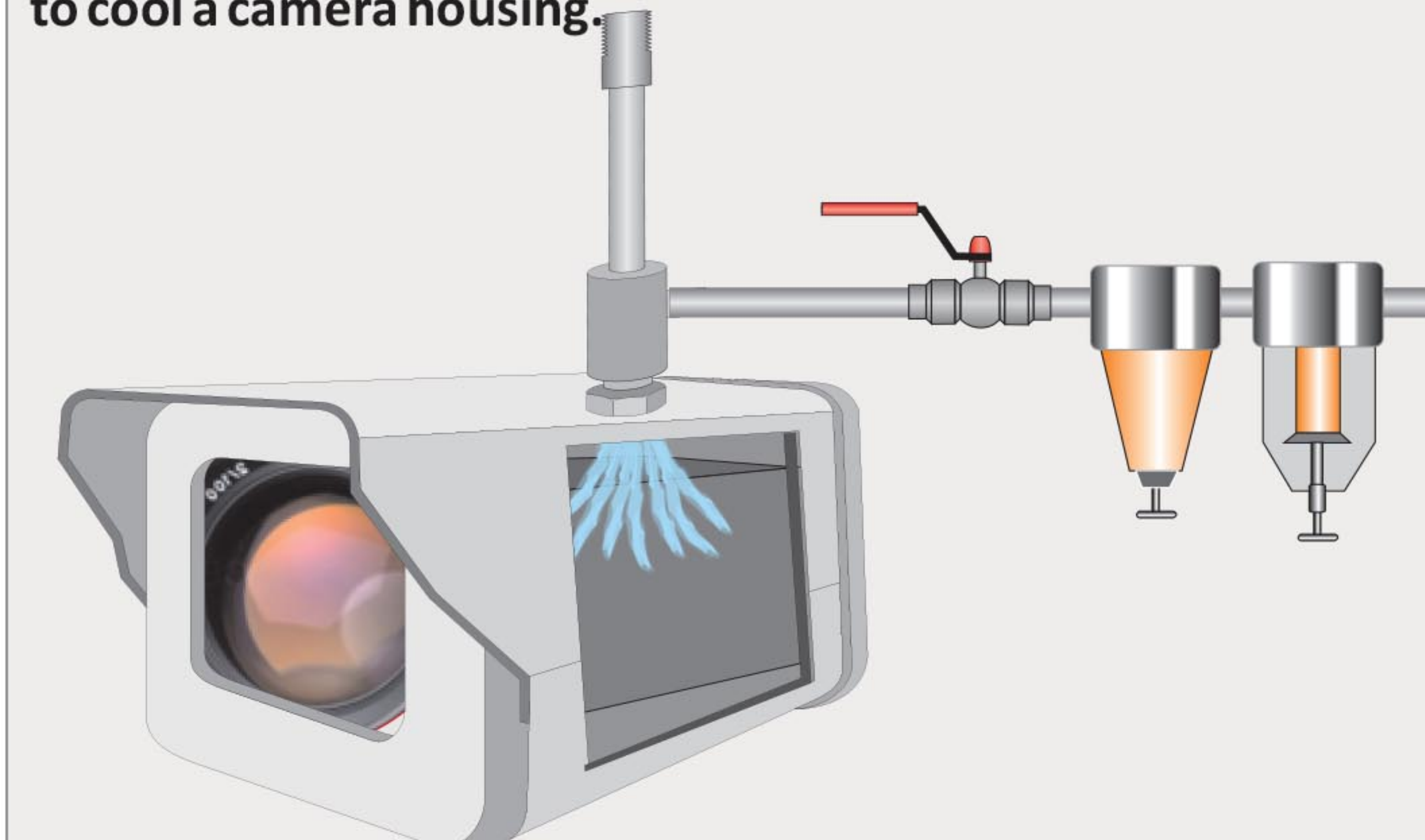


FRIGID-X™ VORTEX TUBE - HOW IT WORKS

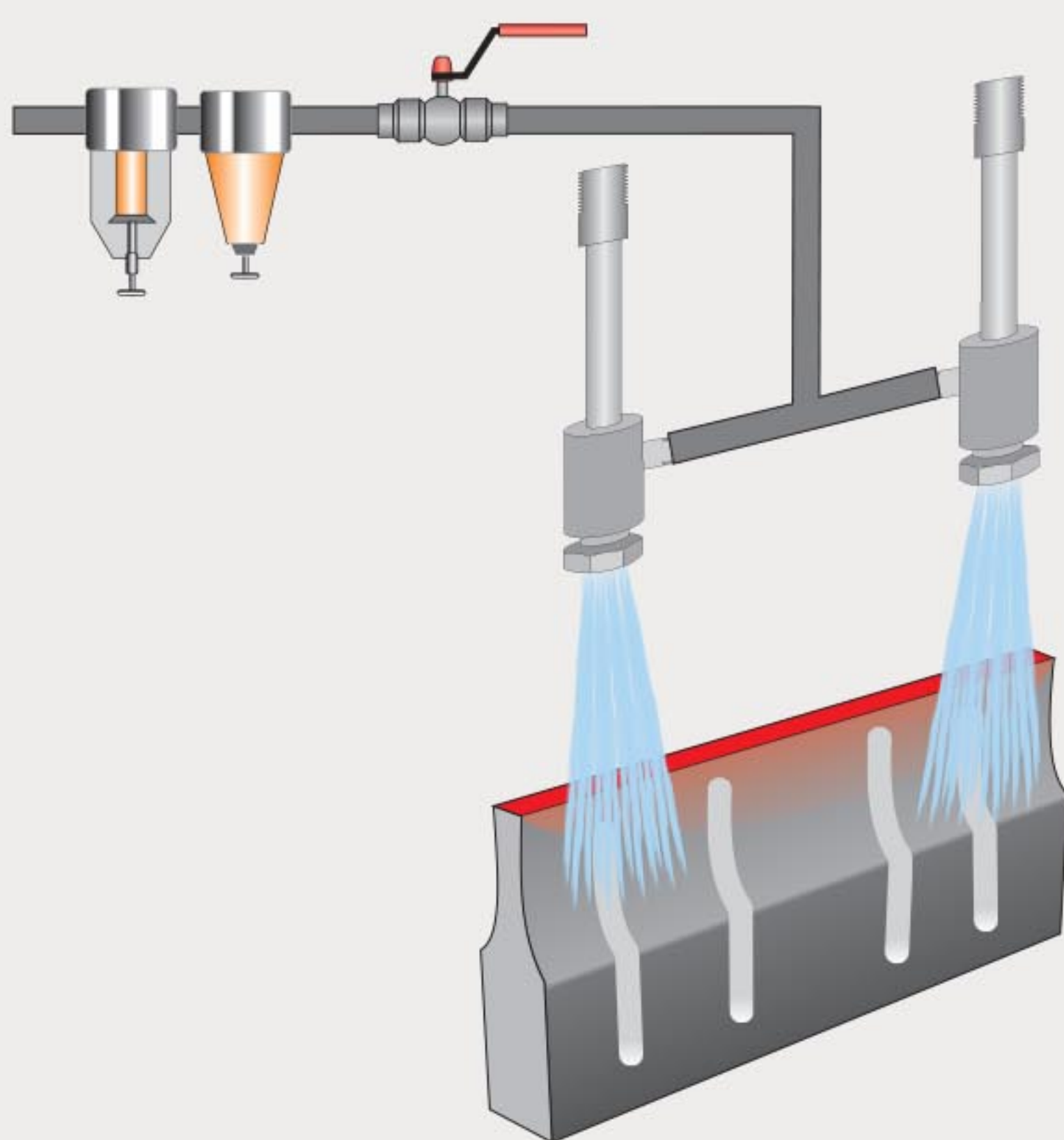
Compressed air enters at point (A). Inside the tube the compressed air is made to spin using a "generator". It travels in one direction along the small (hot end) tube and then back inside itself in the reverse direction creating one stream of air (B) and the second stream of air (C) in the opposite direction. The outside stream of air gets hot and exhausts at point (D). The center column of air gets cold and exists at point (E). Temperatures and capacities can vary by adjusting the hot end plug at (D) and by using different "generators"



Due to space limitation & the need to eliminate water cooling the camera, a Model 50025H Vortex Tube was used to cool a camera housing.

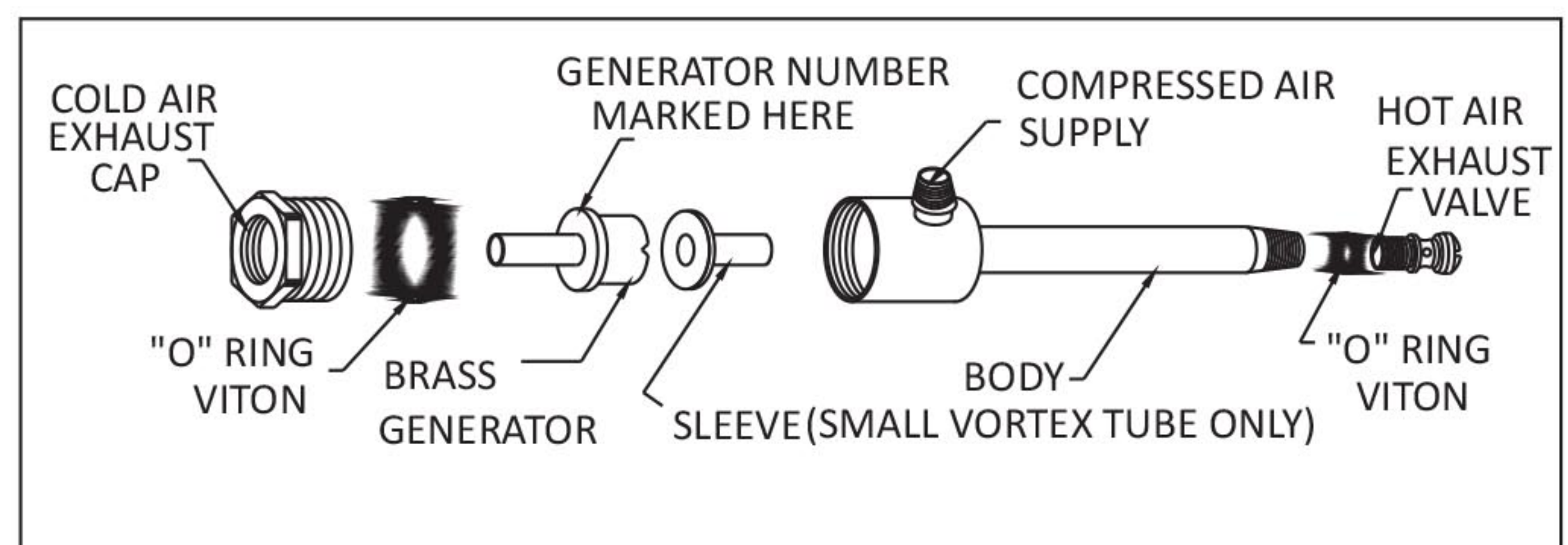


Two Vortex Tubes model 50030H with a Model 55002 Muffler cools and Ultrasonic Welding Horn.



FRIGID-X™ VORTEX TUBE EXPERIMENTAL KITS

Three Experimental Kits are available (Small Vortex Tube Kit, Medium Size Vortex Tube Kit and Large Vortex Tube Kit) which contains the appropriate Vortex Tube, all generators for that size, cold end muffler and filter with auto drain to do testing if you are not certain of what exact size you require.



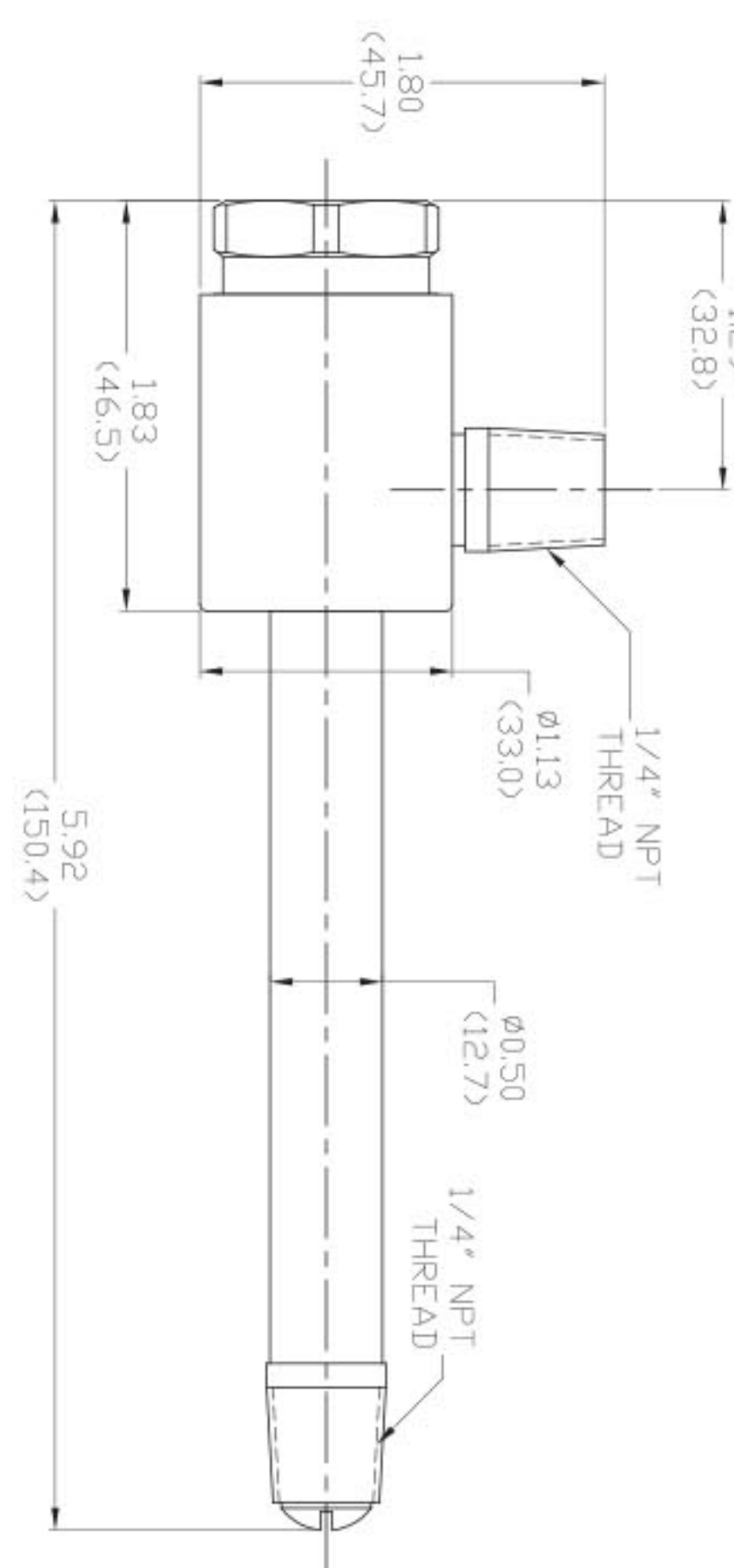
CONTROLLING THE FLOW RATE AND TEMPERATURE IN THE FRIGID-X™ VORTEX TUBE

The flow rate and temperature in a Vortex Tube are interdependent. When you open the adjusting valve at the hot end, the cold air flow decreases and the temperature drops. As you close the valve the cold air end flow increases and temperature rises. The percentage of the total input air that exits the cold end is termed the "cold fraction". Depending on inlet air temperature a cold fraction of between 60% and 80% produces the optimum combination of flow and temperature drop for maximum cooling effect, when using an H generator. Lower cold fractions produce colder air but do not cool as well because of reduced flow. Most industrial applications require the 60% to 80% setting and the H generator for optimal cooling.

