SANYO CO2 Heat Pump Water Heater

SANYO Air-conditioners Corporation


SANYO New VISION
Think GAIA

Award winner in INTER CLIMA 2006 in Paris

Sanyo received “Innovation Award” in INTERCLIMA in Jan. 2006

<*INTERCLIMA = International Heating, Refrigerating, Air Conditioning and Sanitaryware Exhibition>

The issue of global environment protection

Destruction of ozon layers
The use of CFCs and HCFCs was prohibited.
(Montreal Protocol)

→ Progress of HFCs

Global warming problem
New technology is required.
(Kyoto Protocol COP3)

→ Natural Refrigerants

Why CO2 is the best refrigerant?

		ODP	GWP	Flammability	Toxicity	Natural Substance
Natural refrigerant	CO2	0	1	—	—	Yes
	HC	0	≒0	++ 	—	Yes
	NH3	0	≒0	+ 	+ 	Yes
HFC	R134a	0	1300	—	—	No
	R410A	0	1900	—	—	No
	R407C	0	1600	—	—	No
HCFC	R22	0.055	1700	—	—	No

Why CO_2?

Advantage: • *Environmental friendly : no ODP, negligible GWP*
• *Nonflammable, Nontoxic, cheap refrigerant*
• ***High Heat Pump Performance at Low ambient***

