// INDUSTRIENS BEDSTE SAMARBEJDSPARTNER

KATALOG:
CABINET COOLER FRA EXAIR

Køling med lave omkostninger

Undgå varmeskader

På forkant med den teknologiske udvikling

UNDGÅ AT TEKNIKKEN FEJLER I VARMEN

INGEN NEDETID PÅ GRUND AF VARME, SNAVS OG FUGT!

AVS kabinetkølesystemer fra EXAIR giver en billig og pålidelig metode til at køle elektroniske kontrolpaneler. Kabinetkølerne skaber kold luft ud fra komprimeret luft.

Kabinetkølerne er lavet af rustfrit stål og kan installeres på få minutter.
Kabinetkølerne er CE-godkendte.

Har du spørgsmål? Ring til os på +45 46 56 43 43
AVS Danmark ApS • Skelvej 18 • 2640 Hedehusene • www.avsdanmark.dk

Cabinet Cooler® Systems

Stop electronic control downtime due to heat, dirt, and moisture!

Cabinet Coolers maintain NEMA 4, 4X, and 12 integrity. All Cabinet Coolers are c UL us LISTED and CE compliant!

EXAIR Cabinet Cooler Systems accurately maintain the temperature inside the enclosure.

What is an EXAIR Cabinet Cooler® System?

A low cost, reliable way to cool and purge electronic control panels. EXAIR Cabinet Coolers incorporate a vortex tube to produce cold air from compressed air - **with no moving parts.** The compact Cabinet Cooler can be installed in minutes through a standard electrical knockout. NEMA 12, 4, and 4X Cabinet Coolers that match the NEMA rating of the enclosure are available in many cooling capacities for large and small control panels.

Why EXAIR Cabinet Cooler® Systems?

The vortex tubes incorporated in the EXAIR Cabinet Coolers are constructed of **stainless steel.** The wear, corrosion and oxidation resistance of stainless steel assures long life and maintenance free operation. **All Cabinet Coolers are UL Listed and CE compliant.**

A Model 4830 NEMA 4 Cabinet Cooler cools a panel with 20°F air while keeping the inside dry.

Applications

- Programmable controllers
- Line control cabinets
- Motor control centers
- Relay panels
- NC/CNC systems
- Modular control centers
- CCTV cameras
- Computer cabinets
- Cool laser housings
- Electronic scales
- Food service equipment

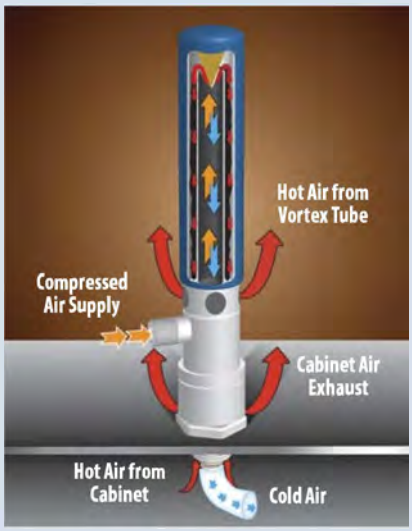
Advantages

- Low cost
- Compact
- Cooling capacities to 5,600 Btu/hr. (1411 Kcal/hr.)
- Quiet
- Install in minutes
- Maintain NEMA 12, 4 and 4X integrity (IP54 and 66)
- Stabilize enclosure temperature and humidity
- No CFC's
- No moving parts — maintenance free
- Mount in standard electrical knockout
- Stop nuisance tripping
- Stop heat damage
- Eliminate fans and filters
- Eliminate lost production
- Stop circuit drift
- Stop dirt contamination
- Provide washdown protection

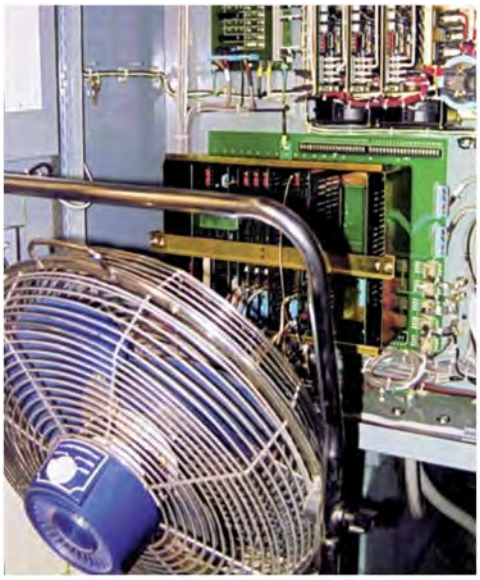
Special Cabinet Coolers

- High temp. models for ambients up to 200°F (93°C) available
- Type 316 stainless steel available
- Purge models for non-hazardous locations available

How The Cabinet Cooler Works



Compressed air enters the vortex tube powered Cabinet Cooler and is converted into two streams, one hot and one cold. (For more information on vortex tube operation, see page 134.) Hot air from the vortex tube is muffled and exhausted through the vortex tube exhaust. The cold air is discharged into the control cabinet through the cold air distribution kit. The displaced hot air in the cabinet rises and exhausts to atmosphere through the cabinet air exhaust at a slight positive pressure. Thus, the control cabinet is both cooled and purged with cool, clean air. Outside air is never allowed to enter the control panel.



A dangerous shock hazard exists when the panel door is opened to let a fan blow hot, dirty shop air at the electronics.

Selecting The Right Model

EXAIR Cabinet Cooler® Systems are available with or without thermostat control. The continuous coolers (Model 4200 and 4700 series) are recommended when constant cooling and a constant positive purge are desirable. The thermostatically controlled systems (Model 4300 and 4800 series) save air by activating the cooler only when internal temperatures approach critical levels. The adjustable thermostat is factory set at 95°F (35°C). Thermostatic systems are recommended where heat load fluctuates and continual purge is not required.

All EXAIR Cabinet Cooler® Systems contain a 5 micron **Automatic Drain Filter** for the compressed air supply and a **Cold Air Distribution Kit** to circulate the cold air throughout the enclosure. See page 154 for details.

Heat Can Stop Your Machines

When hot weather causes the electronics inside a control cabinet to fail, there is a panic to get the machinery up and running again. There are several cooling options out there and it's important to know the facts.

A. Heat Exchangers and Heat Pipes

These have serious limitations. On hot summer days when the temperatures of the room and inside of the enclosure are about equal, there's not enough difference for effective heat exchange.

- **They fail when dust and dirt clogs the filter**
- **The cooling capacity is limited due to ambient conditions**

B. Refrigerant Panel Air Conditioners

These coolers are prone to failure in dirty, industrial environments when dust and dirt clog the filter.

- **It takes almost a day to install**
- **Vibration from machinery causes refrigerant leaks and component failures**

C. "Plastic Box" Coolers

The "plastic box" cooler from a competitor uses an inaccurate mechanical thermostat that's designed for liquids. This thermostat has a poor ability to react quickly to changes in air temperature. **It costs up to 85% more to operate than EXAIR's ETC Cabinet Cooler® System with the same SCFM rating and Btu/hr. output.**

- **Electronics can overheat before it turns on**
- **It runs far longer than necessary before shutting off**

EXAIR Cabinet Cooler® Systems

EXAIR has a complete line of Cabinet Cooler Systems to dependably cool and purge your electrical enclosures. They convert an ordinary supply of compressed air into clean, cold 20°F air. They mount in minutes through an ordinary electrical knockout and have no moving parts to wear out. The compressed air filtration that is provided keeps water, oil and other contaminants out of the enclosure.

- **There is no room air filter to clog**
- **An accurate electrical thermostat control minimizes compressed air use**
- **All Cabinet Coolers are UL Listed to US and Canadian safety standards**
- **They are the only compressed air powered coolers that are CE compliant**

Cabinet Cooler® System Specifications

	Model #	Capacity*		Thermostat Control	Sound Level dBA
		Btu/hr.	Kcal/hr.		
NEMA 12 (IP54) (Dust, Oil resistant)	4208	550	139	No	67**
	4215	1000	252	No	73**
	4225	1700	428	No	74**
	4230	2000	504	No	74**
	4240	2800	706	No	78**
	4250	3400	857	No	75**
	4260	4000	1007	No	77**
	4270	4800	1209	No	77**
	4280	5600	1411	No	79**
	4308	550	139	Yes	67**
	4315	1000	252	Yes	73**
	4325	1700	428	Yes	74**
	4330	2000	504	Yes	74**
	4340	2800	706	Yes	78**
	4350	3400	857	Yes	75**
	4360	4000	1007	Yes	77**
	4370	4800	1209	Yes	77**
	4380	5600	1411	Yes	79**
NEMA 4 (IP66) (Splash resistant)	4708	550	139	No	67**
	4715	1000	252	No	73
	4725	1700	428	No	80
	4730	2000	504	No	80
	4740	2800	706	No	82
	4750	3400	857	No	84
	4760	4000	1007	No	84
	4770	4800	1209	No	84
	4780	5600	1411	No	85
	4808	550	139	Yes	67**
	4815	1000	252	Yes	73
	4825	1700	428	Yes	80
	4830	2000	504	Yes	80
	4840	2800	706	Yes	82
	4850	3400	857	Yes	84
	4860	4000	1007	Yes	84
	4870	4800	1209	Yes	84
	4880	5600	1411	Yes	85
NEMA 4X (IP66) (Corrosion resistant) (Available in 316SS)	4708SS	550	139	No	67**
	4715SS	1000	252	No	73
	4725SS	1700	428	No	80
	4730SS	2000	504	No	80
	4740SS	2800	706	No	82
	4750SS	3400	857	No	84
	4760SS	4000	1007	No	84
	4770SS	4800	1209	No	84
	4780SS	5600	1411	No	85
	4808SS	550	139	Yes	67**
	4815SS	1000	252	Yes	73
	4825SS	1700	428	Yes	80
	4830SS	2000	504	Yes	80
	4840SS	2800	706	Yes	82
	4850SS	3400	857	Yes	84
	4860SS	4000	1007	Yes	84
	4870SS	4800	1209	Yes	84
	4880SS	5600	1411	Yes	85

[redacted]

Environmental Considerations

NEMA 12 (IP54) Cabinet Coolers (dust-tight, oil-tight) are ideal for general industrial environments where no liquids or corrosives are present.

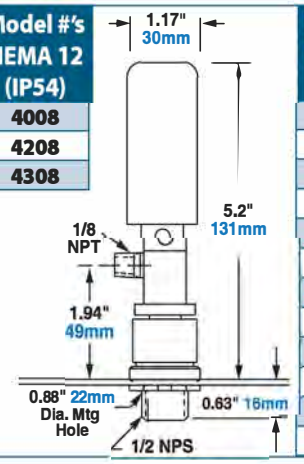
NEMA 4 (IP66) Cabinet Coolers (dust-tight, oil-tight, splash resistant, indoor/outdoor service) incorporate a low pressure relief valve for both the vortex tube and cabinet air exhaust. This valve closes and seals when the cooler is not operating, **to maintain the integrity of a NEMA 4 enclosure.**

NEMA 4X (IP66) Cabinet Coolers offer the same protection as NEMA 4 but are **constructed of stainless steel for food service and corrosive environments.**

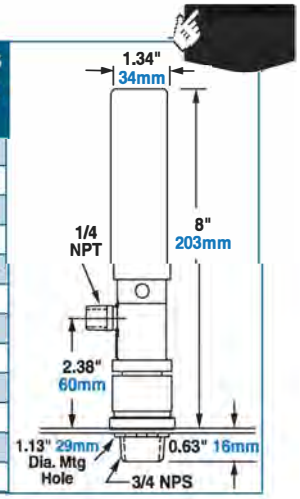
See page 156 for a complete description of each Cabinet Cooler and Cabinet Cooler System.