In some instances such as cooling laboratory samples, testing circuit boards and other "cryogenic" applications, a 'C' generator is used which limits the cold end flow rate to lower levels and produces very cold temperatures.

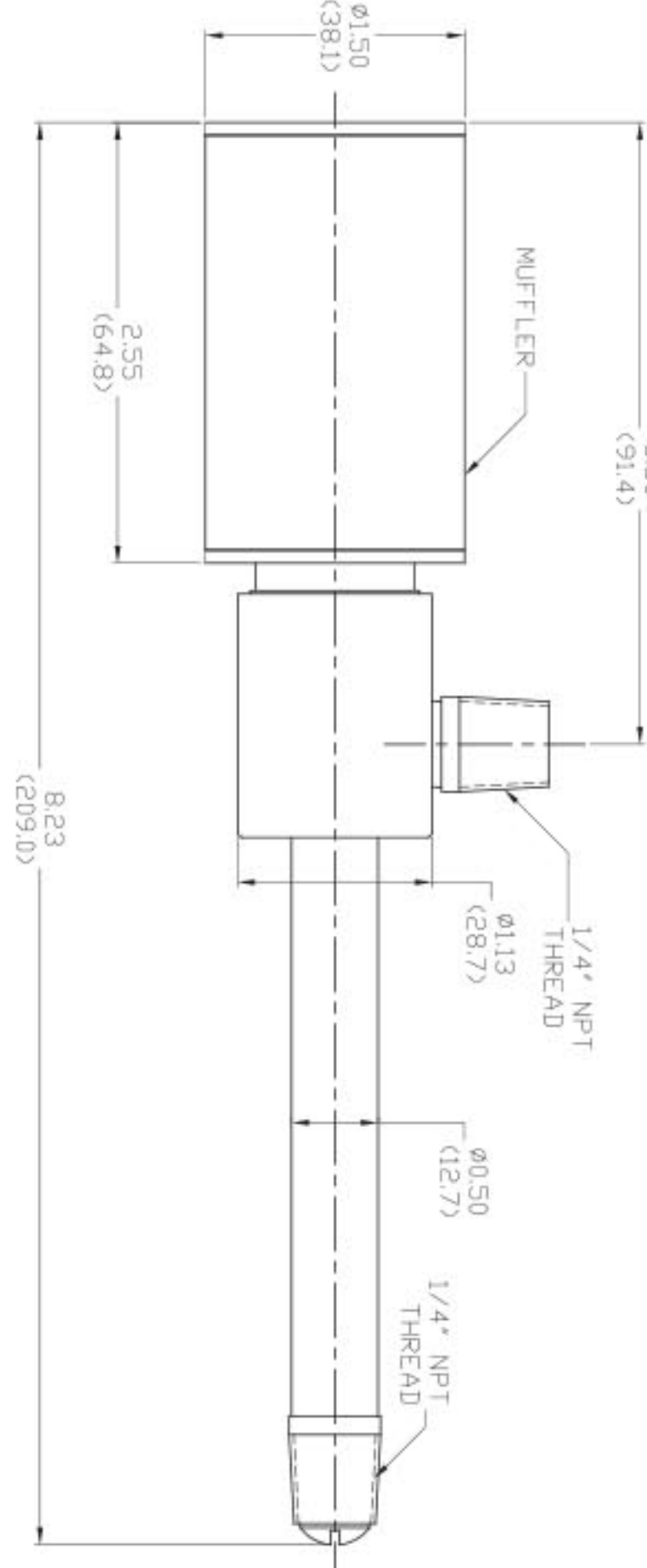
To set the Vortex Tube to the desired temperature simply insert a thermometer at the cold end and adjust the hot end valve. The optimum cooling effect is achieved when the difference from the inlet air temperature and the cold air drops is 50° F (28° C) if the inlet air is relatively cool to 80° F (45° C) below compressed air temperature if the inlet air is relatively hot.

There are three basic physical sizes of Standard Vortex Tubes used in industry - the small, medium and large version. Frigid-X™ Vortex Tubes can be selected by required performance in cooling for the 'H' generator versions and where very cold temperature is required, the 'C' generators are used. However, even with 'C' generators, as expected, the higher the are flow rating the greater any cooling effect.

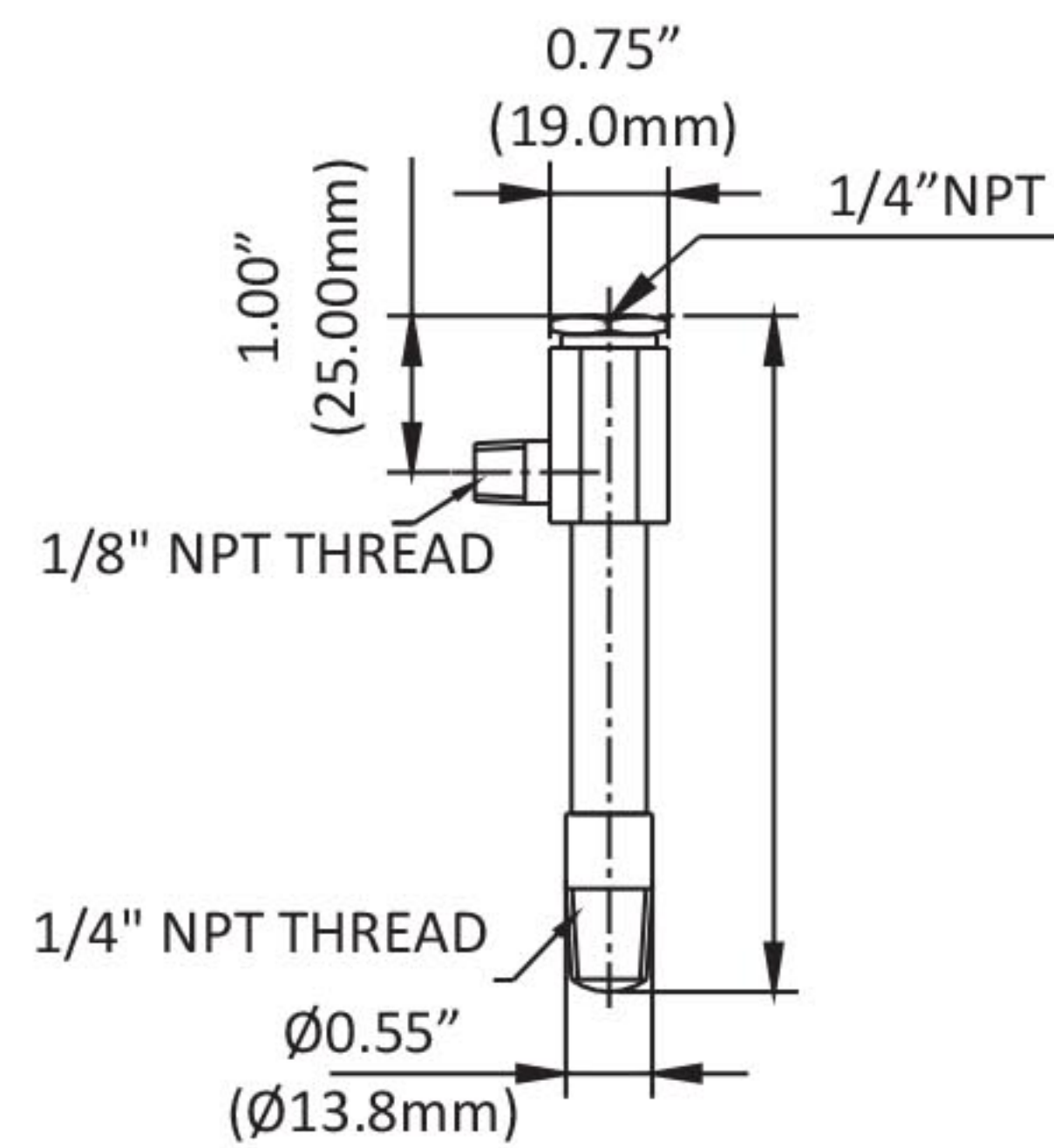


VORTEX TUBE MODELS
50010C- 50040C
50010H- 50040H
FLOW RATE:
10-40SCFM
(283-1133SLPM)

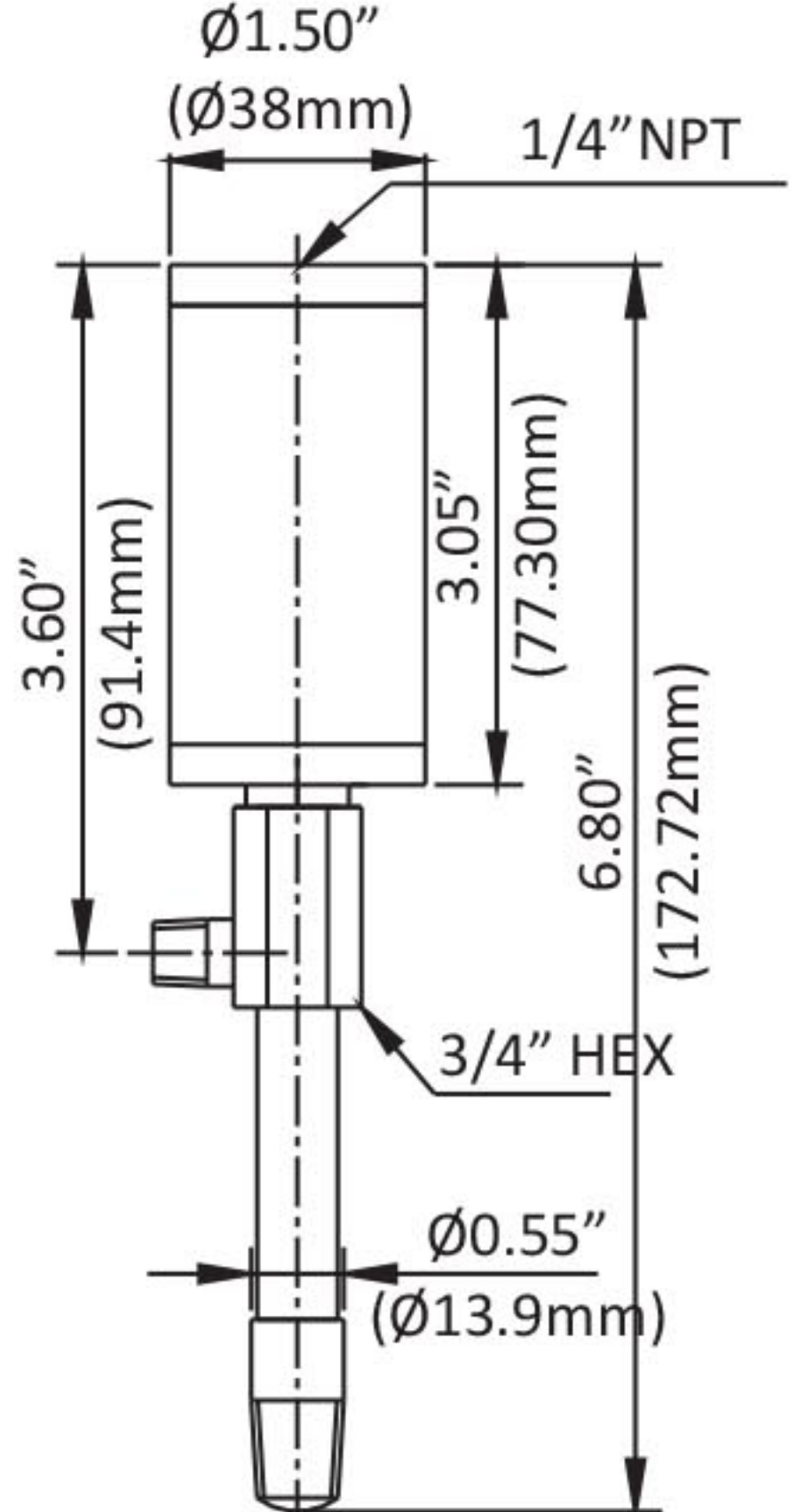
**ASSEMBLED
WITH COLD END
MUFFLER MODEL
NO: 55002**



VORTEX TUBE MODELS
50002C- 50008C
50002H- 50008H
FLOW RATE:
2-8 SCFM
(57-227 SLPM)

