



**ATMO**  
sphere

Business Case for  
Natural Refrigerants  
25-27/09/17 - Berlin

**Panasonic**  
BUSINESS

# CO<sub>2</sub> refrigeration system for small format retail stores or walk-in cooler in Europe

**Sep 26, 2017**

**Gaku Shimada**  
**Panasonic Corporation**

# Today's agenda

- **Introduction**
- **Product launching in Europe**
- **Future Plan**

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## Panasonic

### Appliances

HA · Cold Chain · HVAC · Devices



**TV**  
**Home Appliances**  
**Air Conditioner**  
**Store Showcases**  
**Refrigeration unit**

### Eco Solutions

Lighting · House Equipment ·  
Environmental Engineering



**Lighting Equipment**  
**Air Purifier &  
Ventilating**  
**Photovoltaic module**  
**Wiring device, etc.**

### Connected Solutions

AV · Network/Mobile communication



**In-Flight Entertainment  
System**  
**PC/Tablet**  
**Security System, etc.**

### Automotive & Industrial Systems

Automotive/Industrial devices · components



**Manufacturing Machines**  
**Batteries**  
**Components**  
**Automotive devices, etc.**

2001 Production of CO<sub>2</sub> Compressor for Heat Pump Water Heater

2005 Joined the project of Ministry of Economy,  
Trade and Industry (NEDO)

Period for baseline study

2009 Demonstration test started in supermarket

2010: **CO<sub>2</sub> refrigeration system launched**

2015: **2<sup>nd</sup> generation CO<sub>2</sub> refrigeration system  
[“Pressure adjust control” type] launched**

Component  
development

Japan  
1st ※

CO<sub>2</sub>(R744)自然冷媒採用  
ノンフロン冷凍機

※2010年5月25日現在



初代ノンフロン冷凍機

Field test



Pressure adjust control type condensing unit

Point of “Pressure adjust control” type

- Regularized refrigerant pressure level
- Lighter & smaller body
- Improved workability and installation cost



OCU-CR200VF5(SL)  
1<sup>st</sup> European model

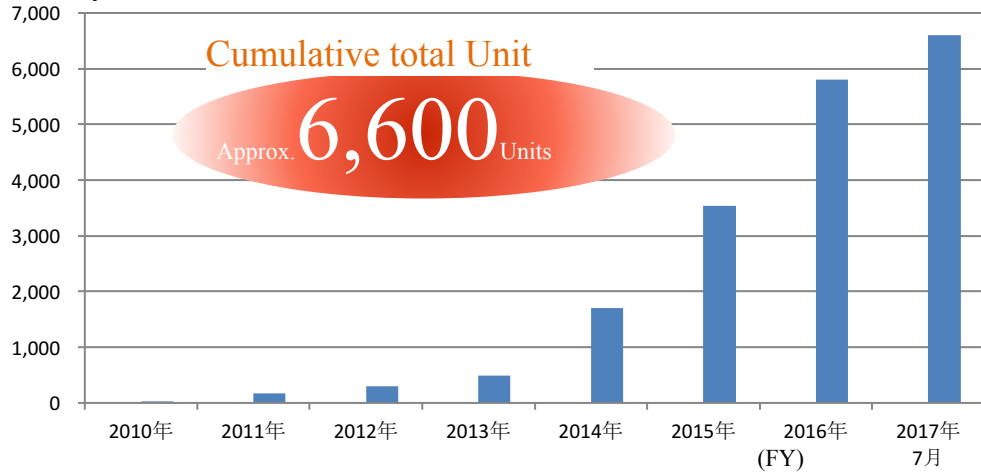
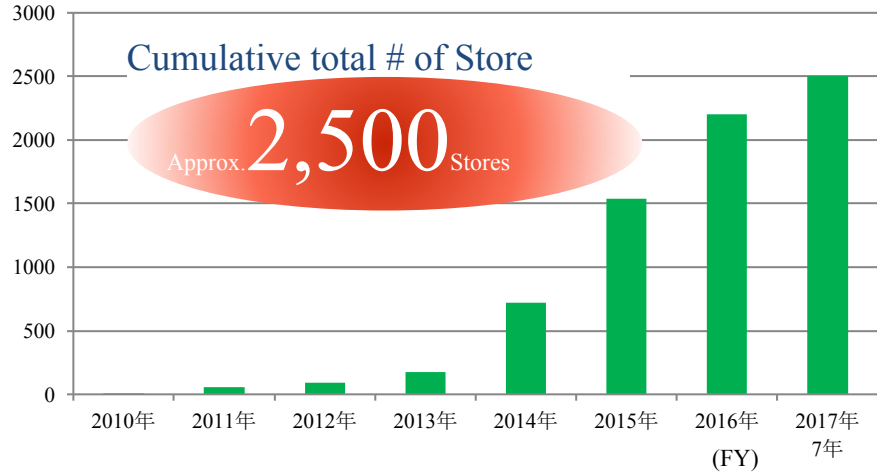
- 1960~ R&D in Oizumi → 50+ year experience in HVAC&R
- 2001~ CO2 HP Production → 16 year of CO2 unit production  
Cumulated sales of TC CO2 Comp.: 700 thousands
- 2010~ CO2 OCU Production → Established Quality Control !!!



