

# Miracle Coil

Power-Saving Device for  
Air Conditioner / Refrigerator / Chilling Unit

ETE is a research and development company who aims  
to provide solutions to any “environment issue” .

# Significant Reduction in Electric Power Consumption and Power Contract !

## What is "Miracle Coil"

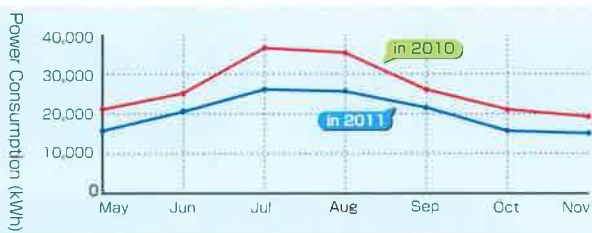
"Miracle Coil" is installed at the rear stage of the condenser. Miracle Coil condenses refrigerant that the condenser could not condense, and helps improve liquefaction performance. Improving refrigerant liquefaction performance sets the performance of the indoor unit. This shortens time to reach the target temperature, thus the operation time of the compressor should be reduced, which leads to power saving. Also, Miracle Coil converts heat energy in the refrigerant to kinetic energy, and thus the refrigerant condenses not by heat exchange but by energy conversion. Therefore, performance would not be affected by ambient temperature or aged deterioration.



Period of Use	May	Jun	Jul	Aug	Sep	Oct	Nov	Total
Power Consumption in 2010 (kWh)	20,436	26,343	36,744	35,147	26,635	20,388	19,121	184,914

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Power Consumption in 2011 (kWh)	17,263	20,277	27,466	27,074	22,212	17,107	16,706	148,065
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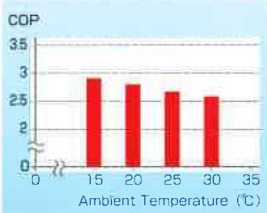
The remarkable point of Miracle Coil is that it condenses the refrigerant without heat exchange. This enables to have liquefaction stable with no influence of the ambient temperature. Especially in Summer seasons, when the efficiency of heat exchange in a condenser gets worse, Miracle Coil works the most efficiently and makes the most power saving performance.

### Most Efficiency in Power Saving in Summer

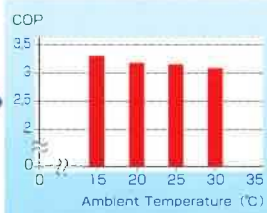
### Easy to Compare and Verify

A switching valve changes the path to the line to go to Coil and to the normal line. This enables you to comparatively verify the performance without making a comparison of one year to another or adjustment of ambient temperature. (The valve itself is available as an option)

#### Miracle Coil Not Used

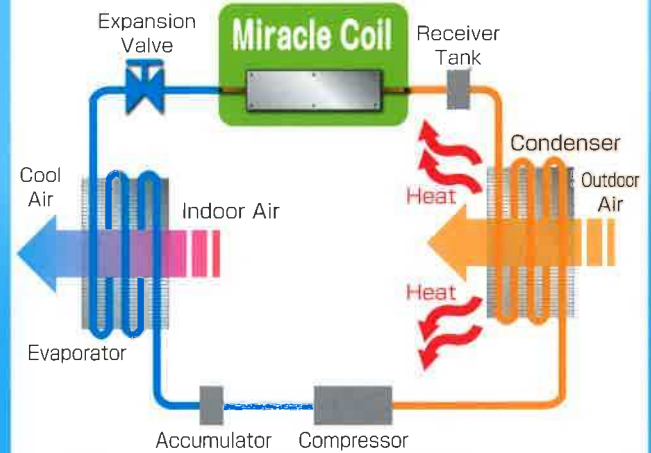


#### Miracle Coil Used



Ambient Temperature (°C)	Miracle Coil Not Used COP	Miracle Coil Used COP	Improvement (%)
15	2.90	3.28	13.1
20	2.80	3.21	14.6
25	2.71	3.15	16.2
30	2.62	3.08	17.9

Data provided by: A Major Automotive Manufacturer in Japan

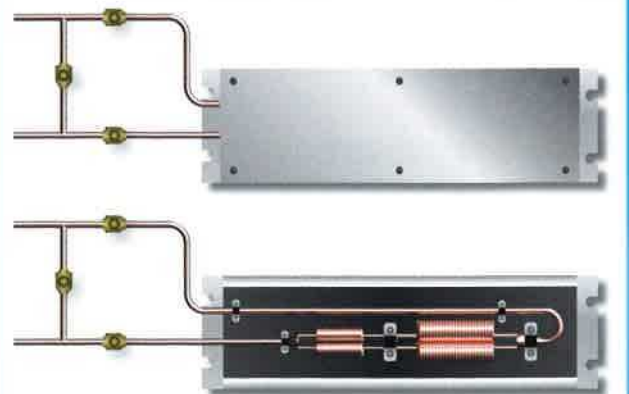


Miracle Coil is constructed very simply with no drive part equipped in itself. It is just a "piping path". This simple structure makes itself maintenance-free.