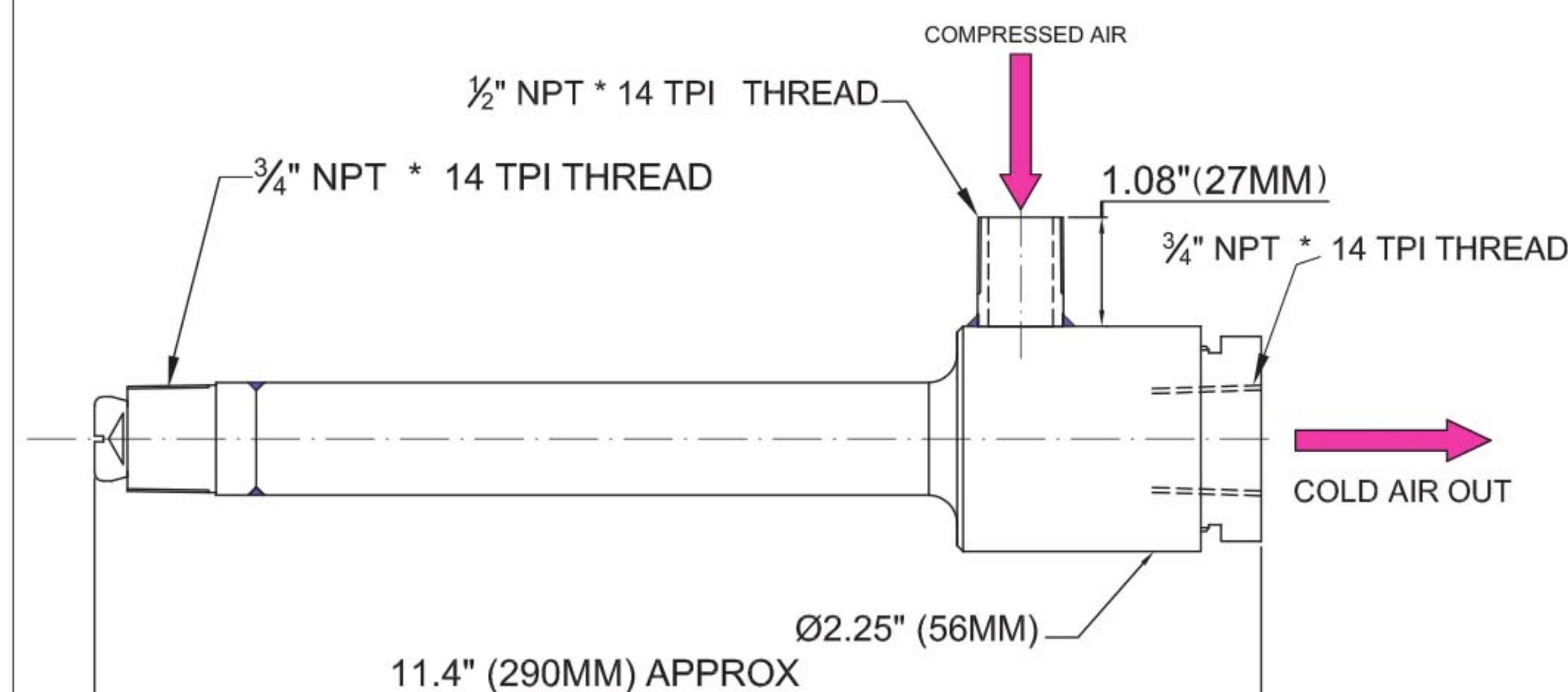


MINI VORTEX TUBE



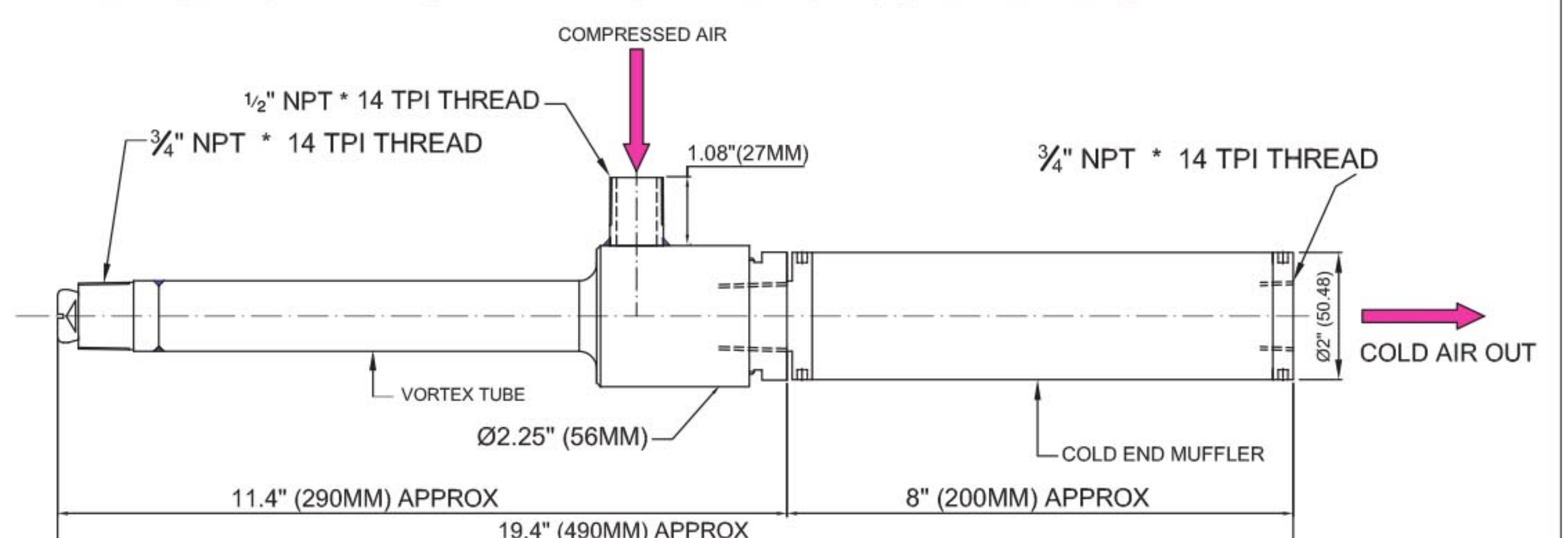
**ASSEMBLED WITH
COLD END MUFFLER
MODEL NO: 55001**

MEDIUM VORTEX TUBE



LARGE VORTEX TUBE WITH GENERATOR

LARGE VORTEX TUBE WITH GENERATOR COLD END MUFFLER



H series Vortex Tubes (For Maximum Cooling)

| MODEL NO. | SCFM | SLPM | BTU/Hr. | WATTS | SIZE |
|-----------|------|------|---------|-------|--------|
| 50002H | 2 | 57 | 145 | 42 | small |
| 50004H | 4 | 113 | 290 | 85 | small |
| 50008H | 8 | 227 | 580 | 170 | small |
| 50010H | 10 | 283 | 730 | 214 | medium |
| 50015H | 15 | 425 | 1100 | 322 | medium |
| 50025H | 25 | 708 | 1800 | 527 | medium |
| 50030H | 30 | 850 | 2100 | 615 | medium |
| 50040H | 40 | 1133 | 2900 | 849 | medium |
| 50050H | 50 | 1416 | 3700 | 1084 | large |
| 50075H | 75 | 2124 | 5400 | 1583 | large |
| 50100H | 100 | 2832 | 7100 | 2081 | large |
| 50150H | 150 | 4248 | 10800 | 3165 | large |

NOTE:

1. SCFM and SLPM at 100 PSIG or 6.9 bar Inlet Pressure
2. BTU/hr and Watts is Cooling Capacity at 100 PSIG or 6.9 bar inlet pressure and with optimal cold fraction setting

C series Vortex Tubes (For Maximum Cold Temperature)

| MODEL NO. | SCFM | SLPM | BTU/Hr. | WATTS | SIZE |
|-----------|------|------|---------|-------|--------|
| 50002C | 2 | 57 | N/A | N/A | small |
| 50004C | 4 | 113 | N/A | N/A | small |
| 50008C | 8 | 227 | N/A | N/A | small |
| 50010C | 10 | 283 | N/A | N/A | medium |
| 50015C | 15 | 425 | N/A | N/A | medium |
| 50025C | 25 | 708 | N/A | N/A | medium |
| 50030C | 30 | 850 | N/A | N/A | medium |
| 50040C | 40 | 1133 | N/A | N/A | medium |
| 50050C | 50 | 1416 | N/A | N/A | large |
| 50075C | 75 | 2124 | N/A | N/A | large |
| 50100C | 100 | 2832 | N/A | N/A | large |
| 50150C | 150 | 4248 | N/A | N/A | large |

NOTE:

1. SCFM and SLPM at 100 PSIG or 6.9 bar Inlet Pressure
2. BTU/hr and Watts not applicable as normally not used for air conditioning applications

Approximate temperature drops (and rises) from inlet air temperature produced by a Vortex Tube set at various cold fractions. Assume constant inlet pressure and temperature. Tests were conducted with a 15H generator in a medium size Vortex Tube (Model 50015H). Will vary with other sizes and capacities.

| PRESSURE SUPPLY | COLD FRACTION % | | | | | | |
|-----------------|-----------------|----------|----------|----------|----------|----------|-----------|
| PSIG (BAR) | 20 | 30 | 40 | 50 | 60 | 70 | 80 |
| 20 (1.4) | 62 (34) | 60 (33) | 56 (31) | 51 (28) | 44 (24) | 36 (20) | 28 (16) |
| | 15 (8) | 25 (14) | 36 (20) | 50 (28) | 64 (26) | 83 (46) | 107 (59) |
| 40 (2.8) | 88 (48) | 85 (46) | 80 (42) | 73 (39) | 63 (34) | 52 (28) | 38 (20) |
| | 21 (11) | 35 (18) | 52 (28) | 71 (38) | 92 (50) | 117 (62) | 147 (80) |
| 60 (4.1) | 104 (57) | 100 (55) | 93 (51) | 84 (46) | 73 (40) | 60 (33) | 46 (25) |
| | 24 (14) | 40 (22) | 59 (33) | 80 (44) | 104 (57) | 132 (73) | 166 (92) |
| 80 (5.5) | 115 (63) | 110 (62) | 102 (56) | 92 (51) | 80 (45) | 66 (36) | 50 (28) |
| | 25 (14) | 43 (24) | 63 (35) | 86 (47) | 113 (63) | 143 (80) | 180 (100) |
| 100 (6.9) | 123 (68) | 118 (65) | 110 (61) | 100 (55) | 86 (48) | 71 (39) | 54 (30) |
| | 26 (14) | 45 (25) | 67 (37) | 90 (50) | 119 (66) | 151 (84) | 191 (106) |
| 120 (8.4) | 129 (72) | 124 (69) | 116 (64) | 104 (58) | 91 (50) | 74 (41) | 55 (31) |
| | 26 (14) | 46 (26) | 69 (38) | 94 (52) | 123 (68) | 156 (86) | 195 (108) |

Temperature drop of cold air,
°F (°C) in blue

Temperature rise of hot air,
°F (°C) in red

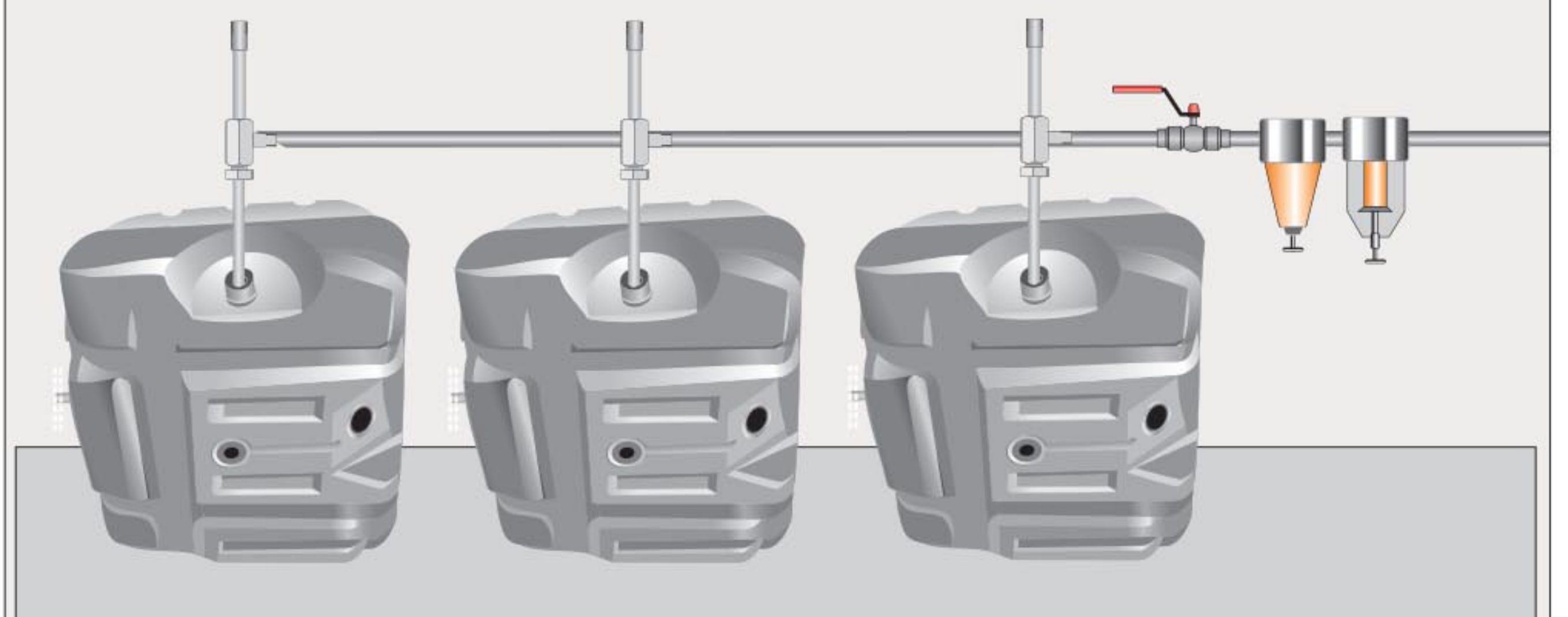
USING THE VORTEX TUBE :

Back pressures over 2 psig (0.1 bar) can reduce the performance of a Vortex Tube. Similarly it is important to use a minimum of 25 micron or less filtration to keep the air clean and dry. Vortex tubes alone without ducting can be noisy so mufflers are available for both the cold end and hot end. All of our Vortex Tubes are built to be used in even high temperature environments at no extra cost.

VORTEX TUBE THEORIES :

There are many theories of the Vortex Tube also known as the Ranque Vortex Tube, the Hilsch Tube, Maxwell's Demon Tube, and the Ranque - Hilsch Tube. Invented in 1933 by French physicist Georges J. Ranque and improved upon by German physicist Rudolf Hilsch in a notable paper published in 1947, there is a great deal of information available on the internet.

To shorten the cooling cycle of molded plastic tanks, a Model 50030H Vortex Tube was used per tank to blow cold air into the tanks.



FRIGID-X™ VORTEX TUBES

| Part No. | Description |
|----------|--|
| 50002H | Small Vortex Tube with 2H Generator for Maximum cooling Effect |
| 50004H | Small Vortex Tube with 4H Generator for Maximum cooling Effect |
| 50008H | Small Vortex Tube with 8H Generator for Maximum cooling Effect |
| 50010H | Medium Vortex Tube with 10H Generator for Maximum cooling Effect |
| 50015H | Medium Vortex Tube with 15H Generator for Maximum cooling Effect |
| 50025H | Medium Vortex Tube with 25H Generator for Maximum cooling Effect |
| 50030H | Medium Vortex Tube with 30H Generator for Maximum cooling Effect |
| 50040H | Medium Vortex Tube with 40H Generator for Maximum cooling Effect |
| 50050H | Large Vortex Tube with 50H Generator for Maximum cooling Effect |
| 50075H | Large Vortex Tube with 75H Generator for Maximum cooling Effect |
| 50100H | Large Vortex Tube with 100H Generator for Maximum cooling Effect |
| 50150H | Large Vortex Tube with 150H Generator for Maximum cooling Effect |
| 50002C | Small Vortex Tube with 2C Generator for Maximum Cold Temperature |
| 50004C | Small Vortex Tube with 4C Generator for Maximum Cold Temperature |
| 50008C | Small Vortex Tube with 8C Generator for Maximum Cold Temperature |
| 50010C | Medium Vortex Tube with 10C Generator for Maximum Cold Temperature |
| 50015C | Medium Vortex Tube with 15C Generator for Maximum Cold Temperature |
| 50025C | Medium Vortex Tube with 25C Generator for Maximum Cold Temperature |
| 50030C | Medium Vortex Tube with 30C Generator for Maximum Cold Temperature |
| 50040C | Medium Vortex Tube with 40C Generator for Maximum Cold Temperature |
| 50050C | Large Vortex Tube with 50C Generator for Maximum Cold Temperature |
| 50075C | Large Vortex Tube with 75C Generator for Maximum Cold Temperature |
| 50100C | Large Vortex Tube with 100C Generator for Maximum Cold Temperature |
| 50150C | Large Vortex Tube with 150C Generator for Maximum Cold Temperature |
| 55001 | Cold End Muffler for Small Vortex Tube |
| 55002 | Cold End Muffler for Medium Vortex Tube |
| 55003 | Hot End Muffler for Small or Medium Vortex Tube |
| 55004 | X-Stream Hot End Muffler for Small & Medium Vortex Tubes for extra Muffling |
| 55006 | Cold End Muffler for Large Vortex Tube |
| 55007 | Hot End Muffler for Large Vortex Tube |
| 51008K | Small Vortex Tube test Kit. Consists of Small Vortex Tube, Cold Muffler, Filter with auto drain, and Generators - 2C, 2H, 4C, 4H, 8C, 8H |
| 51040K | Medium Vortex Tube test Kit. Consists of Medium Vortex Tube, Cold Muffler, Filter with auto drain, and Generators - 10C, 10H, 15C, 15H, 25C, 25H, 30C, 30H, 40C, 40H |
| 51150K | Large Vortex Tube test Kit. Consists of Large Vortex Tube, Cold Muffler, Filter with auto drain, and Generators - 50C, 50H, 75C, 75H, 100C, 100H, 150C, 150H |
| 59008K | Small Vortex Tube Generator Kit Generators - 2C, 2H, 4C, 4H, 8C, 8H |
| 59040K | Medium Vortex Tube Generator Kit Generators - 10C, 10H, 15C, 15H, 25C, 25H, 30C, 30H, 40C, 40H |
| 59150K | Large Vortex Tube Generator Kit Generators - 50C, 50H, 75C, 75H, 100C, 100H, 150C, 150H |

NOTE: The last three numbers in the part number indicate the SCFM consumption at 100 PSIG (6.9 Bar) - Example 50025C indicates 25 SCFM air consumption at 100 PSIG (6.9 Bar).

