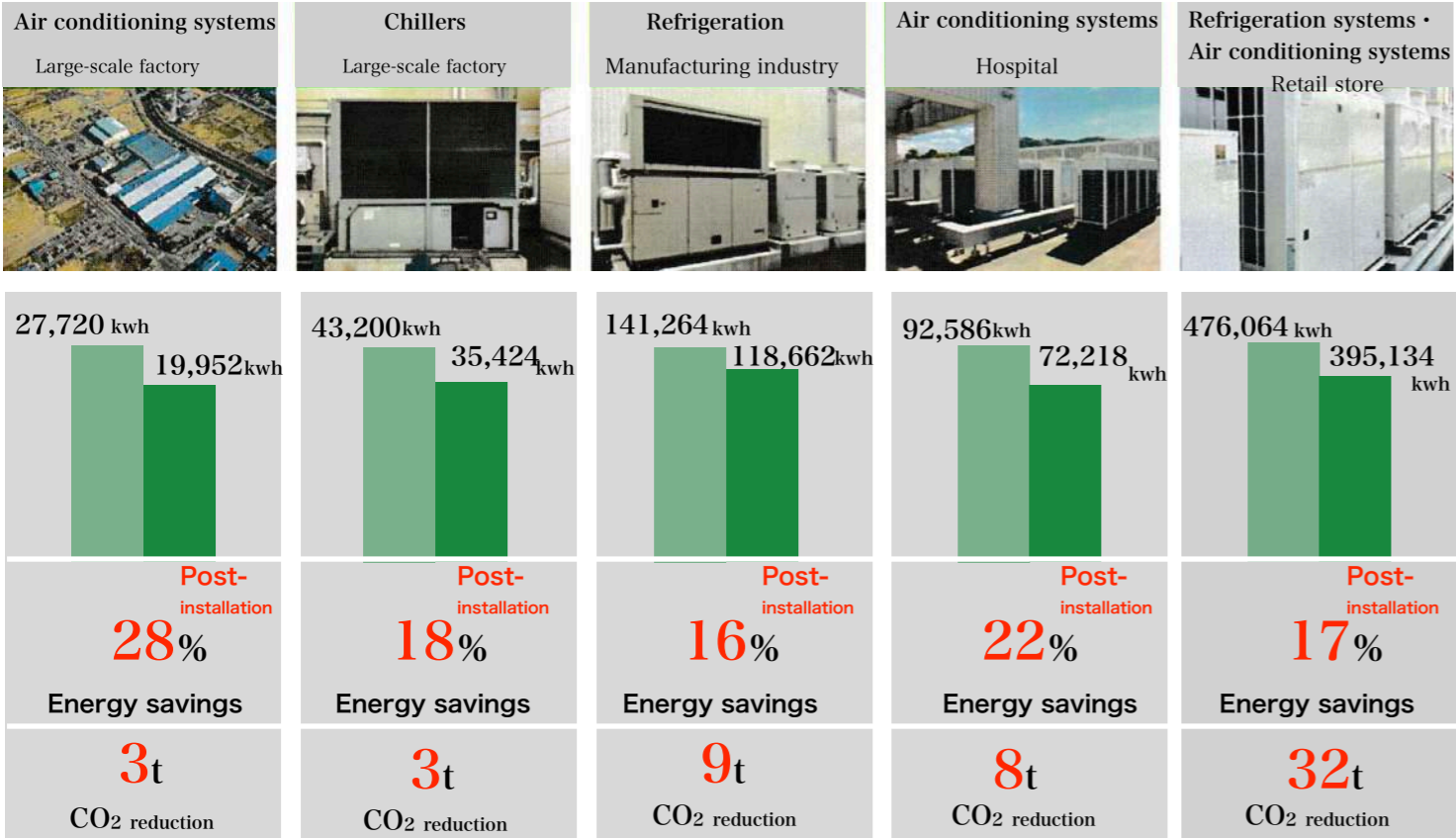


Reduction achievements of PHANTOM Active.

※A chiller is a device designed to regulate temperature by circulating either chilled or heated water. The equipment in this large-scale factory uses a refrigerant-based chiller. It is used for cooling machinery in food processing, industrial applications, and air conditioning systems.