# Installation of TC CO2 System in Japan

## Our partners CO2 system installation in Japan with Government support

Launched in 2010. Result until July 2017.



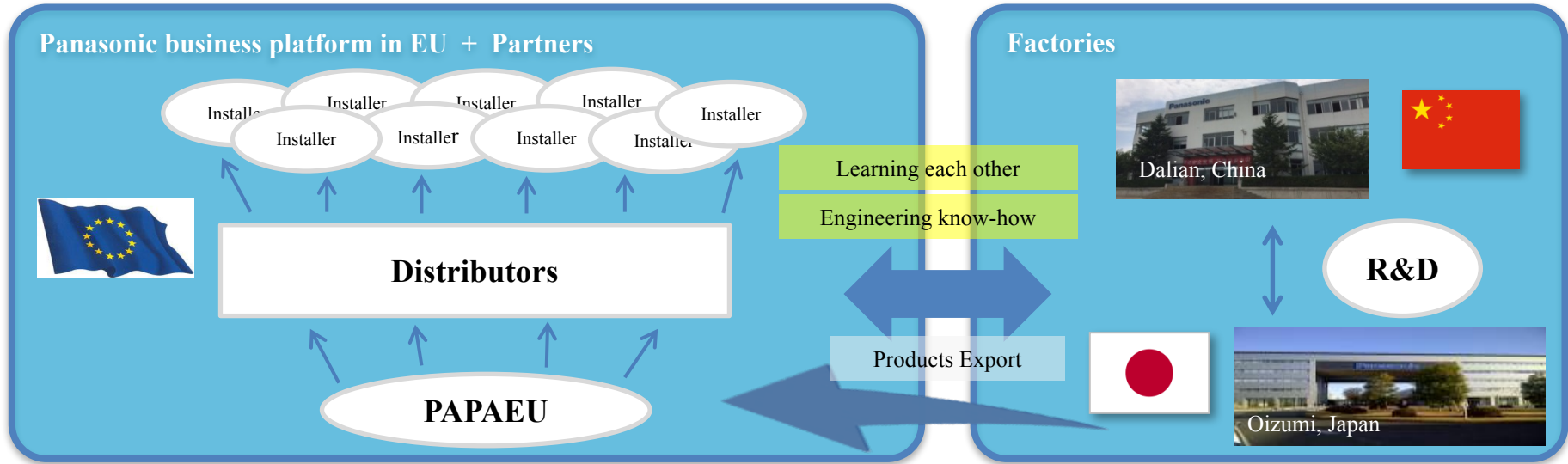
**We learned together with partners and succeeded so far.**

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Challenge the most **CO2 advanced European market** with **“Made-in Japan” CO2 technology** !



