Hitachi Commercial VRF SET FREE Σ

Heat Pump type

Air Conditioning Solutions by Hitachi

Feel the future

Index

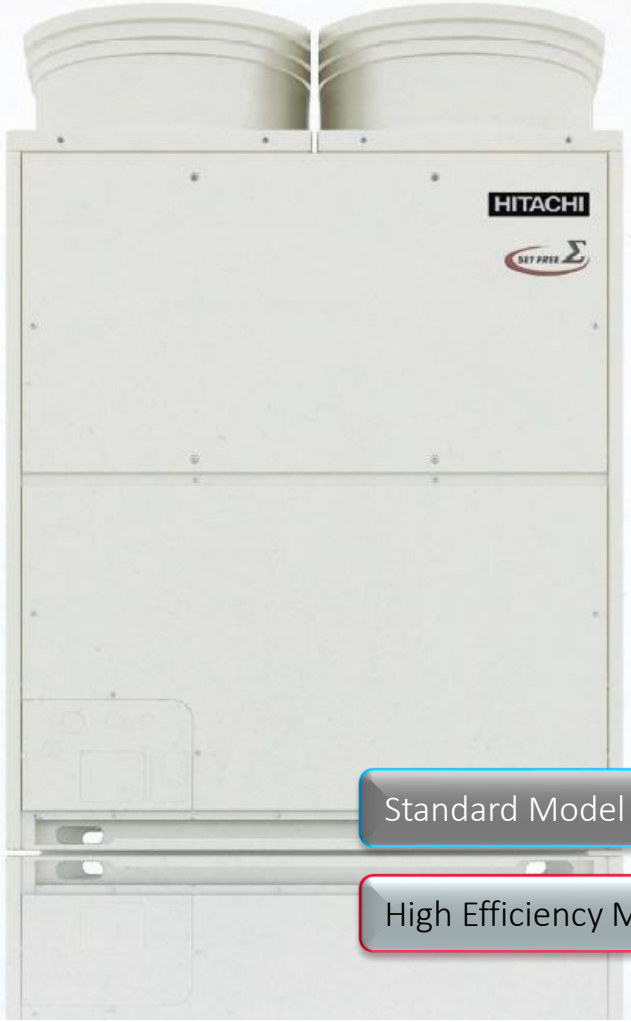
HITACHI

Contents

- ✓ **Expand Line-up**
  - Base unit (Single module) range
  - Standard type: Add 56HP to 96HP
  - High Efficiency type: Add 38HP to 72HP
- ✓ **Top class APF Performance**
  - Achieved top class*2 APF2015*3 in all capacity*1 H.E. type
  - Greater efficiency ratio in EER/COP
  - New Advanced Technology
- ✓ **Improved Design Flexibility**
  - Less Installation Space
- ✓ **Adaptability**
  - “Smooth Drive Control”
  - Quiet Operation

※1 Except ODU combination unit
※2 Combination with 4-way cassette VRF (Feb.8 2016)
※3 Annual energy efficiency according to JIS B 8616：2015

1. Expanded Line-up



New

Standard Model (FSNS series)

High Efficiency Model (FSNP series)

1. Expanded Line-up

Sum-up

Improved!

✓ **Standard type(Std)**
8HP to 96HP

- 56-72HP: coming in July
(Max. combination 3 units)
- 74-96HP: coming in Nov
(Max. combination 4 units)

Improved!

✓ **High Efficiency type (H.E.)**
5HP to 72HP

- 56-72HP: coming in Nov
(Max. combination 4 units)

Single Module (Base Unit)

STD 8-12HP H.E. 5,6HP	STD 14-18HP H.E. 8-12HP	STD 20-24HP H.E. 14-18HP
		
Width : 960mm	Width : 1220mm	Width : 1600mm

1. Expanded Line-up

Single Module Configuration

Standard Model (FSNS series)

Old

	Capacity	5HP	6HP	8HP	10HP	12HP	14HP	16HP	18HP	20HP	22HP	24HP
Standard	Structure	N/A							Combination of Base units			
	Dimension (W x D x H)			950 x 765 x 1720			1210 x 765 x 1720					
	HEX			2 rows	3 rows		3 rows					
	Compressor			INV 50cc	INV 65cc		INV 65cc + Fix					

New

	Capacity	5HP	6HP	8HP	10HP	12HP	14HP	16HP	18HP	20HP	22HP	24HP
Standard	Structure	N/A		NEW 			NEW 			NEW 		
	Dimension (W*D*H)			950 x 765 x 1675			1210 x 765 x 1675			1600 x 765 x 1675		
	HEX			2 rows		3 rows	3 rows			3 rows		
	Compressor			NEW INV 50cc		NEW INV 80cc		NEW INV 50cc x 2			NEW INV 80cc x 2	

1. Expanded Line-up

Single Module Configuration

High Efficiency Model (FSNP series)

Old

	Capacity	5HP	6HP	8HP	10HP	12HP	14HP	16HP	18HP
High efficiency	Structure						Combination of Base units		
	Dimension (W x D x H)	950 x 765 x 1720		1210 x 765 x 1720					
	HEX	2 rows		3 rows					
	Compressor	INV 50cc		INV 65cc					

New

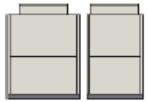
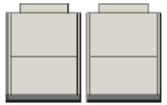
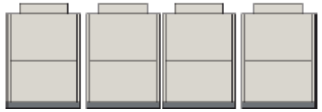
	Capacity	5HP	6HP	8HP	10HP	12HP	14HP	16HP	18HP
High efficiency	Structure	NEW 		NEW 			NEW 		
	Dimension (W*D*H)	950 x 765 x 1675		1210 x 765 x 1675			1600 x 765 x 1675		
	HEX	2 rows		3 rows			3 rows		
	Compressor	NEW INV 50cc		NEW INV 65cc		NEW INV 80cc	NEW INV 50cc x 2		

1. Expanded Line-up

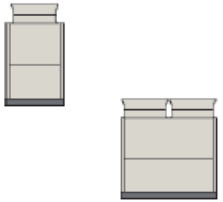
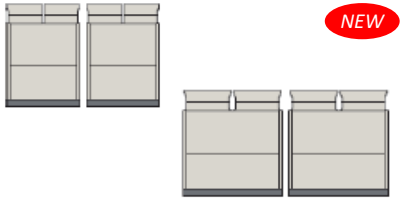
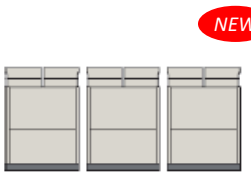
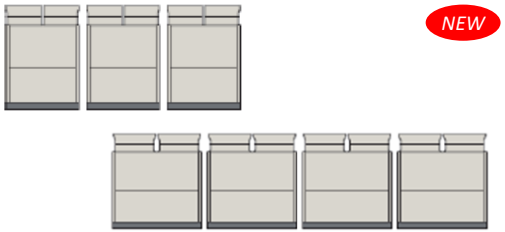
Combination Configuration

Standard Model (FSNS series)

Old

HP	8-16	18-24	26-32	34-48	50-54	56-72	74-96
Cabinet	 Single Module	 2 Units		 3 Units	 4 Units		

New

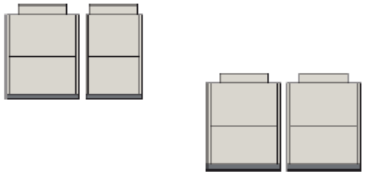
HP	8-16	18-24	26-32	34-48	50-54	56-72	74-96
Cabinet	 Single Module		 NEW 2 Units		 NEW 3 Units	 Jul NEW 3-4 Units	Nov NEW

1-1. Expanded Line-up

Combination Configuration

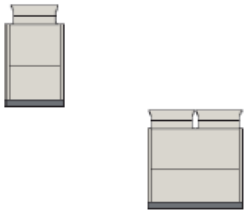
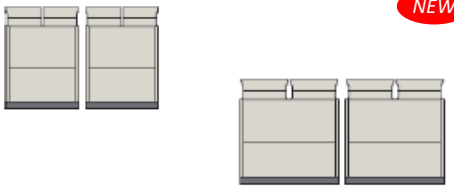
High Efficiency Model (FSNP series)

Old

HP	5-12	14-18	20-24	26-36	38-54	56-72
Cabinet	 Single Module	 2 Units		 3 Units		

Nov

New

HP	5-12	14-18	20-24	26-36	38-54	56-72
Cabinet	 Single Module		 2 Units	NEW	 3 Units	NEW	 4 Units	NEW

1-1. Expanded Line-up

Line-up Comparison

Standard Model (FSNS series)

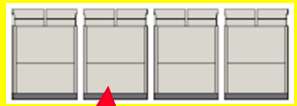
HP	8	10	12	14	16	18	20	22	24	72	74-80	82-88	90-96
HITAHCHI HITACHI	950*765*1670			1210*765*1670			1600*765*1670						
MELCO MITSUBISHI ELECTRIC	920*740*1650			1220*740*1650									
DAIKIN DAIKIN	930*765*1685			1240*765*1685									
LG LG	920*760*1680			1240*760*1680									
Samsung SAMSUNG	880*765*1695			1295*765*1695			1295*765*1795						

Large Single Module !

