

SET FREE Σ

HITACHI

—
**Air source VRF
Heat pump type
HNCQ series**

Cooling & Heating

air

Hi ☺!





SET FREE Σ ?

Cooling & Heating

air



Q. What is SET FREE?

**A. SET FREE is the Hitachi VRF family
brand name. Trademark!**



Q. What is SET FREE Σ ?

**A. SET FREE Σ is Hitachi's 8th generation
Commercial VRF!**



Q. SET FREE Σ Rationale?

A.

1. "Σ" is a mathematical symbol of "sum", so this represents "sum of Hitachi and JCI technologies, the culmination of our entire VRF technologies"
2. "Σ" also means "Σ shaped Heat Exchanger", one of the key technologies of this new generation VRF.
3. "Two Red Circles" represent "Scroll Compressor", our core technology.
4. "Red Circle" also links to the "Temperature symbol" °C or °F (We control temperatures)
5. "Red Circle" also links to the origin of Hitachi Brand, (Chinese Characters = 日立 = Rising Sun or Sun Rise)



—

Q. Hitachi VRF History?
A. Next Page...

Hitachi VRF History

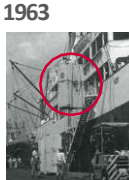


Air compressor
Casting

1940



1961



1963

Refrigerators

1960



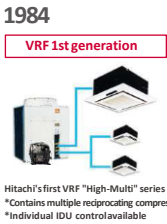
1981

PAC Refrigerators
Compressors



1983

Scroll Compressor
Production for AC unit.

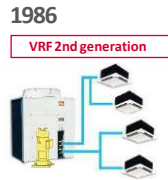


1983

1984

VRF 1st generation

Hitachi's first VRF "High-Multi" series
*Contains multiple reciprocating compressors
*Individual IDU control available



Hitachi's 1st Inverter-driven VRF With Scroll Compressor built-in

1986

VRF 3rd generation



Up to 5 IDUs

World 1st Inverter-driven VRF Up to 115 Hz in 1986



Newly R410A adopted VRF "SET FREE FSXN": heat-pump type "SET FREE FXN": heat-recovery type



2011

Centrifugal VRF Point: "Outdoor unit" that can be installed inside the building

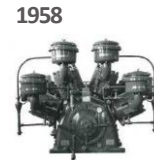
VRF PAC
Compressors

2000

Roller Casting



1951



1958



1956

PAC Refrigerators
Compressor for REF

Casting



1970



1971



1972



1973



1976

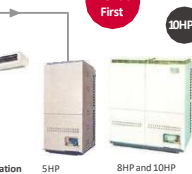


1978



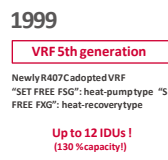
1979

VRF PAC
Compressors



World 1st IGBT Inverter built-in VRF leading to top-in-class quietest operation

1991



Newly R407C adopted VRF "SET FREE FSXN": heat-pump type "SET FREE FXG": heat-recovery type

1999

VRF PAC
Compressors



2012

VRF 8th generation



Hitachi New Generation VRF This New Generation VRF after 33 years experience in VRF is 8th Generation VRF

Awarded

HITACHI

Two prominent awards in 2016 for Japanese domestic base-model.

**Hitachi
8th
generation
VRF**



Grand Prize for Excellence in Energy Efficiency and Conservation

Year prize won: FY2016
Prize name: FY2016 Grand Prize for Excellence in Energy Efficiency and Conservation
Prize category: Product Category & Business Model Category
Organizer: The Energy Conservation Center, Japan
Prize-winning product: FLEXMULTI air-cooled multi-split air conditioning system for buildings (high efficiency type)



The Environment Minister's Award for Global Warming Prevention Activities 2016

Year prize won: FY2016
Prize name: The Environment Minister's Award for Global Warming Prevention Activities 2016
Prize category: Technological development and commercialization category
Organizer: Ministry of the Environment of Japan
Prize-winning product: FLEXMULTI air-cooled multi-split air conditioning system for buildings (high efficiency type)

SET FREE Σ Heat Pump Type HNCQ Series



**Improved performance
in more sizes increases
design flexibility**



- Widest Range ever in our Hitachi VRF History



Capacity Range

Cooling & Heating

Capacity Range

- Single module: Up to 24HP

(8-12HP)



(14-18HP)



(20-24HP)



Capacity Range

- Two module: Up to 48HP

(26-28HP)



(30-34HP)



(36-42HP)



(44-**48HP**)



Capacity Range

- Three module: Up to 72HP



Capacity Range

- Capacity Range: Up to 96HP





Summary Table

Cooling & Heating

• Summary table

* For more details, please consult your distributors or dealer, or, refer to technical catalogue.

** Concerning maximum level difference between ODU and IDU (ODU above IDU),

Standard: up to 50m/Custom Order: up to 110m.

Longer piping (up to 110m) is available for 8 to 54HP models only.

Maximum level difference for 56-96HP is 90m.

HITACHI

Item		Unit	HNCQ Series
Capacity	HP class		8- 96
	Nominal Cooling	kW	22.4 - 272.0
	Nominal Heating	kW	25.0 - 300.0
Maximum connectable indoor unit quantity			13 - 64
Combination capacity ratio between ODU and IDU		%	50 - 130
Maximum piping length	Total piping length	m	1,000
	Refrigerant piping length	Actual	165
		Equivalent	190
	Between piping connection kit and each outdoor unit	m	10
	Between 1st branch multi kit and farthest indoor unit	m	90
	Between multi kit and each indoor unit	m	40
	Between outdoor units (combination of base units)	m	0.1
Maximum level difference **	Between outdoor unit and indoor units	ODU above IDU	50 (standard) / Up to 110m (custom order)
		IDU above ODU	40
	Between indoor units	m	30
Cooling operation range *		°C DB	-5 to 52
Heating operation range *		°C WB	-20 to 15

- HNCQ Series

HITACHI



Feature & Benefit

Cooling & Heating

Feature & Benefit



HIGH EFFICIENCY

- **EER**
Up to 4.50
- **COP**
Up to 4.90



DESIGN FLEXIBILITY

- **Smaller cabinet**
Single module: 24HP
- **Better piping limit**
Level difference between ODU
and IDU: Up to 110m
- **Wider operation range**
From -20°C to +52°C
- **Higher ESP of ODU**
Up to 80Pa



COMFORT

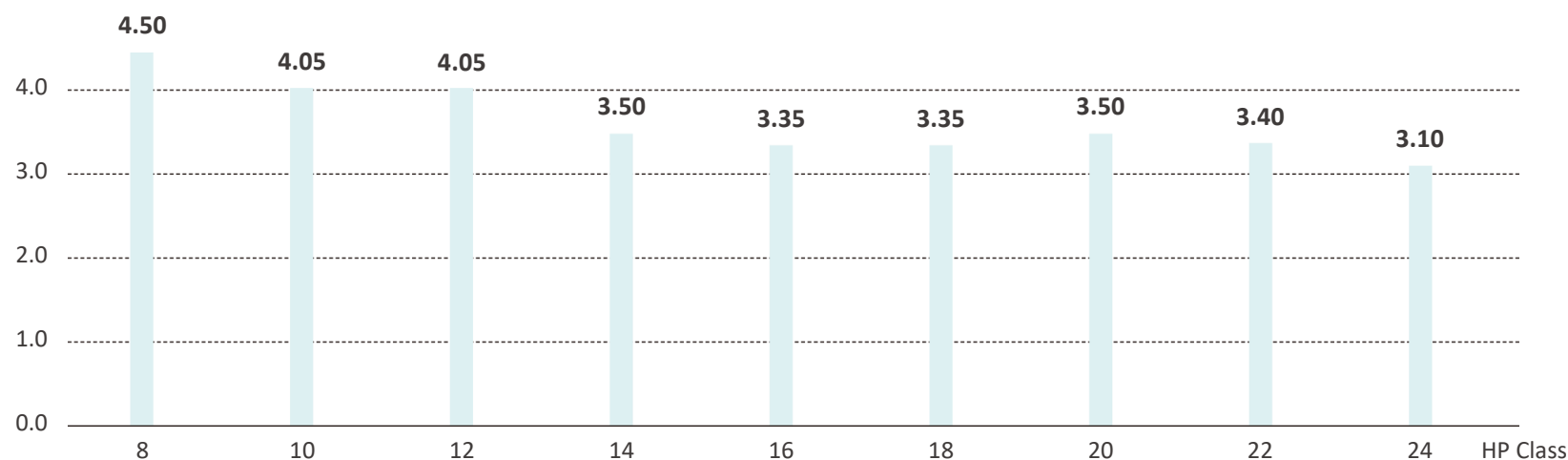
- **Smooth drive**
- **To prevent failure**
- **Back-up function**