**Deliver Cooling & Heating Products + TC CO2 Refrigeration**



RAC



Multi RAC



Commercial AC



VRF



GHP



ATW

## Challenge the most CO2 advanced European market with “Made-in Japan” CO2 technology !



Press Conference on Feb 28

From 2017



**OCU-CR200VF5(SL)**  
TC CO2 1.6kW  
newly developed  
for Europe market



Climatizacion Refrigeracion 2017  
Panasonic booth



CO2 unit exhibition

## Feature of OCU-CR200VF5(SL)

Outdoor Type 1.6kW CO2 Refrigeration Unit

2-stage compression CO2 rotary compressor & split cycle

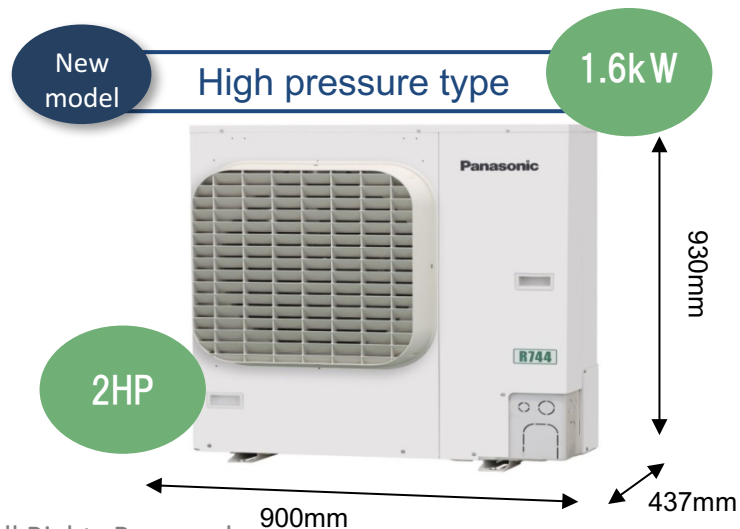
For Multi temperature application (ET -45°C ~ -5°C)

For walk-in cooler, showcase, at CVS, mini supermarket and gasoline stand store

Compact design, light (70kg) and low fan noise  
(35.5db(A)\*1)

\*1 <condition> ET: -10°C, 65Hz,  
10m from product

Now on sale in Belgium, Denmark, Sweden & Norway



Reliability and Easy Commissioning are confirmed in Europe by 2-year FT.

Flexible layout by installing compact small capacity OCU!

## Field Test in Denmark at COOP

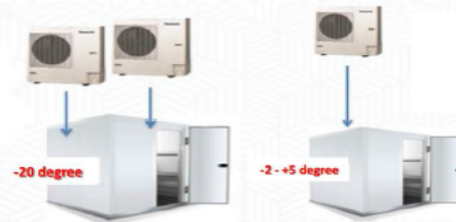
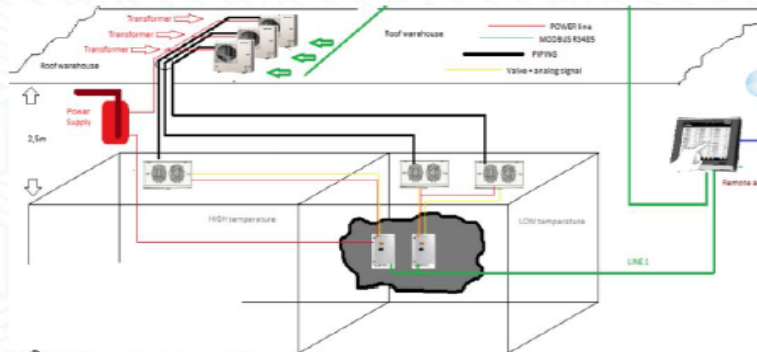
Panasonic

### Kvickly Randers.

- We have in cooperation with COOP Dk carried out a FT in Denmark
- Test started in April 2016
- Installation.
  - 1 unit – medium temperature storage room
  - 2 unit parallel – low temperature storage room.
- System has been running for 6 month and no errors since start up.