1-1. Expanded Line-up

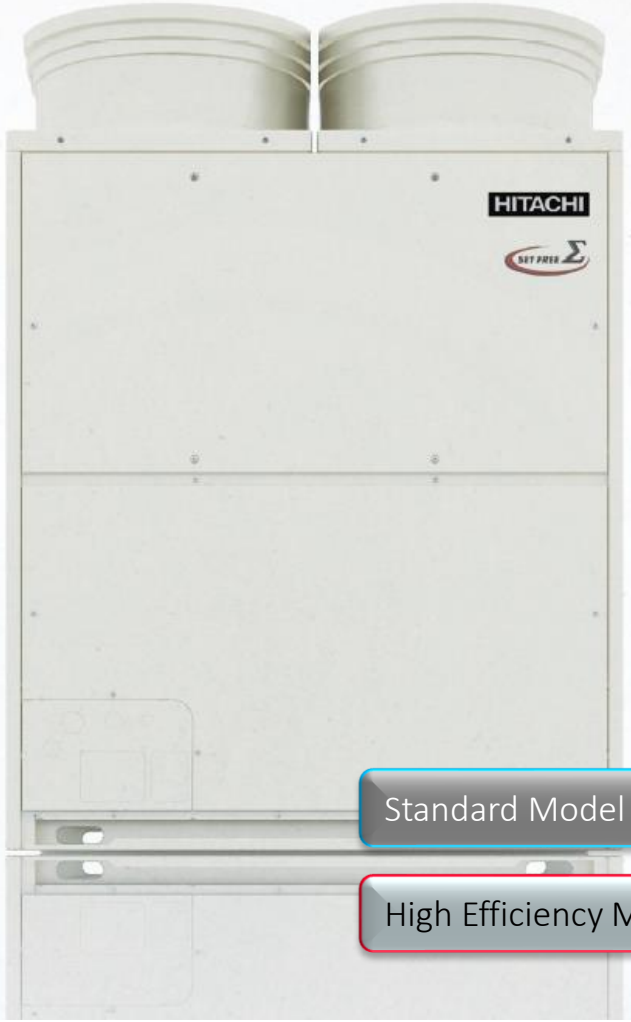
Line-up Comparison

Standard Model (FSNS series)

HP	8	10	12	14	16	18	20	22	24	56-60	62-72	74-80	82-88	90-96
HITAHCHI	 950*765*1670			 1210*765*1670			 1600*765*1670							
MELCO	 920*740*1650			 1220*740*1650			 1750*740 *1650	 1220*740 *1650	 2160*740 *1650					
DAIKIN	 930*765*1685			 1240*765*1685				 1880*765*1657						
LG	 920*760*1680			 1240*760*1680				 1880*760*1680						
Samsung	 880*765*1695			 1295*765*1695				 1295*765*1795						

Large Single Module !

2. High Efficiency



New

Standard Model (FSNS series)

High Efficiency Model (FSNP series)

1-2. High Performance

Sum-up

✓ **Standard type**
8HP to 96HP

New

- APF performance: Top in class
- EER (up to 4.35)
- COP (up to 5.01)

✓ **High Efficiency type**
5HP to 72HP

New

- APF performance: Top
- EER (up to 5.10)
- COP (up to 6.07)

NOTES:
APF (As Reference in the Japanese seasonal performance benchmark for VRF)
APF is meant for cooling/heating capacity per 1kW of operating power consumption under certain conditions throughout the year.
APF = Accumulated cooling/heating loads (kWh) / Accumulated power input in cooling/heating (kWh)

NOTES:
The graphs below show the EER/COP of single units for Oceania.
EER = Energy efficiency ratio = Cooling capacity or Heating capacity ÷ Power consumption of an air conditioner
COP = Coefficient of performance of an air conditioner = Output KW (cooling capacity) ÷ Input KW (power consumption)

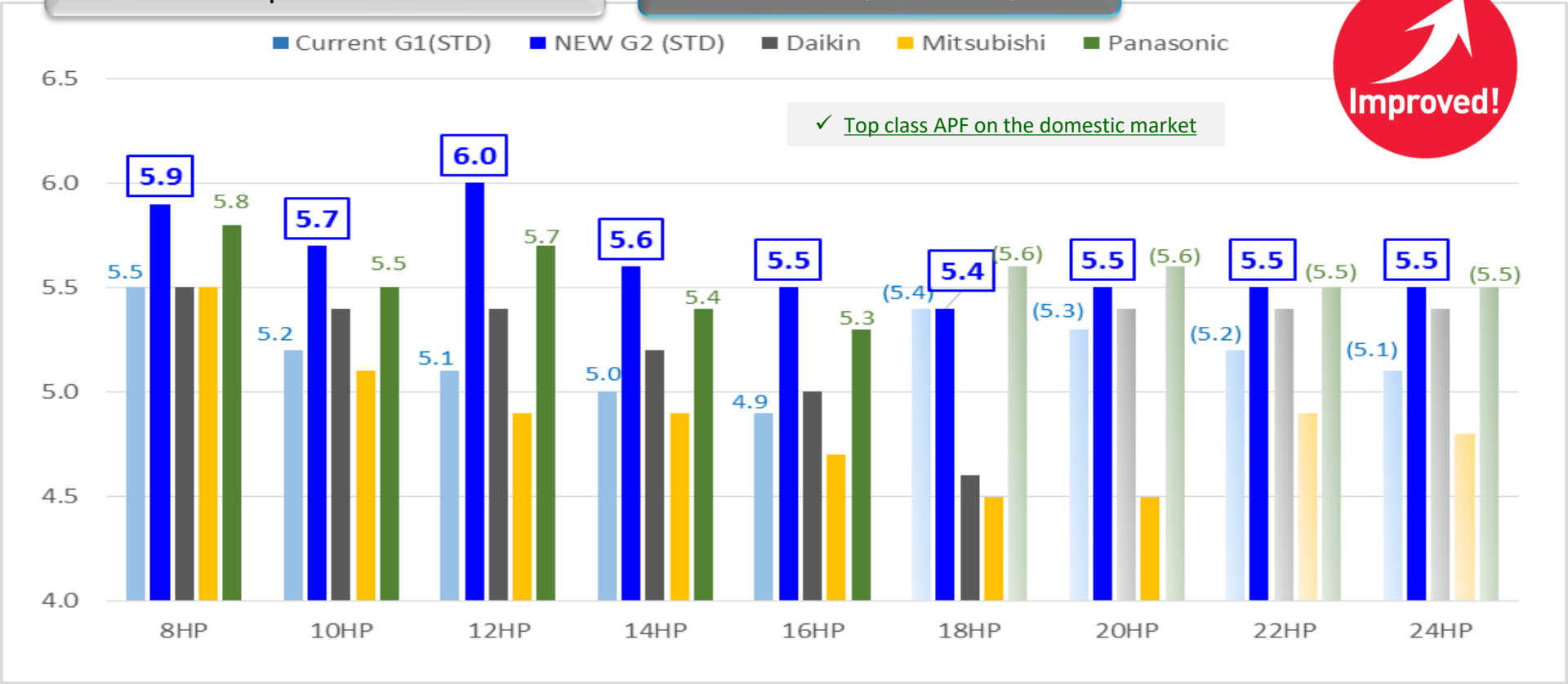
1-2. High Performance

APF (Annual Performance Factor)

APF = Accumulated cooling/heating loads (kWh) / Accumulated power input in cooling/heating (kWh)

APF Ratio comparison

Standard Model (FSNS series)



✓ Top class APF on the domestic market

Improved!