Dimensions

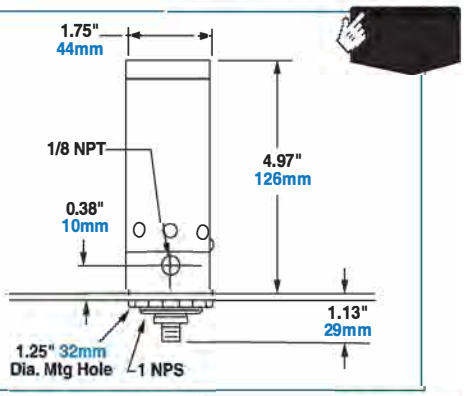
Model #'s NEMA 12 (IP54)
4008
4208
4308



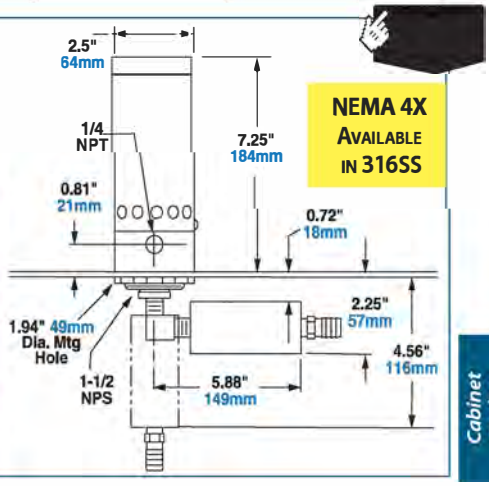
Model #'s NEMA 12 (IP54)
4015
4025
4030
4040
4215
4225
4230
4240
4315
4325
4330
4340



Model #'s NEMA 4 (IP66)	Model #'s NEMA 4X (IP66)
4608	4608SS
4708	4708SS
4808	4808SS



Model #'s NEMA 4 (IP66)	Model #'s NEMA 4X (IP66)
4615	4615SS
4625	4625SS
4630	4630SS
4640	4640SS
4715	4715SS
4725	4725SS
4730	4730SS
4740	4740SS
4815	4815SS
4825	4825SS
4830	4830SS
4840	4840SS



Sizing Guide - How To Calculate Heat Load For Your Enclosure

To determine the correct model for your application, it is first necessary to determine the **total heat load** to which the control panel is subjected. This total heat load is the combination of two factors - heat dissipated within the enclosure and heat transfer from outside into the enclosure.

To Calculate Btu/hr.:

1. First, determine the approximate watts of heat generated within the enclosure. Watts x 3.41 = Btu/hr.
2. Then, calculate outside heat transfer as follows:
   a. Determine the area in square feet exposed to the air, ignoring the top of the cabinet.
   b. Determine the temperature differential between maximum surrounding temperature and desired internal temperature. Then, using the Temperature Conversion Table *(below)*, determine the Btu/hr./ft.^{2} for that differential. Multiplying the cabinet surface area times Btu/hr./ft.^{2} provides external heat transfer in Btu/hr.
3. Add internal and external heat loads for total heat load.

To Calculate Kcal/hr.:

1. First, determine the approximate watts of heat generated within the enclosure. Watts x .86 = Kcal/hr.
2. Then, calculate outside heat transfer as follows:
   a. Determine the area in square meters exposed to the air, ignoring the top of the cabinet.
   b. Determine the temperature differential between maximum surrounding temperature and desired internal temperature. Then, using the Metric Temperature Conversion Table *(below)*, determine the Kcal/hr./m^2 for that differential. Multiplying the cabinet surface area times Kcal/hr./m^2 provides external heat transfer in Kcal/hr.
3. Add internal and external heat loads for total heat load.

Temperature Conversion Table	
Temperature Differential °F	Btu/hr./ft.²
5	1.5
10	3.3
15	5.1
20	7.1
25	9.1
30	11.3
35	13.8
40	16.2

Need Help Sizing EXAIR Cabinet Coolers?
Fill out and fax us the "Cabinet Cooler Sizing Guide" on page 153.

Temperature Conversion Table (METRIC)	
Temperature Differential °C	Kcal/hr./m²
3	4.5
6	9.7
9	15.1
12	21.0
15	27.0
18	34.0
21	41.0

Example:

Internal heat dissipation: 471 Watts or 1606 Btu/hr.

Cabinet area: 40 ft.²

Maximum outside temperature: 110°F

Desired internal temperature: 95°F

The conversion table (*above*) shows that a 15°F temperature differential inputs 5.1 Btu/hr./ft.²

40 sq. ft. x 5.1 Btu/hr./ft.² = 204 Btu/hr. external heat load.

Therefore, 204 Btu/hr. external heat load plus 1606 Btu/hr. internal heat load = 1810 Btu/hr. total heat load or Btu/hr. refrigeration required to maintain desired temperature.

In this example, the correct choice is a 2000 Btu/hr. Cabinet Cooler System. Choose a Cabinet Cooler model by determining the NEMA rating of the enclosure (type of environment), and with or without thermostat control.

Example:

Internal heat dissipation: 471 Watts or 405 Kcal/hr.

Cabinet area: 3.7m²

Maximum outside temperature: 44°C

Desired internal temperature: 35°C

The conversion table (*above*) shows that a 9°C temperature differential inputs 15.1 Kcal/hr./m².

3.7m² x 15.1 Kcal/hr./m² = 56 Kcal/hr. external heat load.

Therefore, 56 Kcal/hr. external heat load plus 405 Kcal/hr. internal heat load = 461 Kcal/hr. total heat load or Kcal/hr. refrigeration required to maintain desired temperature.

In this example, the correct choice is a 504 Kcal/hr. Cabinet Cooler System. Choose a Cabinet Cooler model by determining the NEMA rating of the enclosure (type of environment), and with or without thermostat control.

Special Cabinet Coolers

EXAIR manufactures special NEMA 12, 4, and 4X Cabinet Coolers suited to specific environmental requirements:

High Temperature Cabinet Coolers *(shown top right)* for ambients of 125° to 200°F (52° to 93°C) are available. Internal components can withstand high temperatures (like those near furnaces, ovens, etc.).

Non-Hazardous Purge Cabinet Cooler Systems *(shown middle right)* are ideal for dirty areas where contaminants might normally pass through small holes or conduits. Under normal conditions, the NHP Cabinet Cooler Systems provide a slight positive pressure in the enclosure by passing 1 SCFM (28 SLPM) of air through the cooler, when the solenoid valve is in the closed position. When the thermostat detects high temperature, it energizes the solenoid valve to pass full line pressure to the Cabinet Cooler, giving it full cooling capability.

Type 316 Stainless Steel NEMA 4X Cabinet Coolers *(shown bottom right)* are suitable for food service, pharmaceutical, harsh and corrosive environments, and other applications where 316SS is preferred. Capacities from 650 to 2800 Btu/hr. (164 to 706 Kcal/hr.) are available.

Fax Us The Facts!

Cabinet Cooler Sizing Guide

Use this form to fax us information about your control panel cooling problem. **We'll fax back our recommended solution within 24 hours.**

To: Application Engineering Department, EXAIR® Corporation

From: **Name**_____

Company_____

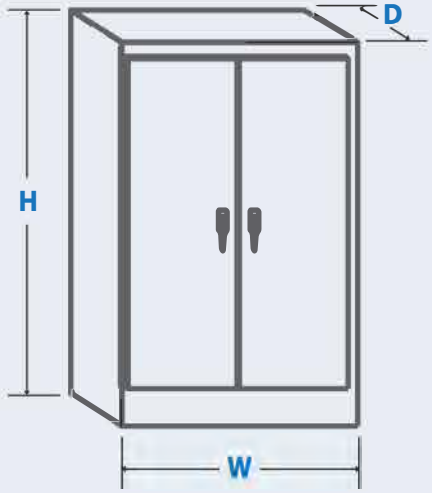
FAX number_____

Phone number_____ **Ext.#**_____

E-mail_____

You can fill this form out online at: www.exair.com/sizing.htm

☐ I have completed the information below. I want to know which EXAIR Cabinet Cooler System is the best choice for my control panel.



1. Height_____ 2. Width_____ 3. Depth_____
4. External air temperature now?_____ °F or °C
5. Internal air temperature now?_____ °F or °C
6. Maximum external air temperature possible?_____ °F or °C
7. Maximum internal air temperature desired?_____ °F or °C
8. My cabinet rating is:
   - ☐ NEMA 12 ☐ NEMA 4 ☐ NEMA 4X
   - ☐ Other (explain)_____
9. My cabinet is (check all that apply):
   - ☐ Vented - outside air circulates through the enclosure
   - ☐ Not vented - outside air does not circulate through the enclosure
   - ☐ Free standing
   - ☐ Wall mounted
   - ☐ Fan(s)
     - Indicate diameter or SCFM_____
     - Number of fans_____

Cold Air Distribution Kit: The kit includes a length of flexible vinyl tubing used to direct the cold air for circulation, or to hot spots. Tubing connectors and adhesive backed clips to hold the tubing in place are provided.

Systems for continuous operation include a Cabinet Cooler, cold air distribution kit and filter.

Filtration: EXAIR Cabinet Cooler Systems include a 5 micron automatic drain water and dirt filter. This filter **is critical** for protection of electronics from water in the compressed air line. If oil is present in the compressed air, a coalescing (oil removal) filter, such as EXAIR Model 9005 is recommended.

Systems with thermostat control include a Cabinet Cooler, thermostat, solenoid valve, cold air distribution kit and filter.

Humidity: For a continuous operating Cabinet Cooler, relative humidity inside the enclosure stabilizes at 45%. No moisture condenses inside the enclosure. (The enclosure must be sealed to prevent condensation.)

Inlet Air Temperature: Cabinet Cooler Systems provide a 50°F (28°C) temperature drop from supply air temperature when the inlet pressure is 80 PSIG (5.5 BAR). Elevated inlet temperature will produce a corresponding rise in cold air temperature and reduction in cooling capacity. Low air pressures will also reduce the cooling capacity.

Mounting: The Cabinet Cooler mounts to the enclosure through a drilled hole or electrical knockout. The NEMA 12 Cabinet Coolers may be mounted on the top or side of the panel. NEMA 4 and 4X Cabinet Coolers must be mounted on the top of the panel, or on the side of the panel using one of our Side Mount Kits (see page 157).

Solenoid Valve and Thermostat.

Solenoid Valve and Thermostat: Cabinet Cooler Systems with thermostat control include a solenoid valve and thermostat that limit the flow of compressed air to only when cooling is needed. The solenoid valve is rated 120V, 60 Hz or 110V, 50 Hz. It is UL Listed, CSA Certified.

See page 157 for more options.

The thermostat is factory set at 95°F (35°C). It will normally hold ±2°F (1°C) inside the cabinet. It is rated 24V-240V, 50/60 Hz and is UL Recognized, CSA Certified.

ETC™ Electronic Temperature Control

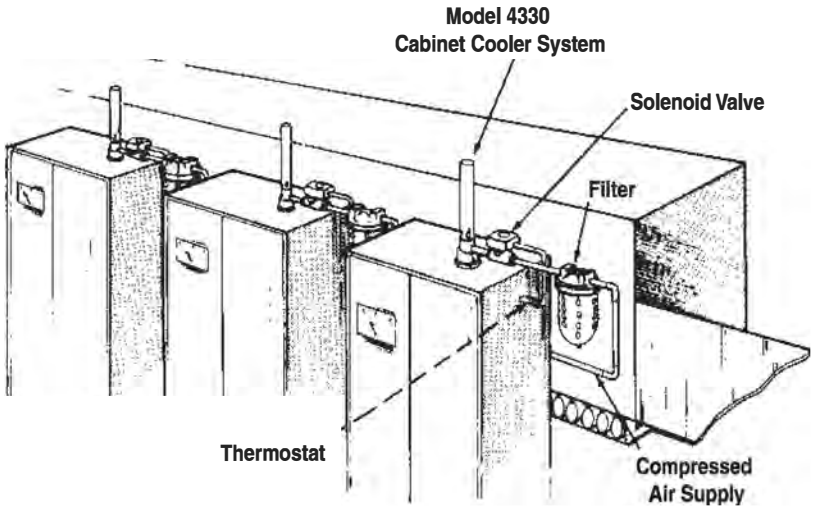
Model 9238 - 120VAC, 50/60 Hz
Model 9239 - 240VAC, 50/60 Hz

Setting Temperature:	Membrane push button control
Power Supply Current:	165 mA max
Sensor:	Type J Thermocouple
ETC Enclosure:	Polycarbonate NEMA 4X, IP 65, UL508, UL94-5V
Temperature Sampling Rate:	1 Reading/second
Max. Temp.:	158°F (70°C)
Solenoid Valve:	1/4 NPT

RoHS and CE Compliant

EXAIR's digital ETC (Electronic Temperature Control) provides precise temperature control for your electrical enclosure. It can accurately maintain a constant temperature that is slightly under the maximum rating of the electronics, permitting just enough cooling for the electronics without going so cold as to waste compressed air. The LED readout of the ETC displays the internal temperature of the electrical enclosure (°F or °C) that is constantly being monitored by a quick response thermocouple. The control activates the solenoid valve (included) when the temperature setting is exceeded. The polycarbonate plastic enclosure of the ETC is suitable for NEMA 12, 4 and 4X environments. (Cabinet Cooler not included.)