High Efficiency

HITACHI

- Energy Efficiency Ratio

EER



EER up to 4.50

Notes:

1. The cooling and heating performances are the values when combined with our test indoor units.

Cooling Operation Conditions:

Indoor Air Inlet Temperature: 27°C DB 19°C WB

Outdoor Air Inlet Temperature: 35°C DB

Piping Length: 7.5 Meters

Heating Operation Conditions:

Indoor Air Inlet Temperature: 20°C DB

Outdoor Air Inlet Temperature: 7°C DB 6°C WB

Piping Lift: 0 Meter

2. Please see the technical catalogues for more details.



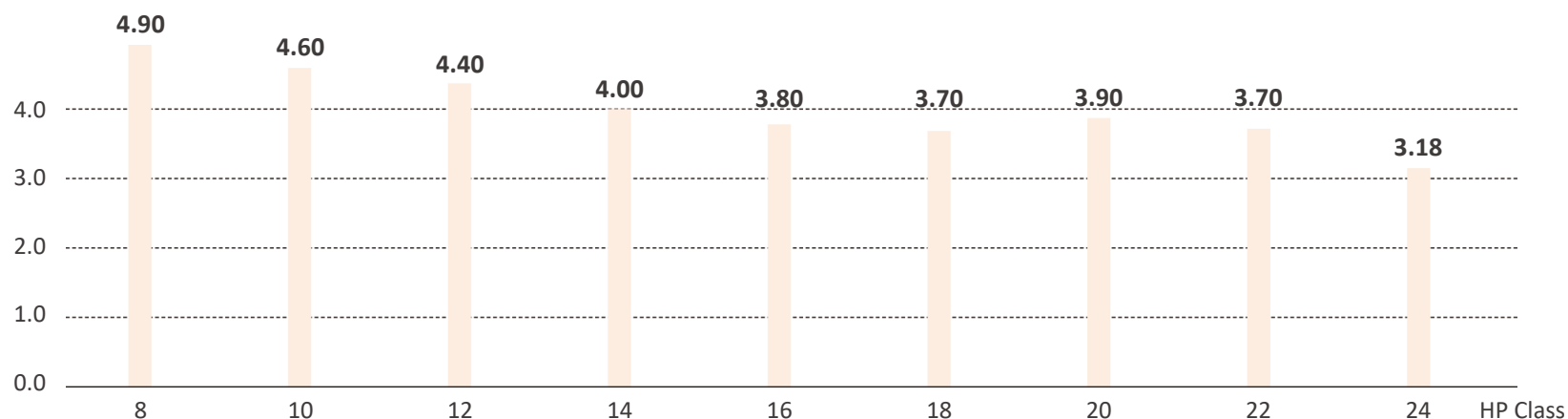
HIGH EFFICIENCY

High Efficiency

HITACHI

- Energy Efficiency Ratio

COP



COP up to 4.90

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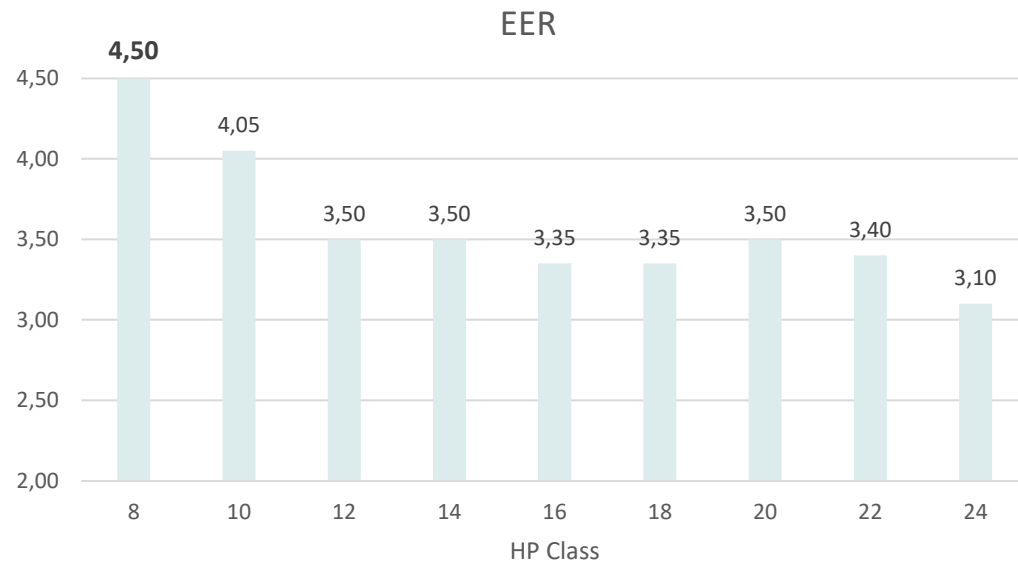
HIGH EFFICIENCY

High Efficiency

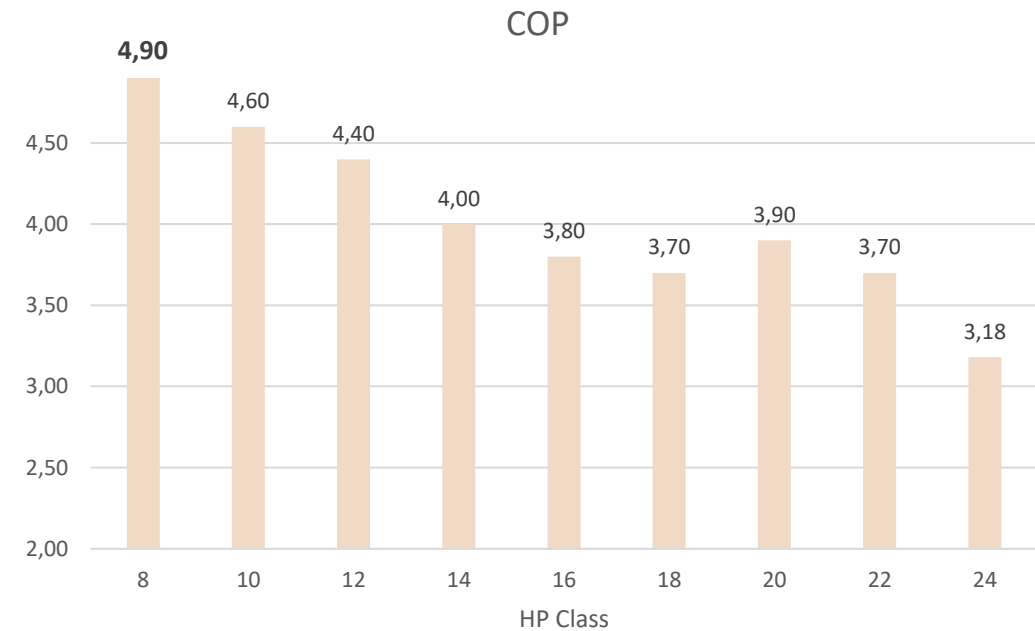
HITACHI

- Energy Efficiency Ratio

EER: Up to 4.50!



COP: Up to 4.90!