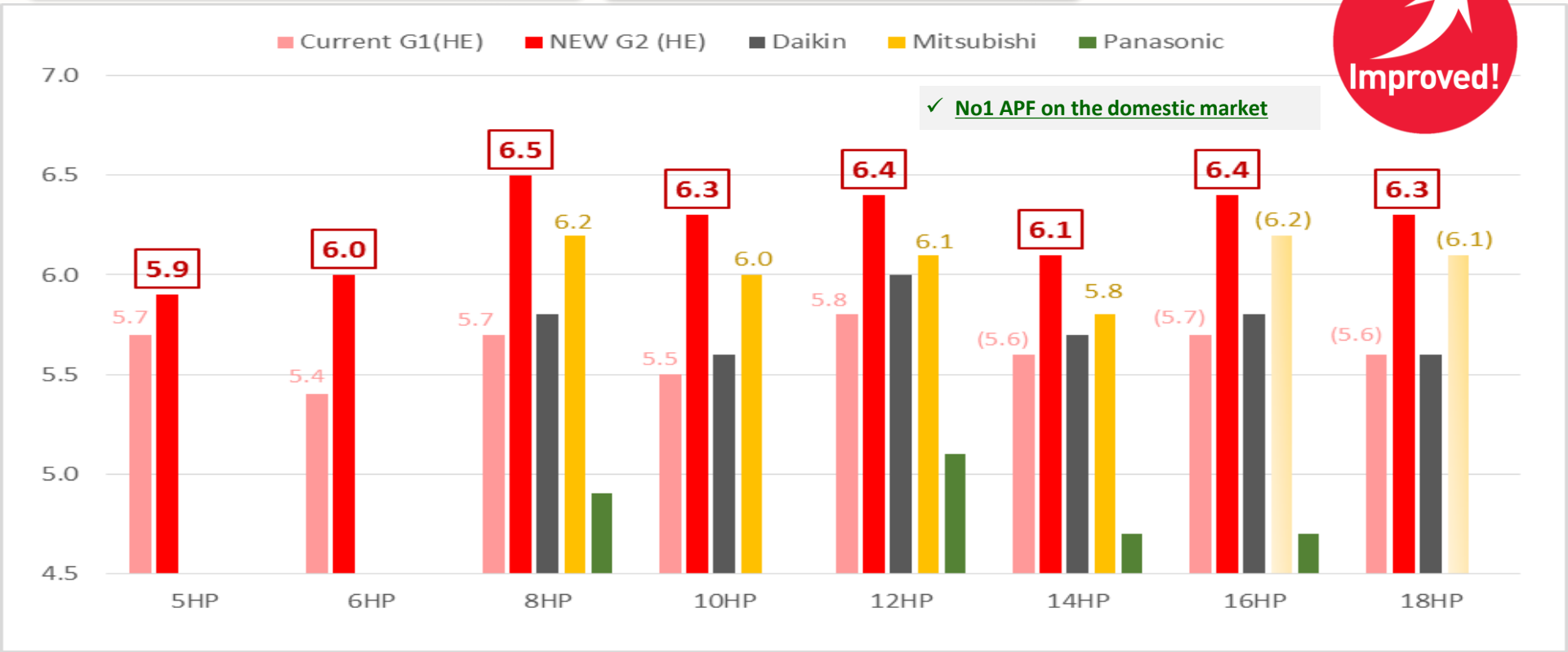
1-2. High Performance

APF (Annual Performance Factor)

APF = Accumulated cooling/heating loads (kWh) / Accumulated power input in cooling/heating (kWh)

Single Module Configuration

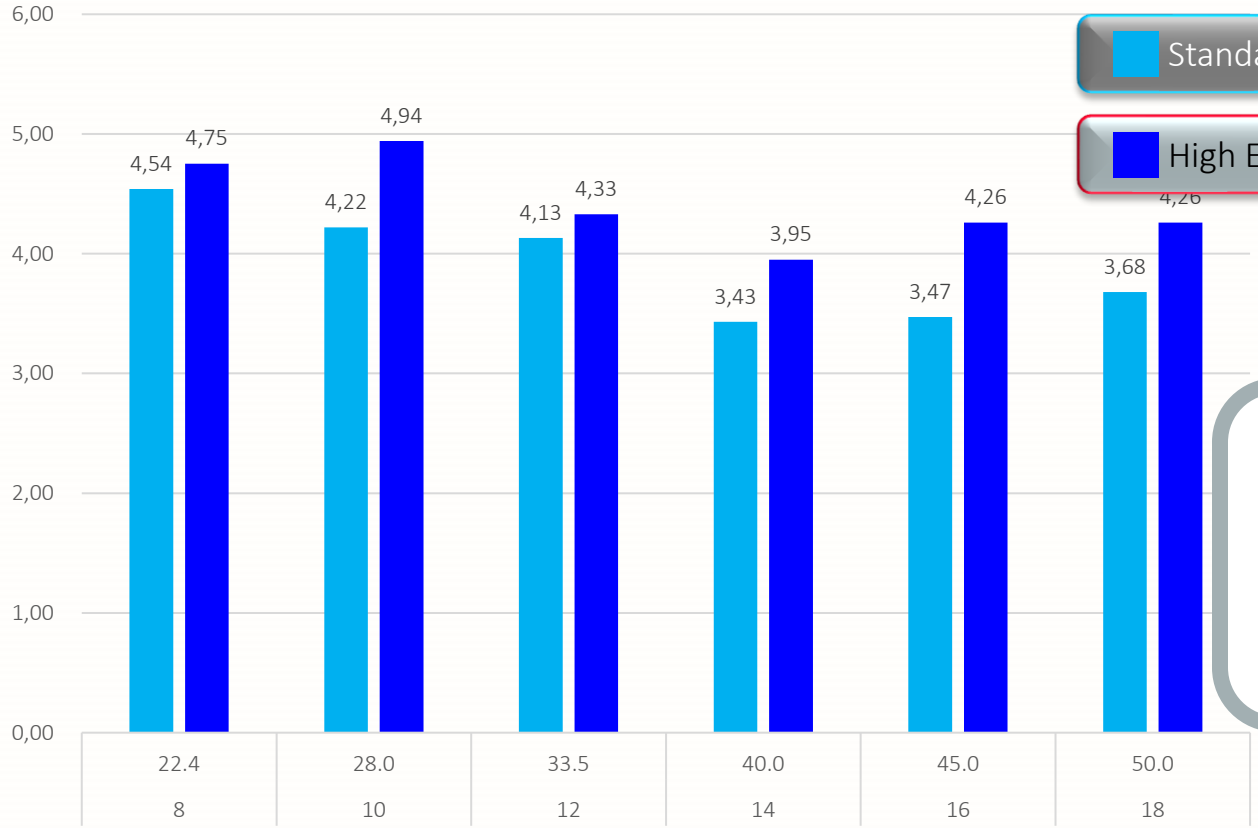
High Efficiency Model (FSNP series)



1-2. High Performance

Cooling EER (Energy efficiency ratio)

= Cooling capacity or Heating capacity ÷ Power consumption of an air conditioner



Standard Model (FSNS series)

High Efficiency Model (FSNP series)

NP = 4.28

NS = 3.56

(on average)

1-2. High Performance

Comparison

Cooling EER

HITACHI

RAS-FSNP
High efficiency type
100% combination
case

DAIKIN

RXYTQ
TYF

SAMSUNG

DVM S
Desert
(High Efficiency)

LG

ARUN
LTH4

1-2. High Performance

Comparison

Cooling EER

Brand	Series	HP	Combination	T1 (35℃)			T3 (46℃)			T2 (48℃)		
				TC	PI	EER	TC	PI	EER	TC	PI	EER
Hitachi	RAS-FSNP (High Efficiency)	5	5	14	2.68	5.22	12.2	3.13	3.90	9.98	2.56	3.90
		6	6	16	3.11	5.14	13.9	3.64	3.82	11.4	2.98	3.83
		8	8	22.4	4.72	4.75	19.5	5.52	3.53	14.72	4.35	3.38
		10	10	28	5.67	4.94	24.4	7.12	3.43	18.96	5.63	3.37
		12	12	33.5	7.74	4.33	29.1	9.03	3.22	22.69	7.16	3.17
		14	14	40	10.14	3.94	32.8	10.58	3.10	25.26	8.35	3.03
		16	16	45	10.57	4.26	39.2	12.33	3.18	28.98	9.21	3.15
		18	18	50	11.74	4.26	43.5	13.73	3.17	32.21	10.23	3.15
		20	10+10	56	11.34	4.94	48.8	13.26	3.68	37.93	10.48	3.62
		22	10+12	61.5	13.41	4.59	53.5	15.66	3.42	41.65	12.4	3.36
		24	12+12	67	15.48	4.33	58.2	18.06	3.22	45.38	14.31	3.17
		26	10+16	73	16.24	4.50	63.6	18.96	3.35	47.95	14.45	3.32
		28	12+16	77.5	17.79	4.36	67.43	20.76	3.25	51.02	15.91	3.21
		30	12+18	85	20.18	4.21	73.9	23.57	3.14	55.88	18.02	3.10
		32	14+18	90	21.88	4.11	76.3	24.26	3.15	57.46	18.56	3.10
		34	16+18	95	22.32	4.26	82.7	26.06	3.17	61.19	19.44	3.15
		36	18+18	100	23.49	4.26	87	27.46	3.17	64.41	20.46	3.15
		38	12+12+14	106	25.16	4.21	90.15	28.08	3.21	69.98	22.22	3.15
		40	12+14+14	112	27.24	4.11	93.45	29.31	3.19	72.23	23.17	3.12
		42	14+14+14	118	29.3	4.03	96.76	30.58	3.16	74.51	24.13	3.09
		44	12+14+18	122	28.75	4.24	104.12	32.3	3.22	79.18	24.95	3.17
		46	14+14+18	128	31.03	4.13	107.42	33.75	3.18	81.44	26.08	3.12
		48	12+18+18	136	31.61	4.30	118.26	36.92	3.20	88.98	28.08	3.17
		50	14+18+18	140	33.62	4.16	119.8	37.98	3.15	89.67	28.79	3.11
		52	16+18+18	145	34.06	4.26	126.2	39.79	3.17	93.39	29.67	3.15
		54	18+18+18	150	35.23	4.26	130.5	41.19	3.17	96.62	30.7	3.15