Condensing unit's on the roof.



heating & cooling solutions

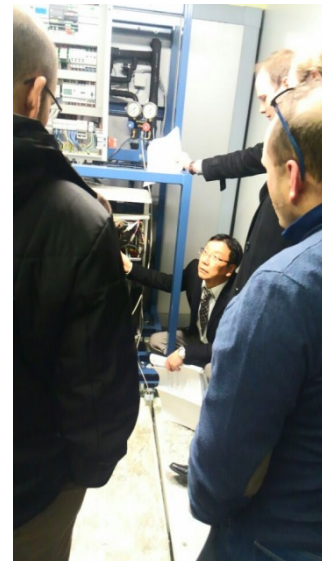
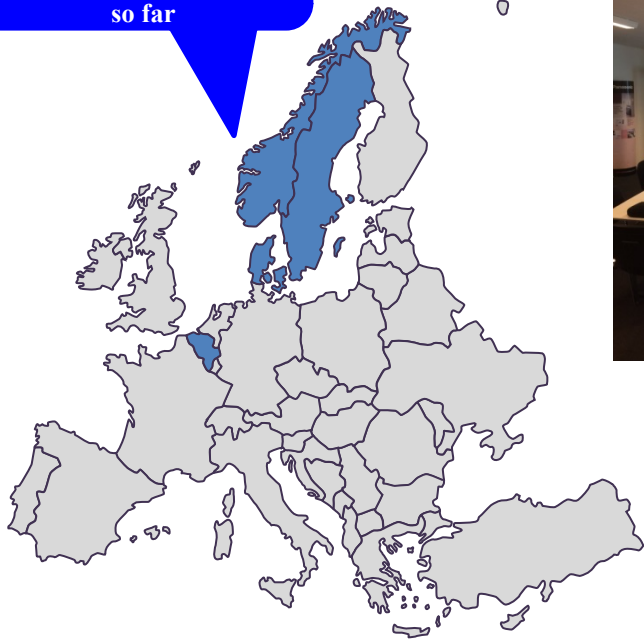
for Refrigerator  
(-5°C)

+

also for Freezer  
(-30°C)

## Conducting installation training with customers

Around **60**  
participants joined our  
training  
so far



## For easier installation and commissioning in Europe

### a. Packaged Solution for easy commissioning



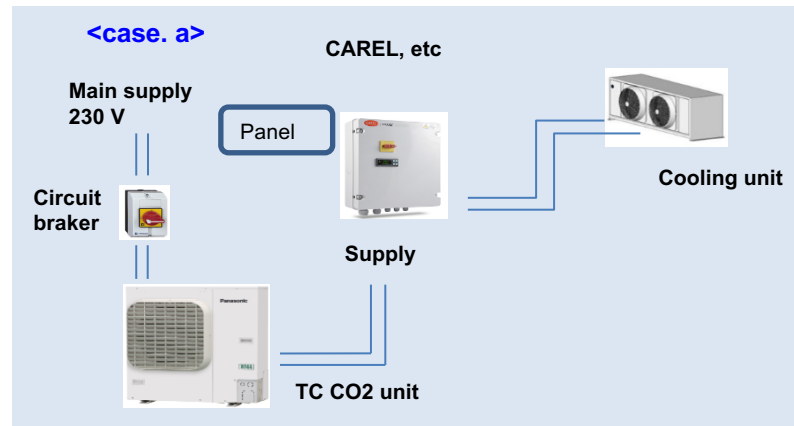
OCU-CR200VF5(SL)