HIGH EFFICIENCY

High Efficiency

HITACHI

3 New Technology to achieve “Higher Performance”

NEW

✓ Heat Exchanger

- Σ Shape Heat Exchanger
(STD>14HP, H.E.>8HP)

NEW

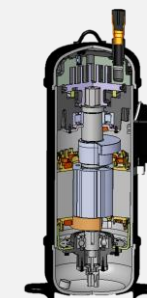
✓ Fan-outlet

Long and better outlet

NEW

✓ Compressor

Improve efficiency
at low load operation



WHAT'S IMPROVED?

1) Fan Outlet

2) Heat Exchanger

3) Compressor



HIGH EFFICIENCY

High Efficiency

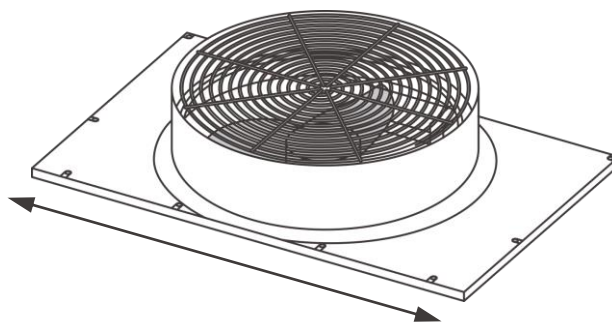
HITACHI

- New Technology

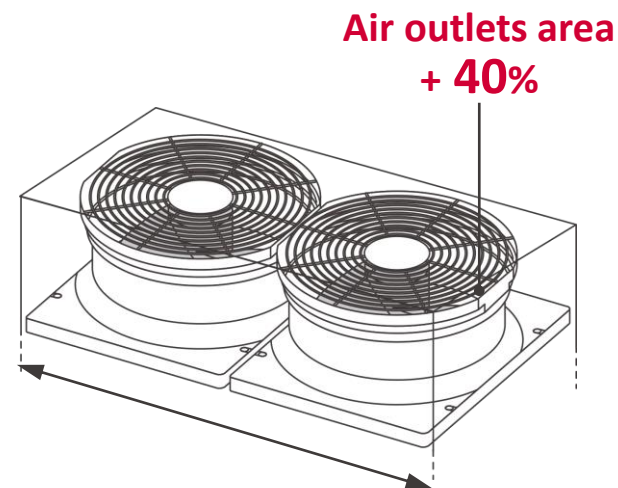


1) Air outlet

Expansion of air outlet



Current model



New model

High Efficiency

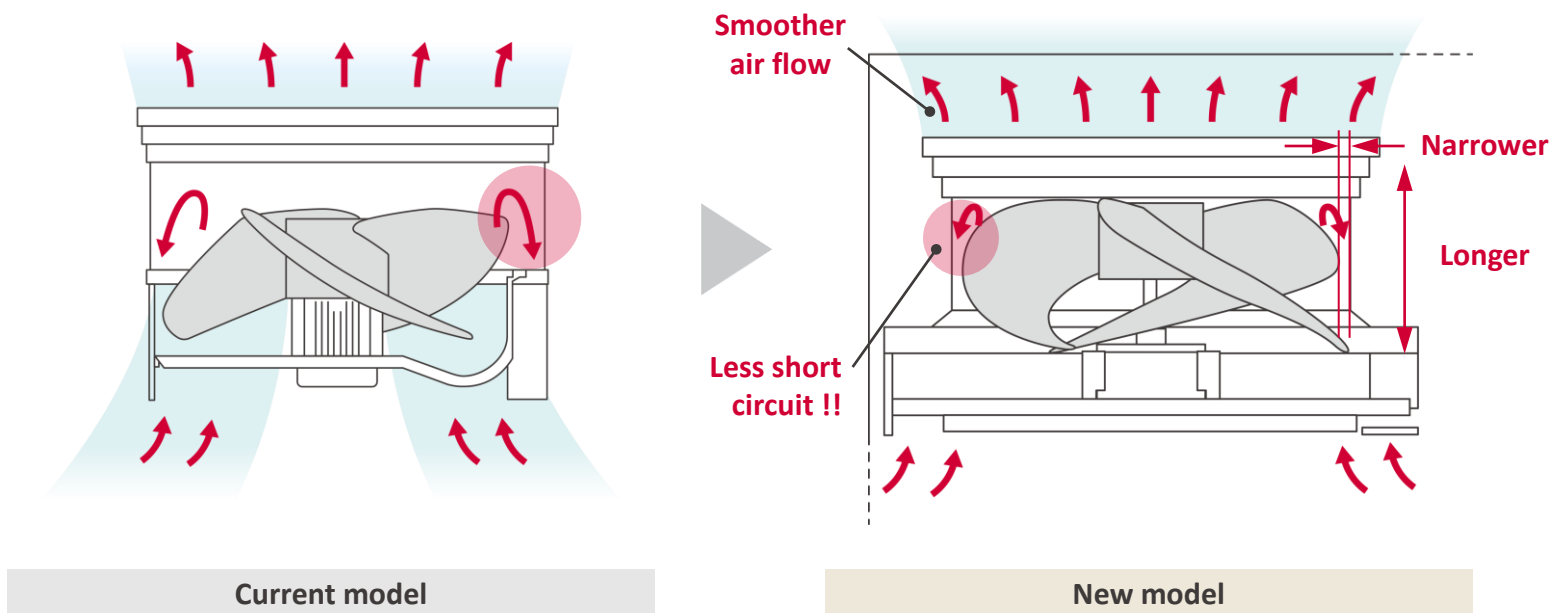
HITACHI

- New Technology



1) Air outlet

Improvement in air outlet



High Efficiency

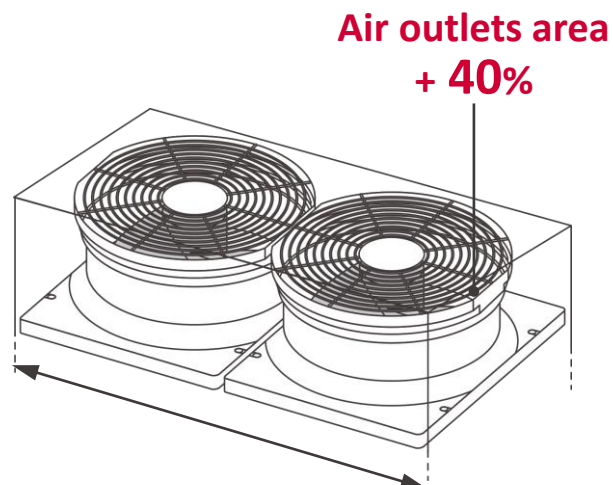
HITACHI

- New Technology



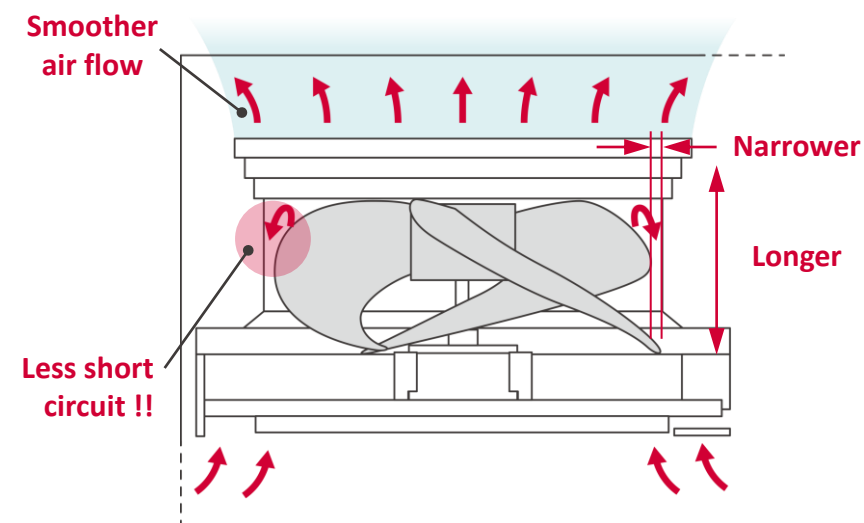
1) Air outlet

Expansion of air outlet



New model

Improvement in air outlet



New model

- Improvement of airflow volume by **23%** (single module)
- Energy consumption in the driving shaft has decreased by **20%** on average