Cooling Control Panels In A Glass Plant

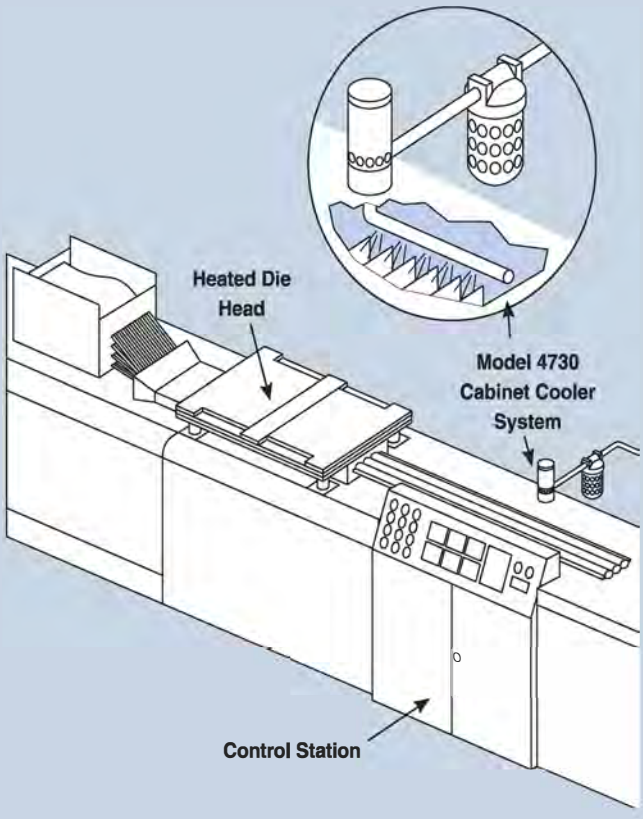


The Problem: Few companies contend with more heat-related problems than do glass manufacturers. Control panels in close proximity to molten glass are particularly susceptible. High ambient temperatures caused constant "nuisance tripping" of the circuit breakers. The "quick fix" solution — opening the panel doors — allowed dirt to enter the panels and created a potential safety hazard.

The Solution: EXAIR **Model 4330 Cabinet Cooler Systems** were installed on each control panel. Cold air was directed through the Cold Air Distribution Kit over the circuit breakers. Thermostat control assured that the **Cabinet Coolers would activate only when internal temperatures approached critical levels.** The panel doors were closed to prevent dirt infiltration and shock hazard. Downtime was eliminated.

Comment: The inherent reliability of the vortex tube operated Cabinet Cooler was the important advantage in this application. Because they have no moving parts, **EXAIR Cabinet Coolers are virtually impervious to hostile environments.** Glass plants, steel mills, foundries, and casting plants are just a few of the facilities benefiting from this simple, yet effective technology.

Cooling And Purging A Pultrusion Control



The Problem: In the pultrusion process, resin coated fibers are assembled by a forming guide, then drawn through a heated die. Residual heat from the die caused electronic malfunctions at the control station located immediately downstream.

The Solution: In minutes, a **Model 4730 NEMA 4 Cabinet Cooler System** was installed on the control module. **Its 2,000 Btu/hr. (504 Kcal/hr.) cooling capacity more than offset the additional heat load produced by the die.** Heat related malfunctions and downtime were eliminated.

Comment: The ability of EXAIR's Cabinet Cooler System to maintain a slight positive pressure within the enclosure was an important additional benefit in this application. **This purging feature assured that dust from the surroundings would not infiltrate the enclosure and compromise the sensitive electronic components.** The Cabinet Cooler also maintained the NEMA 4 integrity of the enclosure which was necessary for the occasional washdown of the die and surrounding surfaces.

NEMA 12 Cabinet Cooler Systems

The following Continuous Operation Systems include the NEMA 12 Cabinet Cooler, automatic drain filter and cold air distribution kit.

Model #	Description
4208	550 Btu/hr. (139 Kcal/hr.)
4215	1000 Btu/hr. (252 Kcal/hr.)
4225	1700 Btu/hr. (428 Kcal/hr.)
4230	2000 Btu/hr. (504 Kcal/hr.)
4240	2800 Btu/hr. (706 Kcal/hr.)
4250	3400 Btu/hr. (857 Kcal/hr.)
4260	4000 Btu/hr. (1007 Kcal/hr.)
4270	4800 Btu/hr. (1209 Kcal/hr.)
4280	5600 Btu/hr. (1411 Kcal/hr.)

The following Thermostat Control Systems include the NEMA 12 Cabinet Cooler, automatic drain filter, cold air distribution kit, thermostat and solenoid valve.

Model #	Description
4308	550 Btu/hr. (139 Kcal/hr.)
4315	1000 Btu/hr. (252 Kcal/hr.)
4325	1700 Btu/hr. (428 Kcal/hr.)
4330	2000 Btu/hr. (504 Kcal/hr.)
4340	2800 Btu/hr. (706 Kcal/hr.)
4350	3400 Btu/hr. (857 Kcal/hr.)
4360	4000 Btu/hr. (1007 Kcal/hr.)
4370	4800 Btu/hr. (1209 Kcal/hr.)
4380	5600 Btu/hr. (1411 Kcal/hr.)

NEMA 4 Cabinet Cooler Systems

The following Continuous Operation Systems include the NEMA 4 Cabinet Cooler, automatic drain filter and cold air distribution kit.

Model #	Description
4708	550 Btu/hr. (139 Kcal/hr.)
4715	1000 Btu/hr. (252 Kcal/hr.)
4725	1700 Btu/hr. (428 Kcal/hr.)
4730	2000 Btu/hr. (504 Kcal/hr.)
4740	2800 Btu/hr. (706 Kcal/hr.)
4750	3400 Btu/hr. (857 Kcal/hr.)
4760	4000 Btu/hr. (1007 Kcal/hr.)
4770	4800 Btu/hr. (1209 Kcal/hr.)
4780	5600 Btu/hr. (1411 Kcal/hr.)

The following Thermostat Control Systems include the NEMA 4 Cabinet Cooler, automatic drain filter, cold air distribution kit, NEMA 4/4X solenoid valve and thermostat.

Model #	Description
4808	550 Btu/hr. (139 Kcal/hr.)
4815	1000 Btu/hr. (252 Kcal/hr.)
4825	1700 Btu/hr. (428 Kcal/hr.)
4830	2000 Btu/hr. (504 Kcal/hr.)
4840	2800 Btu/hr. (706 Kcal/hr.)
4850	3400 Btu/hr. (857 Kcal/hr.)
4860	4000 Btu/hr. (1007 Kcal/hr.)
4870	4800 Btu/hr. (1209 Kcal/hr.)
4880	5600 Btu/hr. (1411 Kcal/hr.)

NEMA 4X Stainless Steel Cabinet Cooler Systems

The following Continuous Operation Systems include the NEMA 4X Cabinet Cooler, automatic drain filter and cold air distribution kit.

Model #	Description
4708SS	550 Btu/hr. (139 Kcal/hr.)
4715SS	1000 Btu/hr. (252 Kcal/hr.)
4725SS	1700 Btu/hr. (428 Kcal/hr.)
4730SS	2000 Btu/hr. (504 Kcal/hr.)
4740SS	2800 Btu/hr. (706 Kcal/hr.)
4750SS	3400 Btu/hr. (857 Kcal/hr.)
4760SS	4000 Btu/hr. (1007 Kcal/hr.)
4770SS	4800 Btu/hr. (1209 Kcal/hr.)
4780SS	5600 Btu/hr. (1411 Kcal/hr.)

The following Thermostat Control Systems include the NEMA 4X Cabinet Cooler, automatic drain filter, cold air distribution kit, NEMA 4/4X solenoid valve and thermostat.

Model #	Description
4808SS	550 Btu/hr. (139 Kcal/hr.)
4815SS	1000 Btu/hr. (252 Kcal/hr.)
4825SS	1700 Btu/hr. (428 Kcal/hr.)
4830SS	2000 Btu/hr. (504 Kcal/hr.)
4840SS	2800 Btu/hr. (706 Kcal/hr.)
4850SS	3400 Btu/hr. (857 Kcal/hr.)
4860SS	4000 Btu/hr. (1007 Kcal/hr.)
4870SS	4800 Btu/hr. (1209 Kcal/hr.)
4880SS	5600 Btu/hr. (1411 Kcal/hr.)

NEMA 12, 4, and 4X Cabinet Coolers are available in many cooling capacities for large and small control panels.

NEMA 4X models are available in Type 316 stainless steel.

High Temperature and Non-Hazardous Purge Cabinet Coolers are described on page 153.

24VDC Solenoid Valves are available.

If you have special requirements, please contact an Application Engineer.

Cabinet Cooler Only

NEMA 12 Cabinet Coolers Only

Model #	Description
4008	550 Btu/hr. (139 Kcal/hr.), 1/8 NPT
4015	1000 Btu/hr. (252 Kcal/hr.), 1/4 NPT
4025	1700 Btu/hr. (428 Kcal/hr.), 1/4 NPT
4030	2000 Btu/hr. (504 Kcal/hr.), 1/4 NPT
4040	2800 Btu/hr. (706 Kcal/hr.), 1/4 NPT

NEMA 4 Cabinet Coolers Only

Model #	Description
4608	550 Btu/hr. (139 Kcal/hr.), 1/8 NPT
4615	1000 Btu/hr. (252 Kcal/hr.), 1/4 NPT
4625	1700 Btu/hr. (428 Kcal/hr.), 1/4 NPT
4630	2000 Btu/hr. (504 Kcal/hr.), 1/4 NPT
4640	2800 Btu/hr. (706 Kcal/hr.), 1/4 NPT

NEMA 4X Cabinet Coolers Only

Model #	Description
4608SS	550 Btu/hr. (139 Kcal/hr.), 1/8 NPT
4615SS	1000 Btu/hr. (252 Kcal/hr.), 1/4 NPT
4625SS	1700 Btu/hr. (428 Kcal/hr.), 1/4 NPT
4630SS	2000 Btu/hr. (504 Kcal/hr.), 1/4 NPT
4640SS	2800 Btu/hr. (706 Kcal/hr.), 1/4 NPT

Upgrade your Thermostat Control System

Upgrade your Thermostat Control System to EXAIR's ETC™ Electronic Temperature Control (shown on page 154)

Simply add a:

"-ETC120" (for 120V, 50/60Hz) or "-ETC240" (for 240V, 50/60Hz) to your Thermostat Control Cabinet Cooler System model number.

Example:

Model 4330-ETC120 replaces the standard thermostat and solenoid valve with the ETC.

Dual Cabinet Cooler Systems are available with cooling capacities up to 5,600 Btu/hr. (1,411 Kcal/hr.).

Accessories and Components			
Model #	**Description**	**Model #**	**Description**
4904	Cold Air Distribution Kit (For all Cabinet Coolers except 550 Btu/hr. output)	**9044**	Valve and Thermostat Kit, (240V, 50/60Hz)
4905	Cold Air Distribution Kit (For Cabinet Coolers with 550 Btu/hr. output only)	**9016**	NEMA 4-4X Valve and Thermostat Kit, (120V, 50/60Hz)
9004	Automatic Drain Filter Separator, 1/4 NPT, 43 SCFM (1359 SLPM)	**9045**	NEMA 4-4X Valve and Thermostat Kit, (240V, 50/60Hz)
9027	Oil Removal Filter (For Cabinet Coolers with 550 Btu/hr. output), 1/4 NPT, 7-24 SCFM (198-680 SLPM)	**9017**	Thermostat Only, (24V-240V, 50/60Hz)
9005	Oil Removal Filter (For all Cabinet Coolers except 550 Btu/hr. output), 3/8 NPT, 15-37 SCFM (425-1048 SLPM)	**9018**	NEMA 4-4X Solenoid Valve Only, (120V, 50/60Hz), 1/4 NPT, 40 SCFM (1133 SLPM)
9006	Oil Removal Filter, 3/4 NPT, 50-150 SCFM (1415-4248 SLPM)	**9024**	NEMA 4-4X Solenoid Valve Only, (240V, 50/60Hz), 1/4 NPT, 40 SCFM (1133 SLPM)
9008	Pressure Regulator with Gauge, 1/4 NPT, 50 SCFM (1415 SLPM)	**9020**	Solenoid Valve Only, (120V, 50/60Hz), 1/4 NPT, 40 SCFM (1133 SLPM)
9238	ETC - Electronic Temperature Control, (120V, 50/60Hz), 1/4 NPT	**9021**	Solenoid Valve Only, (200-240V, 50/60Hz), 1/4 NPT, 40 SCFM (1133 SLPM)
9239	ETC - Electronic Temperature Control, (240V, 50/60Hz), 1/4 NPT	**9031**	Solenoid Valve Only, 24VDC, 1/4 NPT, 40 SCFM (1133 SLPM)
9015	Valve and Thermostat Kit, (120V, 50/60Hz)	**9065**	Solenoid Valve Only, 24VDC, 1 NPT, 350 SCFM (9911 SLPM)

EXAIR's Side Mount Kits for NEMA 12, 4 and 4X Cabinet Coolers offer convenient mounting to the side of an electrical enclosure.