The PLCFC described in Section A is an effective means to control energy used by turning on and off the Vortex Tubes as required.

SMART N CLEVER™
MORE THAN INTELLIGENT



FRIGID-X™ VORTEX TUBES

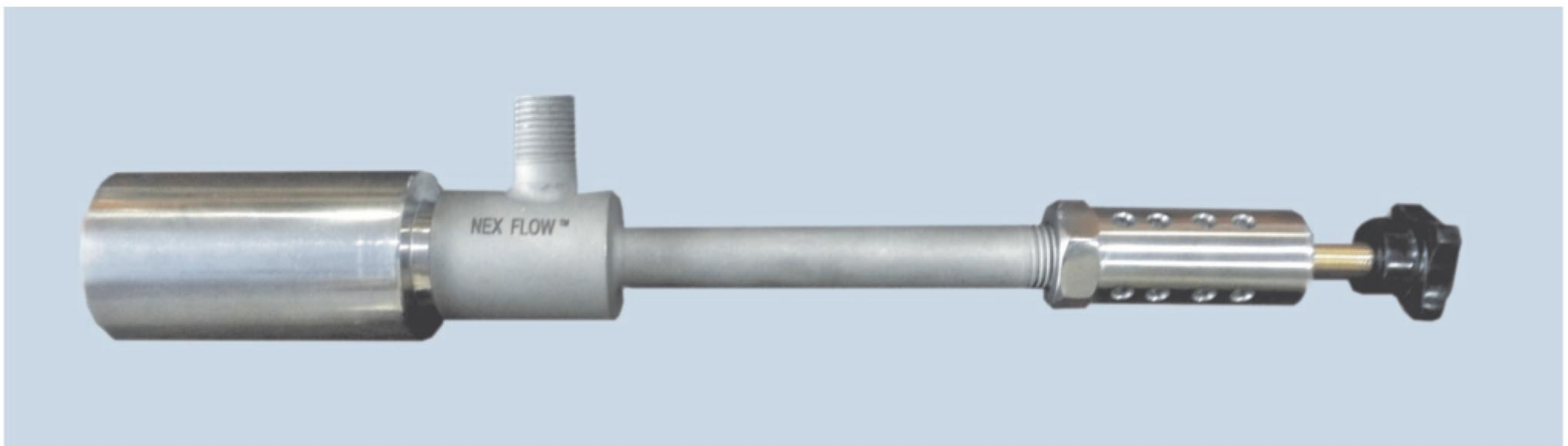
| Part No. | Description |
|----------|--|
| 59002C | 2 SCFM Small Vortex Tube Brass Generator Only - Cold Temp. |
| 59004C | 4 SCFM Small Vortex Tube Brass Generator Only - Cold Temp. |
| 59008C | 8 SCFM Small Vortex Tube Brass Generator Only - Cold Temp. |
| 59002H | 2 SCFM Small Vortex Tube Brass Generator Only - Max. BTU/hr |
| 59004H | 4 SCFM Small Vortex Tube Brass Generator Only - Max. BTU/hr |
| 59008H | 8 SCFM Small Vortex Tube Brass Generator Only - Max. BTU/hr |
| 59010C | 10 SCFM Medium Vortex Tube Brass Generator Only - Cold Temp. |
| 59015C | 15 SCFM Medium Vortex Tube Brass Generator Only - Cold Temp. |
| 59025C | 25 SCFM Medium Vortex Tube Brass Generator Only - Cold Temp. |
| 59030C | 30 SCFM Medium Vortex Tube Brass Generator Only - Cold Temp. |
| 59040C | 40 SCFM Medium Vortex Tube Brass Generator Only - Cold Temp. |
| 59010H | 10 SCFM Medium Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59015H | 15 SCFM Medium Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59025H | 25 SCFM Medium Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59030H | 30 SCFM Medium Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59040H | 40 SCFM Medium Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59050C | 50 SCFM Large Vortex Tube Brass Generator Only - Cold Temp. |
| 59075C | 75 SCFM Large Vortex Tube Brass Generator Only - Cold Temp. |
| 59100C | 100 SCFM Large Vortex Tube Brass Generator Only - Cold Temp. |
| 59150C | 150 SCFM Large Vortex Tube Brass Generator Only - Cold Temp. |
| 59050H | 50 SCFM Large Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59075H | 75 SCFM Large Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59100H | 100 SCFM Large Vortex Tube Brass Generator Only - Max. BTU/Hr. |
| 59150H | 150 SCFM Large Vortex Tube Brass Generator Only - Max. BTU/Hr. |

| Accessories | |
|-------------|--|
| 90001 | 3/8" NPT Filter with automatic drain - 65 SCFM (1841 SLPM) capacity |
| 90002 | 3/4" NPT Filter with automatic drain - 200 SCFM (6230 SLPM) capacity |
| 90005 | 3/8" NPT Oil Removal Filter with automatic drain - 15 - 37 SCFM (425 - 1048 SLPM) capacity |
| 90006 | 3/4" NPT Oil Removal Filter with automatic drain - 50 - 150 SCFM (1415 - 4248 SLPM) capacity |

FRIGID-X™ VORTEX TUBES

With Hand Adjustable and Muffled Hot End

Produce cold air as low as minus 50° F (minus 46° C) from compressed air with no moving parts to spot cool or cool enclosures with no electricity and easily adjust the setting by hand to control the temperature and flow rates.



WHAT ARE THEY - REASONS TO USE

Nex Flow™ Frigid-X™ Vortex Tubes normally come with an adjustable hot end that requires screwdriver to change the setting. If the application requires an easier adjusting mechanism the Hand Adjustable version is available. For the small and medium sized vortex tubes. It comes with a built in hot end muffler for noise reduction and is made of stainless steel. The Hand Adjustable assembly may also be purchased separately to convert the standard Vortex Tube into a hand adjustable version.

Inside the vortex tube is the interchangeable brass generator which determines the air flow capacity. There are two types – one to produce extreme cold temperatures (maximum cold temperature out call the C generator) and one type to produce the maximum amount of cooling (maximum refrigeration called the H generator). The Hand Adjustable units are used only with the H generators.

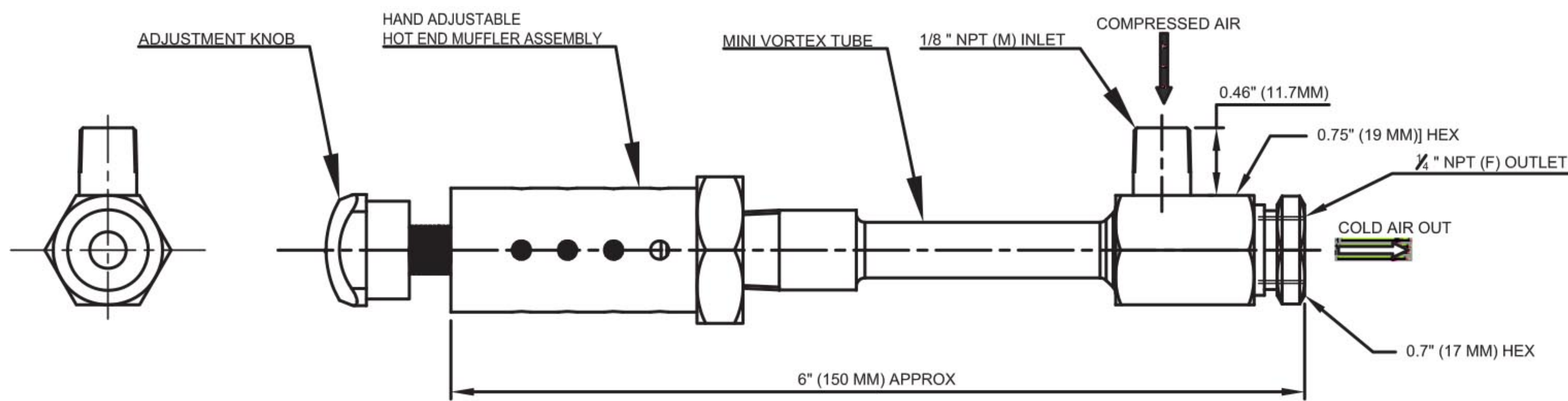
WHY THE FRIGID-X™ HAND ADJUSTABLE UNIT:

The Nex Flow™ Frigid-X™ Vortex Tube is constructed of stainless steel and uses a brass generator and brass and stainless hand adjustable system with a plastic knob and integral muffler to allow it to be used in the widest range of environments. In applications which adjustment convenience is necessary this system is an ideal solution. The unique design and quality of materials used in the Frigid-X™ Vortex Tubes will deliver years of maintenance-free operation.

FRIGID-X™ HAND ADJUSTABLE UNIT ADVANTAGES:

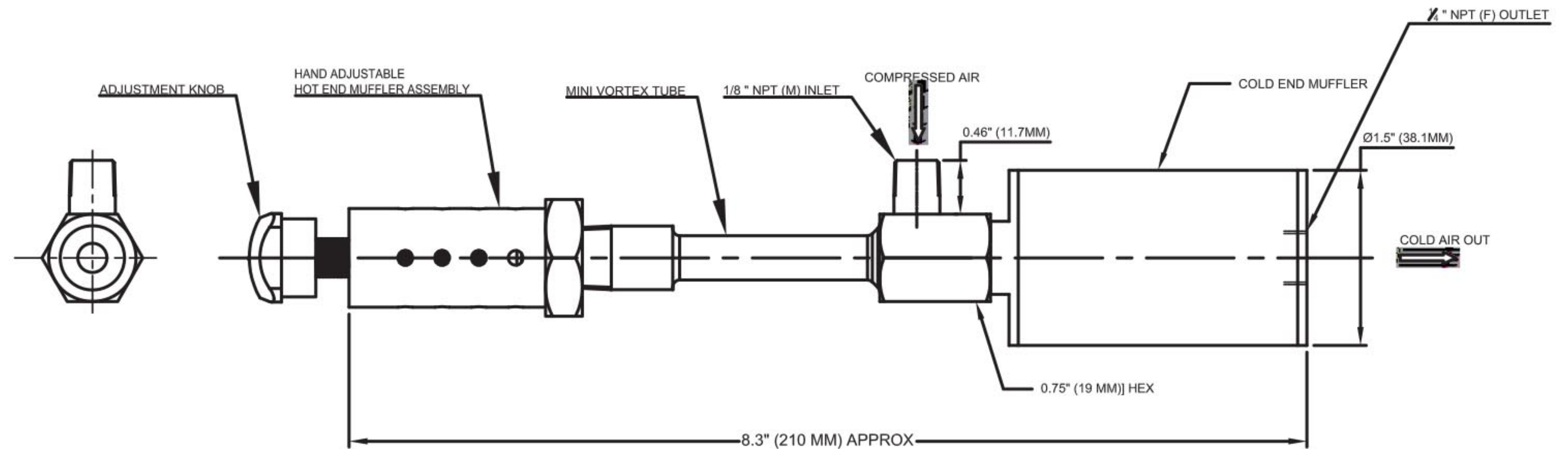
- easy adjustment – no screwdriver needed
- driven by air no electricity
- Small and lightweight – portable
- Low in cost compared to others
- Maintenance free operation
- Adjustable temperature range



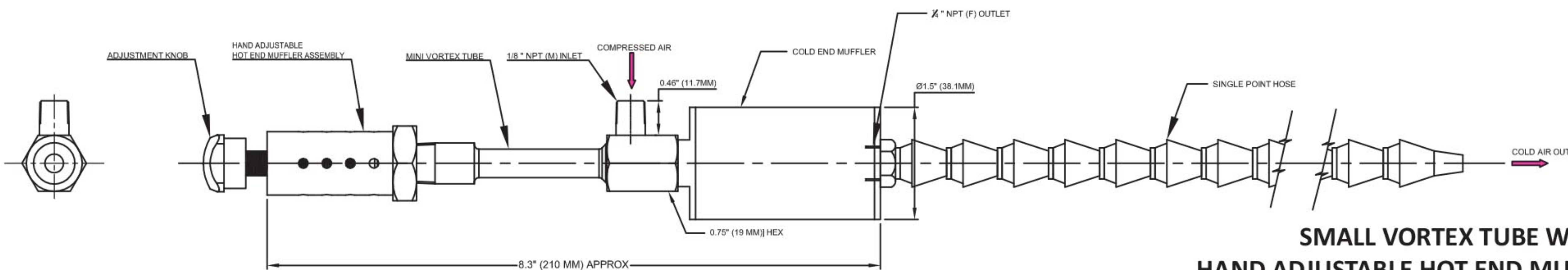


**SMALL VORTEX TUBE WITH GENERATOR,
HAND ADJUSTABLE HOT END MUFFLER ASSEMBLY**

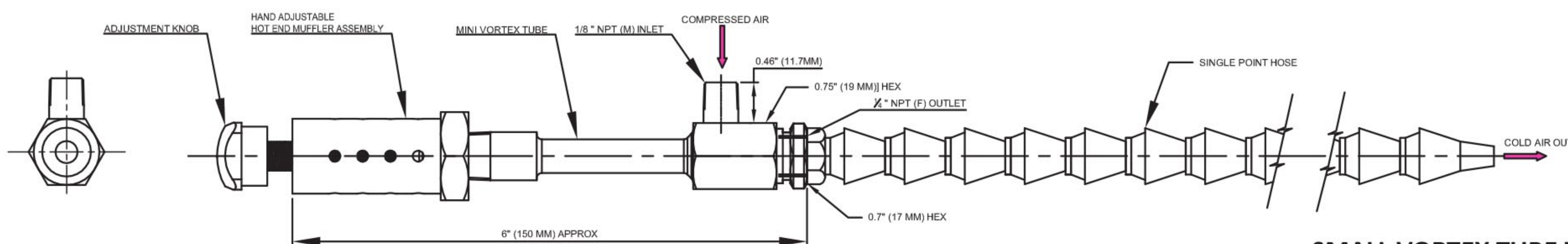
**SMALL VORTEX TUBE WITH GENERATOR,
HAND ADJUSTABLE
HOT END MUFFLER ASSEMBLY
+ COLD MUFFLER**



