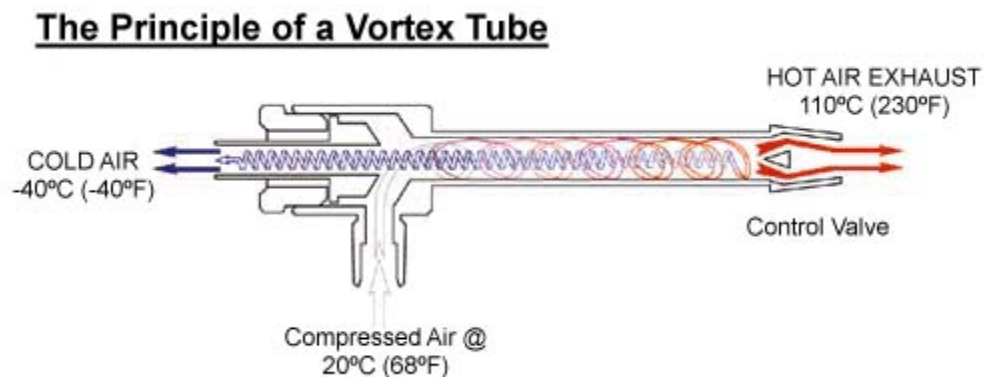


Vortex Tube Applications:

This newsletter provides information on the unique technology of a vortex tube for improved productivity in plant operations.

NOT ALL VORTEX TUBES CREATED EQUAL:

The vortex tube is unique technology that takes compressed air divides it into two flows - one end of the tube gets hot and the other tube gets cold. It was a little known technology 20 years ago but now is commonly used in several types of useful devices.



Compressed air, typically at 80-to 100 PSIG enters the vortex tube from the side at a tangent and enters through the generator into the tube, causing the air to spin. This air stream spins toward the hot end where some leaves the tube via the control valve. The remaining, spinning air travels back up the center of the tube. The inner spinning stream gives off heat energy to the outer stream (which leaves the tube at the hot end as hot air) and exits the vortex tube at the cold end as cooled air. The input air is literally split into hot and cold and can be quite extreme in range.

Some vortex tubes are made of aluminum, but most are now made of stainless steel that is the preferred material due to its greater strength and application in corrosive and high temperature environments. The control of the total flow and temperature produced at each end is determined primarily by a piece at the cold end called a "generator." The generator is a notched piece that causes the incoming compressed air to spin toward the hot end, turn and spin back inside itself to the cold end as described above. Generators are often made of plastic that may not hold up in hot environments. Metal generators made of brass are far preferable along with the use of viton o-rings to seal the space between the generator and the cold outlet end cap. After all, vortex tubes are used to cool so often they encounter hot environments and all metal is a far superior product.

Frigid-X™ vortex tubes are most useful in their pre-packaged versions. The most common “packages” are those for spot cooling of tooling and materials, either adjustable or fixed and, for the air conditioning of electrical and electronic enclosures.

Spot Cooling Systems

Applications for spot cooling include:

- Replace some coolants
- Replace most mist cooling applications
- Solder Cooling
- Adjusting thermostats
- Cool plastic machined parts
- Set hot melt adhesives
- Cool welding horns on ultrasonics
- Cool molded plastics
- Cool Electronic components
- Cool heat shrink tubing

Adjustable spot cooling systems are preferred obviously when some adjustability is required by the customer such as in cooling ultrasonic horns. For cooling machine tools to replace some coolants and most mist coolants, fixed units tend to be preferred. Adjustable units and fixed units are essentially the same except for the adjustable knob at the “hot” end.



Nex Flow™ Frigid-X™ Adjustable Spot Cooling System Above.

Nex Flow™ Frigid-X™ Air Conditioner

Nex Flow™ Frigid-X™ Air Conditioner for control panels provide a low cost method of both purging and cooling electrical and electronic control panels by using a stainless steel vortex tube to create cold air from ordinary compressed air.

The units are maintenance free since there are no moving parts and extremely reliable because even on the hottest days, as long as there is storage of compressed air, they will not break down. There are no compressor motors to burn out, one of the biggest problems with more costly air conditioning systems. Even though the use of compressed air does add to energy use, the cost is more than offset by savings in maintenance and added reliability. Energy is reduced by using on-off control. That is simply the use of a solenoid valve and thermostat to turn the unit on only when required and off when the desired temperature is reached within the housing.