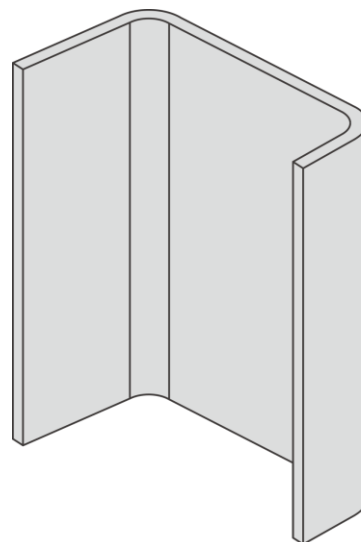
High Efficiency

HITACHI

- New Technology

2) Heat Exchanger

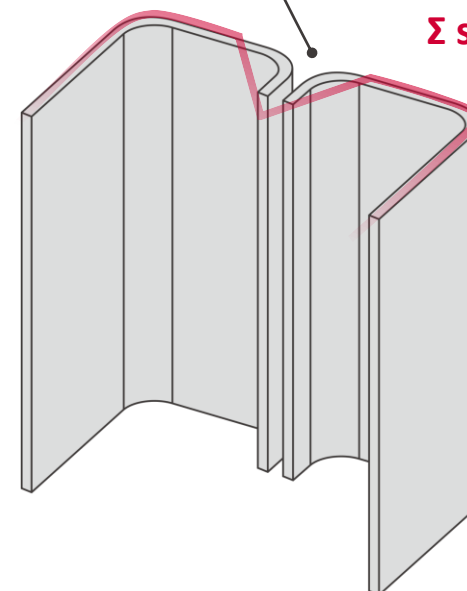
New shape



Current model (single module)

Split left-right
heat exchanger

Σ shape!



New single medium & Large cabinet



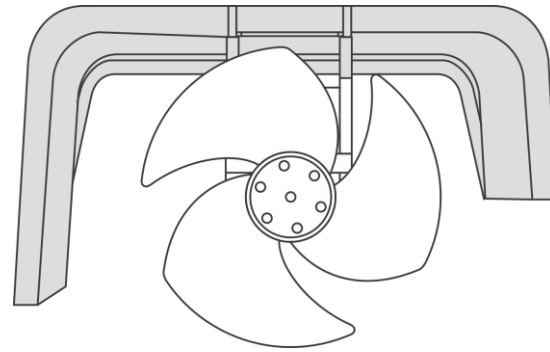
HIGH EFFICIENCY

High Efficiency

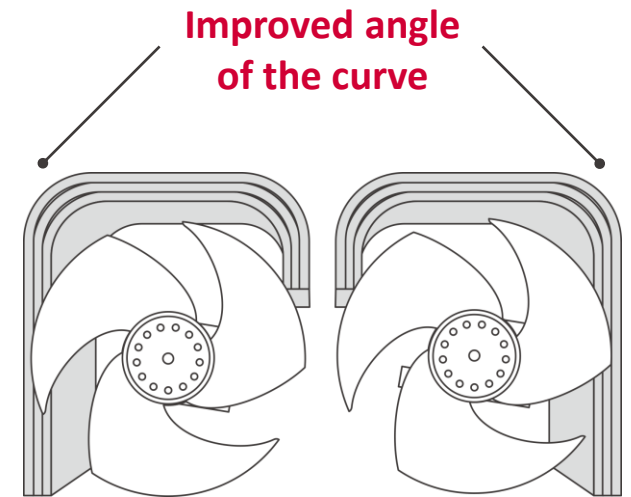
HITACHI

- New Technology

2) Heat Exchanger



Current model (single module)



New single medium & Large cabinet



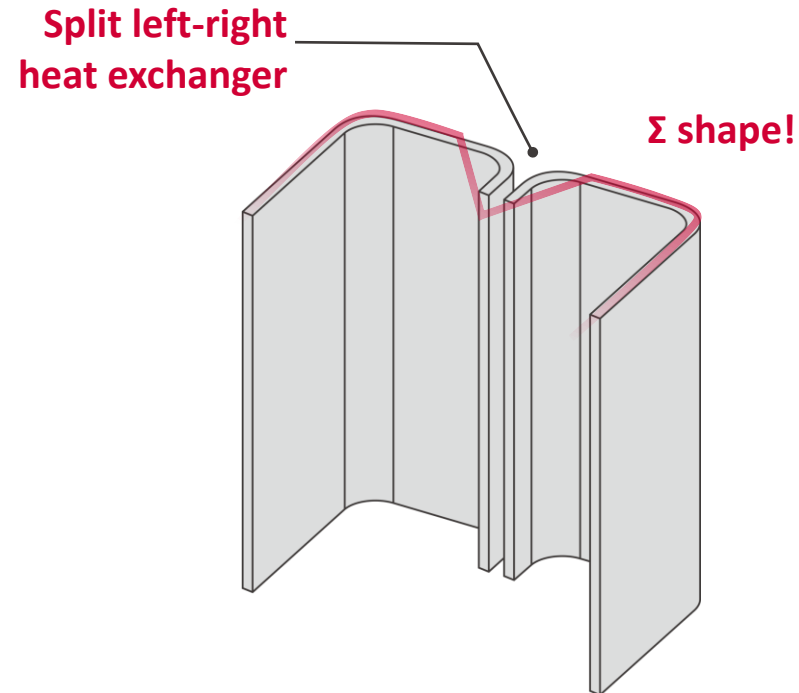
HIGH EFFICIENCY

High Efficiency

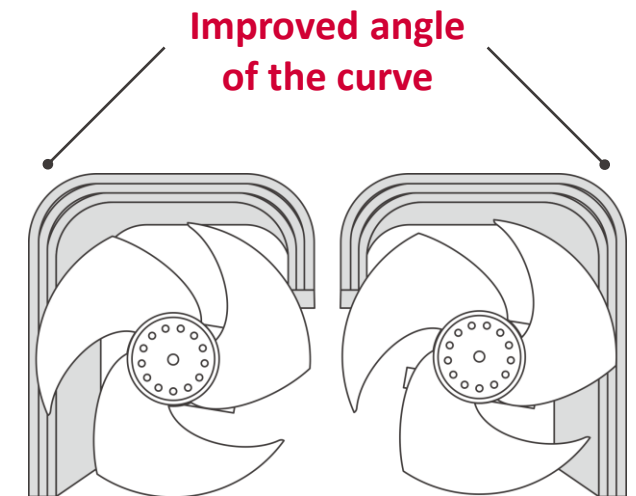
HITACHI

- New Technology

2) Heat Exchanger



New single medium & Large cabinet



New single medium & Large cabinet

- The heat exchange area has been increased by more than **10%** (single module)
- Greater heat exchange efficiency