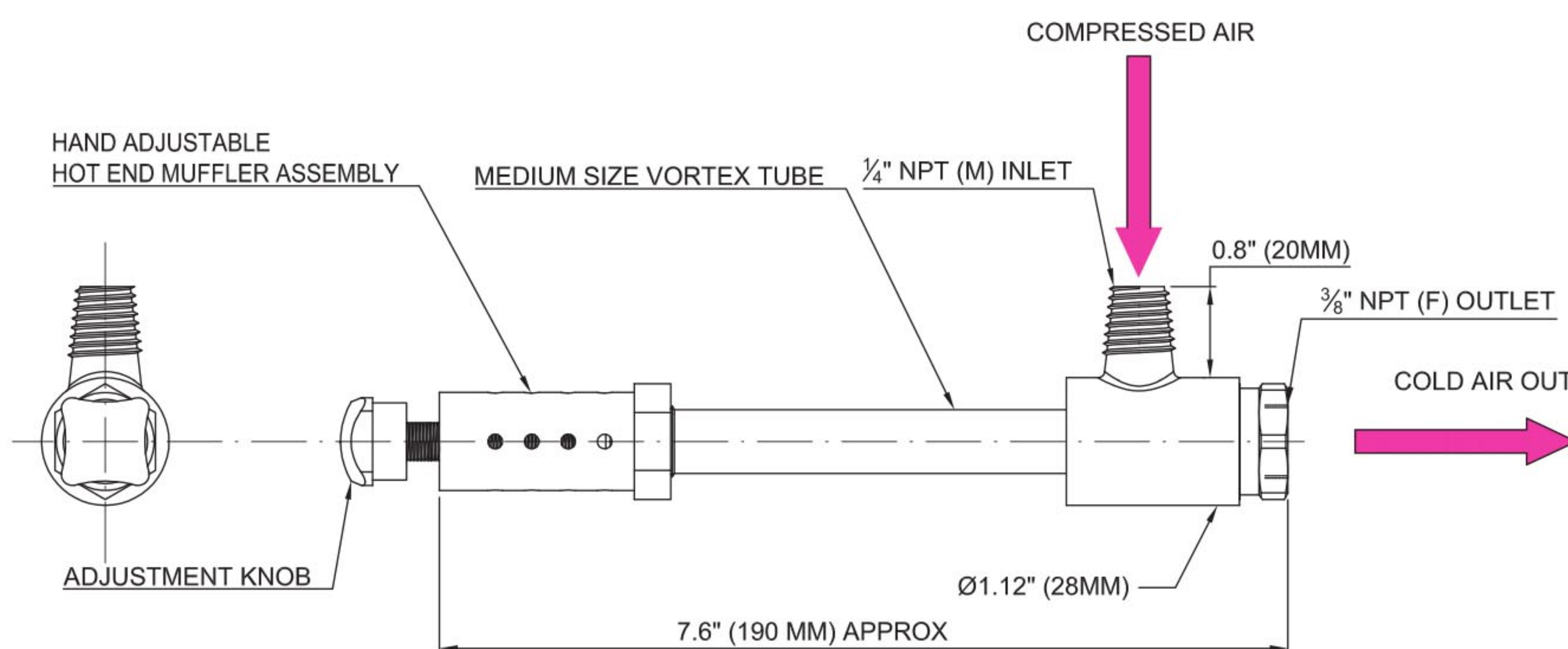
**SMALL VORTEX TUBE WITH GENERATOR,
HAND ADJUSTABLE HOT END MUFFLER ASSEMBLY
+ COLD MUFFLER + SINGLE POINT HOSE KIT**



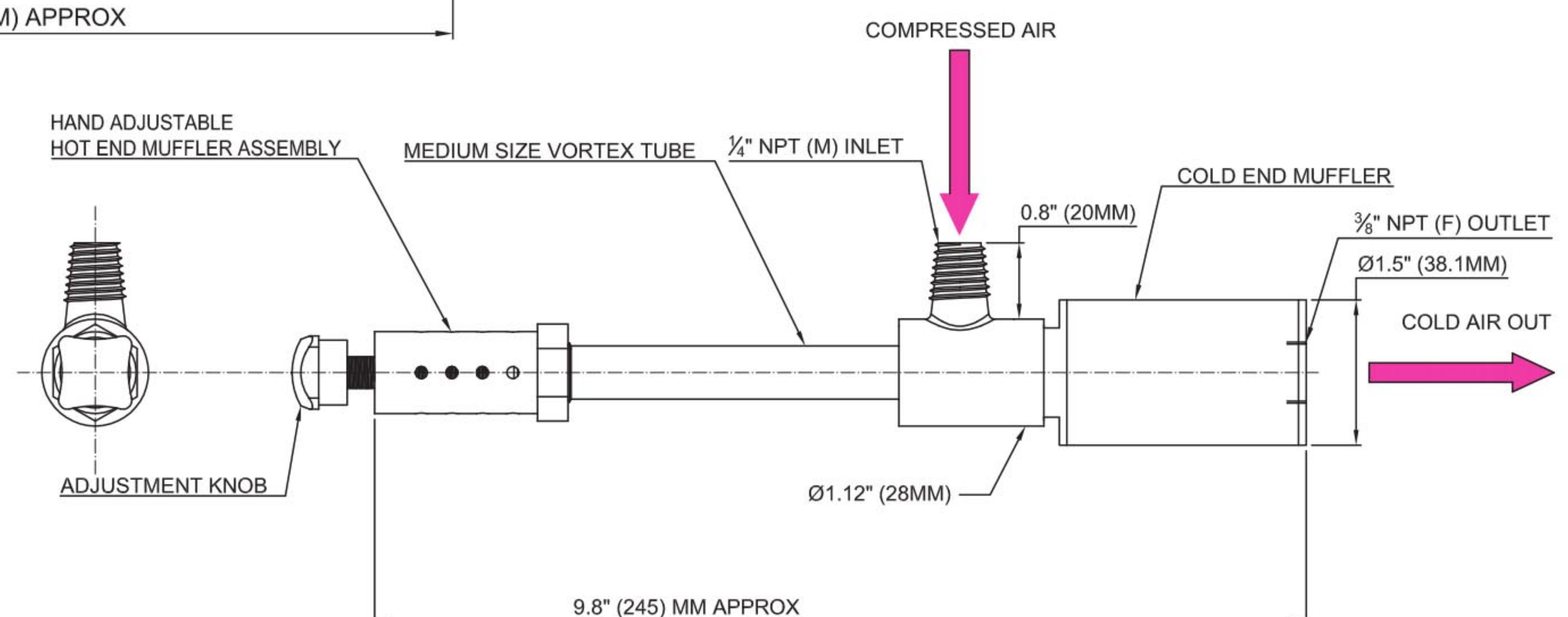
**SMALL VORTEX TUBE WITH GENERATOR,
HAND ADJUSTABLE HOT END MUFFLER ASSEMBLY
+ SINGLE POINT HOSE KIT**

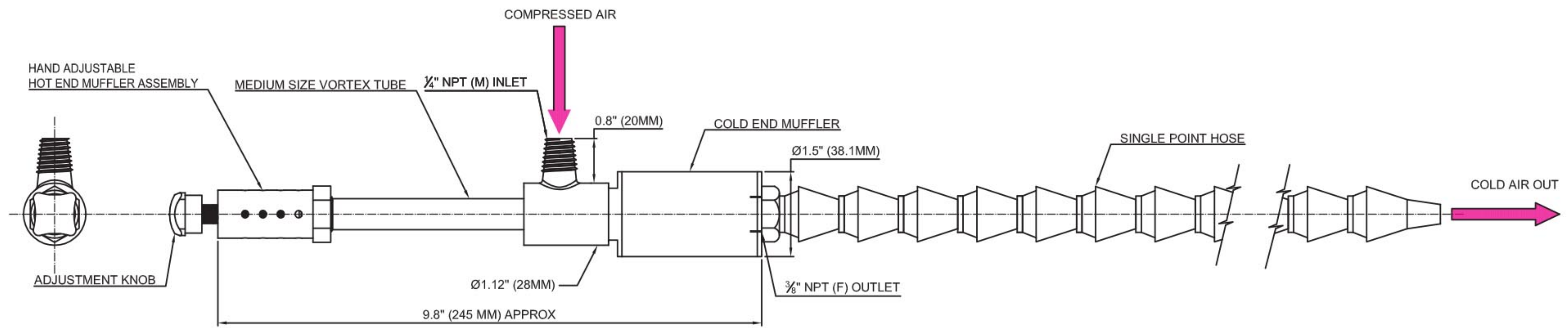


**MEDIUM VORTEX TUBE WITH GENERATOR,
HAND ADJUSTABLE HOT END MUFFLER ASSEMBLY**

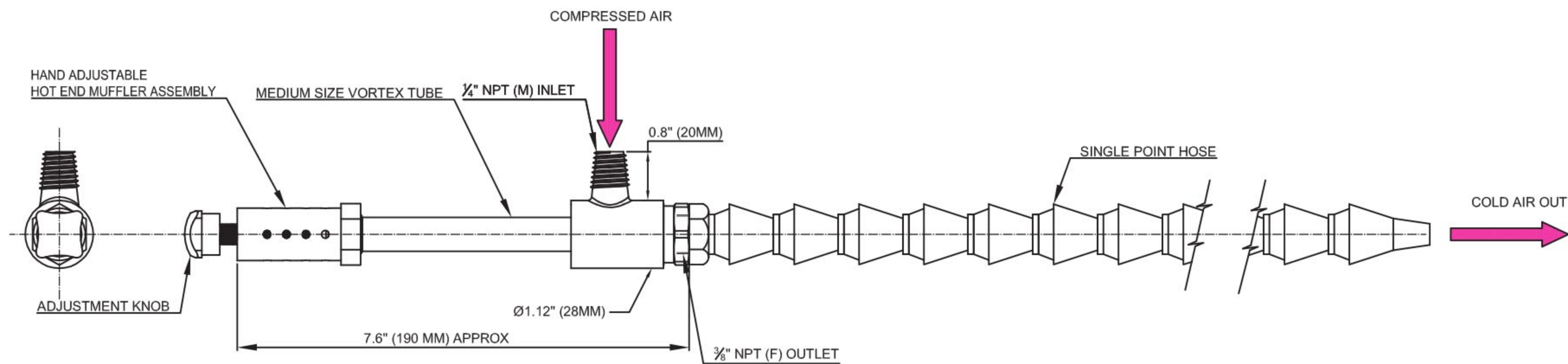


**MEDIUM VORTEX TUBE WITH GENERATOR,
HAND ADJUSTABLE HOT END MUFFLER ASSEMBLY
+ COLD MUFFLER**





MEDIUM VORTEX TUBE WITH GENERATOR, HAND ADJUSTABLE HOT END MUFFLER ASSEMBLY + COLD MUFFLER + SINGLE POINT HOSE KIT



MEDIUM VORTEX TUBE WITH GENERATOR, HAND ADJUSTABLE HOT END MUFFLER ASSEMBLY + SINGLE POINT HOSE KIT

SPECIFICATIONS

| | |
|---------------|---|
| 52002H | - 2 SCFM (57 SLPM) – for Maximum Cooling 145 BTU/hr. (42 watts) – small vortex tube |
| 52004H | - 4 SCFM (113 SLPM) – for Maximum Cooling 290 BTU/hr. (85 watts) – small vortex tube |
| 52008H | - 8 SCFM (227 SLPM) – for Maximum Cooling 580 BTU/hr. (170 watts) – small vortex tube |
| 52010H | - 10 SCFM (283 SLPM) – for Maximum Cooling 730 BTU/hr. (214 watts) – small vortex tube |
| 52015H | - 15 SCFM (425 SLPM) – for Maximum Cooling 1100 BTU/hr. (322 watts) – small vortex tube |
| 52025H | - 25 SCFM (708 SLPM) – for Maximum Cooling 1800 BTU/hr. (527 watts) – small vortex tube |
| 52030H | - 30 SCFM (850 SLPM) – for Maximum Cooling 2100 BTU/hr. (615 watts) – small vortex tube |
| 52040H | - 40 SCFM (1133 SLPM) – for Maximum Cooling 2900 BTU/hr. (849 watts) – small vortex tube |

| Part No. | Description |
|----------|---|
| 52002H | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 52004H | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 52008H | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 52010H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 52015H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 52025H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 52030H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 52040H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly |
| 53002H | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |
| 53004H | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |
| 53008H | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |

| Part No. | Description |
|----------|--|
| 53010H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |
| 53015H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |
| 53025H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |
| 53030H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |
| 53040H | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler |
| 53002HS | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53004HS | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53008HS | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53010HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53015HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53025HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53030HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53040HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + single point hose kit |
| 53010HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + dual point hose kit |
| 53015HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + dual point hose kit |
| 53025HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + dual point hose kit |
| 53030HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + dual point hose kit |
| 53040HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + cold muffler + dual point hose kit |
| 52002HS | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52004HS | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52008HS | Small Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52010HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52015HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52025HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52030HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52040HS | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + single point hose kit |
| 52010HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + dual point hose kit |
| 52015HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + dual point hose kit |
| 52025HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + dual point hose kit |
| 52030HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + dual point hose kit |
| 52040HD | Medium Vortex Tube with Generator, hand adjustable hot end muffler assembly + dual point hose kit |
| 55008 | Hand turning adjustable hot end only c/w muffler for medium and small vortex tube |

FRIGID-X™ ADJUSTABLE SPOT COOLER

Produce cold air as low as minus 30° F (minus 34° C) from compressed air to spot cool with easy adjustability

WHAT ARE THEY - REASONS TO USE

The Frigid-X™ Adjustable Spot Cooler is a low cost and maintenance free system which utilizes a vortex tube to produce cold air at one end.

The Frigid-X™ Adjustable Spot Cooler temperature can be adjusted using a knob at the hot end to set the temperature precisely to your requirements. Temperatures range from approximately minus 30°F to room temperature and can be easily set with a thermometer.

The Frigid-X™ Adjustable Spot Cooler System comes with three brass generators for flow rate adjustment - 15 SCFM (425 SLPM), 25 SCFM (708 SLPM) and 30 SCFM (850 SLPM) providing refrigeration up to 2100 BTU/hr (615 Watts).

Cold air is directed using the flexible tubing. A magnetic base is standard for portability and easy mounting of the adjustable spot cooler.

Units are available with either a single point hose kit for small surface area or a dual point hose kit when heat is generated over a larger surface area. Adjustable spot cooler produces a wide range of airflow and temperature by adjusting the knob at the hot end and changing the various generators supplied.