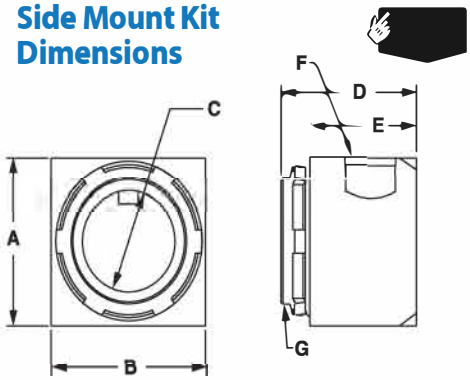
Side Mount Kits

EXAIR's Side Mount Kits make mounting on the side of an electrical enclosure possible when there is limited space on the top or side. (NEMA 4 and 4X Cabinet Cooler Systems must be mounted vertically.) The Side Mount Kits maintain the NEMA rating of large and small NEMA Type 12, 4 and 4X enclosures. They mount in a standard electrical knockout (1-1/2 NPS). Side Mount Kits for NEMA 12 Cabinet Cooler Systems have an aluminum construction. Those for NEMA 4 and 4X Cabinet Cooler Systems are Type 303 or Type 316 stainless steel.

Accessories and Components	
Model #	**Description**
4909	Side Mount Kit for NEMA 12 Cabinet Coolers up to 550 Btu/hr. (139 Kcal/hr.)
4910	Side Mount Kit for NEMA 12 Cabinet Coolers, 650 Btu/hr. (165 Kcal/hr.) and higher
4906	Side Mount Kit for NEMA 4 and 4X Cabinet Coolers up to 550 Btu/hr. (139 Kcal/hr.)
4907	Side Mount Kit for NEMA 4 and 4X Cabinet Coolers, 650 Btu/hr. (165 Kcal/hr.) and higher
4907-316	Type 316 Stainless Steel Side Mount Kit for NEMA 4 and 4X Cabinet Coolers, 650 Btu/hr. (165 Kcal/hr.) and higher

90 Degree Side Mount Kit Dimensions								
Model		**A**	**B**	**C**	**D**	**E**	**F**	**G**
4906	in	2.50	2.50	1.50	3.50	3.03	1 NPS	1-1/2 NPS
	mm	64	64	38	89	77		
4907	in	2.50	2.50	1.50	3.50	3.03	1-1/2 NPS	1-1/2 NPS
	mm	64	64	38	89	77		
4909	in	2.50	2.50	1.50	2.19	1.73	1/2 NPS	1-1/2 NPS
	mm	64	64	38	56	44		
4910	in	2.50	2.50	1.50	2.19	1.73	3/4 NPS	1-1/2 NPS
	mm	64	64	38	56	44		

Side Mount Kit Dimensions



Cold Gun Aircoolant System

An INTELLIGENT COMPRESSED AIR® Product

Cold Gun Aircoolant System™

Replace messy mist systems - improve dry machining with clean, cold air!

The Model 5215 Cold Gun keeps the part cool to the touch and prevents discoloration.

What Is The Cold Gun Aircoolant System?

A new solution to an old problem. Heat build up on dry machining operations reduces tool life and machining rates. The Cold Gun Aircoolant System produces a stream of **clean, cold air at 50°F (28°C) below supply air temperature. Operation is quiet and there are no moving parts to wear out.** It will remove heat to prolong tool life and increase productivity on machining operations when liquid coolants cannot be used.

The Cold Gun is also an alternative to expensive mist systems. It eliminates the costs associated with the purchase and disposal of cutting fluids and worker related health problems from breathing airborne coolants or slipping on wet floors.

EXAIR's Cold Gun is non-adjustable to prevent freeze-up during use. Cold airflow and temperature drop are factory set to optimize the gun's cooling capability.

Cold air eliminates heat cracking of the carbide tool during sharpening.

Applications

- Tool sharpening
- Drill and cutter grinding
- Routing
- Plunge and form grinding
- Milling
- Surface grinding
- Drilling
- Tire grinding
- Band sawing
- Plastic machining
- Laser cutting
- Chill rolls
- Setting hot melt adhesives

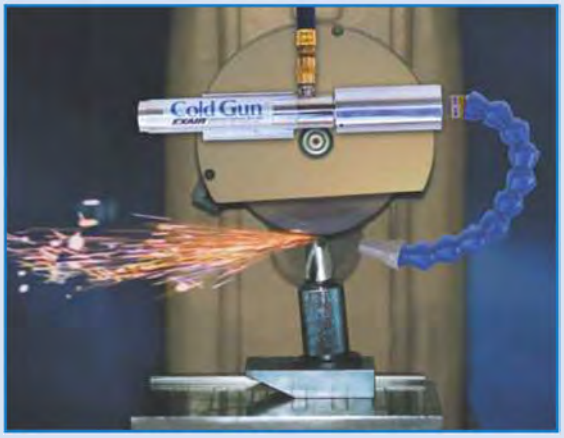
Advantages

- Improves production rates
- Prevents burning
- Extends tool life - reduces breakage
- Improves tolerance control
- Prevents smearing of metal or plastics
- Finished part is dry
- Eliminates wheel loading
- Low cost
- Compact, lightweight, portable
- No moving parts - maintenance free
- Quiet
- No coolant cost
- No electricity

The Model 5315 Cold Gun cools a two flute 3/8" carbide cutter on a CNC, increasing tool life by 50%.

Cold Gun Aircoolant System

Applications



Model 5215 Cold Gun System

Tool Grinding

Cold air eliminates heat cracking of carbide and tool edge burning during grinding and sharpening operations. Increased tool life between regrinds is the result.

Model 5215 Cold Gun System

Milling & Drilling

Fly cutters up to 460mm in diameter have been cooled with the Cold Gun. Dissipating heat with cold air extends tool life, increases speeds and feeds, and improves finishes.

Model 5315 Cold Gun System

Chill Roll

Cooling a roll with 20°F (-7°C) air keeps the material on the surface from bunching up, jamming or tearing. The metal surface transfers the cold temperature to the product.

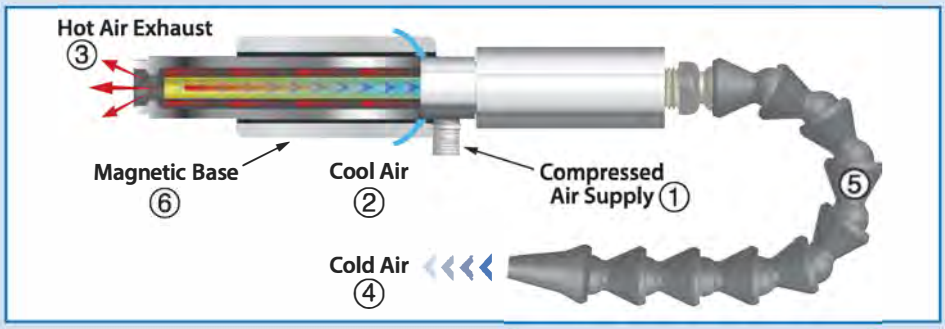
Model 5230 High Power Cold Gun System

Laser Cutting

Cold air cools a laser cut part so it can be handled seconds later. The High Power Cold Gun has twice the cooling capacity of the standard Cold Gun, cooling the part in less time.

Cold Gun Aircoolant System

How The Cold Gun Works

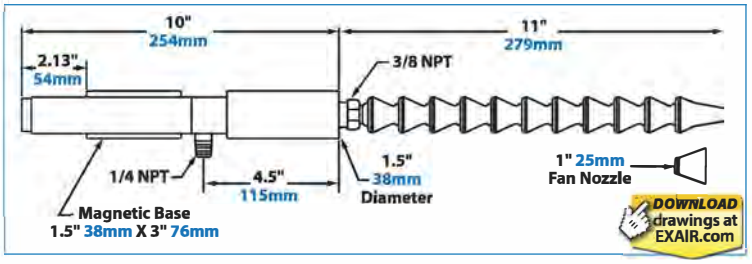


The standard Cold Gun and High Power Cold Gun incorporate a vortex tube to convert an ordinary supply of **compressed air** (1) into two low pressure streams, one hot and one cold. (For complete information on vortex tube operation, see page 160 of this catalog.) Secondary air is drawn in (2). The Cold Gun's hot airstream is muffled and discharged through the **hot air exhaust** (3). The **cold air** (4) is muffled and discharged through the **flexible hose** (5), which directs it to the point of use. Easy mounting and portability are provided through the use of an attached **magnetic base** (6).

Specifications

	Pressure Supply		Air Consumption		Sound Level
Model #	PSIG	BAR	SCFM	SLPM	dBA
Cold Gun 5215, 5315	100	6.9	15	425	70
High Power Cold Gun 5230, 5330	100	6.9	30	850	82

Cold Gun Dimensions



Controlling the Cold Air

The EXAIR Cold Gun gives **instant cold air** when filtered compressed air is supplied to it. Cycling on and off is a good way to save air. **For on and off control**, use a Model 9012 Manual Shutoff Valve. To turn the Cold Gun on with the machine, the Model 9020 Solenoid Valve may be used and wired through the machine control switch. This method is ideal for hand grinders and drill sharpeners.

The Compressed Air Supply

The Cold Gun is designed to use full line pressure of 80-100 PSIG (5.5-6.9 BAR). Temperature drop and flow are reduced when lower input pressures are applied. The use of clean, filtered air is essential to the operation of the Cold Gun. A filter separator that removes moisture, dirt and other particulates from the compressed air is included with each Cold Gun System. An optional Oil Removal Filter is also available. (See page 186 for details.)

Selecting The Right Model

Cold Gun Aircoolant Systems are available with either a Single Point or Dual Point Hose Kit.

The Single Point Hose Kit (included with the Model 5215 Cold Gun and Model 5230 High Power Cold Gun) is recommended for applications where a concentrated airflow is needed such as drilling and grinding operations.

The Dual Point Hose Kit (included with the Model 5315 Cold Gun and Model 5330 High Power Cold Gun) is recommended for applications where the heat is generated over a larger surface area such as band sawing, milling, chill rolls and hot melt adhesives.

A Cold Gun System with the Model 5901 Single Point Hose Kit can be easily converted to a "dual point" system with the purchase of the Model 5902 Dual Point Hose Kit.

Need More Cooling?

EXAIR's High Power Cold Gun Aircoolant System™ produces twice the airflow of the standard Cold Gun, doubling the cooling capability. It produces cold air at 50°F (28°C) below the supply air temperature so the air is as cold as possible without freezing up. Two systems are available: the Model 5230 High Power Cold Gun with Single Point Hose Kit and Model 5330 High Power Cold Gun with Dual Point Hose Kit.

Cold Gun Aircoolant System

Purdue University Study Confirms Benefits Of The EXAIR Cold Gun

Tooling costs a lot of money to replace. That's only part of the problem. As the tools wear out, you can expect:

- Slowed production and downtime to change out the tooling
- Poor tolerances and decreased dimensional accuracy due to increased temperature
- Increased cutting force is required (generates more heat and uses more electricity)

If you could just make the tooling last longer, you'd not only cut the tool cost but could increase profits by reducing scrapped parts and downtime.

A long term study on the effect of refrigerated air on tool wear in wood machining was conducted at the Forestry Products Department of Purdue University by Ms. Judith Gisip. The project was under the direction of Dr. Rado Gazo (department professor) and Harold Stewart (professor at North Carolina State University with 35 years in wood machining research). Wood is brutal on tooling. In metalworking, most of the heat goes away with the machined chip. Wood is an excellent insulator and doesn't conduct the heat away, which keeps it all there at the tool. Temperatures can exceed 1472°F (800°C)!

The extensive tests at Purdue were conducted in a 70°F climate controlled room. They tested (4) 1/2" (12.7mm) two-flute cutters on a CNC router at 16,000 rpm. (22) sheets of 3/4" thick MDF (medium density fiberboard) were fed one at a time, cutting away 1/4" (6mm) depth of cut on each pass. Power consumption of the CNC was recorded (current draw increases as the tool starts to dull). When finished, the surface of the tools was examined using a scanning electron microscope. Machining with the Cold Gun's 20°F air reduced tool wear by over 21% compared to the results with no cooling.

For complete details of the Purdue study, visit our web site at www.exair.com/purdue.htm.

Purdue's CNC router turns (22) 4'x8' sheets into sawdust.

EXAIR's Cold Gun is mounted under the protective guard.

Cold air from EXAIR's Model 5315 Cold Gun System keeps the tooling cool.

How Much Can You Save?

- A 1/2" two flute router bit for wood is approximately $67.
- The 21% reduction in tool wear when using a Cold Gun is $67 x 0.21 = **$14.07 savings per bit.**
- If you use (1) router bit per working day, the savings is $14.07 x 5 working days = **$70.35 per week / $3,658 per year** For One Bit!

Cold Gun Aircoolant Systems

Model 5215 Cold Gun System
(one cold outlet)

includes Cold Gun, Single Point Hose Kit, 3/8" (10mm) Cone Nozzle, 1-1/4" (32mm) Fan Nozzle, Manual Drain Filter Separator.

Model 5315 Cold Gun System
(two cold outlets)

includes Cold Gun, Dual Point Hose Kit, (2) 1/4" (6mm) Cone Nozzles, (2) 1" (25mm) Fan Nozzles, Manual Drain Filter Separator.