HIGH EFFICIENCY

High Efficiency

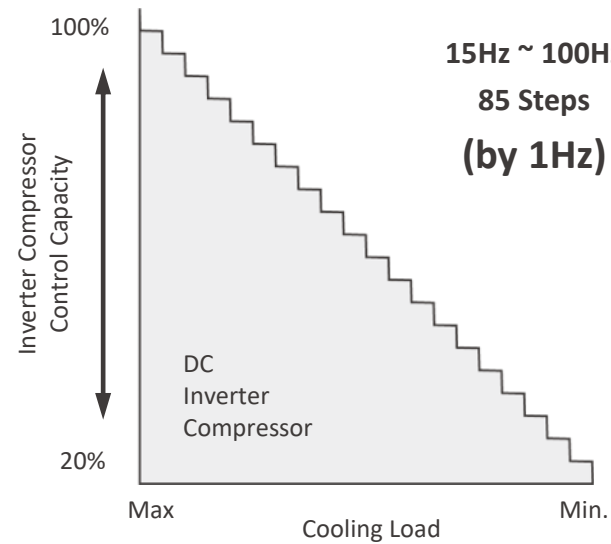
HITACHI

- New Technology

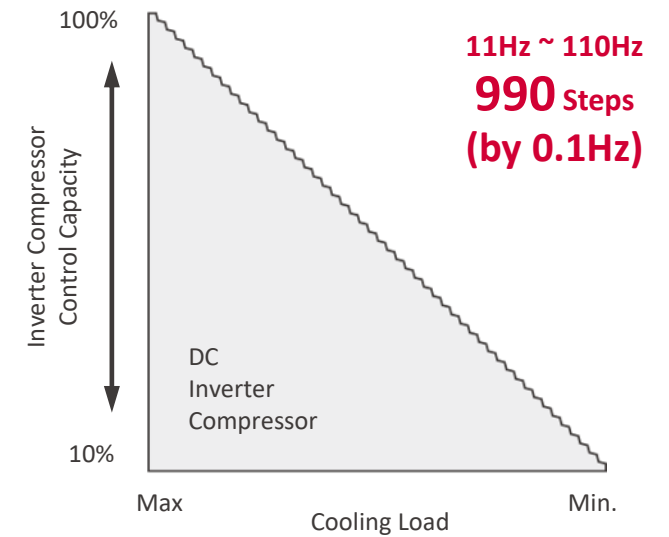


3) Compressor

The highly improved performance as well as greater energy saving is achieved by adopting newly developed high efficiency DC inverter compressor, with outstandingly precise control technology of 0.1Hz increments inverter frequency. Another feature is the dramatically extended working range, enabled by expanding the compressor's operating frequency band, both upwards and downwards.



Current model*



New model*

*Example at 12HP class[33.5kW]



HIGH EFFICIENCY

Design Flexibility

HITACHI

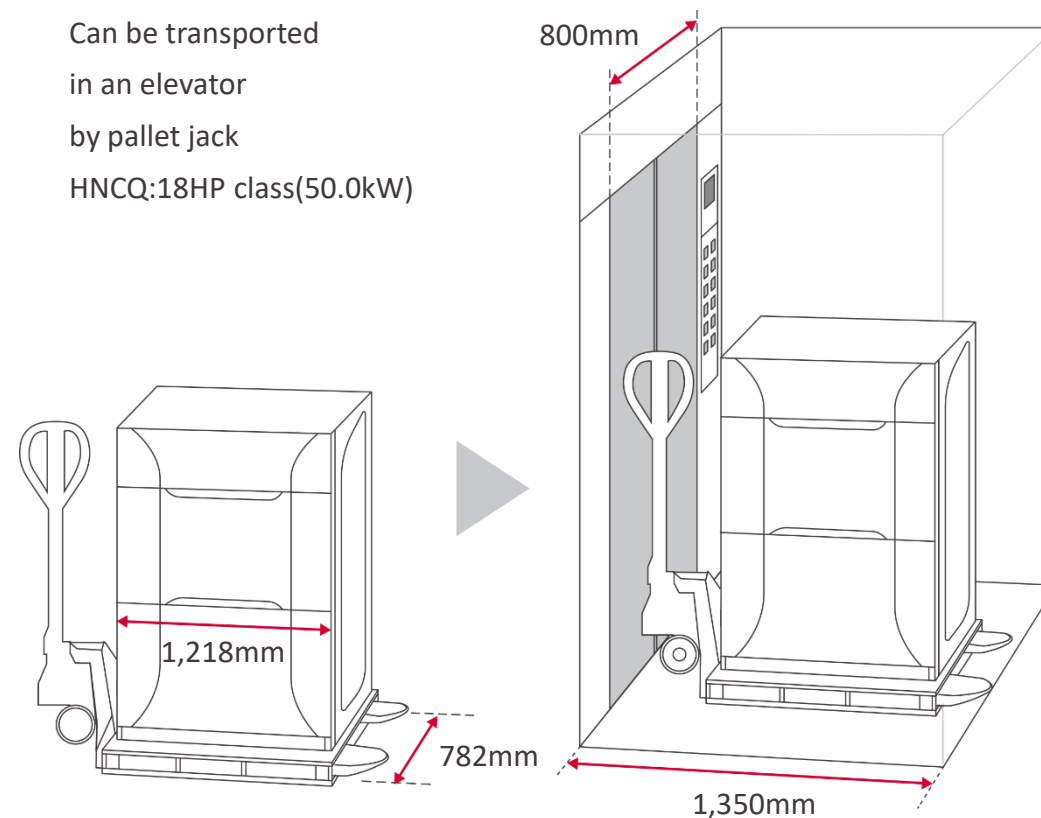
Easier Transportation

- Smaller cabinet



*Example at 24HP class [68.0kW]

Can be transported
in an elevator
by pallet jack
HNCQ:18HP class(50.0kW)



24HP
(68.0kW)

Installation Space

-24.4% (1.67m² => 1.26m²)

Product Weight

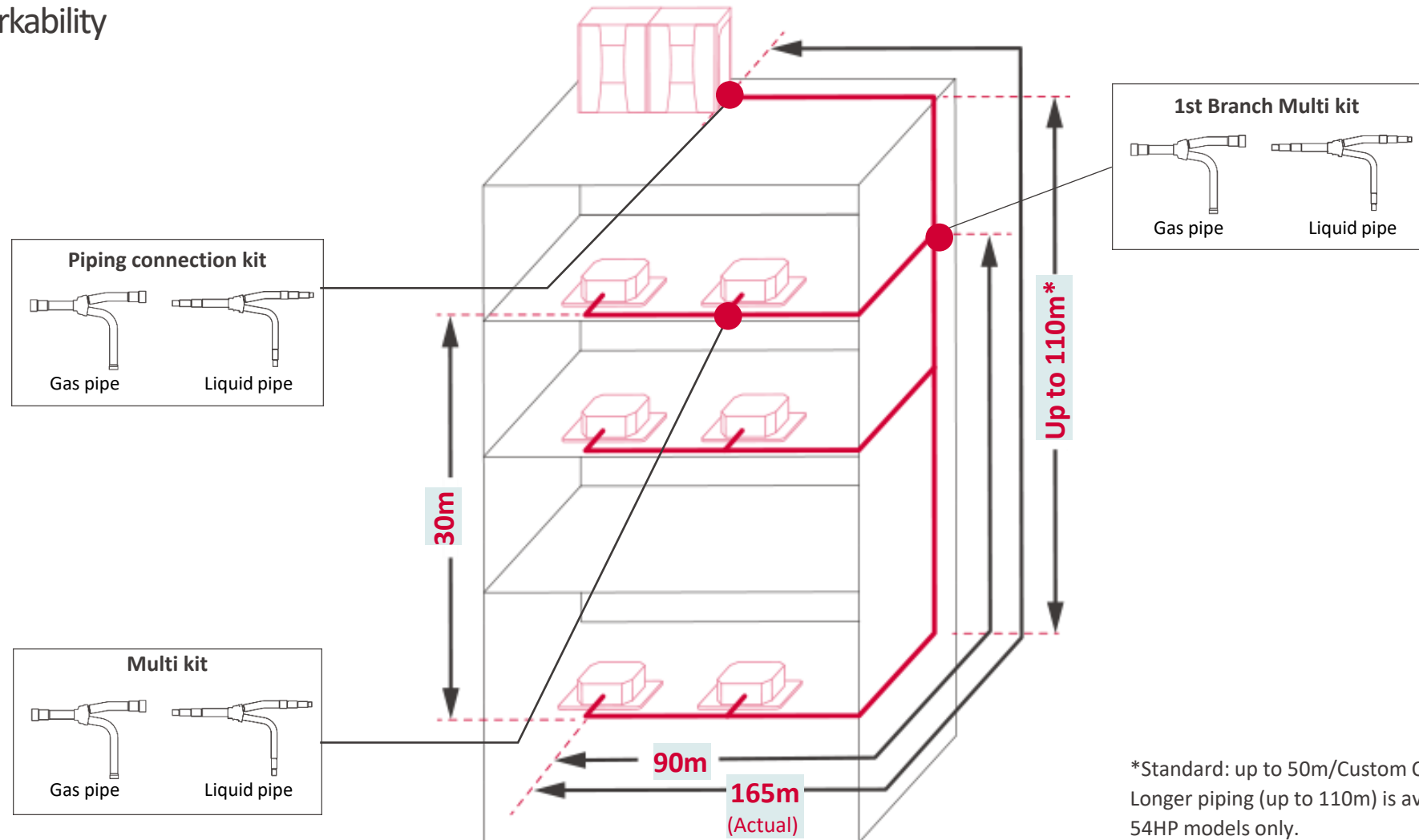
-17.8% (506kg => 416kg)



DESIGN FLEXIBILITY

Design Flexibility

Piping connection workability



*Standard: up to 50m/Custom Order: up to 110m.
Longer piping (up to 110m) is available for 8 to 54HP models only.
Maximum level difference for 56-96HP is 90m.