⇨ *Best for Nordic HP.*

Disadvantage: • *Relatively High Pressure (more than 3 compared to HFCs)*

⇨ *Technology Break-through by Sanyo*

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Key Words

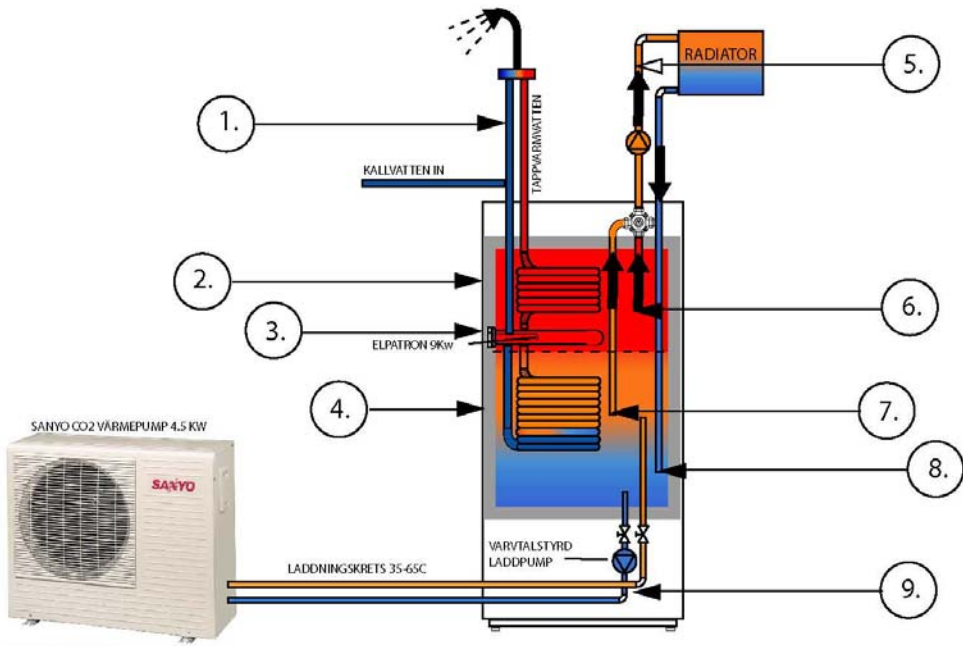
-Environmental

-Economical

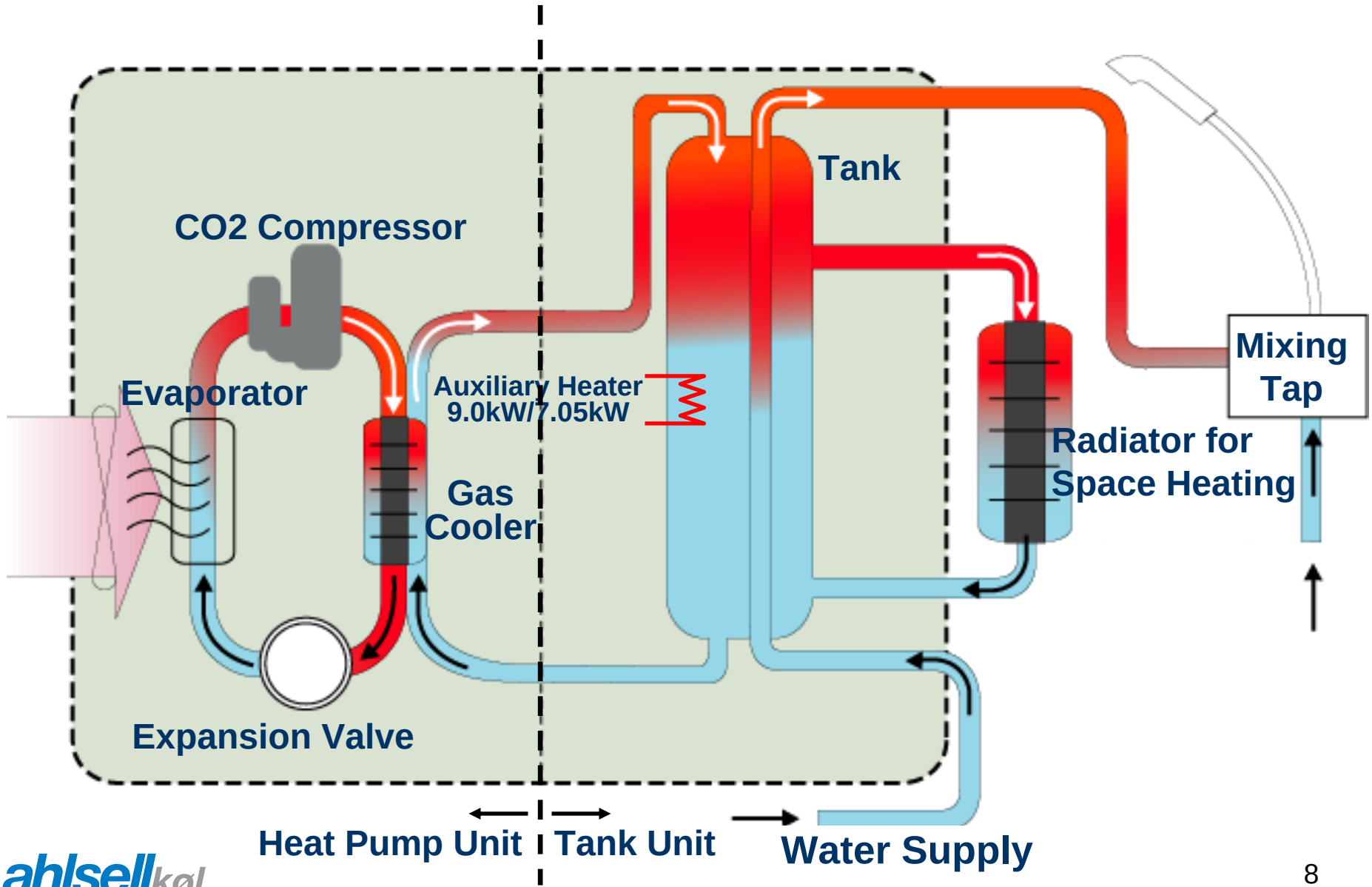
-Easy installation

Sanyo CO2 Eco is the BEST solution for

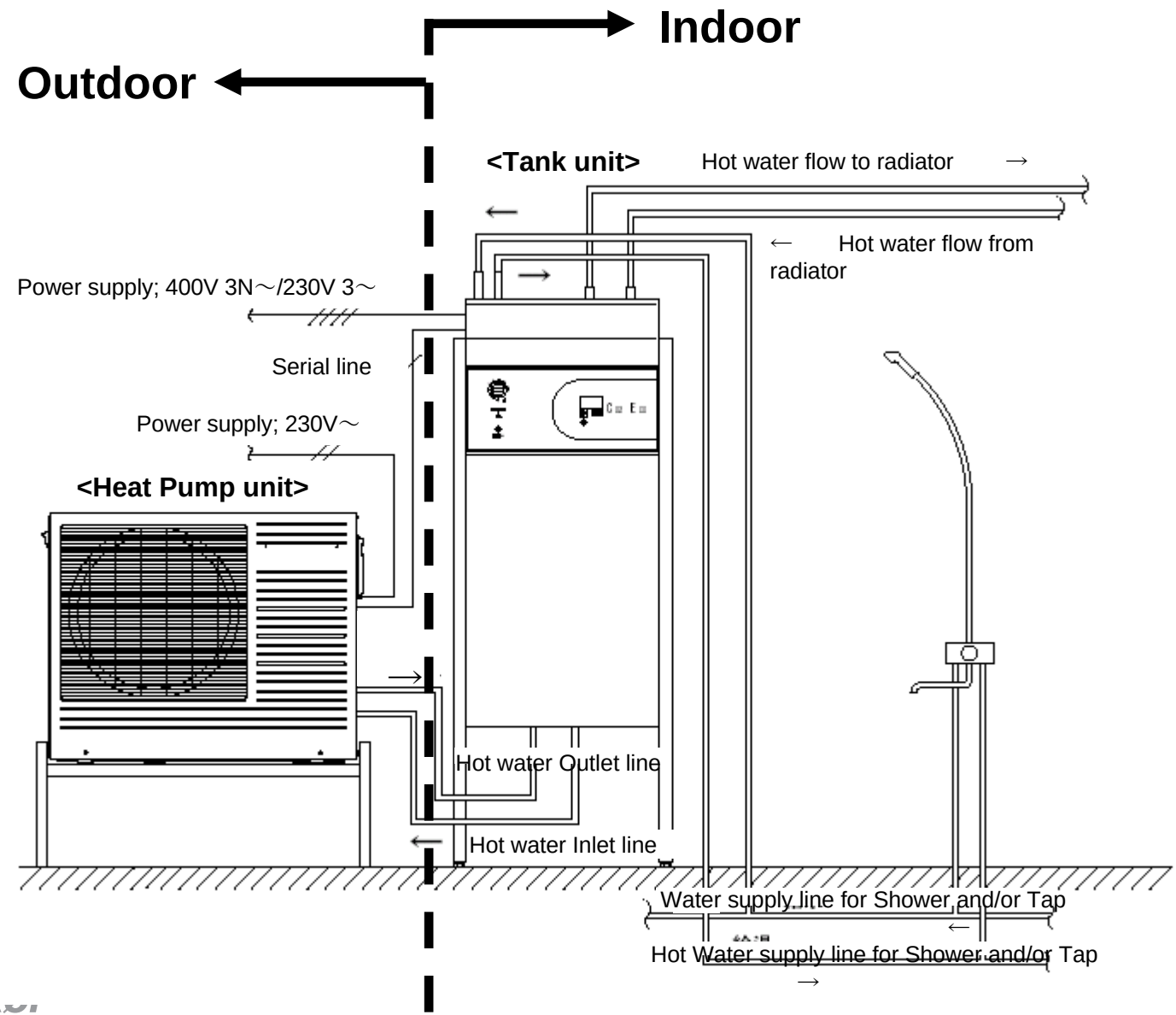
Hot water supply and Space Heating in Nordic Area!


RADIATOR
5.
1.
KALLVATTEN IN
TAPPVARMVATTEN
2.
6.
3.
ELPATRON 9Kw
4.
7.
8.
SANYO CO2 VÄRMEPUMP 4.5 KW
SANYO
VARVTALSTYRD
LADDPUMP
LADDNINGSKRETS 35-65C
9.