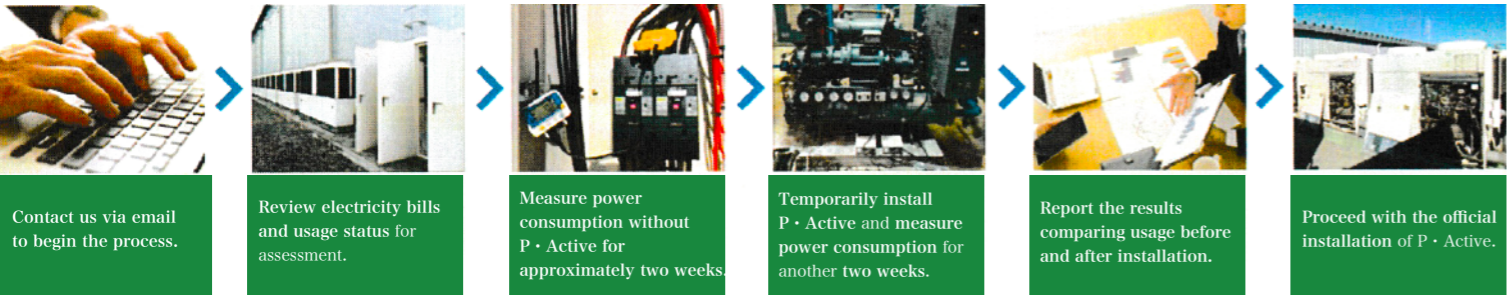
Facility air conditioning, refrigeration, and freezing systems are critical equipment that cannot be stopped for business continuity. PHANTOM Active does not require equipment modifications for installation, allowing implementation without the need to shut down power.



※PHANTOM Active is recommended for the following industries.

- Frozen and refrigerated product storage industry
- seafood processing industry
- food manufacturing industry,
- large-scale factories
- commercial facilities, and hospitals.

PHANTOM Active (P・Active)Installation Process



For inquiries about "PHANTOM Active", please contact us.

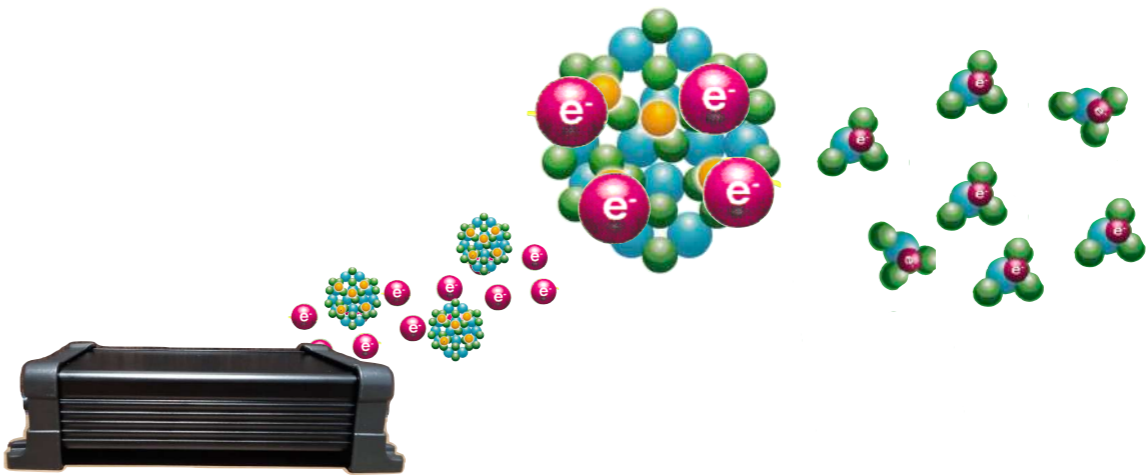
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Made in Japan



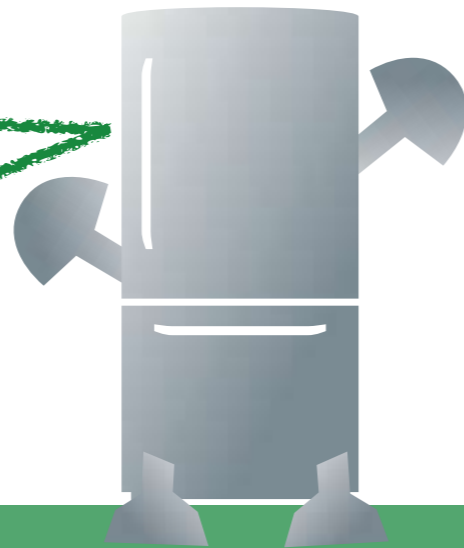
Innovative refrigerant restoration technology
saves approximately 20% in electricity consumption!

PHANTOM Active

~Restoring refrigerant to optimize heat exchange efficiency.~



"Inside air conditioners and refrigerators, a special liquid called refrigerant flows to create cool air. However, over time, impurities stick to it, and the refrigerant molecules clump together due to magnetic forces, making the flow less efficient. As a result, the machine has to work harder and consumes more electricity. That's why keeping the refrigerant clean is crucial! PHANTOM Active helps restore the refrigerant's function and efficiency!"