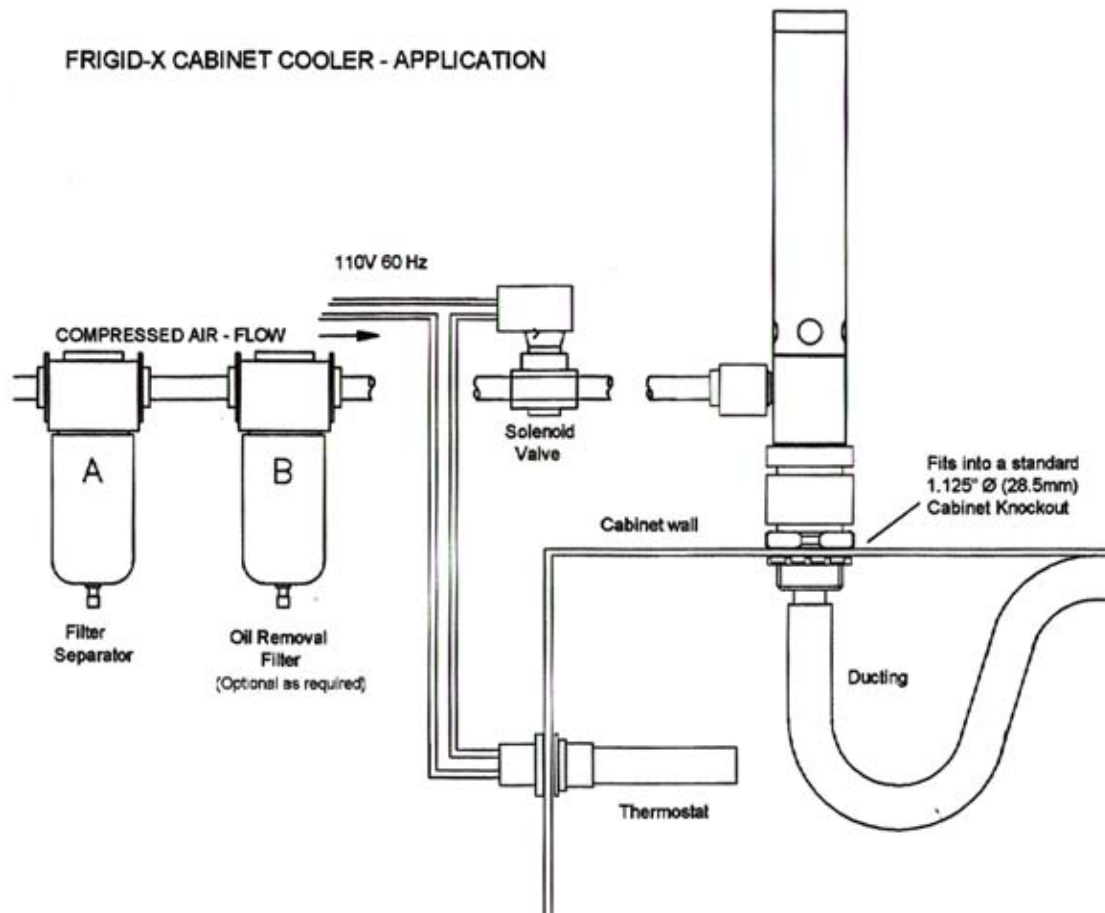


**Nex Flow™ Frigid-X™
Control Panel Air
Conditioner**

Advantages of the Control Panel Cooling System Nex Flow™ Frigid-X™ Air Conditioner

- Low in cost
- Compact
- No CFC's
- Fast installation
- Stabilize enclosure temperature and humidity
- Virtually maintenance free (No Moving Parts)
- Mounts in a standard electrical knockout
- Stops heat damage and nuisance tripping
- Eliminates fans and filters
- Prevents dirt contamination by keeping enclosure at positive pressure
- Units applicable to all environments including high temperature to 200°F

TYPICAL INSTALLATION OF A NEX FLOW FRIGID-X AIR CONDITIONER WITH ON-OFF CONTROL



Filtered, compressed air enters the Nex Flow™ Frigid-X™ Electrical Panel Cabinet Cooling System Air Conditioner and through the vortex tube component. The air is split into into two streams, one hot and one cold.

The muffled hot air from the vortex tube is expelled through the top of the air conditioner. The cold air is directed into the enclosure through the cold air distribution hose. Hot air inside the enclosure rises and exits to atmosphere via the air exhaust at a slight positive pressure. The enclosure is both purged and cooled with clean air. No outside air enters the enclosure.

SUMMARY

Vortex tube technology is applicable to any "spot" cooling or enclosure cooling application where control of temperature and reliability is important. Its use especially for the cooling of machine tools in dry machining applications and for electrical/electronic enclosure air conditioning are the most obvious examples.