Schematic System Flow

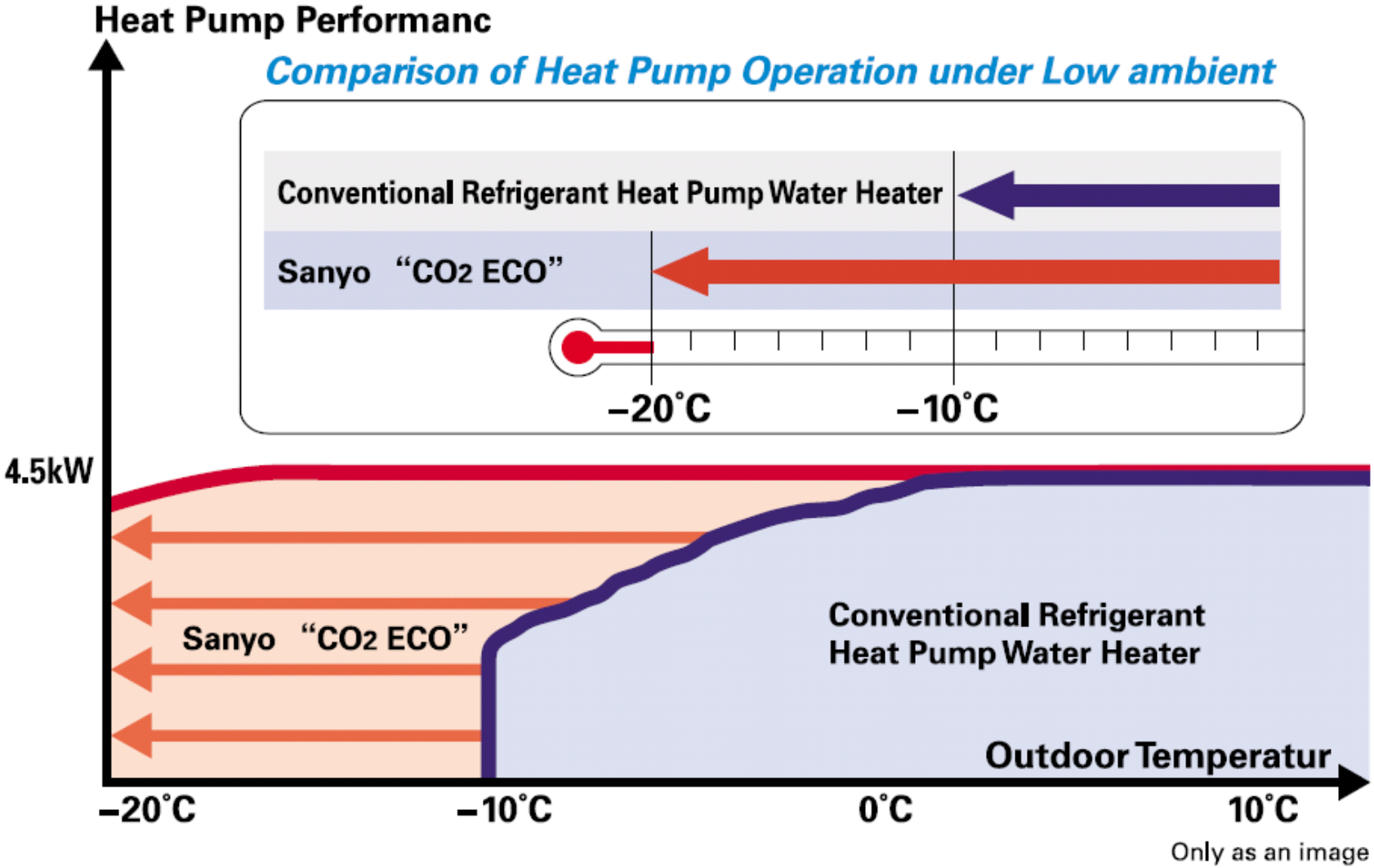


Standard Installation Diagram



Using CO2 as refrigerant (User Merit)