Design Flexibility

Piping connection workability

Maximum piping length	Total piping length		1,000m
	Refrigerant piping length	Actual	165m
		Equivalent	190m
	Between "Piping connection kit" and each ODU		10m
	Between "1st branch Multi Kit" and farthest IDU		90m
	Between "Multi Kit" and each IDU		40m
Maximum level difference	Between ODU (combination of base units)		0.1m
	Between ODU and IDU	ODU above IDU	50 (standard) / up to 110m (custom order)*
		IDU above ODU	40m
	Between indoor units		30m

Each maximum length or level difference has several conditions, please refer to the technical documents in inquiry.

* Standard: up to 50m/Custom Order: up to 110m.

Longer piping (up to 110m) is available for 8 to 54HP models only.

Maximum level difference for 56-96HP is 90m.

Design Flexibility

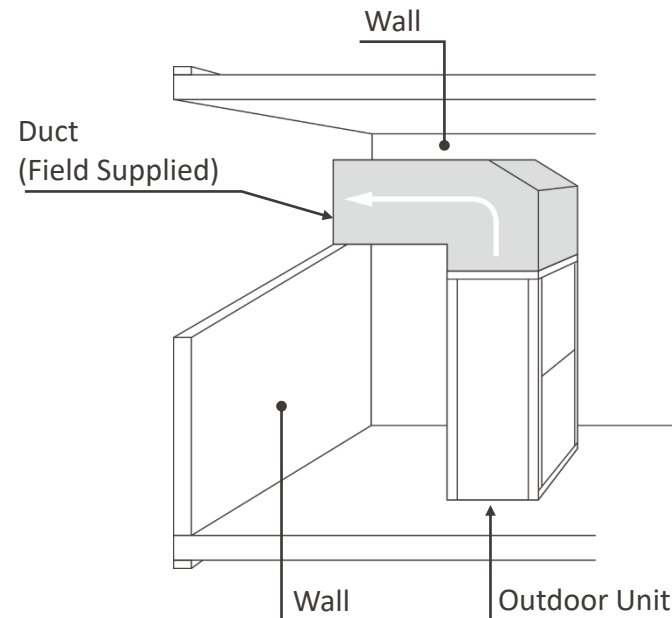
Improved external static pressure

Both more numbers of setting of ESP (up to 4), and, higher ESP (up to 80Pa) of outdoor unit, offer better options for the indoor installation of the outdoor unit, which leads to 3 benefits for you.

- Less piping length
- Lower installation cost
- Visual aesthetics

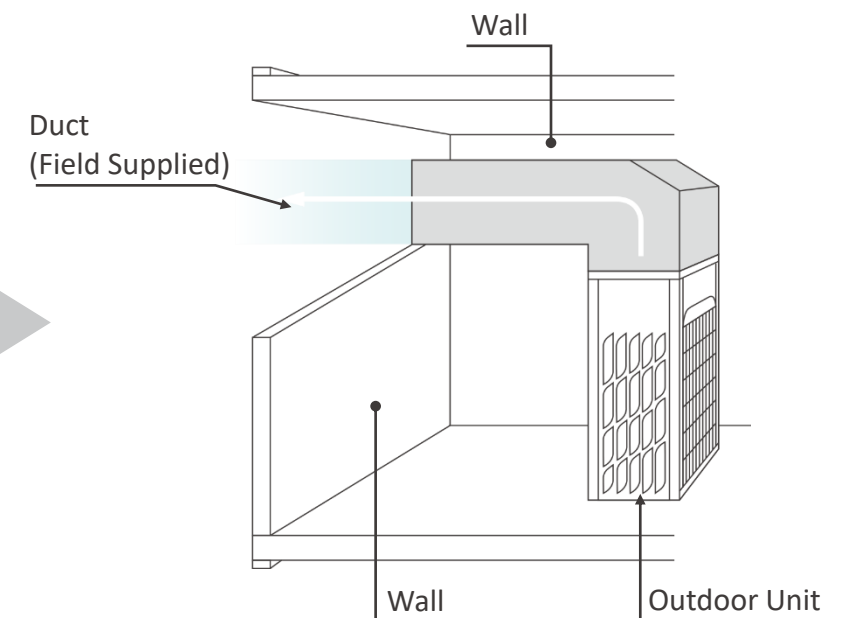
Current Model

0Pa	60Pa
-----	------



New Model

0Pa	30Pa	60Pa	80Pa
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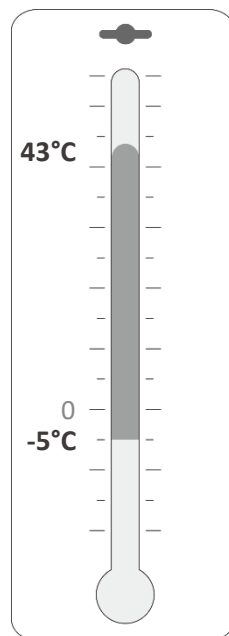


Design Flexibility

Wider Operation temperature range

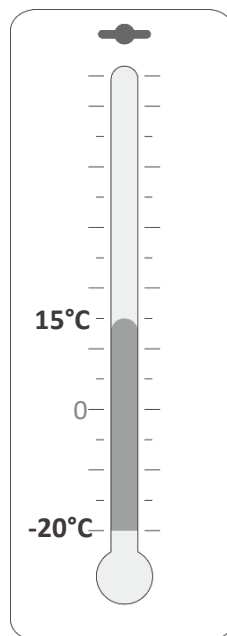
Enhanced performance in consideration of the actual installation environment of the outdoor unit

Current Model
(DB)



Cooling

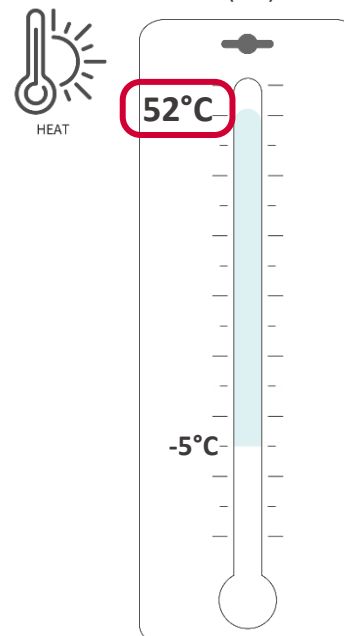
(WB)



Heating

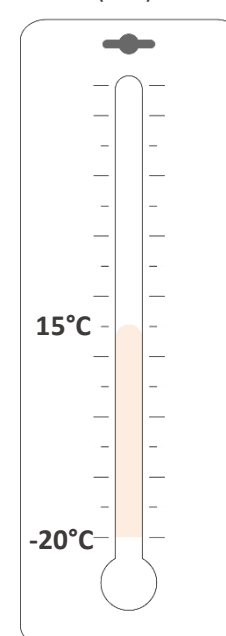


New Model
(DB)



Cooling

(WB)