The generators control the air consumption and are easily interchangeable. Adjustable spot cooler has a 25 SCFM (708 SLPM) generator installed that will produce up to 1,800 Btu/hr. of cooling. If less is required, the 15 SCFM (425 SLPM) generator can deliver 1,100 BTU/Hr. If more cooling is needed Nex Flow™ can supply you with the 30 SCFM (850 SLPM) generator for up to 2,100 BTU/Hr. of cooling.

WHY THE FRIGID-X™ ADJUSTABLE SPOT COOLER OVER OTHERS:

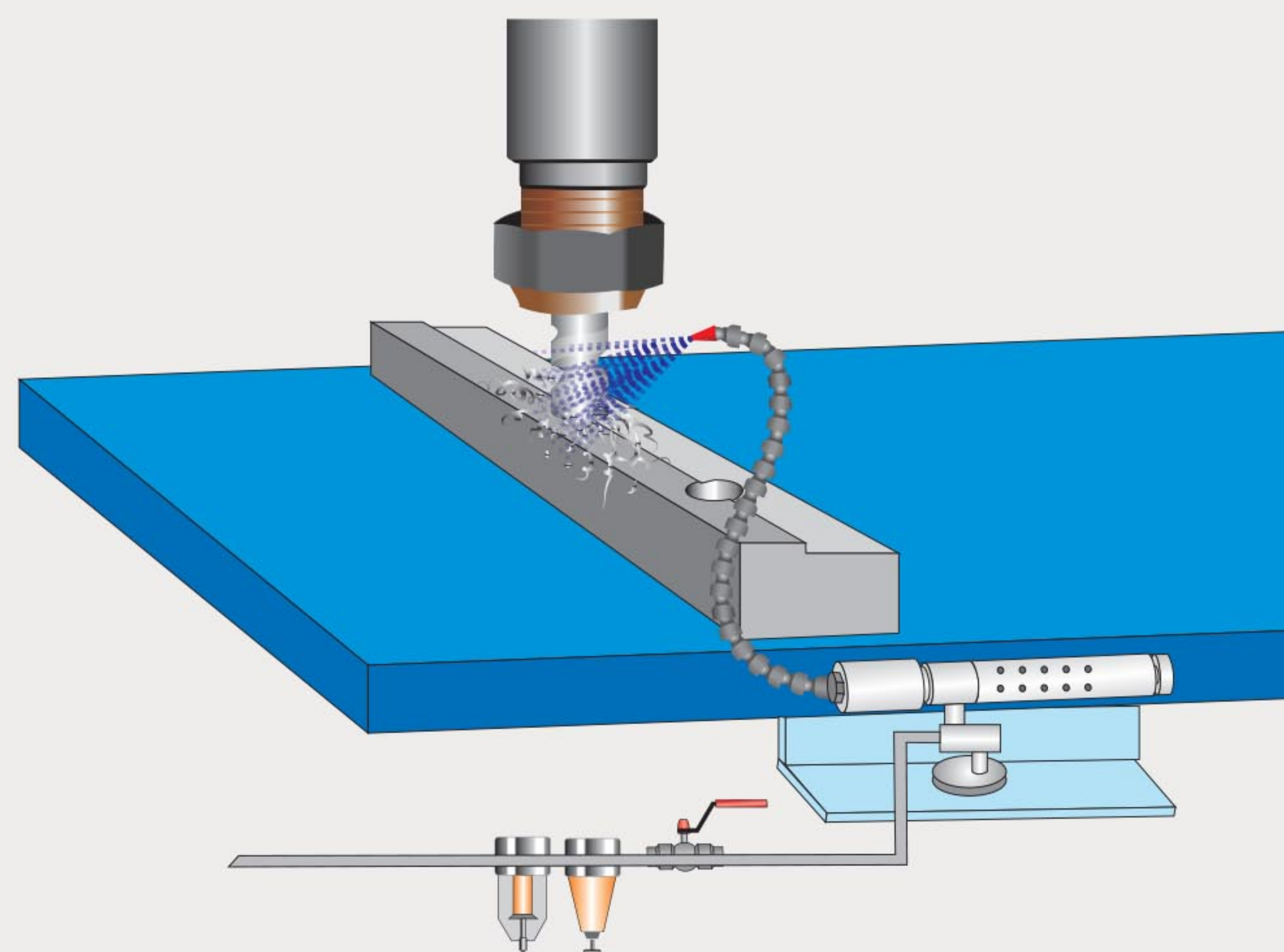
All Metal Parts, Stainless Steel Body, Quiet - Tests Show Frigid-X™ Adjustable Spot Cooler is consistently more quiet than the competition.



FRIGID-X™ ADJUSTABLE SPOT COOLER ADVANTAGES:

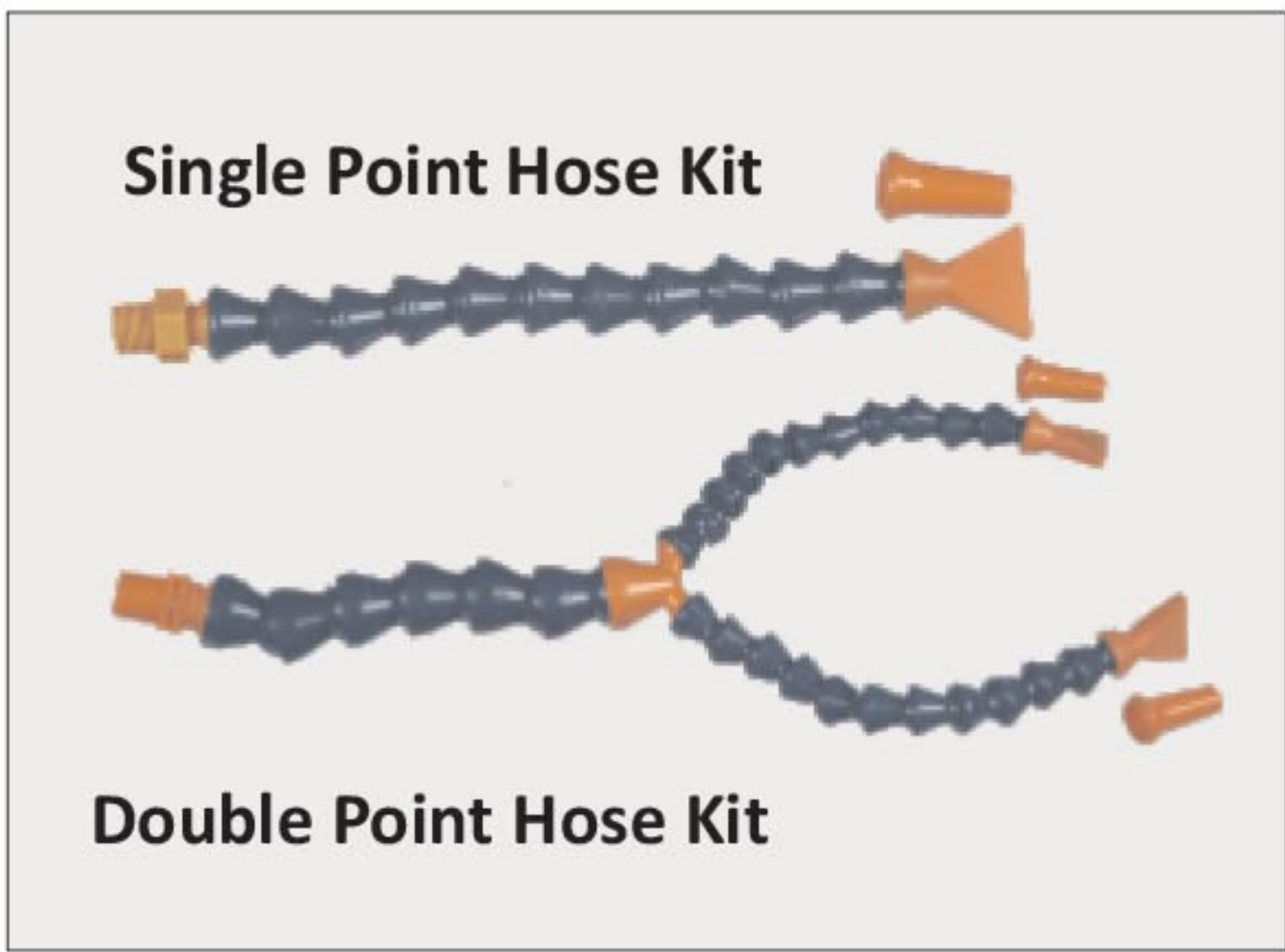
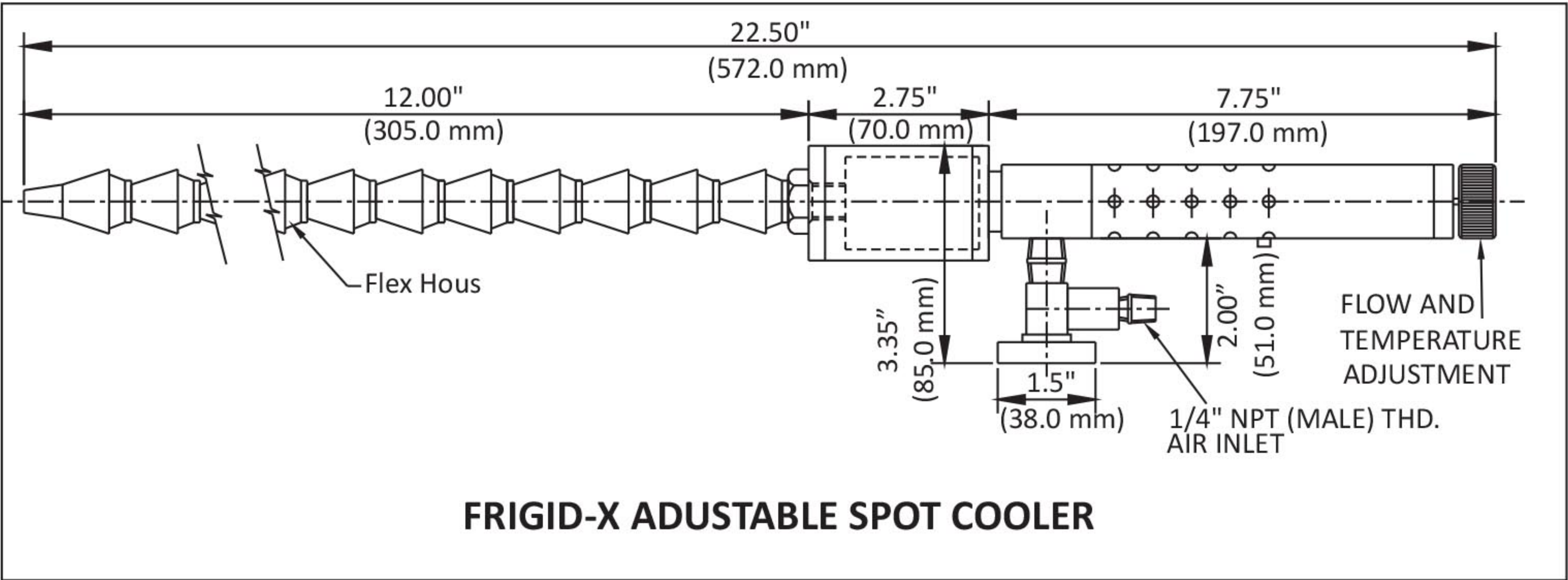
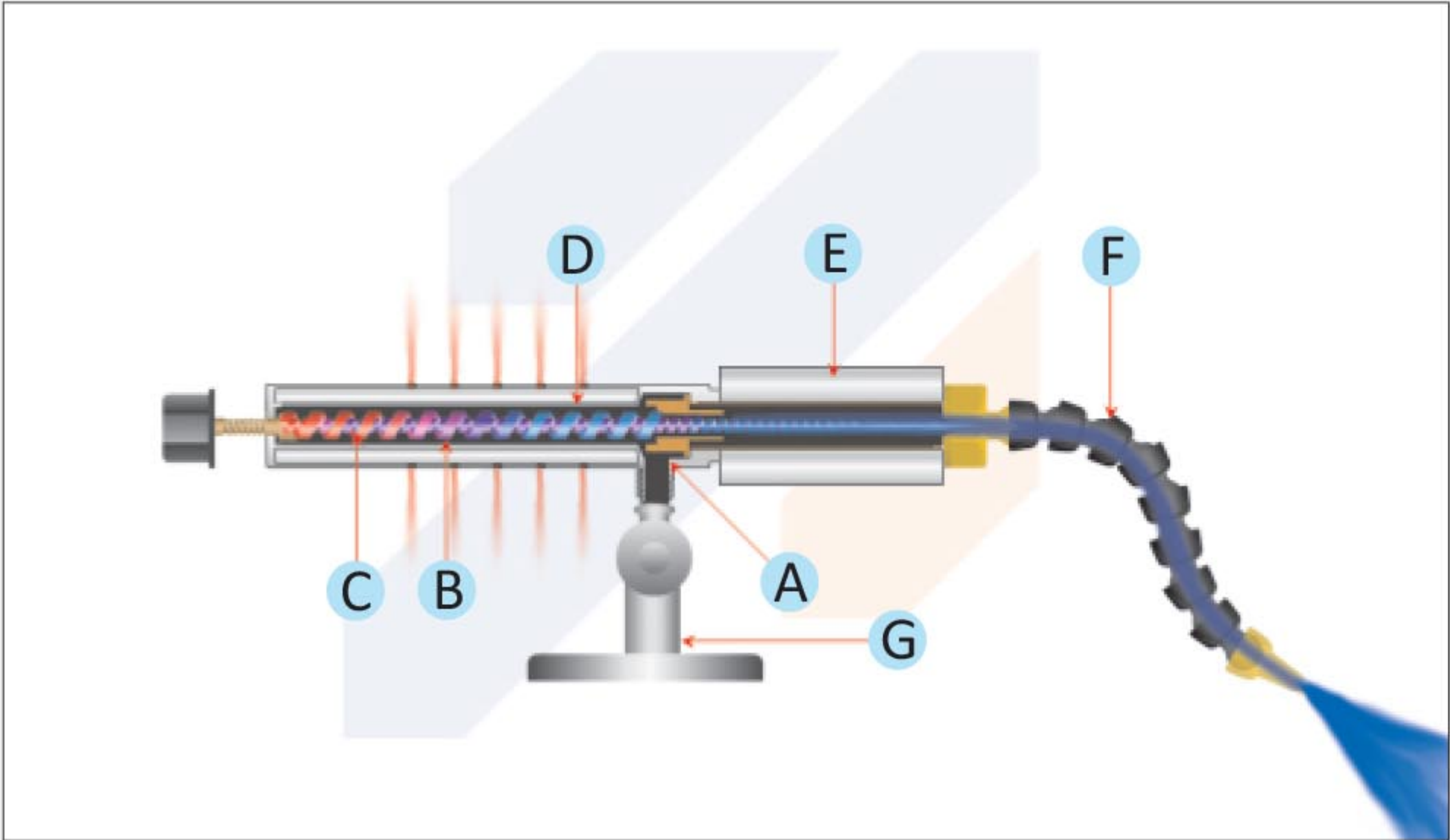
- ▶ No moving parts.
- ▶ Quiet
- ▶ Driven by air not electricity.
- ▶ Small and lightweight - portable.
- ▶ Low in cost compared to most others
- ▶ Superior design and performance
- ▶ Maintenance free operation
- ▶ Made of durable stainless steel and metal parts, no cheap plastic parts
- ▶ Adjustable temperature range
- ▶ Generators are interchangeable
- ▶ System uses strong magnetic base

A Model 57025AS is used to cool a milling operation of a special ceramic material where the temperature had to be tightly controlled.