Model 5230 High Power Cold Gun System
(one cold outlet)

includes High Power Cold Gun, Single Point Hose Kit, 3/8" (10mm) Cone Nozzle, 1-1/4" (32mm) Fan Nozzle, Automatic Drain Filter Separator.

Model 5330 High Power Cold Gun System
(two cold outlets)

includes High Power Cold Gun, Dual Point Hose Kit, (2) 1/4" (6mm) Cone Nozzles, (2) 1" (25mm) Fan Nozzles, Automatic Drain Filter Separator.

A Dual Point Hose Kit is recommended when heat is generated over a larger surface area.

Accessories and Components

Model #	Description	Model #	Description
5015	Cold Gun Only	9005	Oil Removal Filter, 3/8 NPT, 15-37 SCFM (425-1,048 SLPM)
5030	High Power Cold Gun Only	9012	Manual Shutoff Valve, 1/4 NPT
5901	Single Point Hose Kit (Included with 5215 and 5230)	9020	Solenoid Valve, 120V, 50/60Hz, 1/4 NPT, 40 SCFM (1,133 SLPM)
5902	Dual Point Hose Kit (Included with 5315 and 5330)	9021	Solenoid Valve, 200-240V, 50/60Hz, 1/4 NPT, 40 SCFM (1,133 SLPM)
9003	Manual Drain Filter Separator, 1/4 NPT, 27 SCFM (765 SLPM)	9031	NEMA 4/4X Solenoid Valve, 24VDC, 1/4 NPT, 40 SCFM (1,133 SLPM)
9004	Automatic Drain Filter Separator, 1/4 NPT, 43 SCFM (1,359 SLPM)		

Vortex Tubes

Cold air to -50°F (-46°C) from your compressed air supply — with no moving parts!

What Is A Vortex Tube?

A low cost, reliable, maintenance free solution to a variety of industrial spot cooling problems. Using an ordinary supply of compressed air as a power source, vortex tubes create two streams of air, one hot and one cold, **with no moving parts.** Vortex tubes can produce:

- Temperatures from -50° to +260°F (-46° to +127°C)
- Flow rates from 1 to 150 SCFM (28 to 4,248 SLPM)
- Refrigeration up to 10,200 Btu/hr. (2,570 Kcal/hr.)

Temperatures, flows and cooling power are adjustable over a wide range using the control valve on the hot end exhaust.

Why EXAIR Vortex Tubes?

EXAIR Vortex Tubes are constructed of **stainless steel.** The wear resistance of stainless steel, as well as its resistance to corrosion and oxidation, assures that EXAIR Vortex Tubes will provide years of reliable, maintenance-free operation.

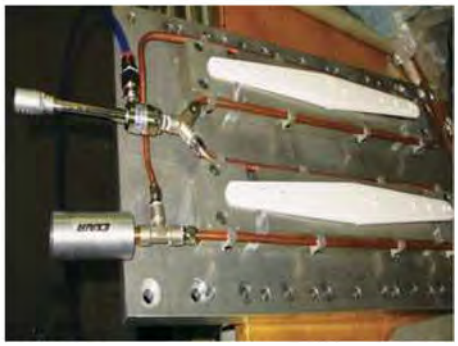
A 1/4 ton of refrigeration in the palm of your hand!

Applications

- Cooling electronic controls
- Cooling machining operations
- Cooling CCTV cameras
- Setting hot melts
- Cooling soldered parts
- Cooling gas samples
- Electronic component cooling
- Cooling heat seals
- Cooling environmental chambers

Advantages

- No moving parts
- No electricity or chemicals
- Small, lightweight
- Low cost
- Maintenance free
- Instant cold air
- Durable - stainless steel
- Adjustable temperature
- Interchangeable generators

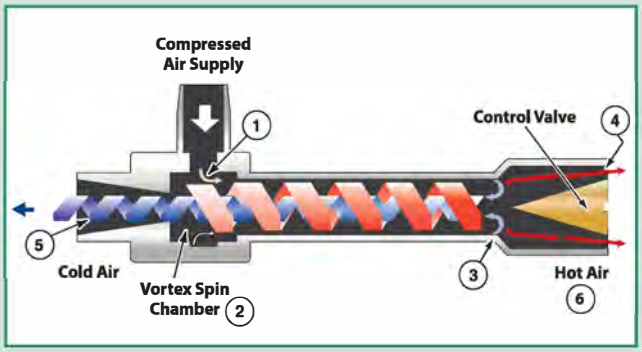


A Model 3225 Vortex Tube keeps plastic dishwasher arms cool during ultrasonic welding.

Special high temperature vortex tubes keep a boroscope lens cool while inserted into a 1200°F (650°C) boiler porthole.

A pair of medium vortex tubes cool a solenoid coil after a welding operation.

How A Vortex Tube Works



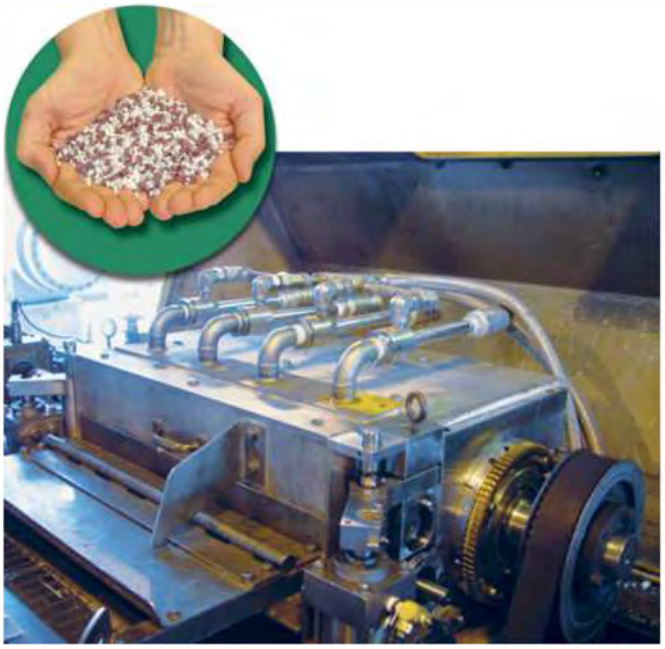
Compressed air, normally 80-100 PSIG (5.5 - 6.9 BAR), is ejected tangentially (1) through a generator into the vortex spin chamber (2). At up to 1,000,000 RPM, this air stream revolves toward the hot end (3) where some escapes through the control valve (4). The remaining air, still spinning, is forced back through the center of this outer vortex. The inner stream gives off kinetic energy in the form of heat to the outer stream and exits the vortex tube as cold air (5). The outer stream exits the opposite end as hot air (6). There is a detailed discussion of vortex tube history and theory later on page 165 in this section.

Controlling Temperature And Flow In A Vortex Tube

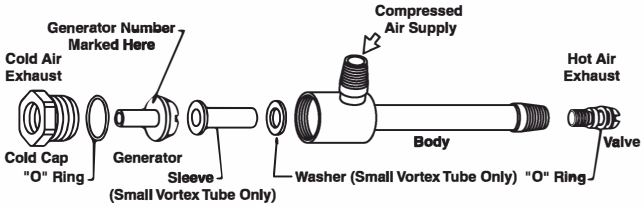
Cold airflow and temperature are easily controlled by adjusting the slotted valve in the hot air outlet. **Opening the valve reduces the cold airflow and the cold air temperature. Closing the valve increases the cold airflow and the cold air temperature.** The percentage of air directed to the cold outlet of the vortex tube is called the "cold fraction". In most applications, a cold fraction of 80% produces a combination of cold flow rate and temperature drop that maximizes refrigeration, or Btu/hr. (Kcal/hr.), output of a vortex tube. While low cold fractions (less than 50%) produce lowest temperatures, cold airflow volume is sacrificed to achieve them.

Most industrial applications, i.e., process cooling, part cooling, chamber cooling, require maximum refrigeration and utilize the 32XX series Vortex Tube. Certain "cryogenic" applications, i.e., cooling lab samples, circuit testing, are best served by the 34XX series Vortex Tube.

Setting a vortex tube is easy. Simply insert a thermometer in the cold air exhaust and set the temperature by adjusting the valve at the hot end. **Maximum refrigeration (80% cold fraction) is achieved when cold air temperature is 50°F (28°C) below compressed air temperature.**



(4) Model 3250 Vortex Tubes cool the cutting knives in this pelletizer to prevent irregular shapes.



Model 3930 EXAIR Cooling Kit

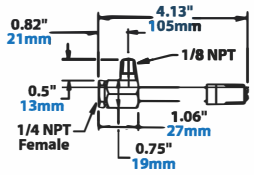
If you are unsure of your flow and temperature requirements, EXAIR recommends the purchase of an **EXAIR Cooling Kit**. It contains a vortex tube, cold air muffler, air line filter and all generators required to experiment with the full range of airflows and temperatures.

Selecting The Right Vortex Tube

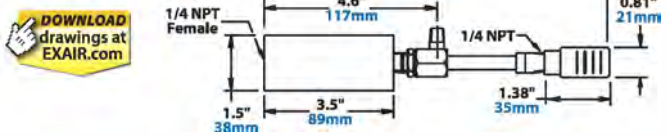
EXAIR Vortex Tubes are available in three sizes. Each size can produce a number of flow rates, as determined by a small internal part called a **generator.** If Btu/hr. (Kcal/hr.) requirements, or flow and temperature requirements are known, simply select the appropriate vortex tube according to the specification information shown below or the performance charts shown on the following page. Keep in mind that the **vortex generators are interchangeable.** If, for example, a Model 3215 Vortex Tube does not provide sufficient cooling, you need only change generators within the vortex tube to upgrade the flow rate from 15 to 25, 30 or 40 SCFM (425 to 708, 850 or 1,133 SLPM). Generator part numbers are shown in the "Accessories" listing on page 166.

Vortex Tube Dimensions

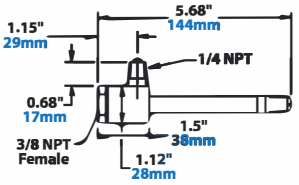
Small



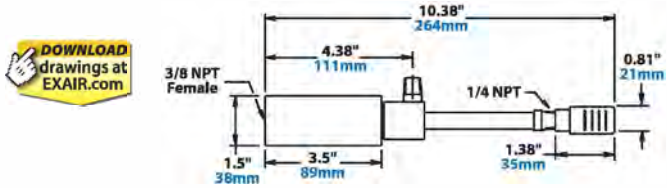
With Mufflers



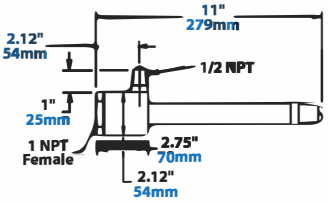
Medium



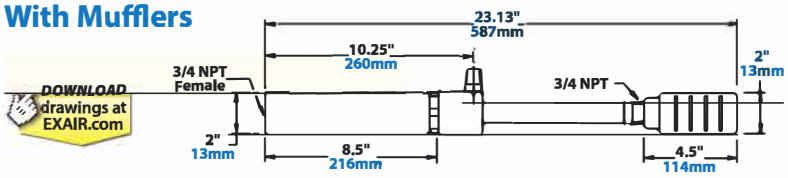
With Mufflers



Large



With Mufflers



Vortex Tube Specifications

32XX series Vortex Tubes optimize temperature drop and airflow to **produce maximum cooling power or Btu/hr. (Kcal/hr.).** Specify 32XX series Vortex Tubes for most general cooling applications.

34XX series Vortex Tubes provide **lowest cold air temperatures, but at low cold airflow (when less than a 50% cold fraction is used).** Specify 34XX series Vortex Tubes only where temperatures below 0°F (-18°C) are desired.

32XX Series Vortex Tube Specifications						
Model	SCFM*	SLPM*	Btu/hr.**	Kcal/hr.**	SIZE	dBA***
3202	2	57	135	34	Small	68
3204	4	113	275	69	Small	70
3208	8	227	550	139	Small	76
3210	10	283	650	164	Medium	80
3215	15	425	1,000	252	Medium	81
3225	25	708	1,700	428	Medium	82
3230	30	850	2,000	504	Medium	84
3240	40	1,133	2,800	706	Medium	88
3250	50	1,416	3,400	857	Large	94
3275	75	2,124	5,100	1,285	Large	96
3298	100	2,832	6,800	1,714	Large	96
3299	150	4,248	10,200	2,570	Large	97

* SCFM (SLPM) at 100 PSIG (6.9 BAR) Inlet Pressure
** Btu/hr. (Kcal/hr.) Cooling Capacity at 100 PSIG (6.9 BAR)
*** Noise levels taken with hot and cold mufflers installed.