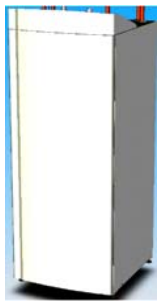
High Performance under Low Ambient

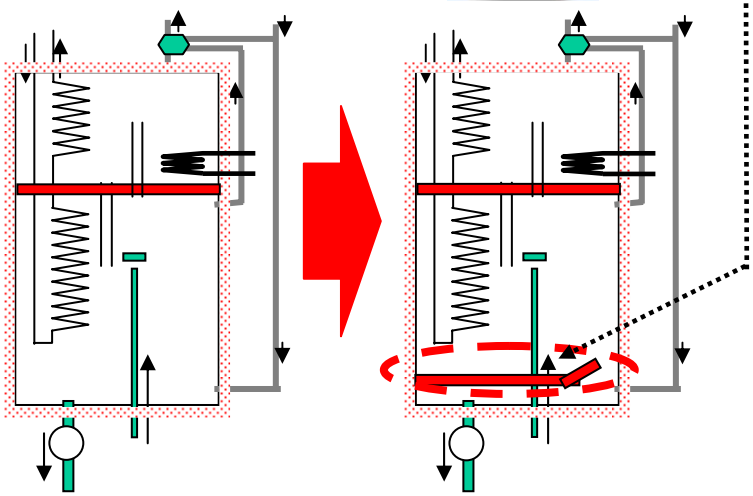


New Tank Appearance and Inside

<Current>

<New>

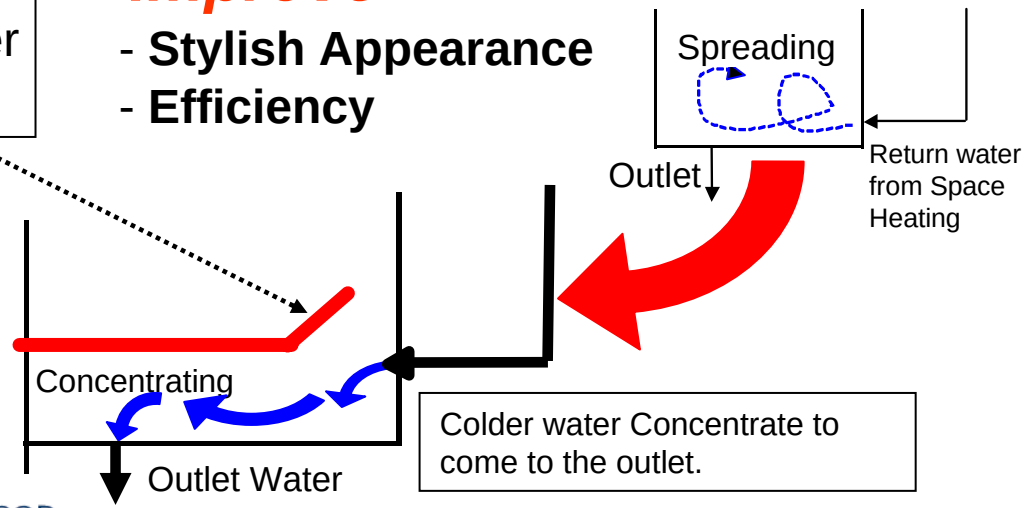


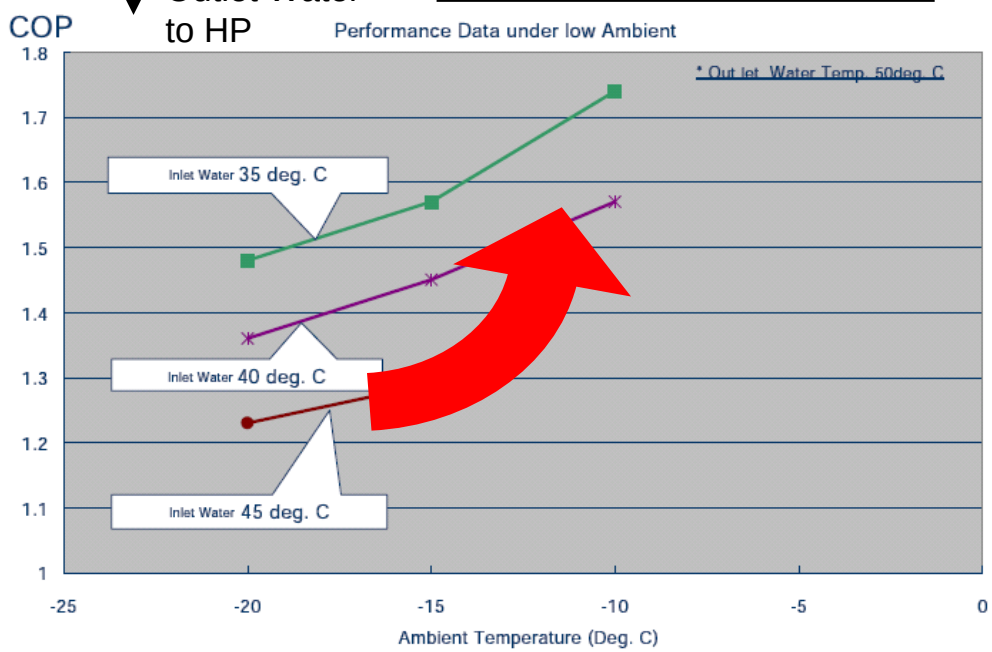


Buffer Plate

Improve

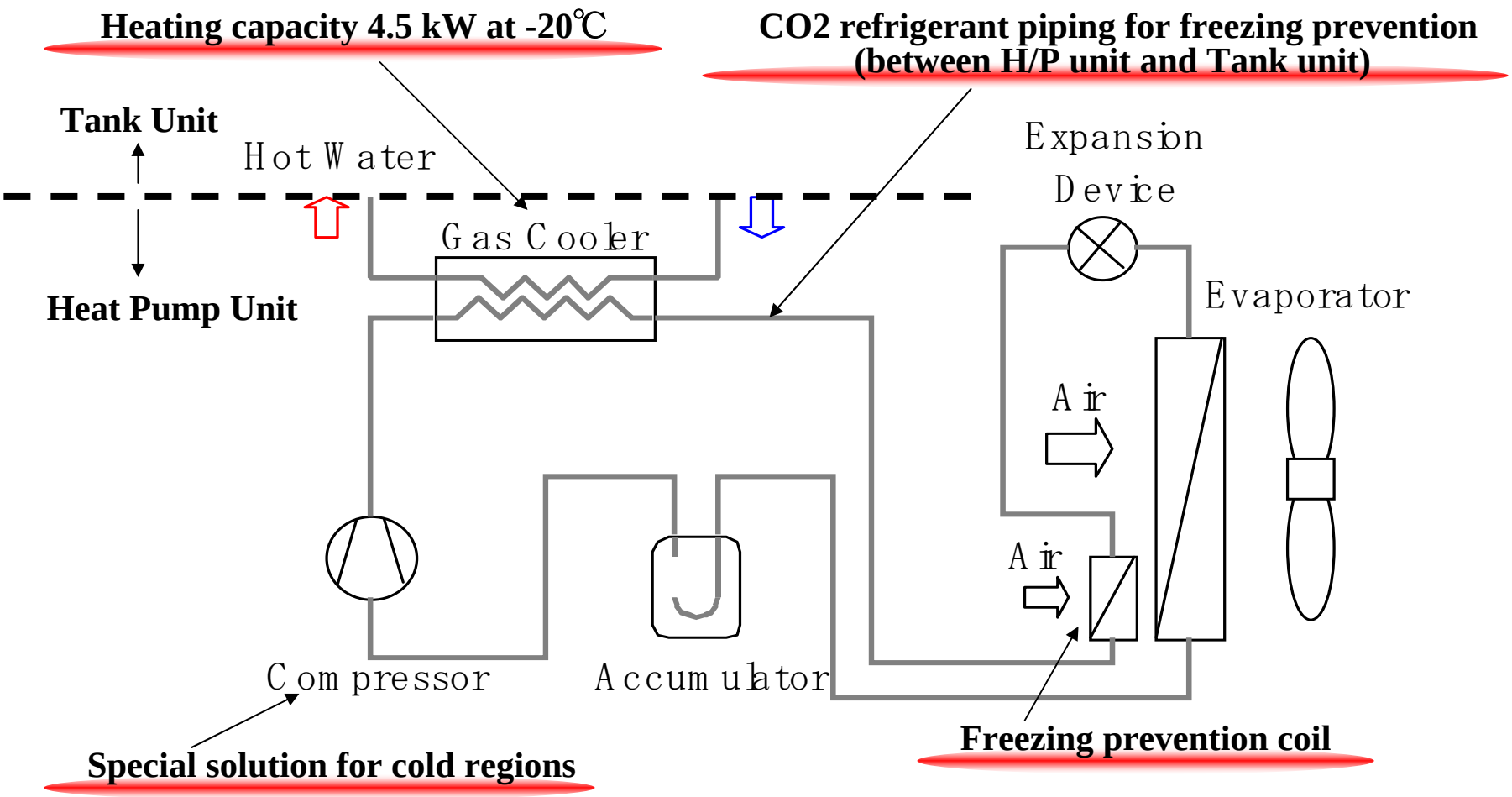
- **Stylish Appearance**
- **Efficiency**