FRIGID-X™ ADJUSTABLE SPOT COOLER – HOW IT WORKS

Frigid-X™ - Adjustable Spot Cooler - Compressed air enters at point (A) into the vortex tube component of the spot cooler. The vortex tube splits the compressed air into a hot (B) and cold (C) stream of air. The hot air from the vortex tube is vented to the atmosphere at point (D) after being muffled to reduce noise. Cold air enters into the muffler (E) and then distributed through the hose distribution kit (F) and onto the item being cooled. A strong magnet (G) holds the spot cooler in place. The temperature of the cold air is controlled by an adjustable knob.

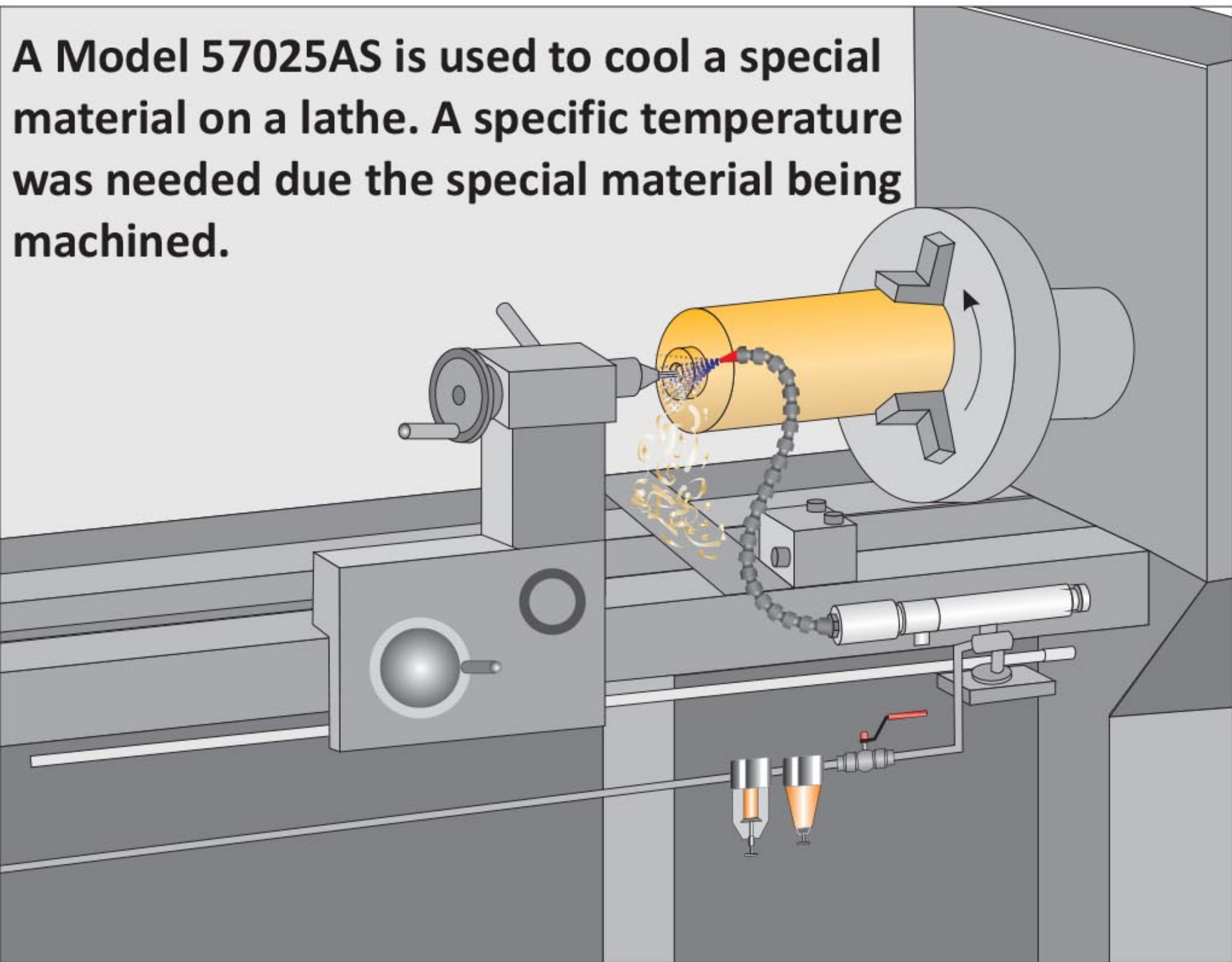


FRIGID-X™ ADJUSTABLE SPOT COOLER APPLICATIONS:

- ▶ Solder Cooling
- ▶ Set hot melt adhesives
- ▶ Cool Electronic components
- ▶ Adjusting thermostats
- ▶ Cool welding horns on ultrasonic
- ▶ Cool heat shrink tubing
- ▶ Cool plastic machined parts
- ▶ Cool molded plastics

| INLET PRESSURE PSIG (Bar) | AIR CONSUMPTION SCFM (SLPM) | SOUND LEVEL dBA |
|---------------------------|-----------------------------|-----------------|
| 100 (6.9) | 15 (425) | 70 |
| 100 (6.9) | 25 (708) | 71 |
| 100 (6.9) | 30 (850) | 72 |

A Model 57025AS is used to cool a special material on a lathe. A specific temperature was needed due the special material being machined.



FRIGID-X™ ADJUSTABLE SPOT COOLER

| PART NO. | DESCRIPTION |
|----------|---|
| 57025AS | Frigid-X™ Adjustable Spot Cooler System c/w cooler, magnetic base, single point hose kit, 25H generator (Installed), 15H generator (loose), 30H generator (loose) |
| 57025AD | Frigid-X™ Adjustable Spot Cooler System c/w cooler, magnetic base, dual point hose kit, 25H generator (installed), 15H generator (loose), 30H generator (loose) |
| 56025A | FRIGID-X™ Adjustable Spot Cooler only |
| OPTIONS | |
| 90001 | Filter with automatic drain, 3/8" NPT, 65 SCFM (1841 SLPM) |
| 90005 | Oil Removal Filter, 3/8" NPT, 15-37 SCFM (425 to 1048 SLPM) |



FRIGID-X™ MINI SPOT COOLER

Cool small parts and tooling with a compact spot cooler with no moving parts.

WHAT ARE THEY - REASONS TO USE

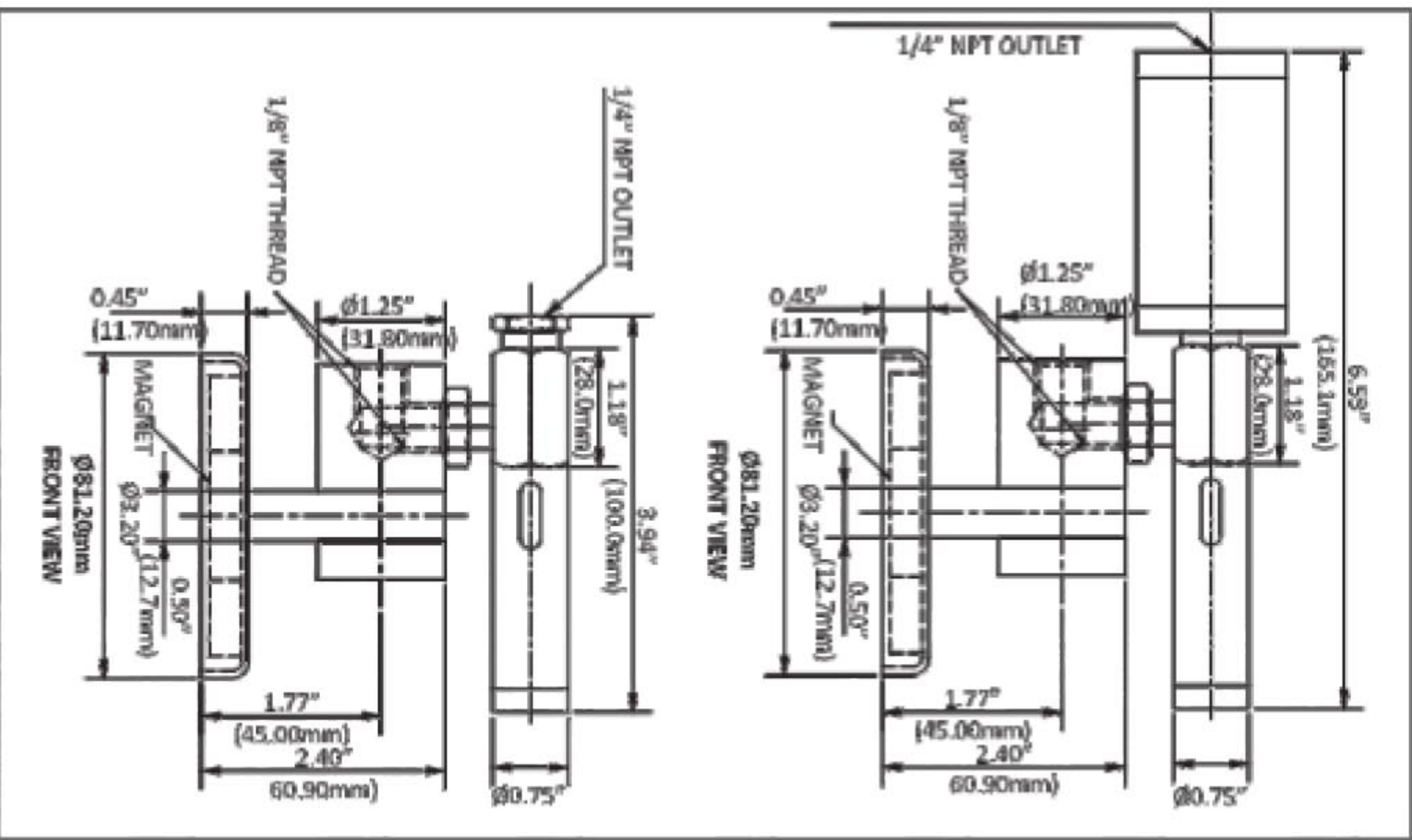
The Frigid-X™ Mini Spot Cooler is a low cost and maintenance free system which utilizes a vortex tube to produce cold air at one end. It is quiet and compact.

Designed for small parts, the Frigid-X™ Mini Spot Cooler produces a stream of 15 to 20 degree F (minus 9.5 to 7 degree C) of cold air to prevent heat buildup depending in inlet air temperature. It can improve tolerances in machining of small critical parts and increase production rates.

Cold air is directed using the flexible tubing. A magnetic base is standard for portability and easy mounting of the mini spot cooler

APPLICATIONS:

- ▶ Needle cooling on sewing machines
- ▶ Cooling small blades
- ▶ Grinding lenses and small parts
- ▶ Cooling small tools



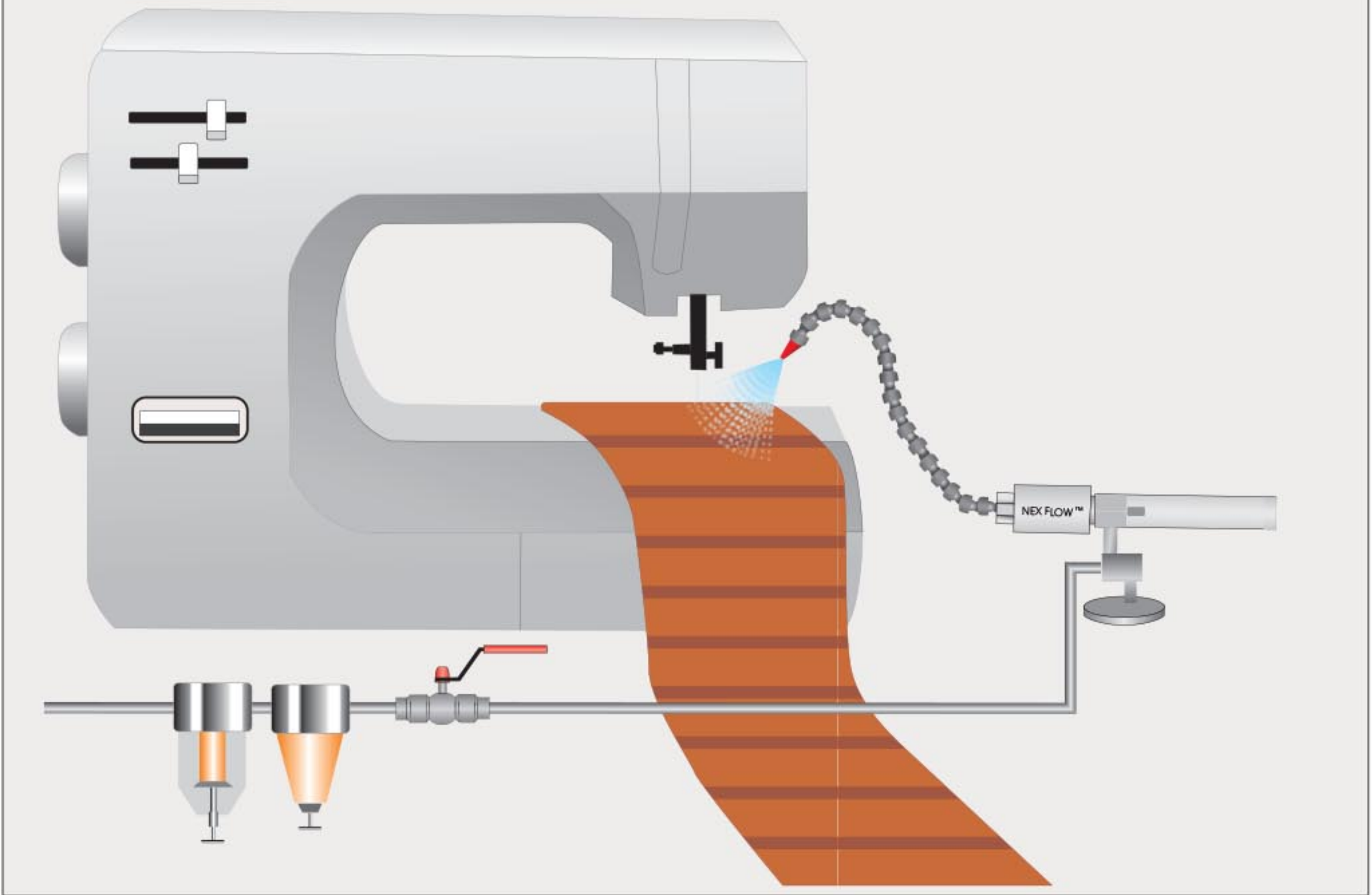
FRIGID-X™ MINI SPOT COOLER

| PART NO. | DESCRIPTION |
|----------|--|
| 56008F | Mini Frigid-X™ Cooler only (no muffler) |
| 56108F | Mini Frigid-X™ Cooler only (with muffler) |
| 57008F | Frigid-X™ Mini Spot Cooler System c/w cooler, magnetic base, single point hose kit |
| 56008F | Frigi -X™ Mini Spot Cooler only options |
| 90003 | Filter with Manual Drain ¼ " NPT |



The Mini Spot Cooler utilizes a vortex tube to create one hot stream and one cold stream (see page 9). The cold air produced at the cold end is directed to the surface to be cooled using a flexible hose.