+

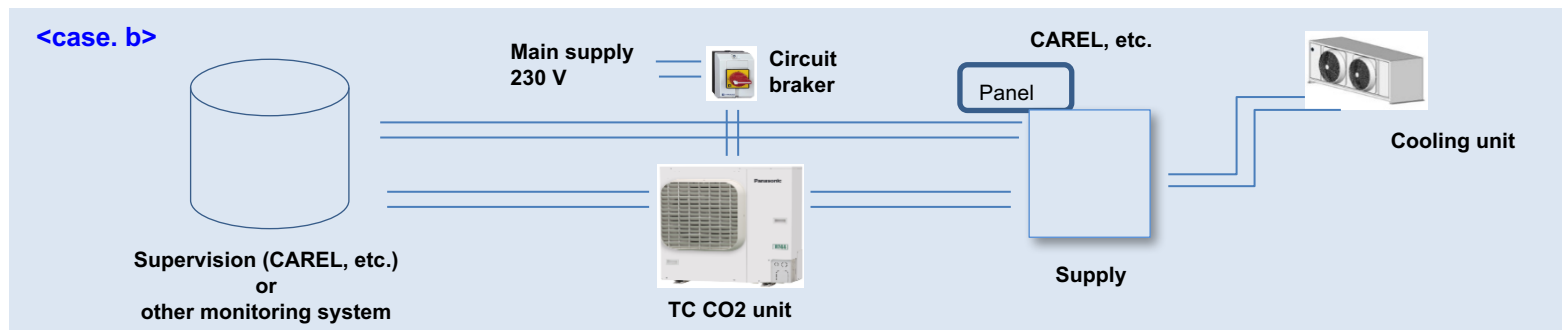


Setup kit (option offered by PAPAEU)

=



### b. Working with local suppliers of Supervision



## Compact unit, Quick installation!



Setup kit (option offered by PAPAEU)

Behind the store!



Voice1: Only a few settings and ready to start!

Voice2: Light weight! Easy installation!



On the roof!



# CO2 System FT & installation by region

## Panasonic CO2 system started global expansion

Area	Status	# of installation
Europe	Aug. 2017, 2HP CO2 unit Started roll out	<b>10 / Month</b>

**Increasing rapidly.  
Speed accerelated**



Area	Status	# of system installed
Japan	Launched in 2010	<b>6,600+</b>



Area	Status	# of system installed
Malaysia	May 2017 20HP CO2 units	2



Area	Status	# of system installed
Taiwan	Dec 2015, 10HP CO2 unit	2

Area	Status
Thailand	Under study

Area	Status	# of system installed
Indonesia	By government subsidy, 13 shops were introduced at the time of May 2015	26

