ACD Cabinet Coolers

A low-cost solution to prevent electrical system failures caused by overheating, humidity, dust, hazardous explosive, or corrosive substances in enclosures.

- Low-cost and environmentally friendly
- Quiet operation
- Maintenance-free for life
- High cooling capacity
- No refrigerant, no electricity needed, safe and reliable

Introduction

The enclosure cooler, also known as a panel cooler, PLC cabinet cooler, pneumatic cabinet air conditioner, explosion-proof cabinet air conditioner, vortex tube cooler, or compressed air cooler, utilizes the vortex tube refrigeration principle (see vortex tube for details) to cool and lower the temperature of enclosures and cabinets. It can reduce compressed air temperature to approximately 20℃-40℃. The cool air flows through the air duct to the heating parts for cooling, while creating positive pressure inside the enclosure, preventing external air from entering. This effectively cools and purifies the enclosure.

Designed specifically for industrial electrical control cabinets, the enclosure cooler is easy to install, low-cost, long-lasting, and environmentally friendly. Therefore, it is the best choice for cooling electrical control cabinets. The enclosure cooler is currently the most reliable and cost-effective product in the country.

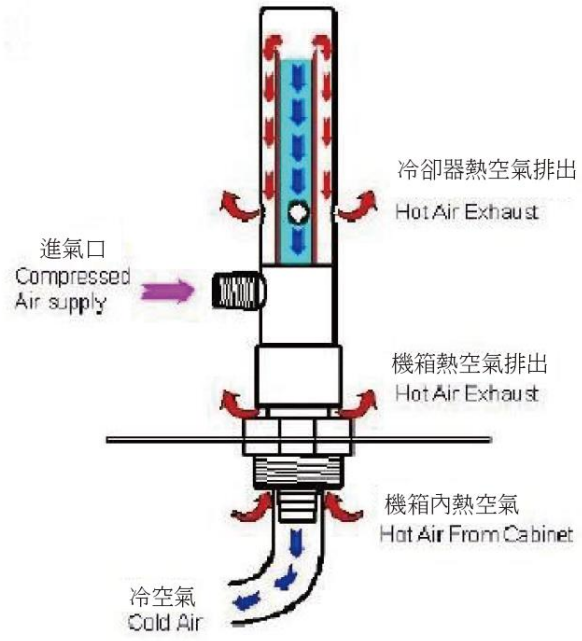
The Dangers of High Temperatures in Electrical Controllers

Heat, dust, humidity, hazardous explosive or corrosive substances can easily cause failures in industrial control electrical systems!

- Overheating causes the control system to frequently trip under rated load
- Reduces production efficiency
- Open cooling leads to dust accumulation and increased noise
- Clogged air filters must be frequently cleaned or replaced
- Easily damages electronic components or shortens their lifespan
- Overheating causes errors in electronic measuring, weighing, counting, or recording instruments
- Freon air conditioners cannot be used in the food industry
- Freon air conditioners are easily damaged in harsh factory environments or high temperatures

Characteristics

- High cooling capacity, low consumption, low noise (<70 decibels)
- Maintenance-free for life, no electrical components, no moving parts, no vibration
- Optional temperature control kit to regulate the temperature inside the control cabinet
- Best product to replace cabinet cooling fans and cabinet air conditioners



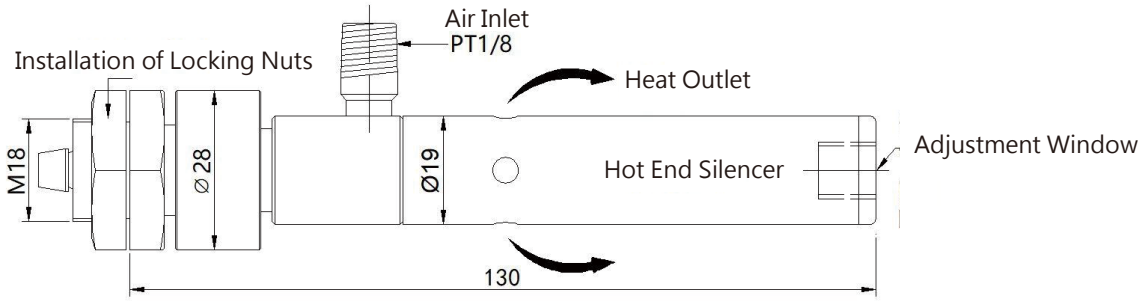
- Can maintain positive pressure inside the enclosure to ensure cleanliness of electrical components
- Available in various materials to suit different applications