34XX Series Vortex Tube Specifications						
Model	SCFM*	SLPM*	Btu/hr.**	Kcal/hr.**	SIZE	dBA***
3402	2	57	-----	-----	Small	67
3404	4	113	-----	-----	Small	69
3408	8	227	-----	-----	Small	75
3410	10	283	-----	-----	Medium	78
3415	15	425	-----	-----	Medium	80
3425	25	708	-----	-----	Medium	82
3430	30	850	-----	-----	Medium	84
3440	40	1,133	-----	-----	Medium	87
3450	50	1,416	-----	-----	Large	93
3475	75	2,124	-----	-----	Large	96
3498	100	2,832	-----	-----	Large	96
3499	150	4,248	-----	-----	Large	96

* SCFM (SLPM) at 100 PSIG (6.9 BAR) Inlet Pressure
** Not Applicable. 34XX series Vortex Tubes are not normally used in air conditioning applications.
*** Noise levels taken with hot and cold mufflers installed.

Vortex Tubes

Vortex Tube Performance

The **Vortex Tube Performance Charts** below give approximate temperature drops (and rises) **from inlet air temperature** produced by a vortex tube set at each cold fraction. Assuming no fluctuation of inlet temperature or pressure, a vortex tube will reliably maintain temperature within ±1°F.

Pressure Supply	Cold Fraction %						
PSIG	20	30	40	50	60	70	80
20	62	60	56	51	44	36	28
	15	25	36	50	64	83	107
40	88	85	80	73	63	52	38
	21	35	52	71	92	117	147
60	104	100	93	84	73	60	46
	24	40	59	80	104	132	166
80	115	110	102	92	80	66	50
	25	43	63	86	113	143	180
100	123	118	110	100	86	71	54
	26	45	67	90	119	151	191
120	129	124	116	104	91	74	55
	26	46	69	94	123	156	195

Numbers in shaded area give temperature drop of cold air, °F.
Numbers in white area give temperature rise of hot air, °F.

Pressure Supply	Cold Fraction % (METRIC)						
BAR	20	30	40	50	60	70	80
1.4	34.4	33.3	31.1	28.3	24.4	20.0	15.6
	8.3	13.9	20.0	28.3	35.6	46.1	59.4
2	40.9	39.6	37.1	33.8	29.2	24.0	18.1
	9.8	16.4	24.0	33.3	42.6	54.6	69.5
3	50.4	48.7	45.7	41.6	36.0	29.7	21.9
	12.0	19.9	29.6	40.3	52.3	66.5	83.5
4	56.9	54.7	50.9	46.1	40.0	32.9	25.1
	13.2	21.9	32.4	43.9	57.1	72.5	91.2
5	61.6	59.0	54.8	49.4	43.0	35.4	26.9
	13.7	23.3	34.2	46.5	60.9	77.2	97.1
6	65.4	62.7	58.2	52.7	45.6	37.6	28.6
	14.1	24.3	35.8	48.6	63.9	81.0	102.1
7	68.6	65.8	61.4	55.7	48.0	39.6	30.0
	14.4	25.1	37.3	50.2	66.3	84.2	106.3
8	71.1	68.2	63.8	57.3	50.0	40.8	30.4
	14.4	25.4	38.1	51.8	67.9	86.1	107.9

Numbers in shaded area give temperature drop of cold air, °C.
Numbers in white area give temperature rise of hot air, °C.

Back Pressure: The performance of a 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).

Filtration: The use of clean air is essential, and filtration of 25 microns or less is recommended. EXAIR filters contain a 5 micron element and are properly sized for flow.

Inlet Air Temperature: A vortex tube provides a temperature drop from supply air temperature (*see Performance Charts above*). Elevated inlet temperatures will produce a corresponding rise in cold air temperatures.

Noise Muffling: EXAIR offers mufflers for both the hot and cold air discharge. Normally, muffling is not required if the cold air is ducted.

Regulation: For best performance, use line pressures of 80 to 110 PSIG (5.5 to 7.6 BAR). Maximum pressure rating is 250 PSIG (17.2 BAR), minimum 20 PSIG (1.4 BAR).

EXAIR Products Using Vortex Tubes

Over the years, the basic vortex tube has been used in virtually hundreds of industrial cooling applications. A few have become so popular as to warrant the development of an "applied product" designed to suit the specific application. These products include the Adjustable Spot Cooler, Mini Cooler, Cold Gun and Cabinet Coolers that can be found in this catalog.

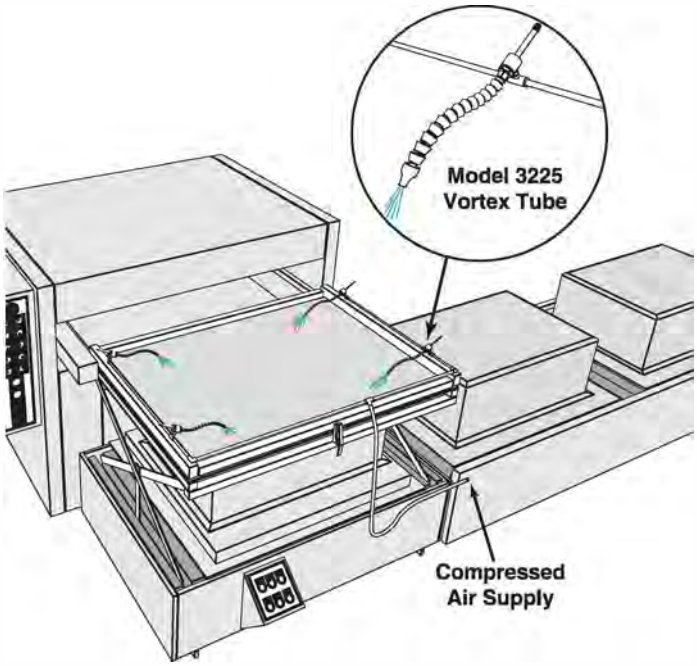
High Temperatures

High temperature vortex tubes for ambient temperatures above 200°F (93°C) are available. Standard vortex tubes are for ambient temperatures up to 125°F (52°C). Contact an Application Engineer at 1-800-903-9247 for details.

Preset Vortex Tubes

EXAIR can provide vortex tubes preset to any combination of flow and temperature desired. To prevent tampering with the desired setting, a drilled orifice that replaces the adjustable hot valve is available. For more information, please contact an Application Engineer.

Cooling Vacuum Formed Parts



The Problem: A manufacturer of major appliances vacuum forms the plastic interior shell of refrigerators. The deep draw of the plastic and complex geometry left the four corners unacceptably thin. The corners would tear during assembly or bulge when insulation was inserted between the shell and exterior housing, resulting in a high rejection rate.

The Solution: (4) Model 3225 Vortex Tubes were positioned to cool the critical corner areas just prior to forming the plastic sheet. By cooling these areas, less stretching of the plastic occurred which resulted in thicker corners.

Comment: Rejected parts become very costly, especially when expensive materials and slow process times are involved. The cold air from the vortex tube is just the solution for big problems like this one. It can supply "instant" cold air down to -50°F (-46°C) from an ordinary compressed air supply. Along with cooling other vacuum formed parts such as spas, bathtubs, tote pans and waste cans, it is ideal for cooling hot melts, ultrasonic welders, environmental chambers, etc.

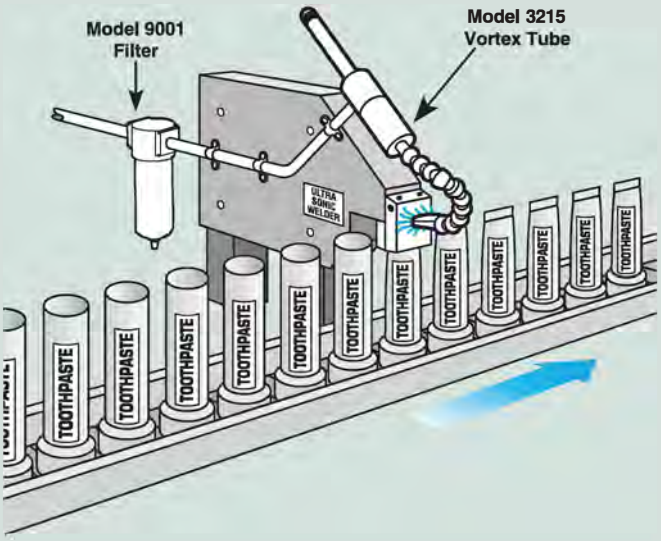
This is an ideal application for EXAIR's EFC, an electronic flow control for compressed air, shown on page 7. It reduces air consumption by turning on the compressed air for a preset length of time, when sensing the plastic sheet is in position.

Cooling An Ultrasonic Weld

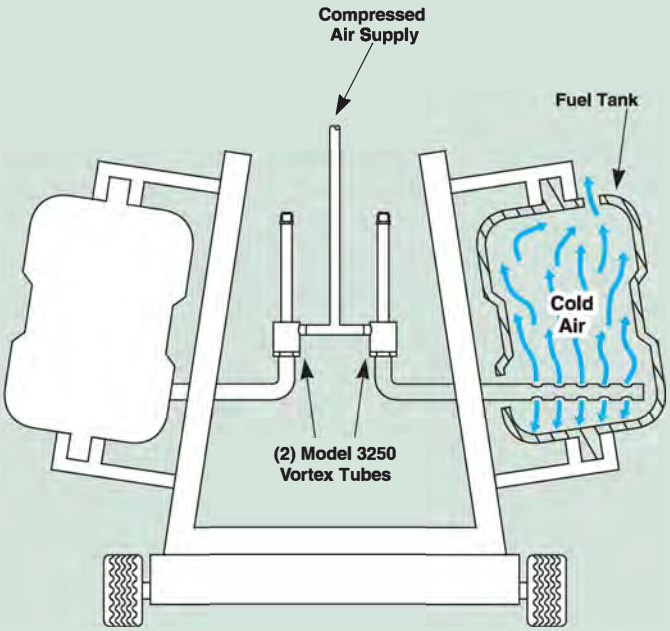
The Problem: A manufacturer of toothpaste seals the ends of plastic tubes with an ultrasonic welder prior to filling. As heat built up at the sealing jaw of the welder, release of the tubes was delayed. Tubes that were too hot would not seal resulting in a high rate of rejection.

The Solution: A Model 3215 Vortex Tube was used to direct cold air at the jaw of the welder. The cooling was transferred through the metal jaw to the tube seam while in the clamped position. **Process time was reduced and rejected tubes were eliminated.**

Comment: It amazes most people that the cooling from a small vortex tube can dramatically improve quality and throughput. The vortex tube is the low cost solution for cooling parts, chambers, heat seals and various processes. They're easy to use, can be adjusted to produce cold air down to -50°F (-46°C) and have no moving parts to wear out.



Cooling Blow Molded Fuel Tanks

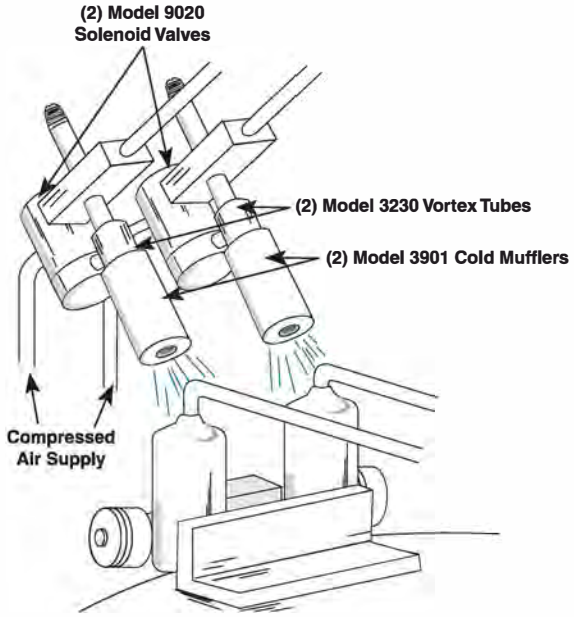


The Problem: Automobile fuel tanks are blow molded, then clamped to a fixture to prevent distortion during the cooling cycle. The cooling time of over 3 minutes required for each tank created a bottleneck in the production process.

The Solution: (2) Model 3250 Vortex Tubes were mounted to the cooling rack and connected to a compressed air line. Cold air produced by the vortex tubes was circulated inside the fuel tanks. **Cooling time was reduced from three minutes to two minutes for each tank, improving productivity by 33%.**

Comment: It's hard to imagine an application better suited to vortex cooling than this one. The vortex tubes' small size and light weight simplified mounting to the cooling rack. No moving parts assured reliability and maintenance-free operation in a hostile environment. Finally, the cold airstream was easily channeled to the fuel tank via the threaded cold air outlet. When the cooling problem includes the need for simplicity, reliability and compact design, a vortex tube is very often the best choice.