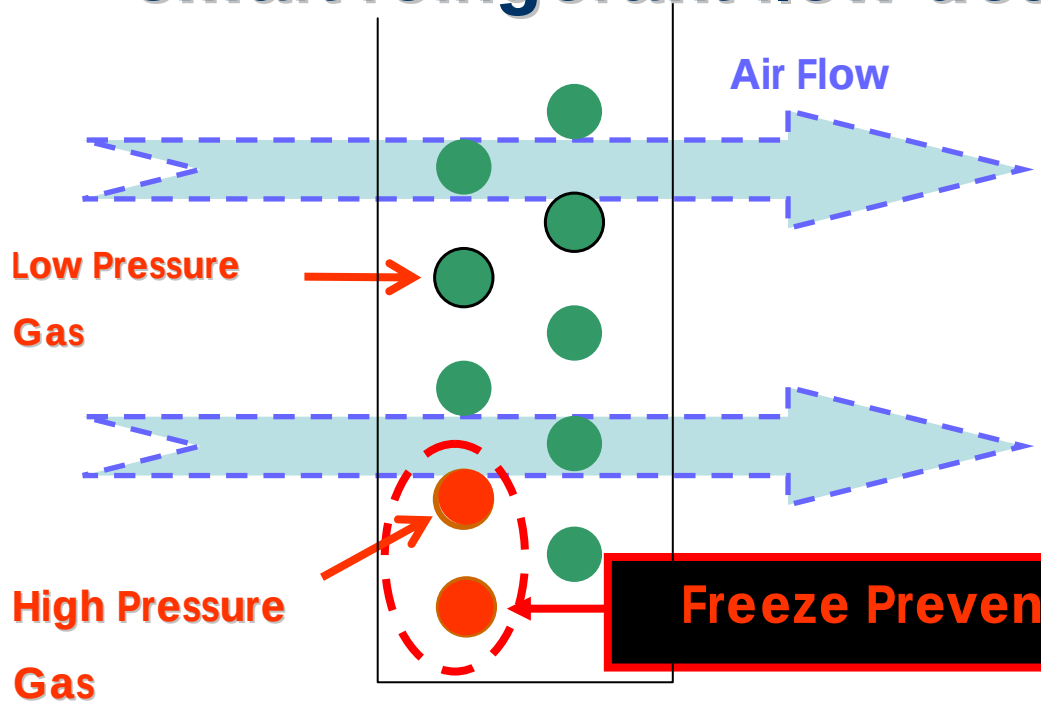
Colder inlet water to HP unit is better for the efficiency.

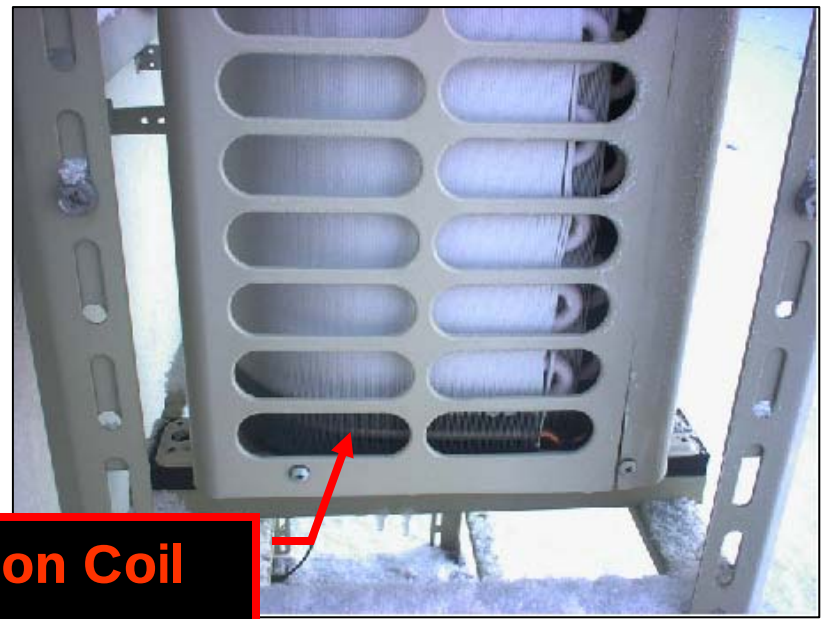
Low Ambient Model Diagram & Characteristics