Model Specifications and Parameters

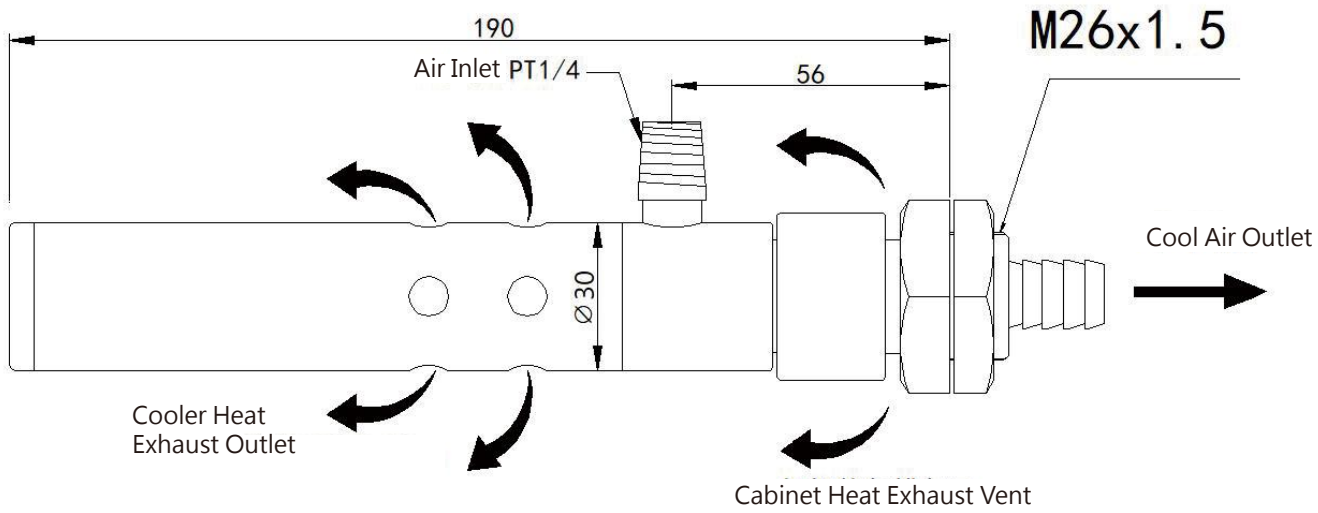
Technical Parameters of the 240 Series Enclosure Cooler						
Model		Air Pressure	Air Consumption		Cooling Capacity (0.86W=Kcal/hr)	
		Bar	SCFM	SLPM	Kcal / hr .	SIZE
ACD-24004	ACD-24004SS	6. 9	4	113	70	Small
ACD-24008	ACD-24008SS	6. 9	8	227	140	Small
ACD-24010	ACD-24010SS	6. 9	10	283	164	Small
ACD-24015	ACD-24015SS	6. 9	15	425	252	Medium
ACD-24025	ACD-24025SS	6. 9	25	708	425	Medium
ACD-24030	ACD-24030SS	6. 9	30	850	500	Medium
ACD-24040	ACD-24040SS	6. 9	40	1133	706	Medium
ACD-24050	ACD-24050SS	6. 9	50	1410	857	Large
ACD-24075	ACD-24075SS	6. 9	75	2124	1285	Large
ACD-24099	ACD-24099SS	6. 9	99	2830	1740	Large

Diagram of Structure

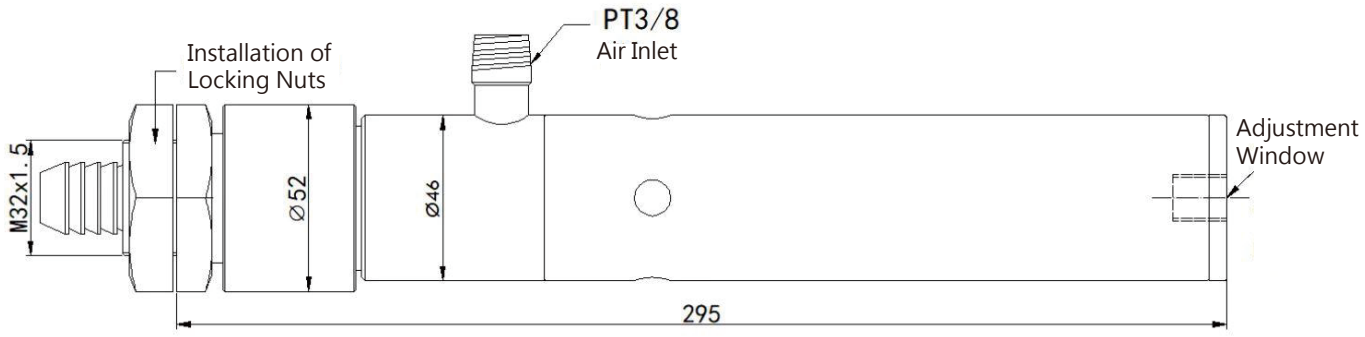
Exterior Diagram of Small Enclosure Cooler