Cooling Small Parts After Brazing

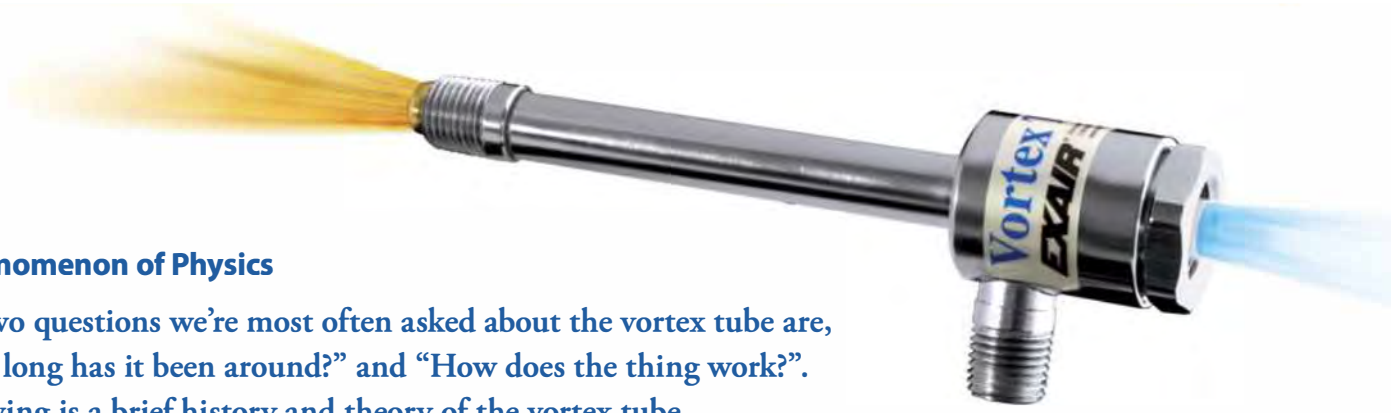


The Problem: Air conditioner parts assembled on an automatic brazing machine must be cooled to handling temperature prior to removal. The machine was capable of brazing up to four hundred pieces per hour. However, the time required for the parts to cool severely limited the production rate. Water cooling was unacceptable from the standpoint of both housekeeping and part contamination.

The Solution: (2) Model 3230 Vortex Tubes (with cold air mufflers installed) **were used to blow cold air on the parts after the brazing cycle.** The vortex tubes were set at an 80% cold airflow (cold fraction) to produce maximum refrigeration. **The parts were cooled from a brazing temperature of 1,450°F (788°C) to a handling temperature of 120°F (49°C) within 20 seconds,** allowing the machine to operate at its **maximum production rate.**

Comment: Compared to conventional refrigeration or water cooling, vortex tubes offer a number of advantages: low cost, compact design, inherent reliability and cleanliness. These attributes make vortex tubes the cost effective choice for many small part cooling operations.

Vortex Tubes



A Phenomenon of Physics

The two questions we're most often asked about the vortex tube are, "How long has it been around?" and "How does the thing work?". Following is a brief history and theory of the vortex tube.

The vortex tube was invented quite by accident in 1928. George Ranque, a French physics student, was experimenting with a vortex-type pump he had developed when he noticed warm air exhausting from one end, and cold air from the other. Ranque soon forgot about his pump and started a small firm to exploit the commercial potential for this strange device that produced hot and cold air with no moving parts. However, it soon failed and the vortex tube slipped into obscurity until 1945 when Rudolph Hilsch, a German physicist, published a widely read scientific paper on the device.

Much earlier, the great nineteenth century physicist, James Clerk Maxwell, postulated that since heat involves the movement of molecules, we might someday be able to get hot and cold air from the same device with the help of a "friendly little demon" who would sort out and separate the hot and cold molecules of air.

Thus, the vortex tube has been variously known as the ***"Ranque Vortex Tube",*** the ***"Hilsch Tube",*** the ***"Ranque-Hilsch Tube",*** and ***"Maxwell's Demon".*** By any name, it has in recent years gained acceptance as a simple, reliable and low cost answer to a wide variety of industrial spot cooling problems.

A vortex tube uses compressed air as a power source, has no moving parts, and produces hot air from one end and cold air from the other. The volume and temperature of these two airstreams are adjustable with a valve built into the hot air exhaust. Temperatures as low as -50°F (-46°C) and as high as 260°F (127°C) are possible.

Theories abound regarding the dynamics of a vortex tube. Here is one widely accepted explanation of the phenomenon:

Compressed air is supplied to the vortex tube and passes through nozzles that are tangent to an internal counterbore. These nozzles set the air in a vortex motion. This spinning stream of air turns 90° and passes down the hot tube in the form of a spinning shell, similar to a tornado. A valve at one end of the tube allows some of the warmed air to escape. What does not escape, heads back down the tube as a second vortex inside the low-pressure area of the larger vortex. This inner vortex loses heat and exhausts through the other end as cold air.

While one airstream moves up the tube and the other down it, both rotate in the same direction at the same angular velocity. That is, a particle in the inner stream completes one rotation in the same amount of time as a particle in the outer stream. However, because of the principle of conservation of angular momentum, the rotational speed of the smaller vortex might be expected to increase. (The conservation principle is demonstrated by spinning skaters who can slow or speed up their spin by extending or drawing in their arms.) But in the vortex tube, the speed of the inner vortex remains the same. Angular momentum has been lost from the inner vortex. The energy that is lost shows up as heat in the outer vortex. Thus the outer vortex becomes warm, and the inner vortex is cooled.

Vortex Tubes

EXAIR Cooling Kits

EXAIR Cooling Kits include a vortex tube, all generators, cold muffler, fitting, tubing and clips to duct cold air, and filter separator.

Model #	Description
3908	Cooling Kit up to 550 Btu/hr. (139 Kcal/hr.), Small Size
3930	Cooling Kit up to 2,800 Btu/hr. (706 Kcal/hr.), Medium Size
3998	Cooling Kit up to 10,200 Btu/hr. (2,570 Kcal/hr.), Large Size

Vortex Tubes

Model #	Description
3202	Vortex Tube, 2 SCFM (57 SLPM), for max. refrigeration, 135 Btu/hr. (34 Kcal/hr.), Small Size
3204	Vortex Tube, 4 SCFM (113 SLPM), for max. refrigeration, 275 Btu/hr. (69 Kcal/hr.), Small Size
3208	Vortex Tube, 8 SCFM (227 SLPM), for max. refrigeration, 550 Btu/hr. (139 Kcal/hr.), Small Size
3210	Vortex Tube, 10 SCFM (283 SLPM), for max. refrigeration, 650 Btu/hr. (164 Kcal/hr.), Medium Size
3215	Vortex Tube, 15 SCFM (425 SLPM), for max. refrigeration, 1,000 Btu/hr. (252 Kcal/hr.), Medium Size
3225	Vortex Tube, 25 SCFM (708 SLPM), for max. refrigeration, 1,700 Btu/hr. (428 Kcal/hr.), Medium Size
3230	Vortex Tube, 30 SCFM (850 SLPM), for max. refrigeration, 2,000 Btu/hr. (504 Kcal/hr.), Medium Size
3240	Vortex Tube, 40 SCFM (1,133 SLPM), for max. refrigeration, 2,800 Btu/hr. (706 Kcal/hr.), Medium Size
3250	Vortex Tube, 50 SCFM (1,416 SLPM), for max. refrigeration, 3,400 Btu/hr. (857 Kcal/hr.), Large Size
3275	Vortex Tube, 75 SCFM (2,124 SLPM), for max. refrigeration, 5,100 Btu/hr. (1,285 Kcal/hr.), Large Size
3298	Vortex Tube, 100 SCFM (2,832 SLPM), for max. refrigeration, 6,800 Btu/hr. (1,714 Kcal/hr.), Large Size
3299	Vortex Tube, 150 SCFM (4,248 SLPM), for max. refrigeration, 10,200 Btu/hr. (2,570 Kcal/hr.), Large Size
3402	Vortex Tube, 2 SCFM (57 SLPM), for max. cold temperature, Small Size
3404	Vortex Tube, 4 SCFM (113 SLPM), for max. cold temperature, Small Size
3408	Vortex Tube, 8 SCFM (227 SLPM), for max. cold temperature, Small Size
3410	Vortex Tube, 10 SCFM (283 SLPM), for max. cold temperature, Medium Size
3415	Vortex Tube, 15 SCFM (425 SLPM), for max. cold temperature, Medium Size
3425	Vortex Tube, 25 SCFM (708 SLPM), for max. cold temperature, Medium Size
3430	Vortex Tube, 30 SCFM (850 SLPM), for max. cold temperature, Medium Size
3440	Vortex Tube, 40 SCFM (1,133 SLPM), for max. cold temperature, Medium Size
3450	Vortex Tube, 50 SCFM (1,416 SLPM), for max. cold temperature, Large Size
3475	Vortex Tube, 75 SCFM (2,124 SLPM), for max. cold temperature, Large Size
3498	Vortex Tube, 100 SCFM (2,832 SLPM), for max. cold temperature, Large Size
3499	Vortex Tube, 150 SCFM (4,248 SLPM), for max. cold temperature, Large Size

Vortex Tube Accessories and Components

Model #	Description
3905	Cold Muffler for 2 through 8 SCFM (57-227 SLPM) Vortex Tube, Small Size
3901	Cold Muffler for 10 through 40 SCFM (283-1,133 SLPM) Vortex Tube, Medium Size
3906	Cold Muffler for 50 through 150 SCFM (1,416-4,248 SLPM) Vortex Tube, Large Size
3903	Hot Muffler for 2 through 40 SCFM (57-1,133 SLPM) Vortex Tube, Small & Medium Size
3907	Hot Muffler for 50 through 150 SCFM (1,416-4,248 SLPM) Vortex Tube, Large Size
3909	Generator Kit for 2 through 8 SCFM (57-227 SLPM) Vortex Tube, Small Size
3902	Generator Kit for 10 through 40 SCFM (283-1,133 SLPM) Vortex Tube, Medium Size
3910	Generator Kit for 50 through 150 SCFM (1,416-4,248 SLPM) Vortex Tube, Large Size

Generator Kits ordered with a vortex tube include all generators for the specified tube. Permits setting the vortex tube for all capacities and styles.

Generator Only —Specify capacity (SCFM) and style ("R" for max. refrigeration, "C" for max. cold temperature).
Example:
15-R = 15 SCFM Generator for max. refrigeration
50-C = 50 SCFM Generator for max. cold temperature

Accessories

Model #	Description
9001	Automatic Drain Filter Separator, 3/8 NPT, 65 SCFM (1,841 SLPM)
9032	Automatic Drain Filter Separator, 1/2 NPT, 90 SCFM (2,549 SLPM)
9002	Automatic Drain Filter Separator, 3/4 NPT, 220 SCFM (6,230 SLPM)
9005	Oil Removal Filter, 3/8 NPT, 15-37 SCFM (425-1,048 SLPM)
9006	Oil Removal Filter, 3/4 NPT, 50-150 SCFM (1,416-4,248 SLPM)
9015	Valve and Thermostat Kit, 120V, 50/60Hz, 1/4 NPT, 40 SCFM (1,133 SLPM)

Other solenoid valves and thermostats available. Contact factory.

Note: Flow ratings shown (SCFM/SLPM) assume 100 PSIG (6.9 BAR) inlet pressure. At other pressures, flow is proportional to absolute inlet pressure.

Adjustable Spot Cooler

Cold air to -30°F (-34°C) from your compressed air supply for spot cooling!

What Is The Adjustable Spot Cooler?

A low cost, reliable, maintenance free solution to a variety of industrial spot cooling problems. With the turn of a knob, you can select the temperature best suited to your application. **The Adjustable Spot Cooler provides a precise temperature setting from -30°F (-34°C) to room temperature.**

The Adjustable Spot Cooler incorporates a vortex tube that converts an ordinary supply of compressed air into cold air.

- It can produce temperatures from -30° to +70°F (-34° to +21°C)
- Parts included for flow rates of 15, 25, and 30 SCFM (425, 708 and 850 SLPM). 25 SCFM (708 SLPM) generator is factory installed.
- It can produce refrigeration up to 2,000 Btu/hr. (504 Kcal/hr.)

A swivel magnetic base provides easy mounting and portability. Flexible tubing that holds its position directs the cold air. No moving parts or CFC's assures maintenance free operation.

PVC hose is cooled at the exit of an extruder so it can be coiled immediately.

Why The Adjustable Spot Cooler?

The Adjustable Spot Cooler is quiet (less than 75 dBA), easily set with a thermometer and holds the temperature setting. It's ideal for applications where mist or liquid cooling can not be used due to part contamination or cost. Tolerances, product finish and production rates can improve dramatically.

The Adjustable Spot Cooler is available with either a single point or dual point hose kit. The single point system (Model 3825) is recommended for cooling a small surface like solder joints, hot melts or drilled plastics. The dual point system (Model 3925) is recommended when heat is generated over a larger surface area.