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1-2. High Performance

Comparison

Cooling EER

Brand	Series	HP	Combination	T1 (35℃)			T3 (46℃)			T2 (48℃)		
				TC	PI	EER	TC	PI	EER	TC	PI	EER
Daikin	RXYTQ TYF	8	8	22.4	6.33	3.54	20.2	7.43	2.72	16.8	6.22	2.70
		10	10	28	7.47	3.75	25.2	8.69	2.90	22.4	8.27	2.71
		12	12	33.5	9.68	3.46	28.5	10	2.85	24	8.89	2.70
		14	14	40	12.4	3.23	32	11.6	2.76	25.1	9.16	2.74
		16	16	45	14	3.21	35.1	13	2.70	28.4	10.4	2.73
		18	8+10	50.4	13.8	3.65	45.4	16.12	2.82	39.2	14.49	2.71
		20	8+12	55.9	16.01	3.49	48.7	17.43	2.79	40.8	15.11	2.70
		22	10+12	61.5	17.15	3.59	53.7	18.69	2.87	46.4	17.16	2.70
		24	8+16	67.4	20.33	3.32	55.3	20.43	2.71	45.2	16.62	2.72
		26	12+14	73.5	22.08	3.33	60.5	21.6	2.80	49.1	18.05	2.72
		28	12+16	78.5	23.68	3.32	63.6	23	2.77	52.4	19.29	2.72
		30	14+16	85	26.4	3.22	67.1	24.6	2.73	53.5	19.56	2.74
		32	16+16	90	28	3.21	70.2	26	2.70	56.8	20.8	2.73
		34	8+10+16	95.4	27.8	3.43	80.5	29.12	2.76	67.6	24.89	2.72
		36	8+12+16	100.9	30.01	3.36	83.8	30.43	2.75	69.2	25.51	2.71
		38	8+14+16	107.4	32.73	3.28	87.3	32.03	2.73	70.3	25.78	2.73
		40	10+14+16	113	33.87	3.34	92.3	33.29	2.77	75.9	27.83	2.73
		42	10+16+16	118	35.47	3.33	95.4	34.69	2.75	79.2	29.07	2.72
		44	12+16+16	123.5	37.68	3.28	98.7	36	2.74	80.8	29.69	2.72
		46	14+16+16	130	40.4	3.22	102.2	37.6	2.72	81.9	29.96	2.73
		48	16+16+16	135	42	3.21	105.3	39	2.70	85.2	31.2	2.73

DAIKIN

VRV IV

1-2. High Performance

Comparison

Cooling EER

Brand	Series	Model	HP	Combination	T1 (35℃)			T3 (46℃)			T2 (48℃)		
					TC	PI	EER	TC	PI	EER	TC	PI	EER
Samsung	DVM S Desert (High Efficiency)	AM080FXVCGH/ID	8	8	22.4	5	4.48	22.4	6.9	3.25	22.4	7.09	3.16
		AM100FXVCGH/ID	10	10	28	6.8	4.12	25	8.2	3.05	24.7	8.76	2.82
		AM120FXVCGH/ID	12	12	33.6	8.12	4.14	28.9	9.05	3.19	28.22	9.5	2.97
		AM140FXVCGH/ID	14	14	40	8.9	4.49	35.3	11.45	3.08	34.95	12.19	2.87
		AM160FXVCGH/ID	16	16	45	11	4.09	40.3	13.68	2.95	39.87	15.07	2.65
		AM180HXVCGH/ID	18	18	50.4	12.3	4.10	44.3	15	2.95	42.34	15.87	2.67
		AM200HXVCGH/ID	20	20	56	14	4.00	47	16.5	2.85	44.24	16.39	2.70
		AM220KXVJNH/ID	22	22	61.6	15.5	3.97	53.9	19	2.84	50.64	18.74	2.70
		AM240KXVJNH/ID	24	24	67.2	17.1	3.93	58	20.5	2.83	55.24	20.67	2.67
		AM260KXVJGH/ID	26	10+16	73	17.8	4.10	65.3	21.88	2.98	64.57	23.83	2.71
		AM280KXVJGH/ID	28	10+18	78.4	19.1	4.10	69.3	23.2	2.99	67.04	24.63	2.72
		AM300KXVJGH/ID	30	10+20	84	20.8	4.04	72	24.7	2.91	68.94	25.15	2.74
		AM320KXVJGH/ID	32	10+22	89.6	22.3	4.02	78.9	27.2	2.90	75.34	27.5	2.74
		AM340KXVJGH/ID	34	10+24	95.2	23.9	3.98	83	28.7	2.89	79.94	29.43	2.72
		AM360KXVJGH/ID	36	12+24	100.8	25.22	4.00	86.9	29.55	2.94	83.46	30.17	2.77
		AM380KXVJGH/ID	38	18+20	106.4	26.3	4.05	91.3	31.5	2.90	86.58	32.26	2.68
		AM400KXVJGH/ID	40	20+20	112	28	4.00	94	33	2.85	88.48	32.78	2.70
		AM420KXVJGH/ID	42	18+24	117.6	29.4	4.00	102.3	35.5	2.88	97.58	36.54	2.67
		AM440KXVJGH/ID	44	20+24	123.2	31.1	3.96	105	37	2.84	99.48	37.06	2.68
		AM460KXVJGH/ID	46	22+24	128.8	32.6	3.95	111.9	39.5	2.83	105.88	39.41	2.69
		AM480KXVJGH/ID	48	24+24	134.4	34.2	3.93	116	41	2.83	110.48	41.34	2.67
		AM500KXVJGH/ID	50	10+20+20	140	34.8	4.02	119	41.2	2.89	113.18	41.54	2.72
		AM520KXVJGH/ID	52	12+20+20	145.6	36.12	4.03	122.9	42.05	2.92	116.7	42.28	2.76
		AM540KXVJGH/ID	54	14+20+20	152	36.9	4.12	129.3	44.45	2.91	123.43	44.97	2.74

1-2. High Performance

Comparison

Cooling EER

Brand	Series	HP	Combination	T1 (35°C)			T3 (46°C)			T2 (48°C)		
				TC	PI	EER	TC	PI	EER	TC	PI	EER
LG	ARUN LTH4	8	8	22.4	4.75	4.72	19	5.4	3.52	18.8	5.66	3.32
		10	10	28	5.86	4.78	25	7.98	3.13	24.7	8.36	2.95
		12	12	33.6	7.91	4.25	28.5	9.41	3.03	28.1	9.84	2.86
		14	14	39.2	8.79	4.46	35.3	11.36	3.11	34.9	11.87	2.94
		16	16	44.8	10.38	4.32	40.3	13.45	3.00	39.8	14.05	2.83
		18	8+10	50.4	10.61	4.75	44	13.38	3.29	43.5	14.02	3.10
		20	10+10	56	11.72	4.78	50	15.96	3.13	49.4	16.72	2.95
		22	10+12	61.6	13.77	4.47	53.5	17.39	3.08	52.8	18.2	2.90
		24	10+14	67.2	14.65	4.59	60.3	19.34	3.12	59.5	20.23	2.94
		26	10+16	72.8	16.24	4.48	65.3	21.43	3.05	64.5	22.41	2.88
		28	12+16	78.4	18.29	4.29	68.8	22.86	3.01	67.9	23.89	2.84
		30	14+16	84	19.17	4.38	75.6	24.81	3.05	74.7	25.92	2.88
		32	16+16	89.6	20.76	4.32	80.6	26.9	3.00	79.6	28.1	2.83
		34	10+10+14	95.2	20.51	4.64	85.3	27.32	3.12	84.3	28.59	2.95
		36	10+12+14	100.8	22.56	4.47	88.8	28.75	3.09	87.7	30.07	2.92
		38	10+12+16	106.4	24.15	4.41	93.8	30.84	3.04	92.6	32.25	2.87
		40	12+12+16	112	26.2	4.27	97.3	32.26	3.02	96	33.73	2.85
		42	12+14+16	117.6	27.08	4.34	104.1	34.22	3.04	102.8	35.76	2.87
		44	12+16+16	123.2	28.67	4.30	109.1	36.31	3.00	107.7	37.94	2.84
		46	14+16+16	128.8	29.55	4.36	115.9	38.26	3.03	114.5	39.97	2.86
		48	16+16+16	134.4	31.14	4.32	120.9	40.35	3.00	119.4	42.15	2.83

LG

MULTI V™

1-2. High Performance

Comparison SET FREE Σ VRV IV

Cooling EER

Brand	Series	HP	EER		
			T1 (35℃)	T3 (46℃)	T2 (48℃)
Hitachi	RAS FSNS (Standard)	8	4.54	3.38	3.38
		10	4.22	4.05	3.05
		12	4.13	3.08	3.03
		14	3.43	2.56	2.54
		16	3.47	3.89	2.46
		18	3.68	4.10	2.59
		20	3.24	3.61	2.28
		22	3.16	3.52	2.22
		24	3.11	3.46	2.18
		26	3.74	4.16	2.63
		28	3.78	3.46	2.84
		30	3.78	3.45	2.79
		32	3.57	3.09	2.56
		34	3.58	4.00	2.53
		36	3.68	4.10	2.59
		38	3.25	3.00	2.40
		40	3.35	3.73	2.36
		42	3.30	3.68	2.32
		44	3.19	3.55	2.24
		46	3.15	3.50	2.21
		48	3.10	3.45	2.18
		50	3.61	3.35	2.56
		52	3.61	4.03	2.55
		54	3.68	4.10	2.59

Brand	Series	HP	EER		
			T1 (35℃)	T3 (46℃)	T2 (48℃)
Daikin	RXYTQ TYF	8	3.54	2.72	2.70
		10	3.75	2.90	2.71
		12	3.46	2.85	2.70
		14	3.23	2.76	2.74
		16	3.21	2.70	2.73
		18	3.65	2.82	2.71
		20	3.49	2.79	2.70
		22	3.59	2.87	2.70
		24	3.32	2.71	2.72
		26	3.33	2.80	2.72
		28	3.32	2.77	2.72
		30	3.22	2.73	2.74
		32	3.21	2.70	2.73
		34	3.43	2.76	2.72
		36	3.36	2.75	2.71
		38	3.28	2.73	2.73
		40	3.34	2.77	2.73
		42	3.33	2.75	2.72
		44	3.28	2.74	2.72
		46	3.22	2.72	2.73
		48	3.21	2.70	2.73
		50			
		52			
		54			

HITACHI SET FREE Σ is Better than DAIKIN VRV IV BY ---%

Totally better EER !