### Maintenance-Free Almost Indefinitely

### No Concern of Outdoor Unit Getting Damaged

Electronic control? Interruption of refrigeration flow? There is no such concerns when you install Miracle Coil, thus there is no need to be afraid that you may damage the main unit. Even when the installation of the product brings any trouble to the main unit, PL Insurance will provide you a compensation.



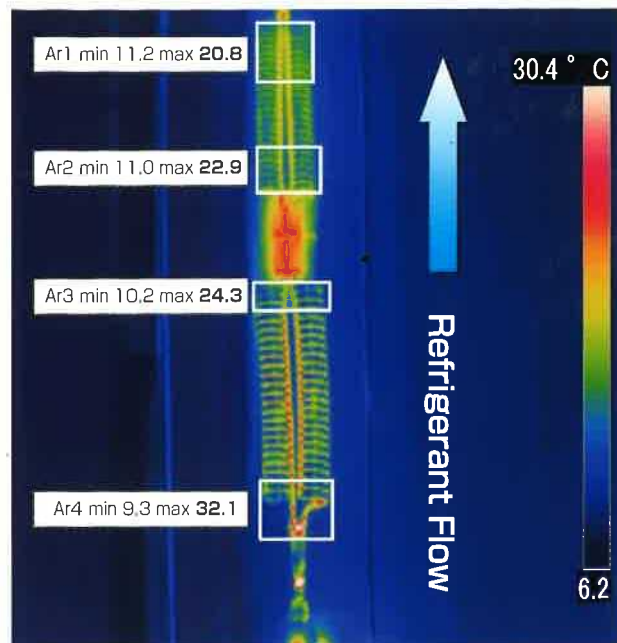
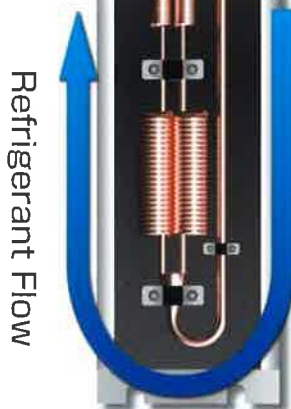
Miracle Coil

## 4 Major Advantages

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- 2
- 3
- 4

# Subcooling Phenomenon of Miracle Coil

Surface temperature on the spiral pipe drops from 32.1°C at the bottom to 20.8°C at the top. You can see, as the refrigerant flows in the pipe, that it gradually loses the heat energy and drops its temperature.



Refrigerant Cooling Effect of Spiral Pipe

## Miracle Coil Enables Condensation not by Heat Exchange, but by Energy Conversion

Existing Outdoor Unit



Blow Air to Release Heat = Heat Exchange (Condenser)

A fan blows air on the gaseous refrigerant that possesses heat energy in order to make [heat exchange] (in condenser) so the heat energy gets released into the atmosphere and the refrigerant turns into liquid.

Outdoor Unit with Miracle Coil Installed



Heat Energy Consumed by Flowing = Energy Conversion (Miracle Coil)

Miracle Coil makes the heat energy in the refrigerant gas flow in spiral so it loses the energy and enables to have condensation and subcooling.

Therefore, Miracle Coil works in any ambient temperature or any other condition to make condensation and subcooling as far as the refrigerant does its job.

## Specifications of "Miracle Coil"

Applications	Compressor Wattage 2.25kW to 90kW	<b>Compressor Wattage</b>	<b>Size: Length×Width×Height (mm)</b>
Applicable Refrigerant	R404, 407, 410, 414, 134, 22, 32, etc.	2.25kW or above	700×150×65
Service Life	13 Years	3.75kW or above	960×150×90
Materials	Refrigerant Piping Specified in JIS (Copper Pipes), Aluminum (Housing)	7.5kW or above	1020×200×90
Salt Durability	Protected with Anodizing Treatment	11.25kW or above	1020×200×90
Power Supply	Not Required	15kW or above	1020×200×90
Operation Temperature	-10 to 50℃	22.5kW or above	1460×400×300
Option	Switching Valve for Testing (from JPY9,000/set)	30kW or above	1460×400×300

\* Contact us for any size out of specified above.

## We will prove solution to any issues

### Fields of Research and Development

- Air Conditioner without Heat Exhaust
- Air Conditioner with Generator
- Water Generating Device
- Air Conditioner for Electric Vehicles
- Air Conditioning System in Business and Commercial Fields

### Fields of Manufacturing and Sales

- Refrigerant Liquefaction Device (Miracle Coil)
- Instantaneous Heat Removal Device (MIH)



## Company Profile

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