Exterior Diagram of Medium Enclosure Cooler



Exterior Diagram of Large Enclosure Cooler

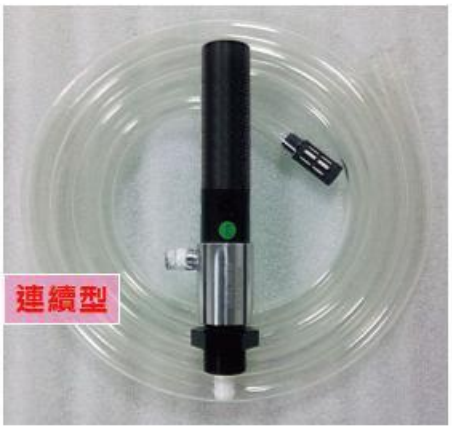


Components

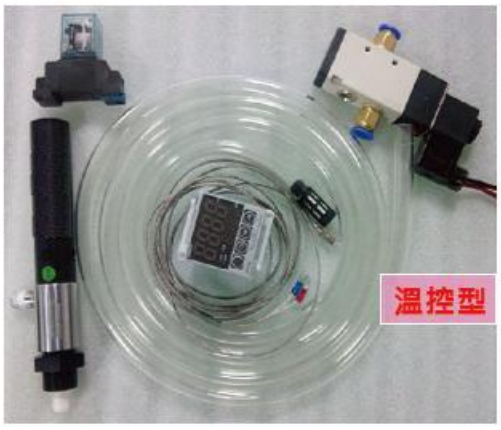
The components of the continuous type enclosure cooler kit include: the enclosure cooler, a 3-meter air duct, a silencer, and an air filter. The air filter is optional.

The components of the temperature-controlled enclosure cooler kit include: the enclosure cooler, a 3-meter air duct, a silencer, a solenoid valve, an intermediate relay, a temperature controller, and a temperature sensor.

Continuous-Type



Temperature-Controlled-Type



Applications and Scenarios

- Cooling for Explosion-proof Enclosures (Best Product)
- Cooling for PLC Control Cabinets
- Cooling for NC/CNC Control Cabinets
- Cooling for Modular Control Centers
- Cooling for Control Cabinets in Dusty and High-Temperature Areas
- Cooling for Motor Control Centers
- Cooling for Electronic Control Devices in CNC Machining Centers

Selecting the correct model of enclosure cooler

1. The enclosure cooler cooling methods are divided into continuous and temperature-controlled types. When continuous cooling and continuous cleanliness are required, it is recommended to use a continuous type enclosure cooler. The enclosure cooler system with a constant temperature controller can save compressed air, as the cooler only operates when the internal temperature of the enclosure reaches the set critical temperature. The adjustable constant temperature controller has a factory temperature setting of 25°C. When the heat load fluctuates and continuous cleanliness is not required, it is recommended to use a constant temperature control system.

2. The cooling capacity of the enclosure cooler:
   The enclosure cooler provides several commonly used cooling capacities: 550Btu/hr (139Kcal/hr), 1000Btu/hr (253Kcal/hr), 1700Btu/hr (428Kcal/hr), 2000Btu/hr (504Kcal/hr), 2800Btu/hr (705Kcal/hr). Calculate the heat load of the enclosure that needs to be cooled, and then select the corresponding cooler with the appropriate energy. The necessary conditions (five elements) for calculating the heat load:

1.Current external ambient temperature;2.Current internal temperature of the enclosure (or total heat generation of electronic components inside the enclosure);3.Maximum external ambient temperature;4.Desired maximum internal temperature;5.Dimensions of the enclosure: height, depth, width.

Calculation formula:

A. Total heat load (Kcal/hr) = Temperature difference coefficient between internal and external (see temperature conversion coefficient table) X total area + maximum internal and external temperature difference coefficient X total area of the enclosure (m^2).

B. Total heat load (Kcal/hr) = Total heat generation inside (Kcal/hr) + maximum internal and external temperature difference coefficient X total

area of the enclosure (m²).

C. The total area of the enclosure does not include the area of the top and bottom of the enclosure.

D. 1W × 0.86 = Kcal/hr

Enclosure cooler levels:

A. Standard Type

B. Corrosion-Resistant Type (SS)

Temperature Conversion Coefficient Table	
Temperature Difference ℃	Coefficient Kcal / hr / m2
3	4. 5
6	9. 7
9	15. 1
12	21
15	27
18	34
21	41

Technical Parameters

Compressed Air Supply Pipe Diameter:

To minimize compressed air loss, please select the appropriate compressed air pipeline for the enclosure cooler, such as: for supply pipes of 3 meters and below, the diameter should be 1/4"; for pipes between 3 meters and 15.2 meters, the diameter should be 3/8"; and for pipes above 15.2 meters, the diameter should be 1/2". If using flexible hoses, for supply hoses of 3 meters and below, the diameter should be 3/8", for hoses between 3 meters and 15.2 meters, the diameter should be 1/2", and for hoses above 15.2 meters, the diameter should be 5/8". Do not use quick couplings.