HP	EER		
	T1 (35℃)	T3 (46℃)	T2 (48℃)
8	34.1%	29.9%	25.3%
10	31.7%	18.2%	24.3%
12	25.1%	13.1%	17.4%
14	22.3%	12.4%	10.4%
16	32.5%	17.7%	15.2%
18	16.6%	12.5%	16.4%
20	41.4%	31.7%	34.0%
22	27.9%	18.9%	24.2%
24	30.6%	19.1%	16.6%
26	35.0%	19.8%	22.0%
28	31.4%	17.5%	18.1%
30	30.8%	14.9%	13.4%
32	28.0%	16.5%	13.4%
34	24.0%	14.8%	15.9%
36	26.6%	15.0%	16.1%
38	28.4%	17.8%	15.5%
40	23.2%	15.0%	14.3%
42	21.1%	15.1%	13.3%
44	29.5%	17.6%	16.6%
46	28.2%	17.1%	14.2%
48	33.9%	18.6%	16.0%
50			
52			
54			

1-2. High Performance

Comparison

Cooling EER

Brand	Series	HP	EER		
			T1 (35℃)	T3 (46℃)	T2 (48℃)
Hitachi	RAS FSNS (Standard)	8	4.54	3.38	3.38
		10	4.22	4.05	3.05
		12	4.13	3.08	3.03
		14	3.43	2.56	2.54
		16	3.47	3.89	2.46
		18	3.68	4.10	2.59
		20	3.24	3.61	2.28
		22	3.16	3.52	2.22
		24	3.11	3.46	2.18
		26	3.74	4.16	2.63
		28	3.78	3.46	2.84
		30	3.78	3.45	2.79
		32	3.57	3.09	2.56
		34	3.58	4.00	2.53
		36	3.68	4.10	2.59
		38	3.25	3.00	2.40
		40	3.35	3.73	2.36
		42	3.30	3.68	2.32
		44	3.19	3.55	2.24
		46	3.15	3.50	2.21
		48	3.10	3.45	2.18
		50	3.61	3.35	2.56
		52	3.61	4.03	2.55
		54	3.68	4.10	2.59

Brand	Series	HP	EER		
			T1 (35℃)	T3 (46℃)	T2 (48℃)
Samsung	DVM S Desert (High Efficiency)	8	4.48	3.25	3.16
		10	4.12	3.05	2.82
		12	4.14	3.19	2.97
		14	4.49	3.08	2.87
		16	4.09	2.95	2.65
		18	4.10	2.95	2.67
		20	4.00	2.85	2.70
		22	3.97	2.84	2.70
		24	3.93	2.83	2.67
		26	4.10	2.98	2.71
		28	4.10	2.99	2.72
		30	4.04	2.91	2.74
		32	4.02	2.90	2.74
		34	3.98	2.89	2.72
		36	4.00	2.94	2.77
		38	4.05	2.90	2.68
		40	4.00	2.85	2.70
		42	4.00	2.88	2.67
		44	3.96	2.84	2.68
		46	3.95	2.83	2.69
		48	3.93	2.83	2.67
		50	4.02	2.89	2.72
		52	4.03	2.92	2.76
		54	4.12	2.91	2.74

HITACHI SET FREE is Better than SAMSUNG DVM S BY ---%

HP	EER		
	T1 (35℃)	T3 (46℃)	T2 (48℃)
8	5.9%	8.8%	7.1%
10	19.9%	12.4%	19.4%
12	4.6%	0.9%	6.7%
14	-12.2%	0.6%	5.5%
16	4.1%	7.9%	18.9%
18	3.9%	7.3%	18.0%
20	23.5%	29.2%	34.1%
22	15.4%	20.4%	24.3%
24	10.1%	13.9%	18.7%
26	9.6%	12.4%	22.5%
28	6.1%	8.7%	17.8%
30	4.3%	7.6%	13.1%
32	2.4%	8.4%	13.0%
34	6.9%	9.7%	15.9%
36	6.5%	7.7%	13.8%
38	4.1%	10.8%	17.3%
40	2.8%	11.9%	15.5%
42	0.7%	9.8%	15.6%
44	7.1%	13.6%	18.2%
46	4.4%	12.4%	16.2%
48	9.5%	13.2%	18.6%
50	3.5%	9.2%	14.3%
52	5.6%	8.5%	14.0%
54	3.4%	8.9%	14.7%

Almost Better EER (except 14HP/T1)

1-2. High Performance

Comparison SET FREE Σ MULTI V

Cooling EER

Brand	Series	HP	EER		
			T1 (35℃)	T3 (46℃)	T2 (48℃)
Hitachi	RAS FSNS (Standard)	8	4.54	3.38	3.38
		10	4.22	4.05	3.05
		12	4.13	3.08	3.03
		14	3.43	2.56	2.54
		16	3.47	3.89	2.46
		18	3.68	4.10	2.59
		20	3.24	3.61	2.28
		22	3.16	3.52	2.22
		24	3.11	3.46	2.18
		26	3.74	4.16	2.63
		28	3.78	3.46	2.84
		30	3.78	3.45	2.79
		32	3.57	3.09	2.56
		34	3.58	4.00	2.53
		36	3.68	4.10	2.59
		38	3.25	3.00	2.40
		40	3.35	3.73	2.36
		42	3.30	3.68	2.32
		44	3.19	3.55	2.24
		46	3.15	3.50	2.21
		48	3.10	3.45	2.18
		50	3.61	3.35	2.56
		52	3.61	4.03	2.55
		54	3.68	4.10	2.59

Brand	Series	HP	EER		
			T1 (35℃)	T3 (46℃)	T2 (48℃)
LG	ARUN LTH4	8	4.72	3.52	3.32
		10	4.78	3.13	2.95
		12	4.25	3.03	2.86
		14	4.46	3.11	2.94
		16	4.32	3.00	2.83
		18	4.75	3.29	3.10
		20	4.78	3.13	2.95
		22	4.47	3.08	2.90
		24	4.59	3.12	2.94
		26	4.48	3.05	2.88
		28	4.29	3.01	2.84
		30	4.38	3.05	2.88
		32	4.32	3.00	2.83
		34	4.64	3.12	2.95
		36	4.47	3.09	2.92
		38	4.41	3.04	2.87
		40	4.27	3.02	2.85
		42	4.34	3.04	2.87
		44	4.30	3.00	2.84
		46	4.36	3.03	2.86
		48	4.32	3.00	2.83
		50			
		52			
		54			