The Mini Spot Cooler is used in the cooling of needles on a sewing machine used to produce heavy materials for carpeting.



FRIGID-X™ BOX COOLER

Packaged System for cooling small enclosures

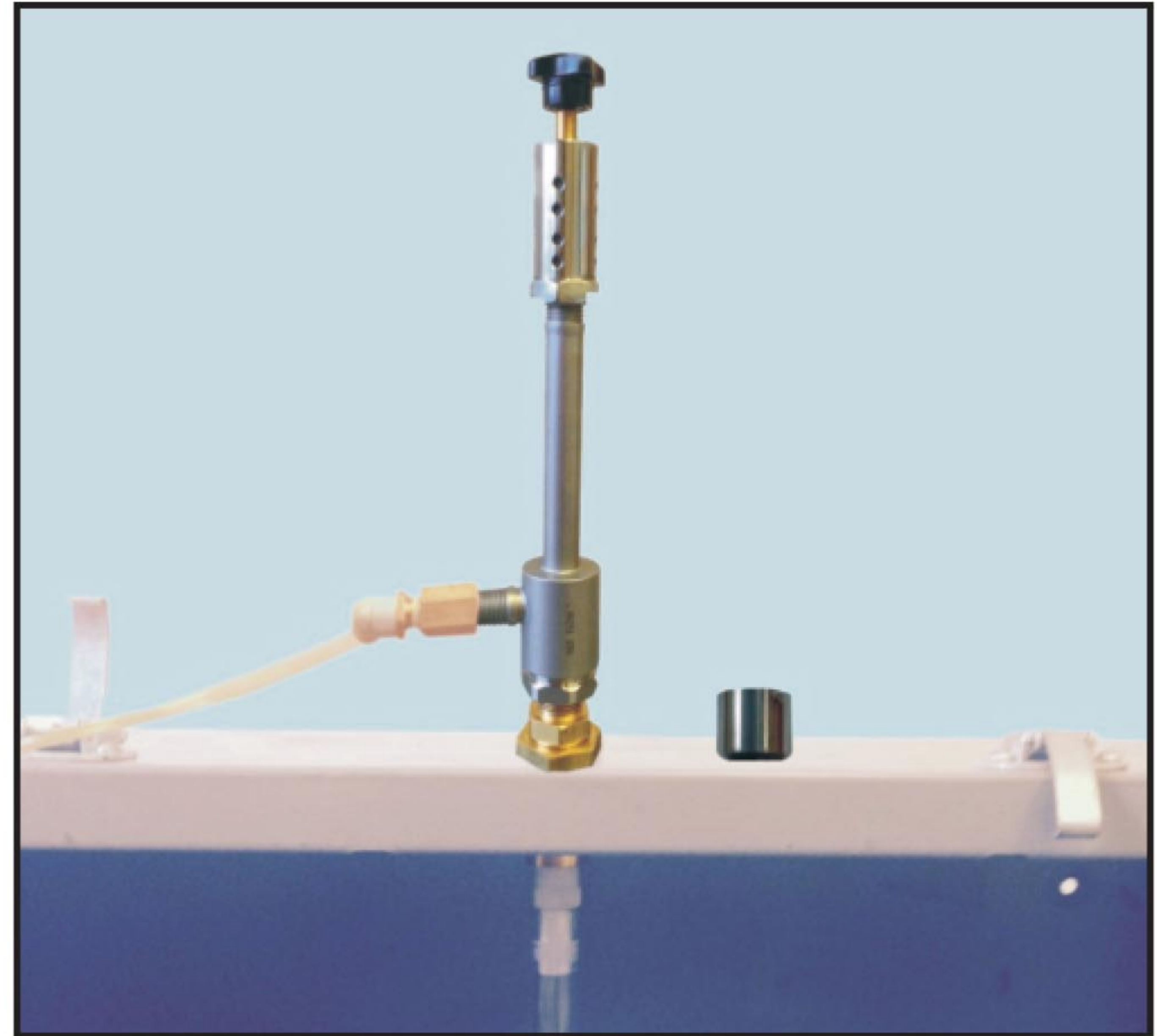
SMART N CLEVER™
MORE THAN INTELLIGENT

WHAT ARE THEY - REASONS TO USE

The Frigid-X™ Box Cooler is used for cooling small enclosures for laboratory use, environmental chambers and any application where an enclosure needs cooling (Note: Not approved for electrical and electronic control panels but may be used if approvals not required). This low cost system utilizes a stainless steel vortex tube with an adjustable hot end to control the temperature produced in the enclosure. In the package are all the necessary items to attach the vortex tube along with a separate venting unit to exhaust the hot air being displaced inside the enclosure. An optional hose distribution kit is available to distribute the cold air inside for larger enclosures. Also available is an optional solenoid and thermostat for on-off control.

FRIGID-X BOX COOLER ADVANTAGES:

- No moving parts
- Maintenance Free Operation
- Compact & Easy to Install
- Cooling Capacities to 2900 BTU/hr.
- No CFC's or HCFC's
- Stainless Steel Construction
- No Electricity
- Adjustable Cold Temperatures

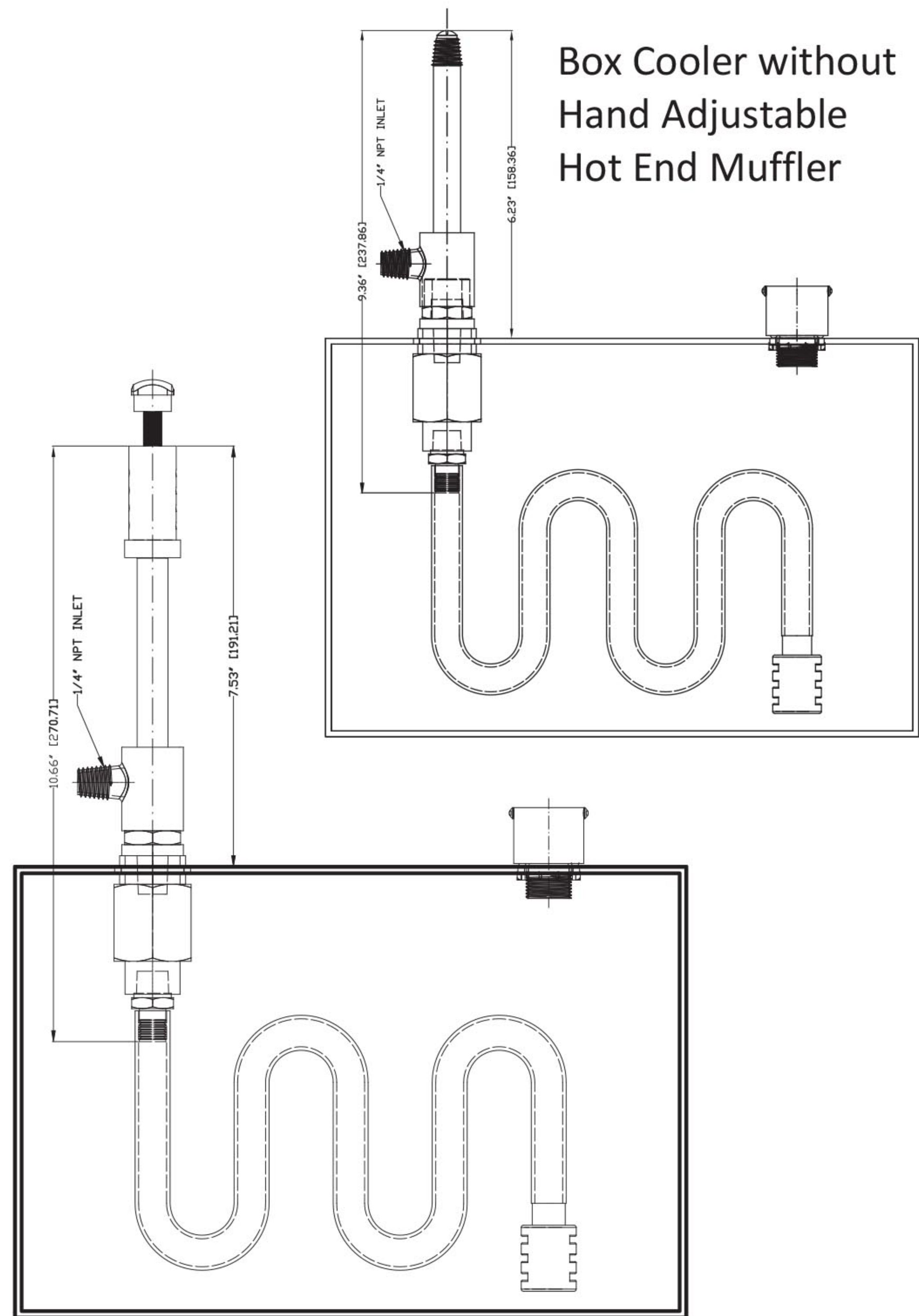
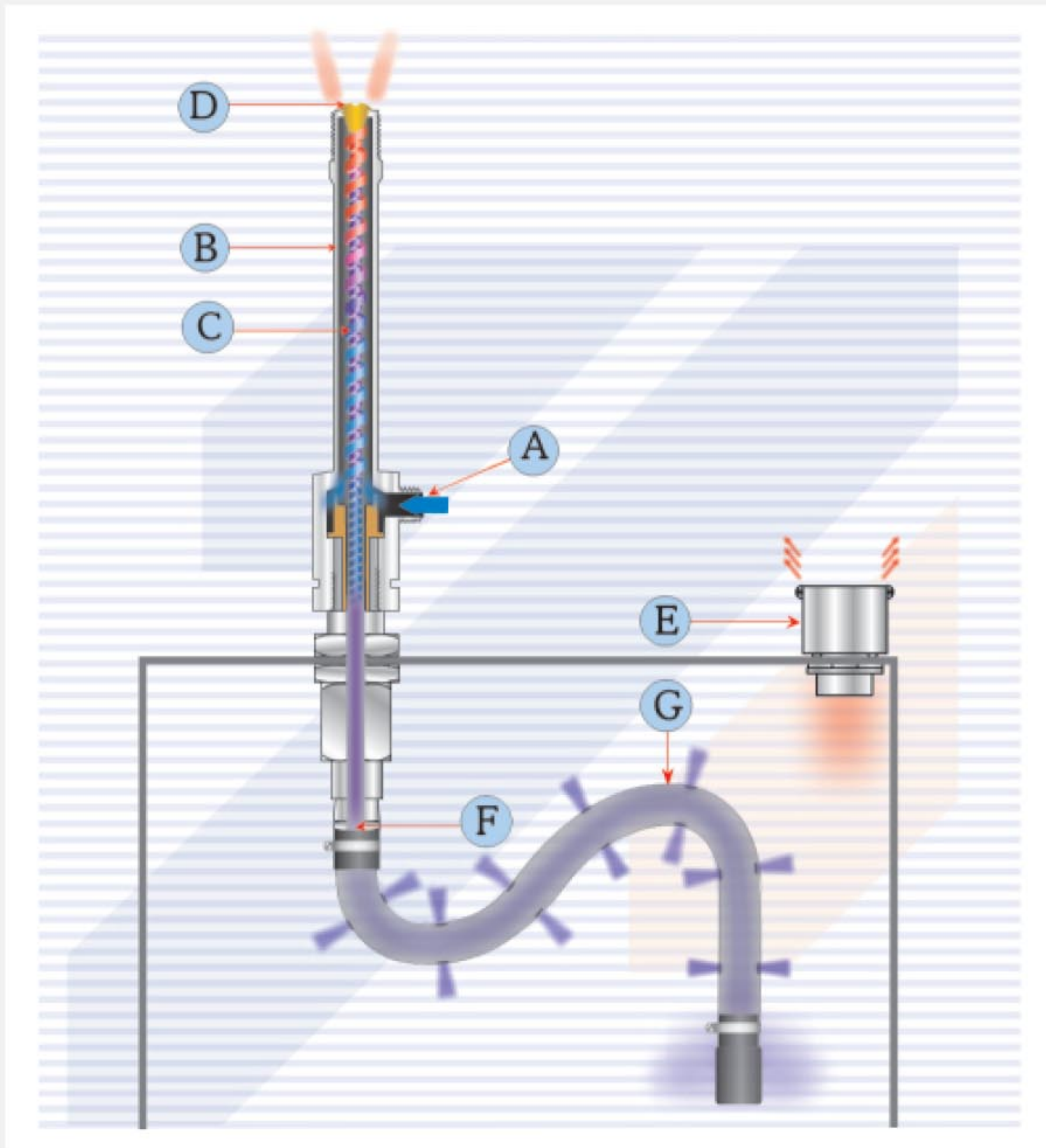


List of parts:

- Vortex Tube
- Hot and adjustable with screwdriver or with optional hand adjusting system
- Breather Cap with Lock Nut
- Connecting assembly to box
- Adaptor and hose barb for hose kit
- Optional hose distribution kit

FRIGID-X™ BOX COOLER SYSTEM – HOW IT WORKS

Compressed air enters at point (A) into the vortex tube. The vortex tube splits the compressed air into a hot (B) & cold (C) stream of air. The hot air from the vortex tube is vented to the atmosphere at point (D). Hot air displaced from the box is vented out through the breather cap (E). Cold air enters the box at point (F) or via an optional hose distribution kit (G).



Box Cooler with Hand Adjustable Hot End Muffler

FRIGID-X™ BOX COOLER SYSTEMS

| Part No. | Description |
|----------|--|
| 50010B | Box Cooler System with hot end adjustable screw 730 BTU/hr. 170 Watts |
| 50015B | Box Cooler System with hot end adjustable screw 1100 BTU/hr. 322Watts |
| 50025B | Box Cooler System with hot end adjustable screw 1800 BTU/hr. 527 Watts |
| 50030B | Box Cooler System with hot end adjustable screw 2100 BTU/hr. 615 Watts |
| 50040B | Box Cooler System with hot end adjustable screw 2900 BTU/hr. 849 Watts |
| 52010B | Box Cooler System with hot end hand adjustable knob 730 BTU/hr. 170 Watts |
| 52015B | Box Cooler System with hot end hand adjustable knob 1100 BTU/hr. 322Watts |
| 52025B | Box Cooler System with hot end hand adjustable knob 1800 BTU/hr. 527 Watts |
| 52030B | Box Cooler System with hot end hand adjustable knob 2100 BTU/hr. 615 Watts |
| 52040B | Box Cooler System with hot end hand adjustable knob 2900 BTU/hr. 849 Watts |

ACCESSORIES

| Part No. | Description |
|----------|---|
| 69004 | Hose Distribution Kit |
| 55003 | Hot End Muffler for Vortex Tube with hot end adj. screw |
| 90004 | Filter with Auto Drain |
| 90015 | Thermostat and Solenoid Valve Kit for On-Off Control |