Using CO2 as refrigerant Technology for high reliability

Smart refrigerant flow design





Freeze Prevention Coil

*Cross-section Diagram

at the bottom of the Evaporator

No electric heater for freeze prevention

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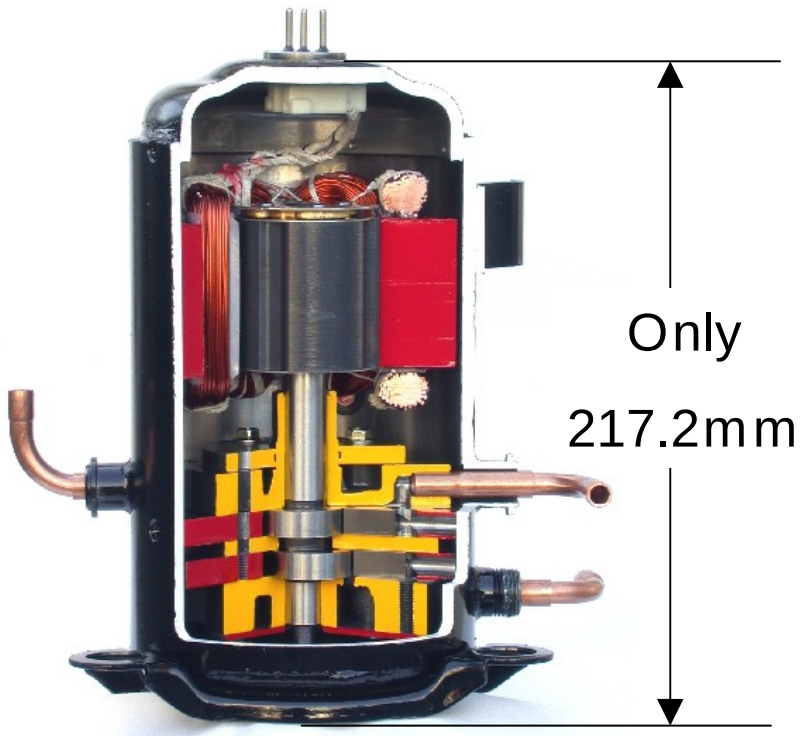
Using CO2 as refrigerant Technology for high efficiency and reliability

The World's First CO2 Rotary 2-stage Compression system

-Smallest and Powerful

-Highly reliable 2-Stage Compression mechanism

-Environmental CO2 Refrigerant



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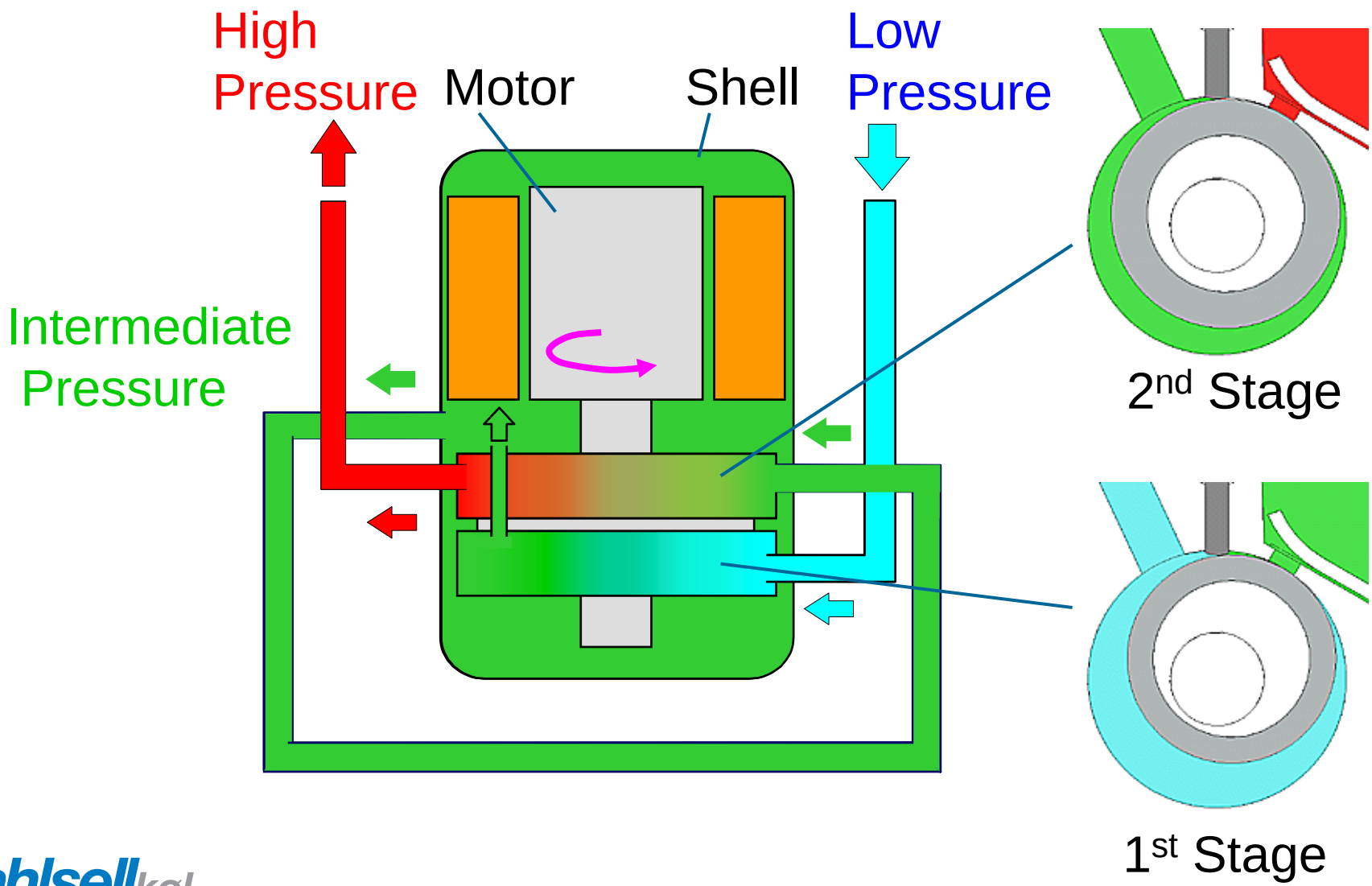
CO2


High Pressure
Motor
Shell
Low Pressure
Intermediate Pressure
2nd Stage
1st Stage

Actual Installation 2

Easy Installation!

No Drilling!