HITACHI SET FREE Σ is Better than LG MULTI V BY ---%

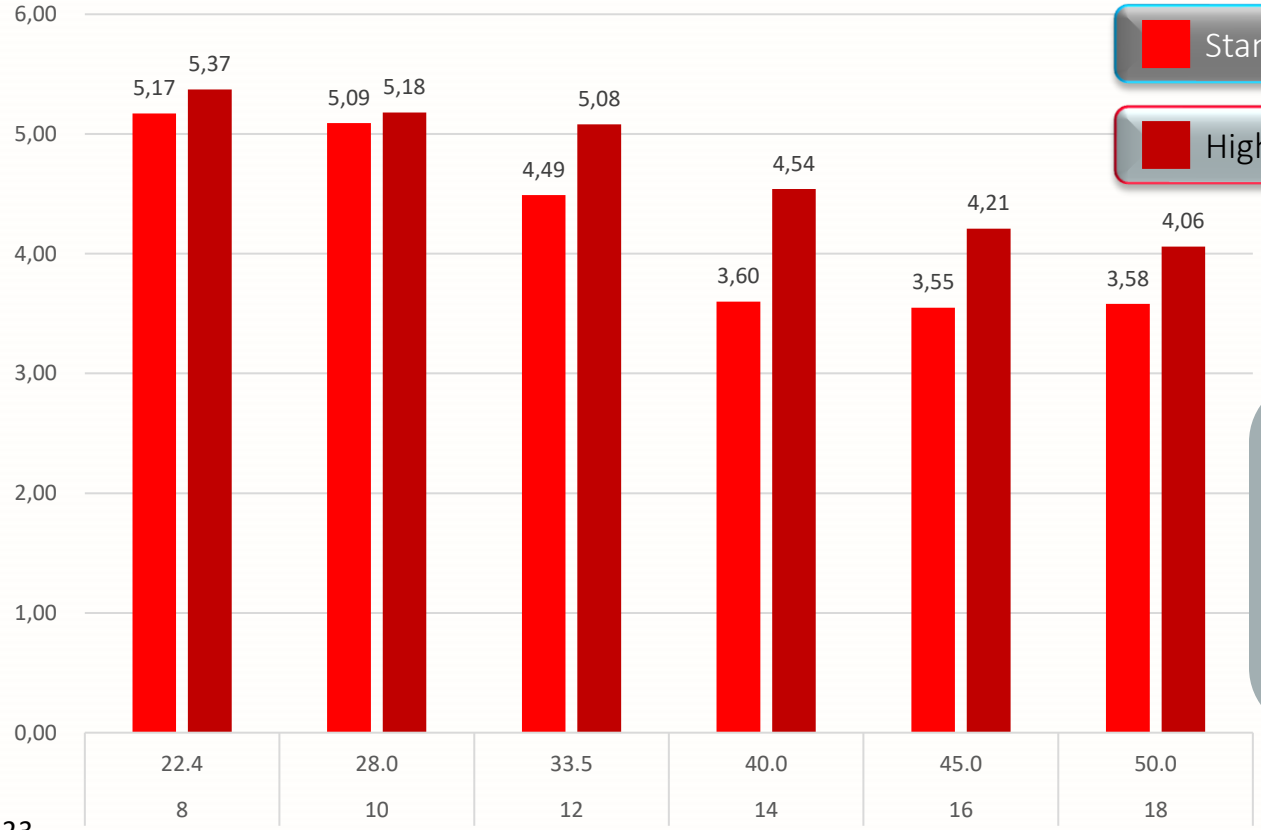
HP	EER		
	T1 (35℃)	T3 (46℃)	T2 (48℃)
8	0.6%	0.4%	1.9%
10	3.4%	9.4%	14.0%
12	1.9%	6.4%	11.0%
14	-11.5%	-0.2%	2.9%
16	-1.4%	6.1%	11.1%
18	-10.3%	-3.7%	1.5%
20	3.4%	17.5%	22.5%
22	2.5%	11.0%	15.8%
24	-5.6%	3.4%	7.8%
26	0.3%	10.1%	15.3%
28	1.6%	7.9%	12.8%
30	-3.9%	2.9%	7.6%
32	-4.7%	5.0%	9.3%
34	-8.3%	1.6%	6.8%
36	-4.7%	2.6%	7.9%
38	-4.4%	5.6%	9.7%
40	-3.8%	5.7%	9.5%
42	-7.3%	4.0%	7.4%
44	-1.2%	7.3%	11.8%
46	-5.4%	5.1%	9.0%
48	-0.3%	6.9%	11.9%
50			
52			
54			

Better EER in T2 !

1-2. High Performance

Heating COP (Coefficient of performance of an air conditioner)

= Output KW (cooling capacity) ÷ Input KW (power consumption)



NP = 4.56
NS = 3.77
(on average)

1-2. High Performance

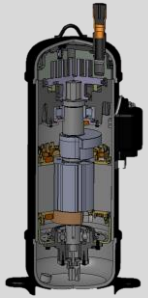
New Technology to achieve “Higher Performance”

NEW **Selling Point**

✓ **Compressor Control**
“Smooth Drive Control”

NEW **Selling Point**

✓ **Compressor**
Improve efficiency
at low load operation



NEW **Selling Point**

✓ **Bell-mouth**
Long Bell-mouth

NEW **Selling Point**

✓ **Heat Exchanger**

- Σ Shape Heat Exchanger
  (STD>14HP, H.E.>8HP)
- Improve path structure
  for better efficiency
  at low load operation
  (H.E.>8HP)

1) FAN 2) Heat Exchanger 3) Compressor 4) Compressor Control

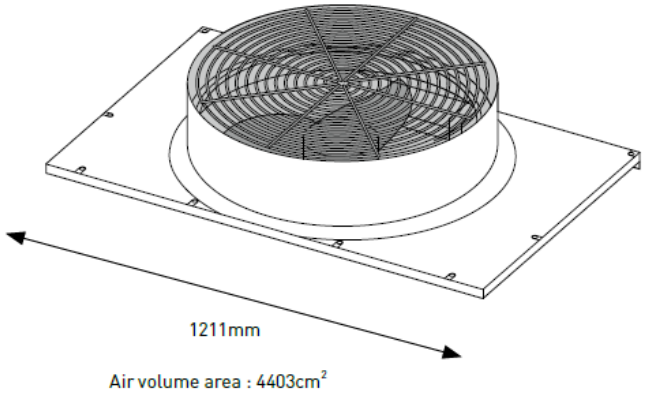
1-2. High Performance

1) FAN

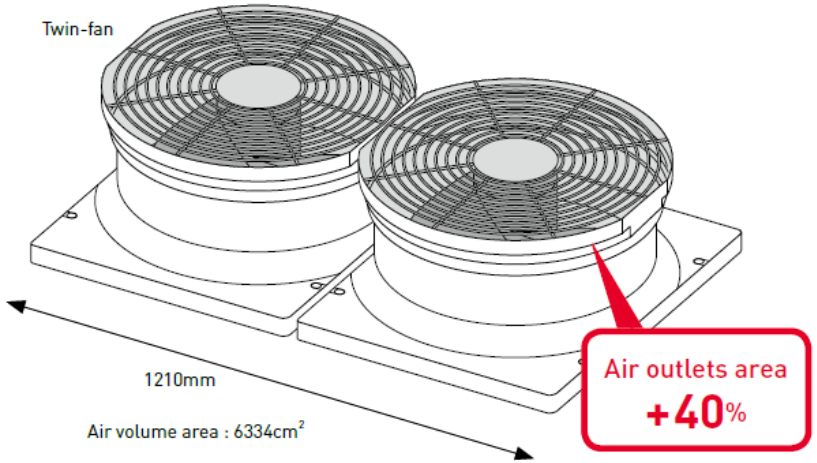
Improved!