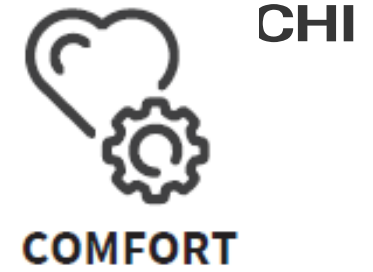


Heating



*48~52 interval operation

Comfort

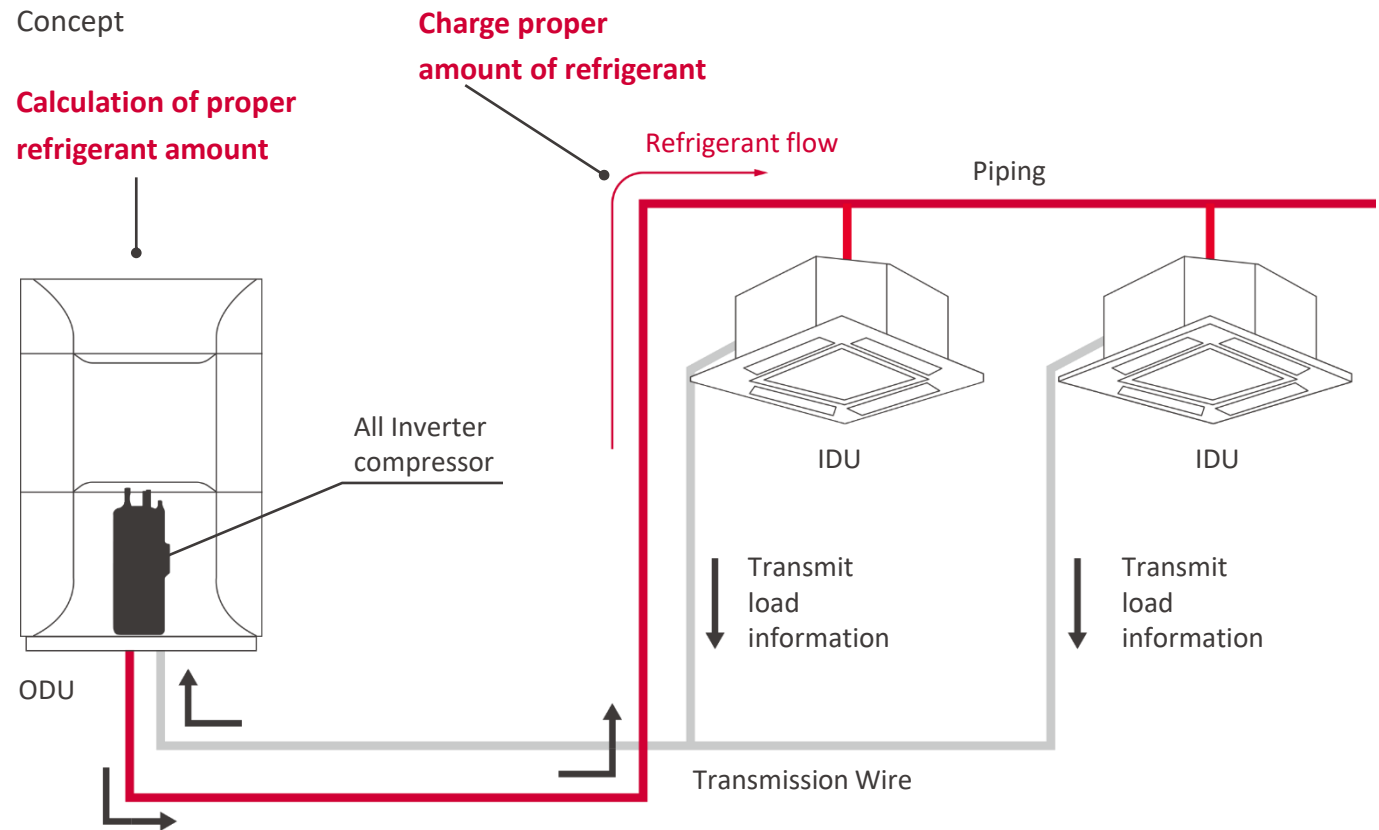


- Smooth Drive

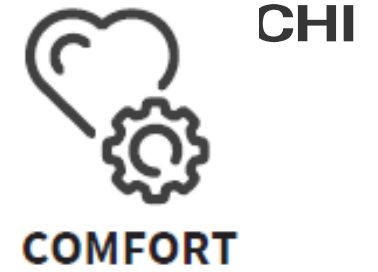
Improved compressor control

Smooth drive

The model calculates the appropriate amount of refrigerant supplied by the outdoor units on the basis of information about the required load from the individual indoor units. The model employs smooth operation control to control the number of revolutions of the inverter compressor. The model supplies the appropriate amount of refrigerant to the indoor units according to the required load. The model increases energy-saving efficiency by operating smoothly while controlling the switching on and off of the compressor at low-load operation.

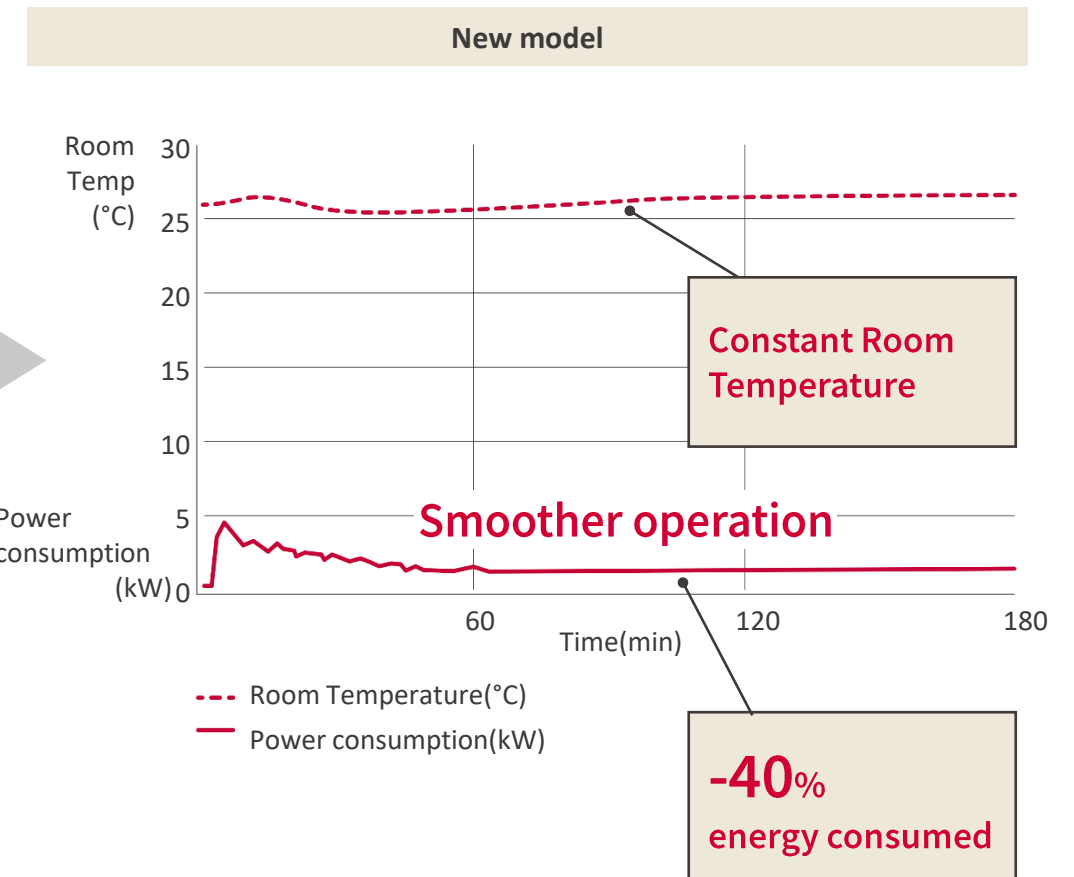
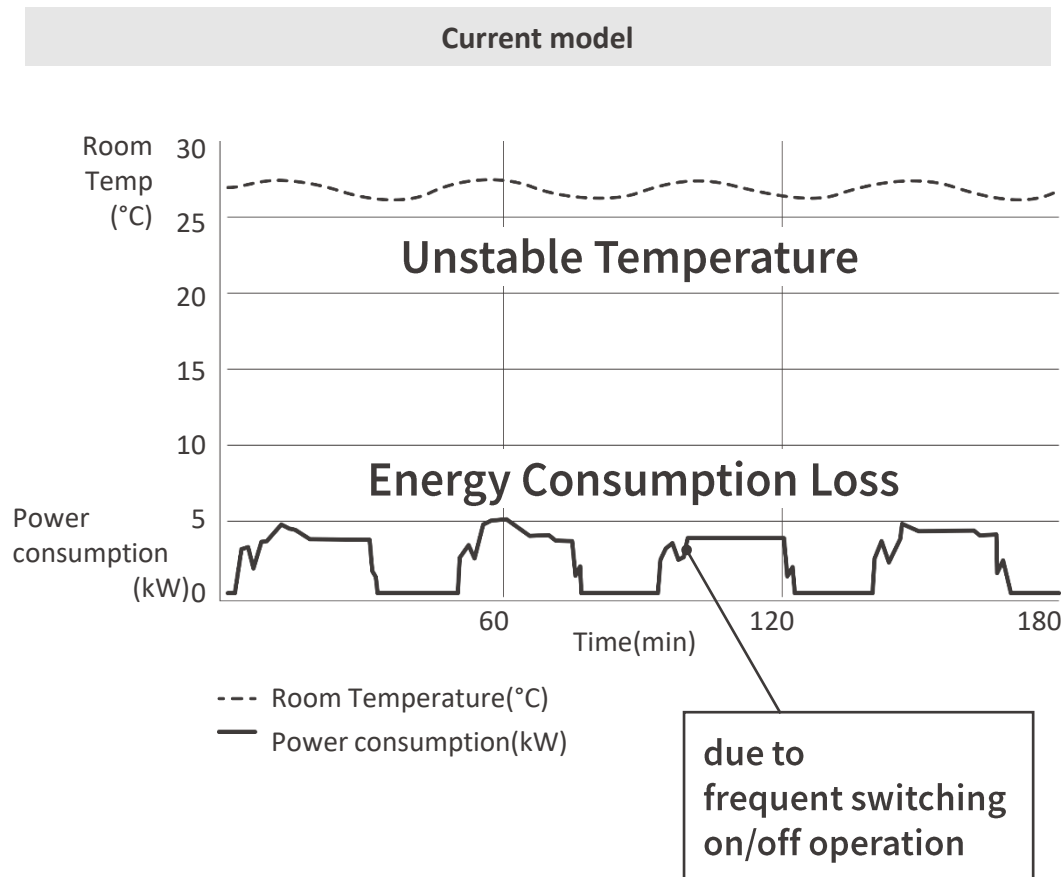