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SANYO CO2 Water Heater for European Market

- Compact Design and Easy Installation
- High Performance even at the cold climate (<-20C)
- Quiet Operation (<45dB(A) at Sanyo condition

Sanyo Room Air-conditioner
Outdoor unit (WW series)

*For Comparison

<Heat pump unit>

SHP-C45DEN

<Tank unit>

SHP-TH22DDN

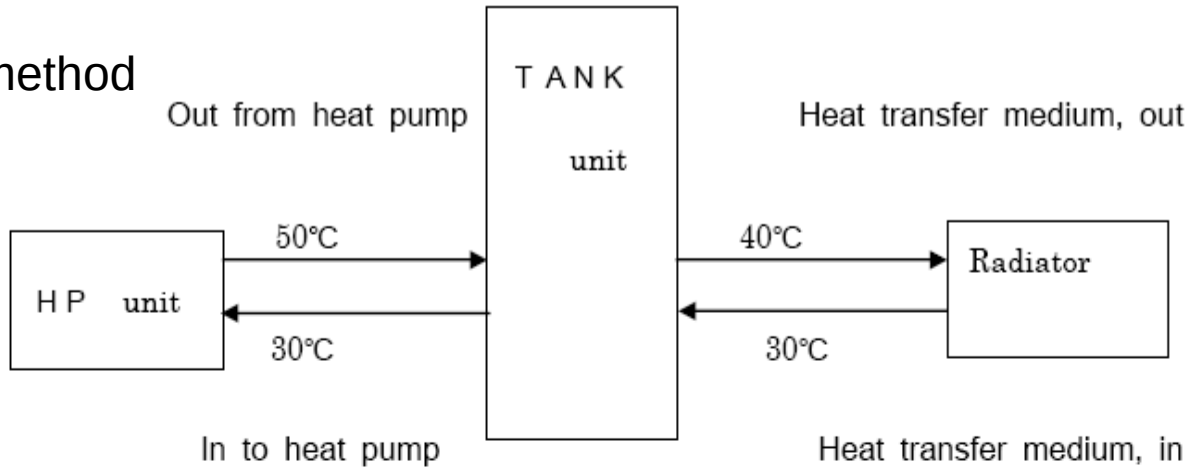
Actual Installation 1

REPORT OF SANYO CO2ECO TEST RESULTS (IN SANYO'S LAB.)

1. Results in accordance with SANYO settings

Heat transfer medium, out	**40 gr.C**	**40 gr.C**	**40 gr.C**
Heat transfer medium, in	**30 gr.C**	**30 gr.C**	**30 gr.C**
Air temperature, dry bulb	**7 gr.C**	**20 gr.C**	**-15 gr.C**
Air temperature, wet bulb	**6gr.C**	**12gr.C**	**-**
Out from heat pump	**50,0 gr.C**	**50,0 gr.C**	**50,0 gr.C**
In to heat pump	**29,9 gr.C**	**30,0 gr.C**	**30,0 gr.C**
Heat transfer medium (kg(min)	**6,35**	**6,392**	**6,31**
Between heat pump and tank (kg/min)	**3,228**	**3,231**	**3,219**
Total thermal output power to heat sink (kW)	**4,43**	**4,46**	**4,40**
Total thermal output to heat sink, heat pump (kW)	**4.527**	**4.508**	**4.492**
Heat pump inverter Hz	**65**	**57**	**98**
The heat pump defrosts	**NO**	**NO**	**NO**
Electrical power			
Total heat pump (kW)	**1,446**	**1,148**	**2,433**
Coefficient of performace			
Heat pump	**3,13**	**3,93**	**1,77**

2. SANYO' test method



3.Comments

Sanyo' test method

The heat pump was tested with 50℃ outlet temperature in accordance with EN255.

Also the heat pump inlet temperature was 30 ℃. This CO2 heat pump needs 20 degree between out/in in order to have full performance. And then the heat transfer medium out/in are 40 ℃ and 30 ℃.

Sanyo CO2 Eco Achievements
Production History

2005~ accumulated shipment to Europe

3500 units ~

2001~ accumulated shipment in Japan

almost 100,000 units

Sanyo have been producing CO2 Eco since 2001 and receiving Excellent reputation from the market.

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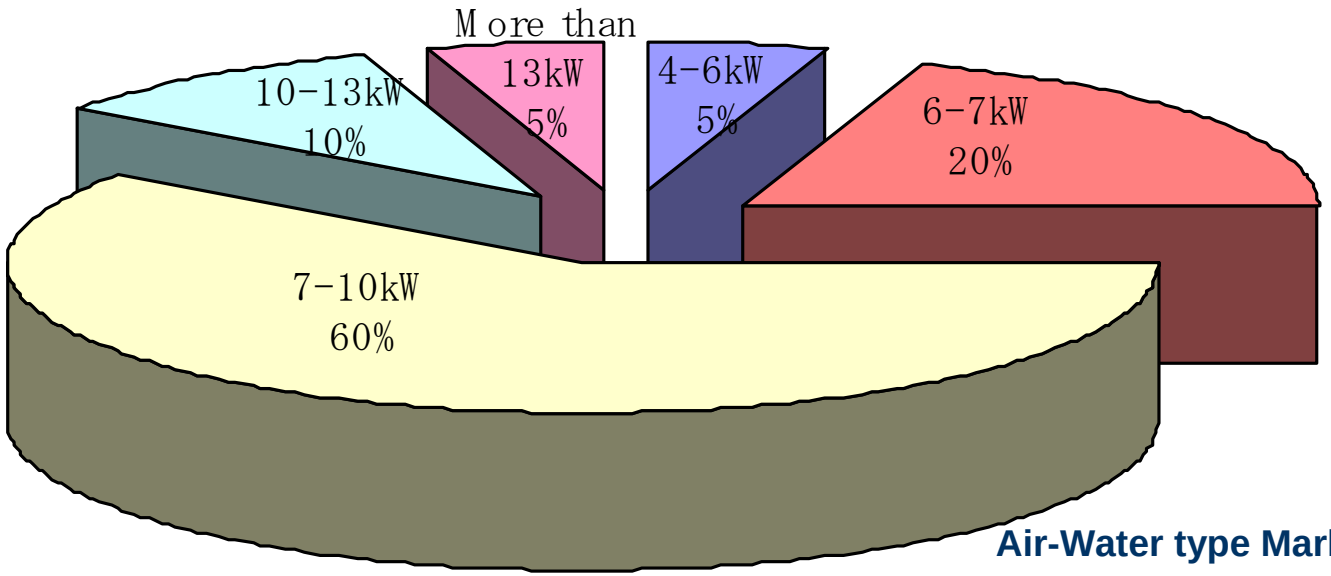
Next Generation SANYO CO_2 Water Heater