Expansion of air outlets

Current model



New model

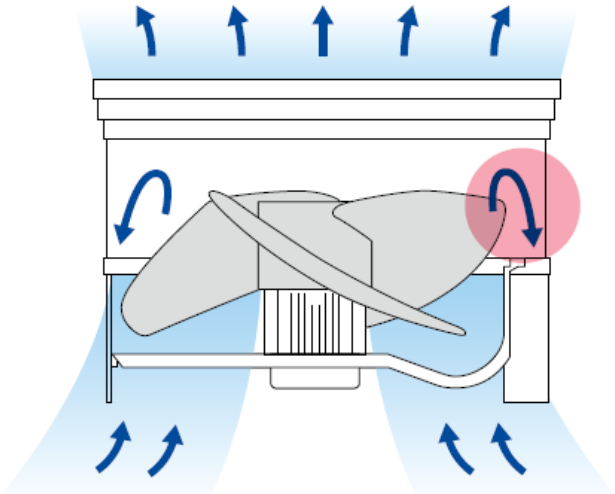


1-2. High Performance

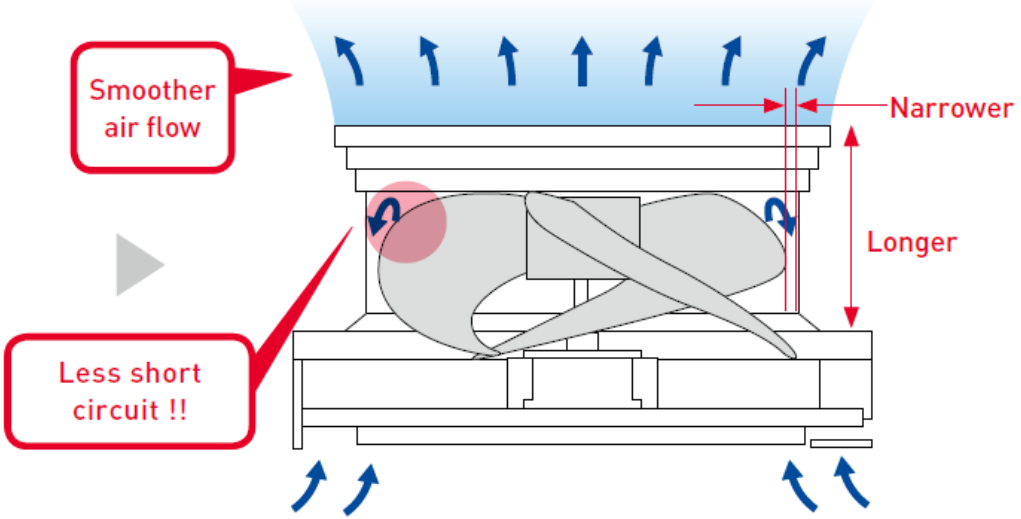
1) FAN

Improvement in bell-mouth

Current model



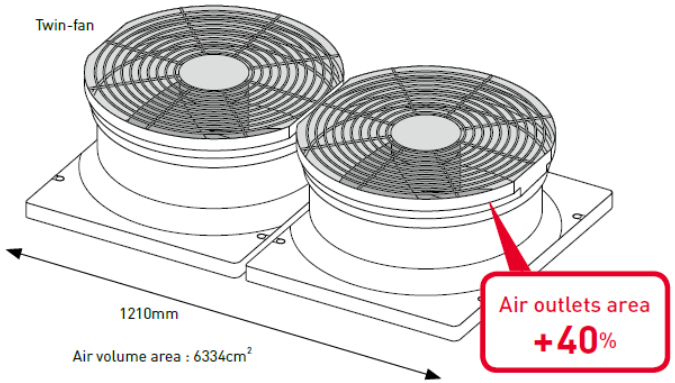
New model



1-2. High Performance

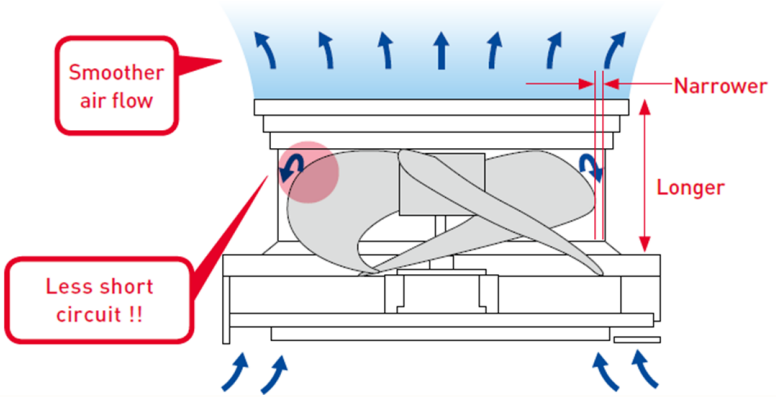
1) FAN

New model



Expansion of Air-inlet area

New model



Improvement of Air flow

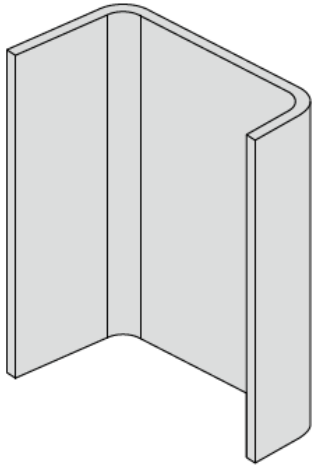
- Improvement of airflow volume by **23%** (12HP)
- Energy consumption in the driving shaft has decreased by **20%** on average

Improved!

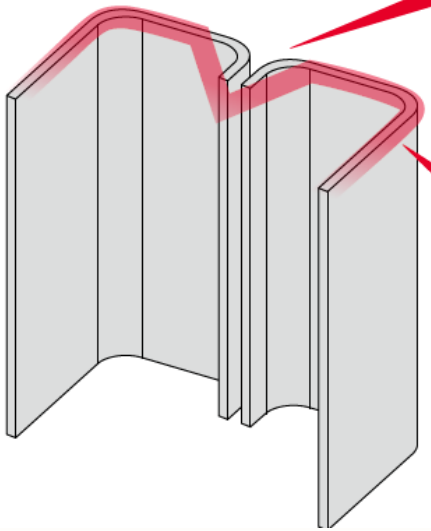
2) Heat Exchanger

New shape

Current model (14,16HP)



New model (14-24HP)

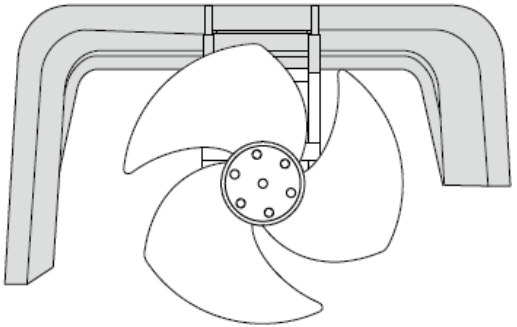


Hitachi Original!

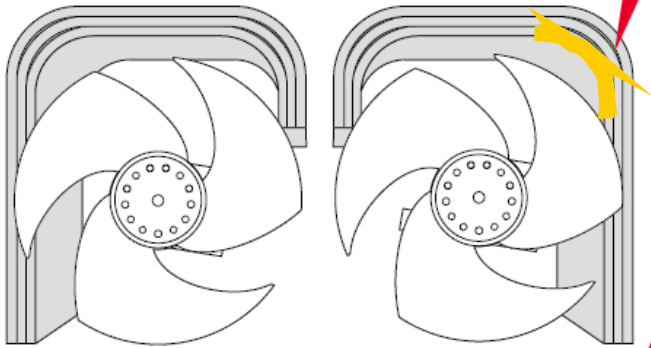
2) Heat Exchanger

New angle

Current model (14,16HP)

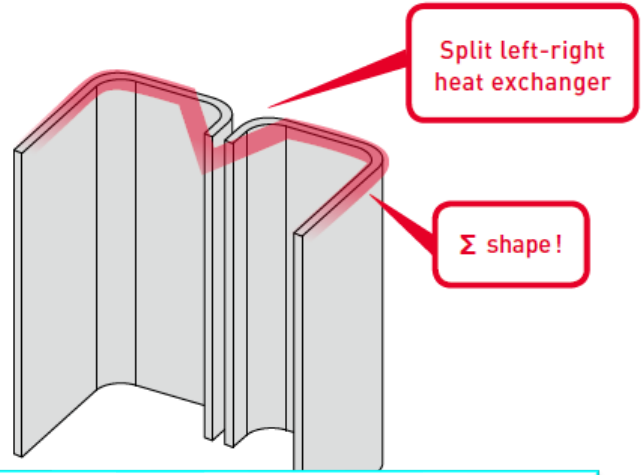


New model (14-24HP)



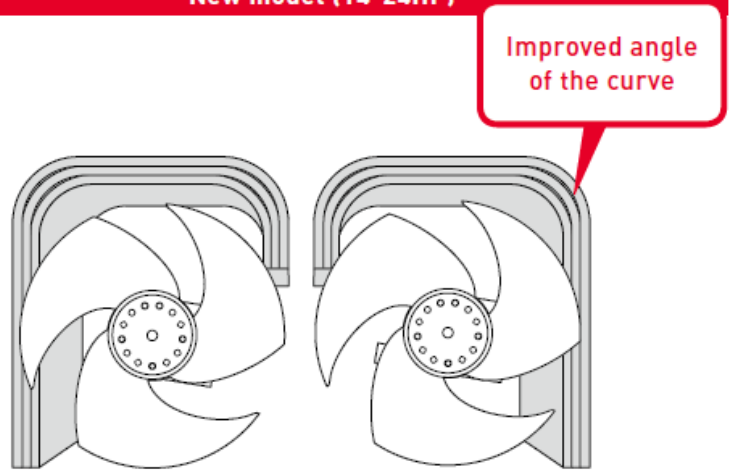
2) Heat Exchanger

New model (14-24HP)



Expansion of Air-inlet area

New model (14-24HP)



Improvement of Air flow

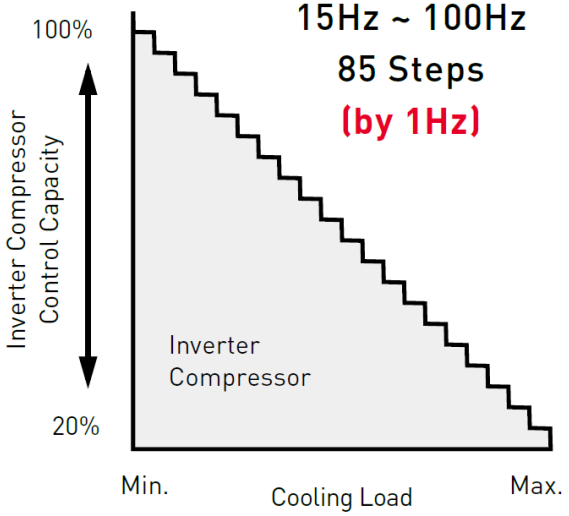
- The heat exchange area has been increased by more than 10% (12HP)
- Greater heat exchange efficiency

Improved!

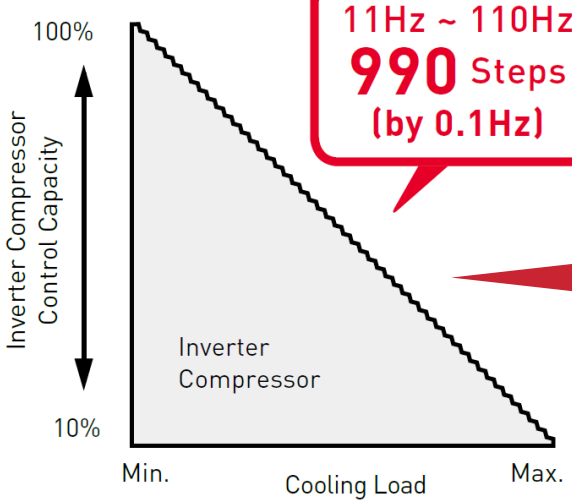
1-2. High Performance

3) Compressor

Current model*



New model*



Improved!