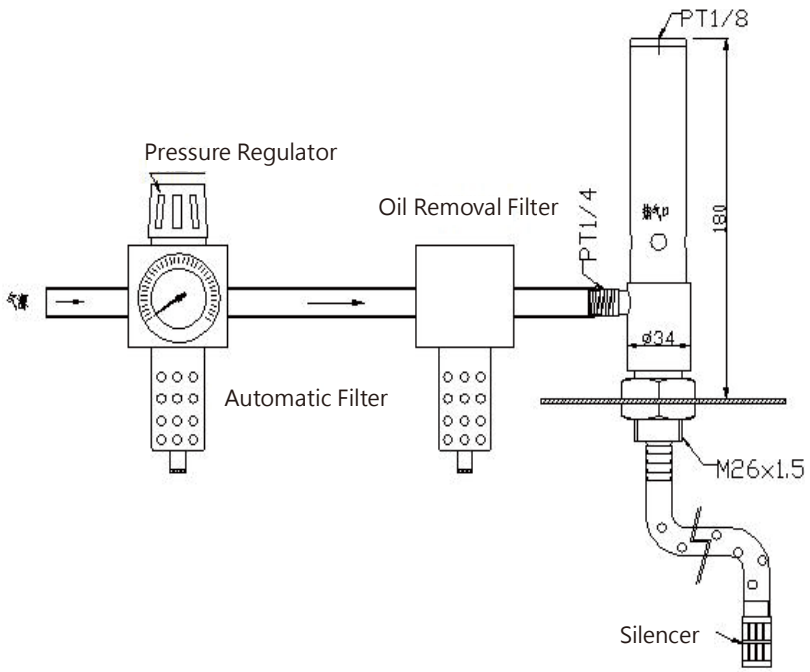
Compressed Air Source:
If clean, dry, and oil-free compressed air is used, the enclosure cooler can operate continuously for many years without maintenance. All enclosure cooler systems are equipped with a 5-micron automatic filter separator. Even when the enclosure cooler is operating continuously, this filter can filter out moisture from the compressed air. Note: Never use a push-type automatic filter. Otherwise, moisture will flow into the enclosure cooler during continuous operation.

If there is oil in the compressed air, an oil removal filter must also be used. This oil removal filter should be installed in parallel downstream of the automatic filter.

All components should be located close to the enclosure cooler, ideally within 3 to 4.5 meters from the enclosure cooler.

All enclosure cooler systems can use standard compressed air with a pressure range of 5.5 to 6.9 kilograms. Temperature-controlled enclosure coolers can maximize compressed air savings. If needed, it is recommended to use them.

Installation and Maintenance



To install the enclosure cooler on the enclosure, drill a hole with a diameter of 26 millimeters and secure the enclosure cooler with a nut. The enclosure cooler can be installed in any position as needed. When the compressed air pressure is 6.9 kilograms, the enclosure cooler can provide a temperature difference of 28 degrees. If the temperature of the air source rises, the cold air produced by the enclosure cooler will also increase accordingly, thereby reducing the cooling capacity. To achieve the ideal cooling effect, our company provides air ducts with N small holes drilled in them, with a diameter of 3mm for each hole. These holes can be placed around the heating devices, with a silencer installed at the tail end. It is advisable to shorten the length of the air duct as much as possible. PT1/8 is the window for adjusting the cooling capacity. First, completely unscrew the PT1/8 screw, then use a screwdriver to rotate it clockwise to increase the cooling capacity, or counterclockwise to decrease it. Remember not to overtighten the adjustment screw, otherwise, the desired cooling effect may not be achieved.

Moisture

If surrounding air enters the interior of the enclosure, moisture in the air will accumulate on the flexible hose of the cold air distributor. Any moisture inside the electrical enclosure is highly dangerous. To avoid this issue, all exhaust ports or ventilation ports on the enclosure should be closed. Fans can be installed inside the enclosure to promote the circulation of cold air.

Maintenance

If the enclosure cooler is not producing cold air, install a pressure gauge at the air source inlet to test whether the compressed air pressure is sufficient. At the same time, check the air source pipeline, filters, and other installed accessories. Insufficient pipe diameter, restricted fittings, or clogged filters can all cause significant air source loss. All enclosure coolers come with silencers. In most cases, the noise level of the enclosure cooler is below 75 dBA.