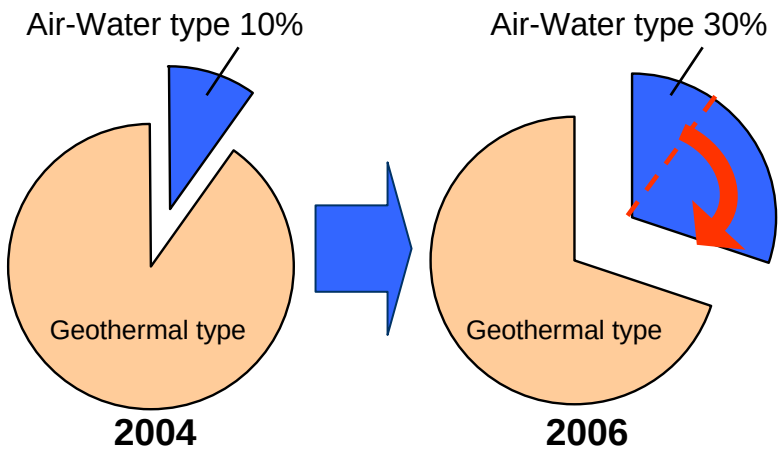
April. 23rd 2007

SANYO Electric Co., Ltd.
Clean Energy Company
Compressor Division

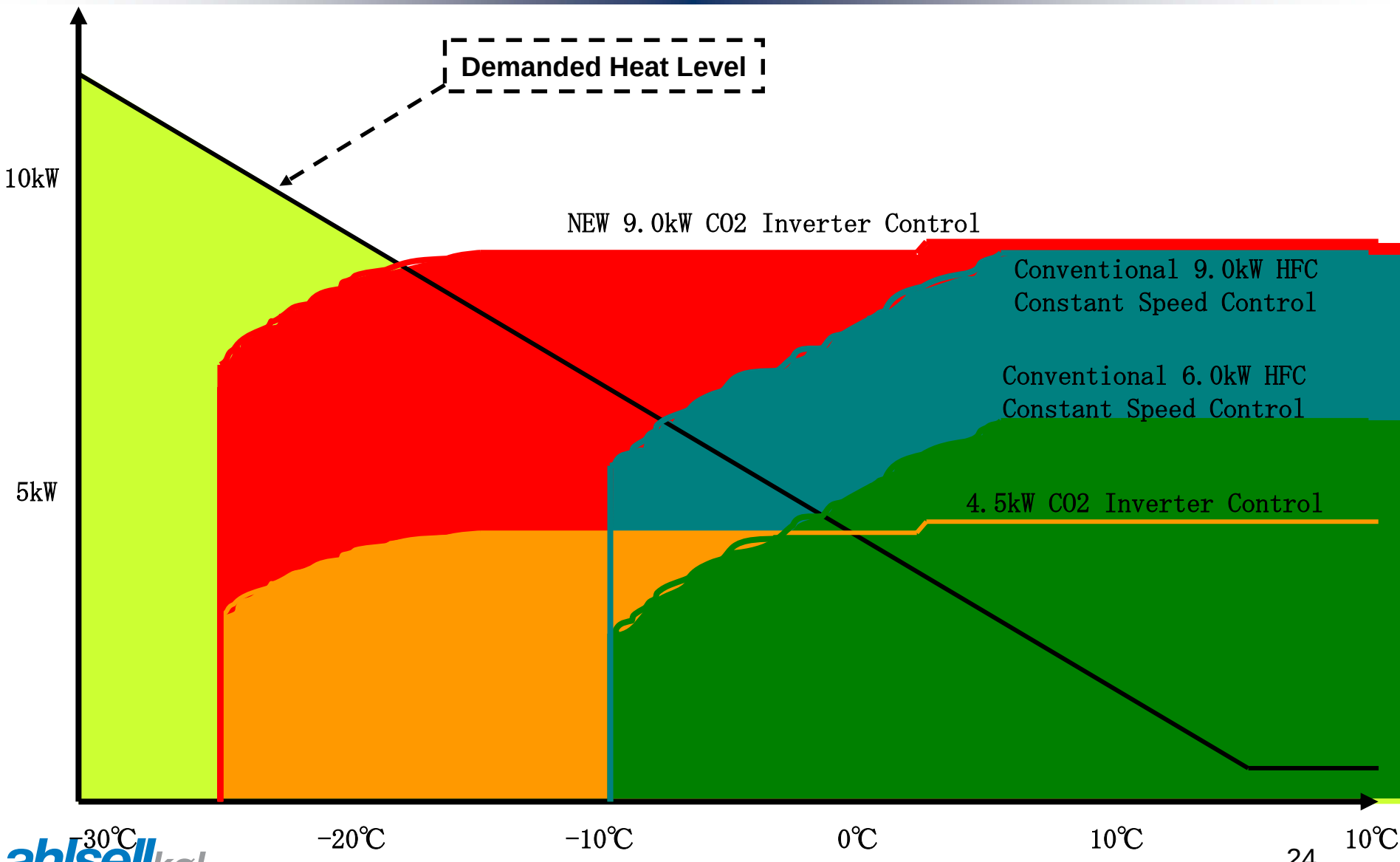
Market Proportion by Heat Pump Size (in Sweden)



Air-Water type Market Growth



Correlations between Outdoor Temp. and HP Performance



Sanyo CO_2 Compressors for 2008

		2005~ Model	2008~ Model	
Heat Pump Capacity		4.5 kW	5.5 kW New	9.0 kW New
Compressor Model		C-CV133	C-CV15*	C-CV30*
Power Source	1ph 230V	Available	Available New	Available New
	3Ph 400V	N/A	Available New	Available New
Outer Diameter (mm)		118	118	133
Weight (Appro. Kg)		9	9 +	15 +
Compressor Outlook				
Comment			The same configuration as the conventional but covers more demands.	The world's largest Hermetic 2-stage Rotary.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