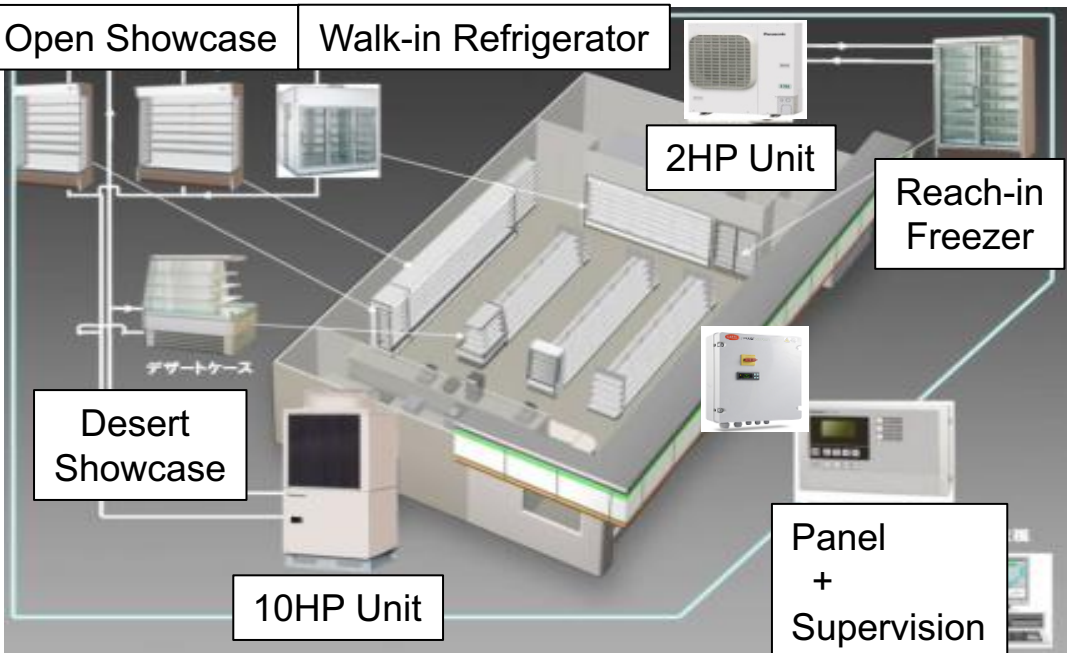




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## 2HP + "New" 10HP cover most of small format stores.



Convenience Store, Sales Floor Area: 150m<sup>2</sup>

Outdoor Unit	Showcase
10HP (Refrigerator)	Open Showcase (Total width 28 feet) Desert Showcase Walk-in Refrigerator (6 or 7 doors)
2HP (Freezer)	Reach-in Freezer (2 or 3 doors)