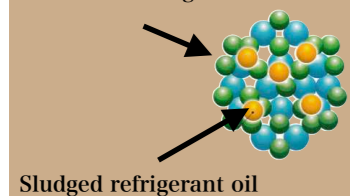
Devices using refrigerants in aging air conditioners, refrigerators, and freezers

Reasons for increased electricity consumption

1.Refrigerant degradation due to aging

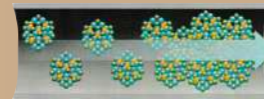
(Clustering & Sludging Refrigerant)

Clustered refrigerant molecules



2. Increased power consumption due to refrigerant degradation

(Image of the inside of the refrigerant pipe)



Refrigerant becomes difficult to flow due to dirt adhesion and molecular attraction.



High viscosity causes the flow to be unidirectional, reducing heat exchange efficiency.
(≒The Reynolds number decreases)

Refrigerant molecules used in air conditioners, refrigerators, and freezers have polarity. After years of use, refrigerant degradation occurs. Specifically, the molecules may attract each other and cluster together (clustering). Additionally, impurities and deposits accumulate (sludging), causing the refrigerant flow within the piping to deteriorate and reducing cooling performance. As a result, the burden on the equipment increases, leading to higher power consumption.

~Clustering & Sludging

Increased Power Consumption Due to Refrigerant Degradation~

Aging refrigerant inside the piping transforms into a high-viscosity refrigerant that only flows in a single direction. As a result, the flow slows down, reducing heat exchange efficiency. This leads to decreased performance in air conditioners and cooling devices, increasing the burden on the equipment and causing higher power consumption.

【The power consumption of air conditioning and refrigeration equipment increases year by year.”】

※Initial performance degradation is minimal, and stability is maintained for about 3 to 10 years (approximately 3% degradation per year → around 50% degradation over 10 years). However, after 12 years, a sharp decline in performance is observed. The aging of refrigerant also becomes a factor that places additional strain on the equipment.



"Reduce electricity costs for factory air conditioners, refrigerators, and freezers by 20%."

PHANTOM Active Features



Energy savings without modifying existing

Modifying or altering equipment may cause malfunctions or negatively impact its performance. This device only requires a lead wire to supply free electrons by making contact with the refrigerant pipe, with the only necessary installation work being electrical wiring. No power shutdown is required during installation.

Reduce electricity consumption.

Improving heat exchange efficiency reduces power consumption, increases downtime, and leads to lower electricity costs.

Reduce the burden on equipment.

As the refrigerant flow stabilizes, the load on the compressor is reduced, extending the lifespan of the equipment. Additionally, operating noise decreases, and abnormal pressure increases that could cause shutdowns are prevented.

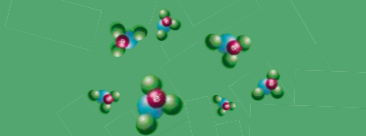
Lower environmental impact.

Reducing power consumption ultimately leads to a reduction in CO2 emissions.

3.By installing PHANTOM Active, free electrons are supplied, restoring the functionality of the refrigerant.



Supplying free electrons to the refrigerant pipe through lead wires from PHANTOM Active.



The refrigerant separates, dirt is removed, and the flow

(Image of the inside of the pipe where the refrigerant has regained its degree of freedom.)



The refrigerant moves freely, improving heat exchange
(The Reynolds number increases)

By supplying free electrons from "PHANTOM Active", the bonding of refrigerant molecules loosens, improving flow. The breakdown of sludge restores heat exchange efficiency, contributing to equipment performance maintenance and energy savings.

Cases where the effectiveness of "PHANTOM Active" is reduced

- The equipment is new (the refrigerant has not aged significantly)
 - Clustering and sludging have not progressed, so the expected effect may not be achieved.
- Using a refrigerant with low polarity → It is less likely to form clusters, making the effect weaker.
- If the number of installed PHANTOM Active units is not appropriate for the rated capacity or refrigerant charge amount → The effect may not be fully realized.
- When a twin-type system adjusts capacity using two electronic expansion valves
 - In twin-type systems, two electronic expansion valves finely control the refrigerant flow (= the influence of free electrons is more likely to be dispersed). As a result, the refrigerant improvement effect of free electrons does not spread evenly, reducing effectiveness.
- If the equipment has malfunctions → The increase in heat exchange efficiency is recognized as supercooling, causing the system to regulate itself according to standard operation. As a result, the effect is diminished.

We conduct test operations to evaluate effectiveness. After that, our expert team provides careful guidance on installation and operational know-how.