Comfort

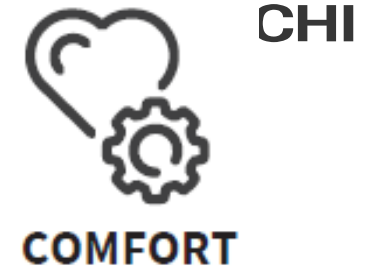


- Smooth Drive

Hitachi Original!

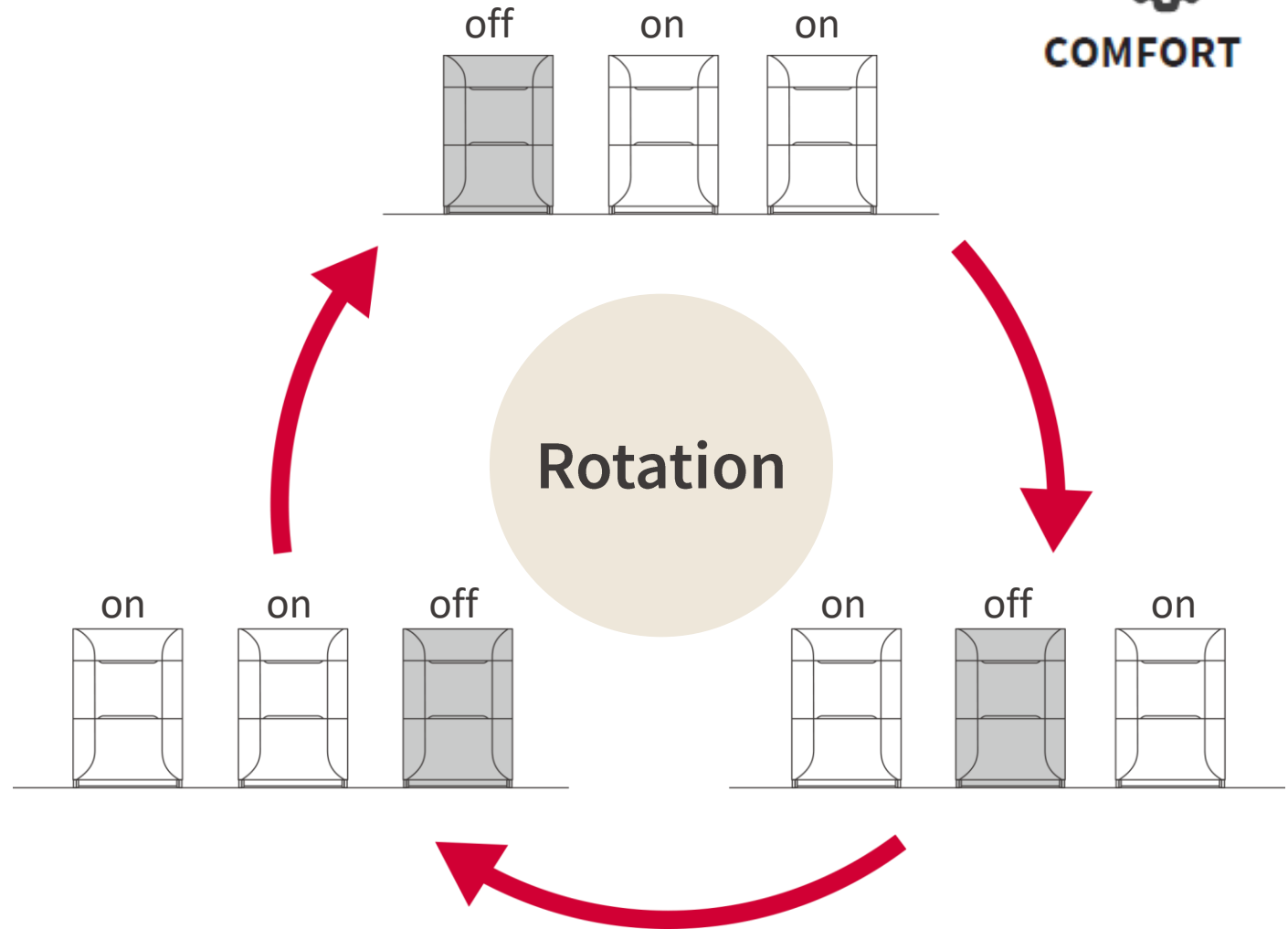


Comfort

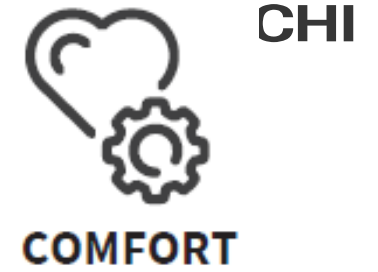


- To prevent a failure

Regulating the operation time of each outdoor unit leads to load reduction on compressors. During multiple unit operation, the same rotation frequency of inverter compressor results in an equivalent load on each compressor. Therefore, outdoor unit endurance is improved.



Comfort



- Back up function

Full introduction of backup operation function. If one outdoor unit should fail, the model can continue to operate using the remaining outdoor units, thereby preventing total system failure.

Combined ODU