Now Tested in EU Pressure adjust control type

7.3kW

10HP

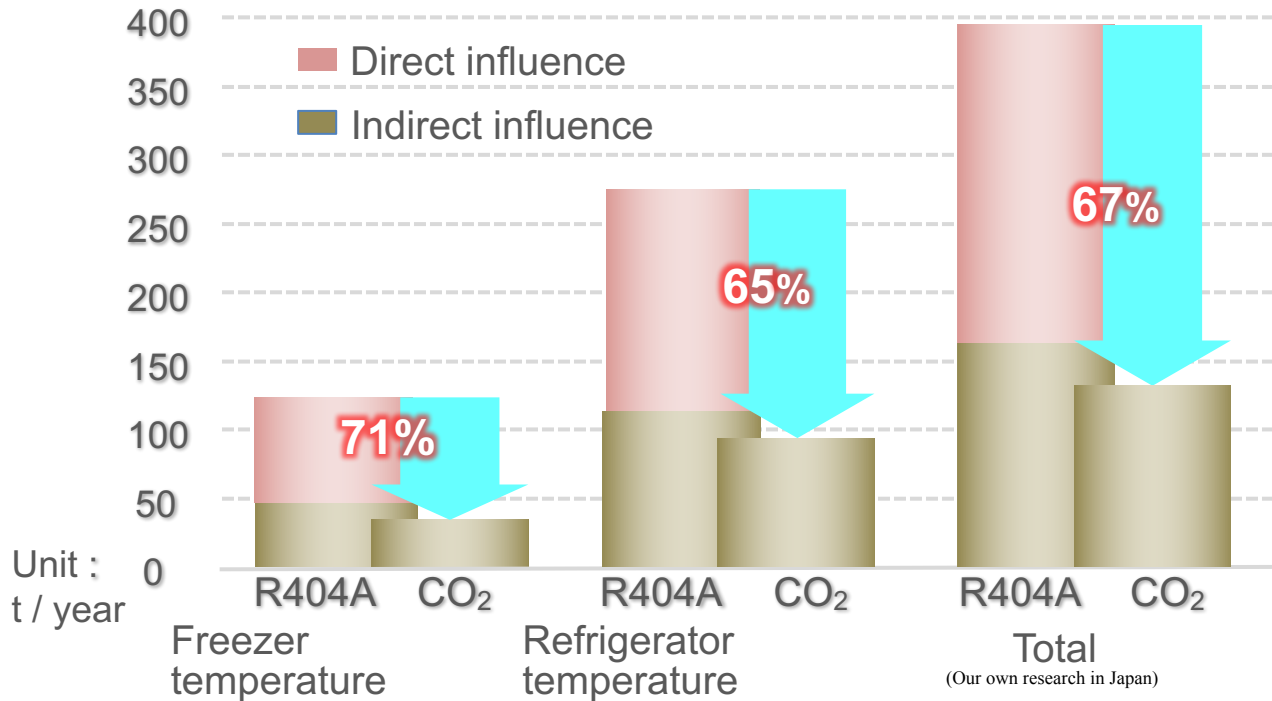


for Refrigerator (-5°C)

+ also for Freezer (-30°C)

Please note all specifications are subject to change without prior notice.

## Comparison of CO<sub>2</sub> emissions



**Energy Saving**  
 25.4% (Freezer)  
 16.2% (Refrigerator)

(Our own research on 6 stores in Japan)

**CO<sub>2</sub> emission**  
 67% reduction

※Comparing with 6 shop average of R404A inverter multi condensing unit  
 Electricity CO<sub>2</sub>conversion factor : 0.000579t-CO<sub>2</sub>/kWh  
 Refrigerant leakage rate : 16%

# Panasonic

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\*1 Compare with R404A



# “Natural Refrigerant Solution”

to help restore a beautiful Earth  
for future generations.

Panasonic aims to make "R744 refrigeration system" global standard by adopting CO<sub>2</sub> that has zero ODP and minimum GWP

# Cooling Food shouldn't be Warming the Earth.

“Ecology” is the serious issue in the cooling food industries, especially supermarkets and convenience stores which are running for 24 hours a day and 365 days a year. Recently, **Non Freon Refrigeration System** adapted the natural refrigerant (CO<sub>2</sub>) is making steady progress in Japan. Panasonic developed it by unique technologies of **2-stage compression rotary compressor & Split cycle**, to aim at Zero Ozone Depletion & Greenhouse Effect by 1/4000 compared to HFC (R404A).

Panasonic was the first to adopt the natural refrigerant (CO<sub>2</sub>) in refrigeration business in Japan.

That environmental performance is equivalent to about 67% reduction per year in CO<sub>2</sub> estimate.

Additionally, the remote monitoring and control services using **Cloud** were set up to make facilitate management of energy usage. We always pursue “Environmentally friendly products” from a various angles.



## Panasonic



### Panasonic Non Freon Refrigeration System

※1. R404A 冷媒との比較において。 ※2. 2010年5月25日現在。スーパーマーケット向け冷凍ショーケース用冷凍機システムにおいて。 ※3. 試算条件：冷凍機「OCU-CR2008MVF」1台、ショーケース「FLD-EX0377LC(T)」6台、配管長20mの冷凍機システムにおいて、R404A冷媒のGWP3,920、CO<sub>2</sub>を1、年間の自然漏洩を封入量の16%として算出。

Panasonic

[www2.panasonic.biz/es/cold-chain/cfcfree/](http://www2.panasonic.biz/es/cold-chain/cfcfree/)

Pressure Adjust Control type

CO<sub>2</sub> Reduction

GWP

approx. 1/4000

approx. 67%

Ozone depletion potential 0



10HP Refrigerator



10HP Refrigerator & Freezer



15HP/20HP Refrigerator & Freezer

## There is Panasonic you haven't known yet.

## Wonders! by Panasonic

# New lineup of CO2 Units

## Panasonic's environmentally friendly CO2 cooling systems are green solution in all ways

This cooling system product line is Panasonic's environmentally friendly and reliable solution for the supermarket industry. Energy savings, the customer's feeling of safety and the environment have been the focus when developing these units. By choosing the Panasonic solution using a natural refrigerant, you may already be able to meet future European regulations regarding cooling systems today.