The Adjustable Spot Cooler replaces flood coolant and eliminates hours of cleanup on a cast iron machining operation.

Applications

- Adjusting thermostats
- Cooling solder
- Cooling machined plastics
- Setting hot melts
- Cooling welding horns
- Cooling molded plastics
- Electronic component cooling
- Cooling gas samples
- Cooling environmental chambers

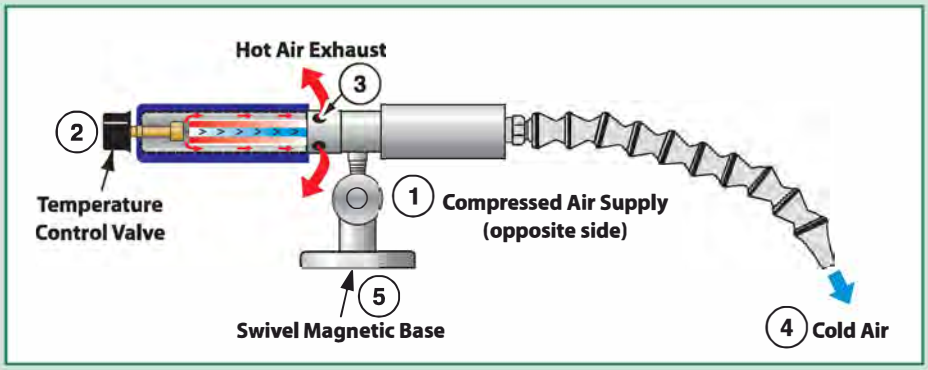
Advantages

- No moving parts
- No electricity or chemicals
- Small, lightweight
- Low cost
- Maintenance free
- Instant cold air
- Quiet - less than 75 dBA
- Swivel magnetic base
- Interchangeable generators

The Adjustable Spot Cooler maintains critical tolerances on machined plastic parts.

Adjustable Spot Cooler

How The Adjustable Spot Cooler Works



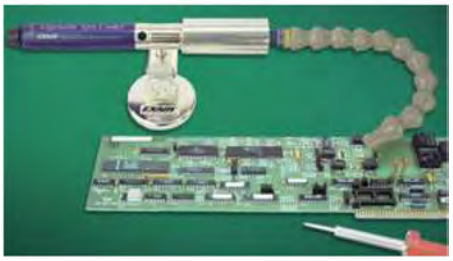
The Adjustable Spot Cooler incorporates a vortex tube to convert an ordinary supply of compressed air (1) into two low pressure streams, one hot and one cold. (For complete information on vortex tube operation, see page 160.) With the turn of a knob, the **temperature control valve** (2) allows some hot air to flow through a muffling sleeve and out the **hot air exhaust** (3). The opposite end provides a cold airstream (4) that is muffled and discharged through the flexible hose, which directs it to the point of use. The **swivel magnetic base** (5) provides easy mounting and portability.

Specifications

Pressure Supply		Air Consumption		Sound Level
PSIG	BAR	SCFM	SLPM	dBA
100	6.9	15	425	72
100	6.9	25*	708	73
100	6.9	30	850	74

* 25 SCFM (708 SLPM) generator is factory installed

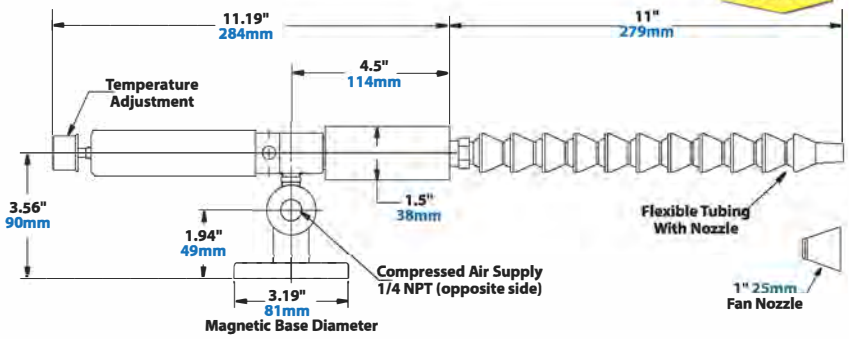
The Model 3825 Adjustable Spot Cooler can produce temperatures from -30° to +70°F (-34° to +21°C).



Electronic components stay cool during a soldering operation.

Dimensions

DOWNLOAD drawings at EXAIR.com



Adjusting the Spot Cooler

The Adjustable Spot Cooler System can produce a full range of airflows and temperatures as determined by the knob setting and a small internal part called a generator. The generators control the SCFM (SLPM) of air consumption and are easily interchangeable.

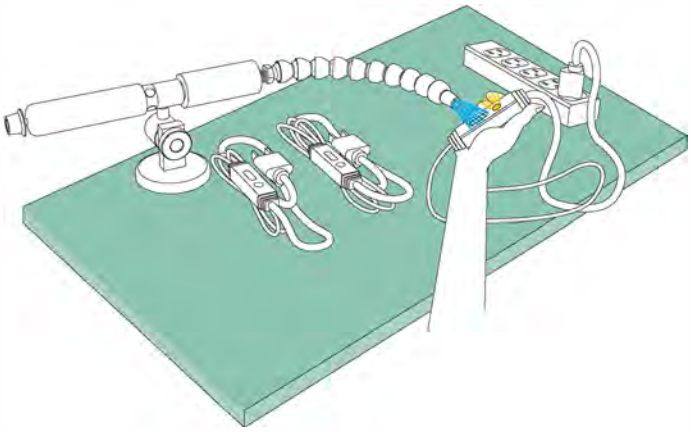
The Adjustable Spot Cooler has a 25 SCFM (708 SLPM) generator installed that produces up to 1,700 Btu/hr. (429 Kcal/hr.). If less cooling is desired, the 15 SCFM (425 SLPM) generator which delivers 1,000 Btu/hr. (252 Kcal/hr.) can be installed. If more cooling is needed, the 30 SCFM (850 SLPM) generator can be installed for up to 2,000 Btu/hr. (504 Kcal/hr.).

Controlling the Cold Air

The Adjustable Spot Cooler gives instant cold air when filtered compressed air is supplied to it. Cycling on and off is a good way to save air. For on and off control, use a Model 9012 Manual Shutoff Valve. To turn the Adjustable Spot Cooler on with the machine, the Model 9020 Solenoid Valve may be used and wired through the machine control switch. The EFC electronic flow control shown on page 7 can also be used.

Adjustable Spot Cooler

Testing Heat Tape Thermostats



The Problem: A manufacturer of electrical heat tapes had a problem testing thermostats for accuracy. The heat tape is supposed to switch on when the outdoor temperature dips below 40°F to prevent pipes from freezing or ice from building up on a roof's edge. The liquid-tight thermostat of every tape had to be dipped into a bowl of ice water (thermometer checked at 36°F (2°C)) to make sure the indicator light came on and the tape got warm. Summertime heat caused the water to heat up so quickly that more time was spent regulating the water temperature than testing thermostats.

The Solution: The water bath was replaced with a **Model 3825 Adjustable Spot Cooler. Once set to their desired temperature of 36°F (2°C), it provided a stable temperature all day long without adjustment.** Drying each heat tape was no longer required and testing was over in seconds.

Comment: The Adjustable Spot Cooler paid for itself in no time as a result of the increased productivity. In this case, **the company used the included 15 SCFM (425 SLPM) generator which minimized the compressed air use, costing only 23 cents per hour of continuous use!** When testing thermostats, cooling machined plastics, setting hot melts or controlling tolerances, the Adjustable Spot Cooler is the best choice.

Adjustable Spot Cooler Systems

Model 3825 Adjustable Spot Cooler System

includes the Adjustable Spot Cooler, single point hose kit with cone and fan nozzle, swivel magnetic base, filter separator, 15 and 30 SCFM (425 and 850 SLPM) generators. (25 SCFM/708 SLPM generator installed.)

Accessories and Components	
Model #	**Description**
5901	Single Point Hose Kit (Included with 3825)
5902	Dual Point Hose Kit (Included with 3925)
9004	Auto Drain Filter Separator, 1/4 NPT, 43 SCFM (1,359 SLPM) (Included with 3825 and 3925)
9005	Oil Removal Filter, 3/8 NPT, 15-37 SCFM (425-1,048 SLPM)
9012	Manual Shutoff Valve, 1/4 NPT
9020	Solenoid Valve, 120V, 50/60Hz, 1/4 NPT, 40 SCFM (1,133 SLPM)

Model 3925 Adjustable Spot Cooler System

includes the Adjustable Spot Cooler, dual point hose kit with cone and fan nozzles, swivel magnetic base, filter separator, 15 and 30 SCFM (425 and 850 SLPM) generators. (25 SCFM/708 SLPM generator installed.)

(Adjustable Spot Cooler with dual point hose kit is recommended when heat is generated over a larger surface area.)

An INTELLIGENT COMPRESSED AIR® Product

Mini Cooler

Mini Cooler™

Cool small parts and tools with clean, cold air!

Prevent burning, melting or breakage!

What Is The Mini Cooler?

A proven way to reduce downtime and increase productivity on a variety of operations involving small parts where heat is a problem. EXAIR's Mini Cooler produces a stream of 20°F (-7°C) cold air to prevent heat build-up. **The Mini Cooler is particularly effective on high speed operations to prevent burning, melting and heat related breakage.** Operation is quiet (76 dBA) and there are no moving parts to wear out.

Built to Last 5 yr. WARRANTY

Applications

- Small tool cooling
- Needle cooling
- Blade cooling
- Lens grinding

Advantages

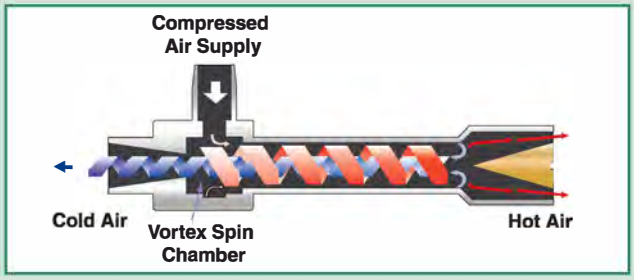
- Low cost
- Increases production rates
- Improves tolerances
- Quiet, compact

Mini Cooler Specifications

Air Consumption		Temperature Out		Sound @ 3' (914mm)	
SCFM	SLPM	°F	°C	dBA	INLET
8	227	20	-7	76	1/4 NPT

Supply air at 100 PSIG (6.9 BAR) & 70°F (21°C)

How The Mini Cooler Works

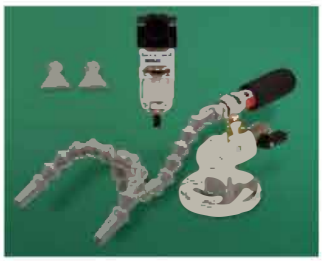


The Mini Cooler incorporates a vortex tube to convert a small amount of compressed air into two low pressure streams, one moving within the other in opposite directions (see page 160). The two airstreams exchange heat, producing cold air from one end of the tube and hot air from the other. A flexible hose directs the cold airstream at the surface to be cooled.

Mini Cooler Systems

Model 3808
Mini Cooler System
(one cold outlet)

Includes Mini Cooler, Single Point Hose Kit, Swivel Magnetic Base and Manual Drain Filter Separator with Mounting Bracket.

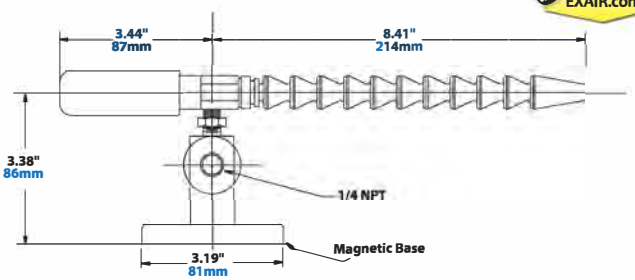


Model 3308
Mini Cooler System
(two cold outlets)

includes Mini Cooler, Dual Point Hose Kit, Swivel Magnetic Base and Manual Drain Filter Separator with Mounting Bracket.

Dimensions

DOWNLOAD drawings at EXAIR.com



Mini Cooler	
Model #	Description
3808	Mini Cooler System (one cold outlet) includes the Mini Cooler, swivel magnetic base, mini single point hose kit and manual drain filter with mounting bracket
3308	Mini Cooler System (two cold outlets) includes the Mini Cooler, swivel magnetic base, mini dual point hose kit and manual drain filter with mounting bracket

Accessories	
Model #	Description
5904	Mini Cooler Single Point Hose Kit (Included with 3808)
5905	Mini Cooler Dual Point Hose Kit (Included with 3308)
9003	Manual Drain Filter Separator, 1/4 NPT (Included with 3808 and 3308)
9012	Manual Shutoff Valve, 1/4 NPT
9027	Oil Removal Filter, 1/4 NPT, 24 SCFM (680 SLPM)