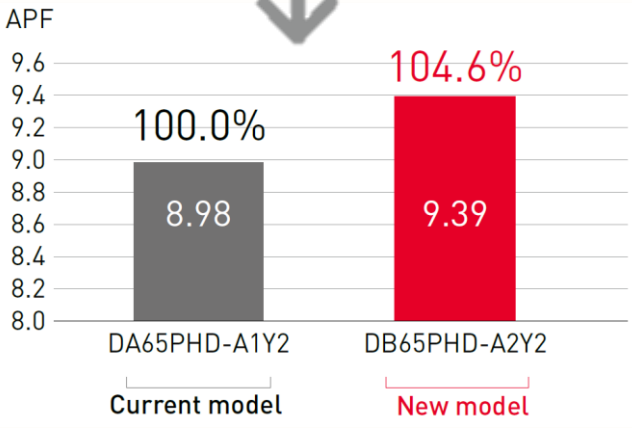
New DC Inverter Compressor

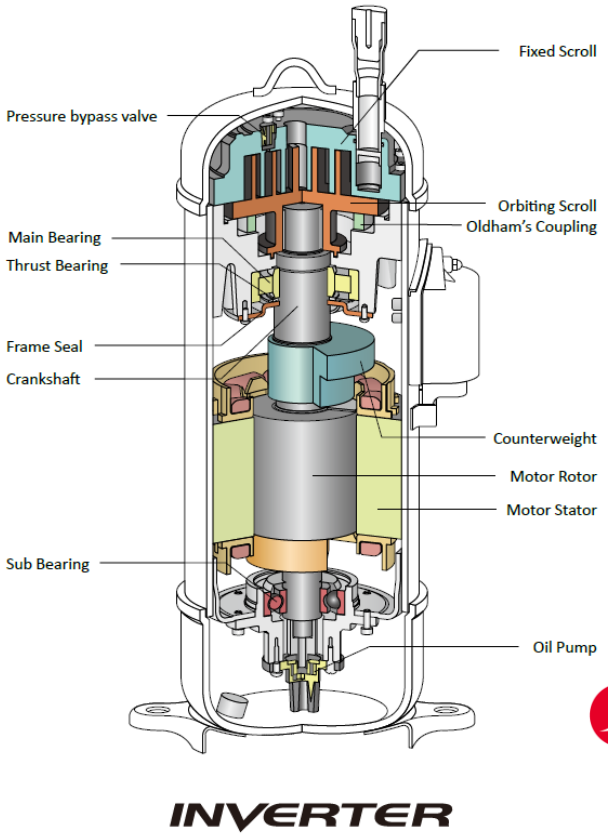
*Example at 12HP

1-2. High Performance

3) Compressor

The 13 colored parts are new!





Hitachi Original!

Compressor performance
+4.6% improved

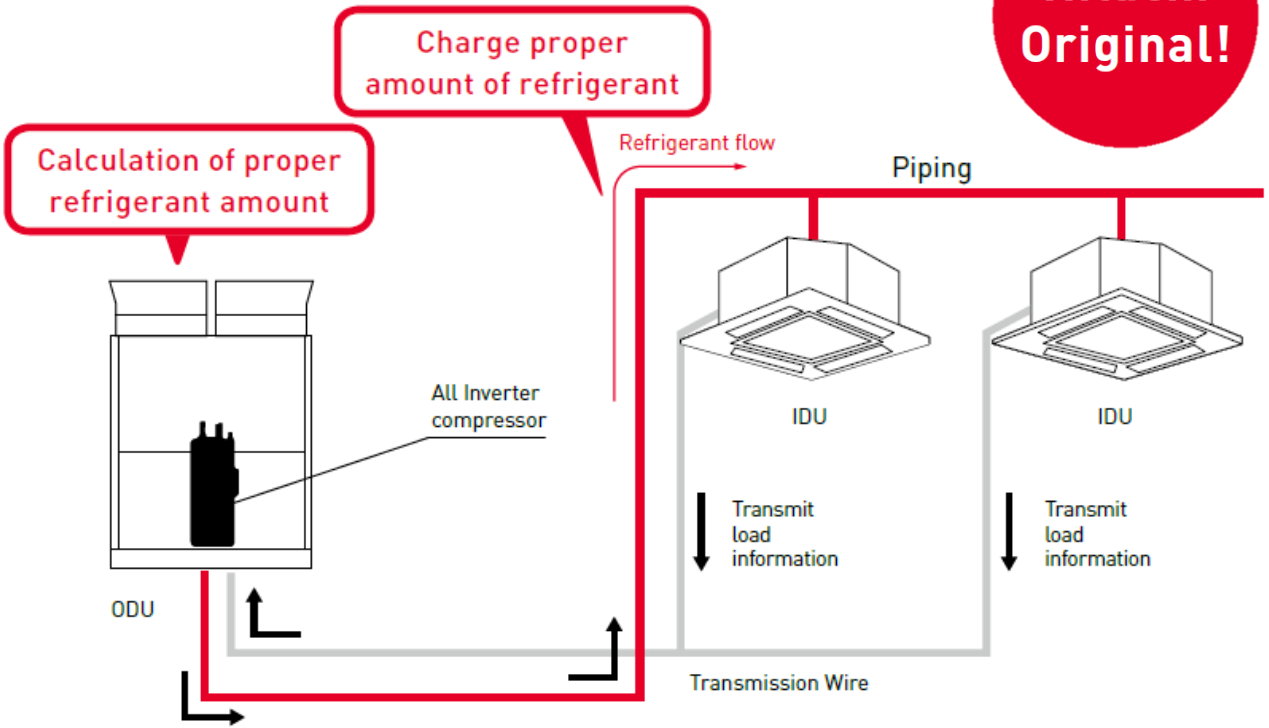
4) Compressor Control

Smooth Drive

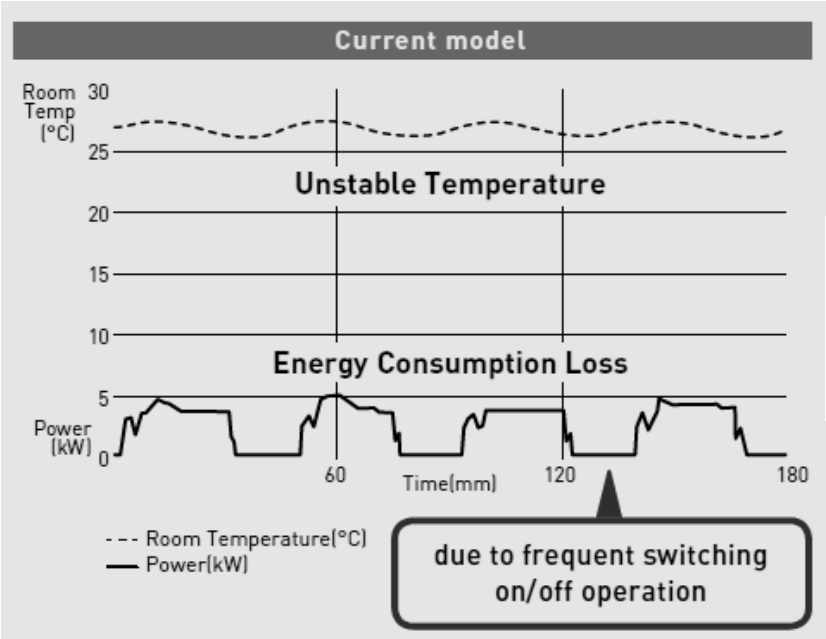
The model calculates the appropriate amount of coolant supplied by the outdoor units on the basis of information about the required load from the individual indoor units.

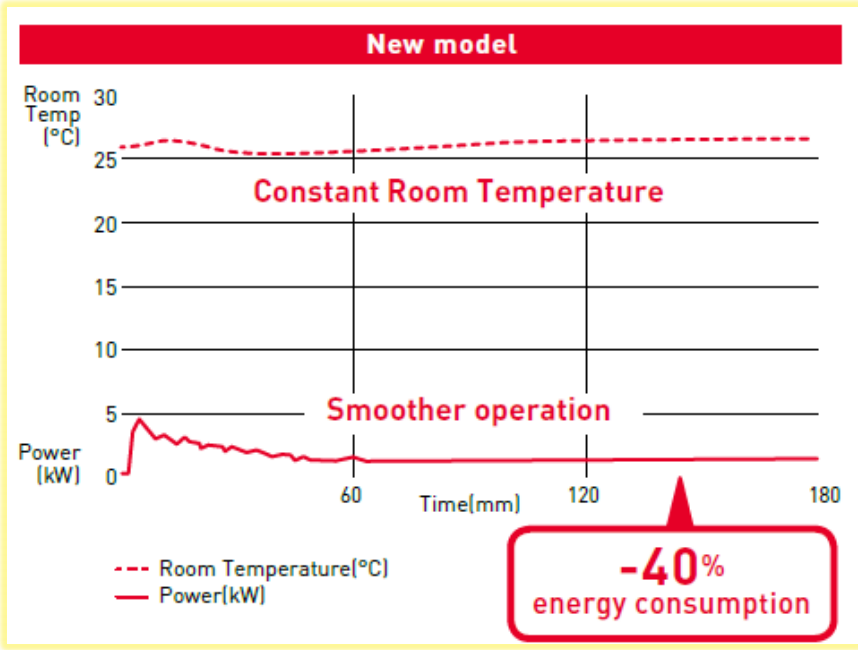
The model employs smooth operation control to control the number of revolutions of the inverter compressor.

The model supplies the appropriate amount of coolant 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.

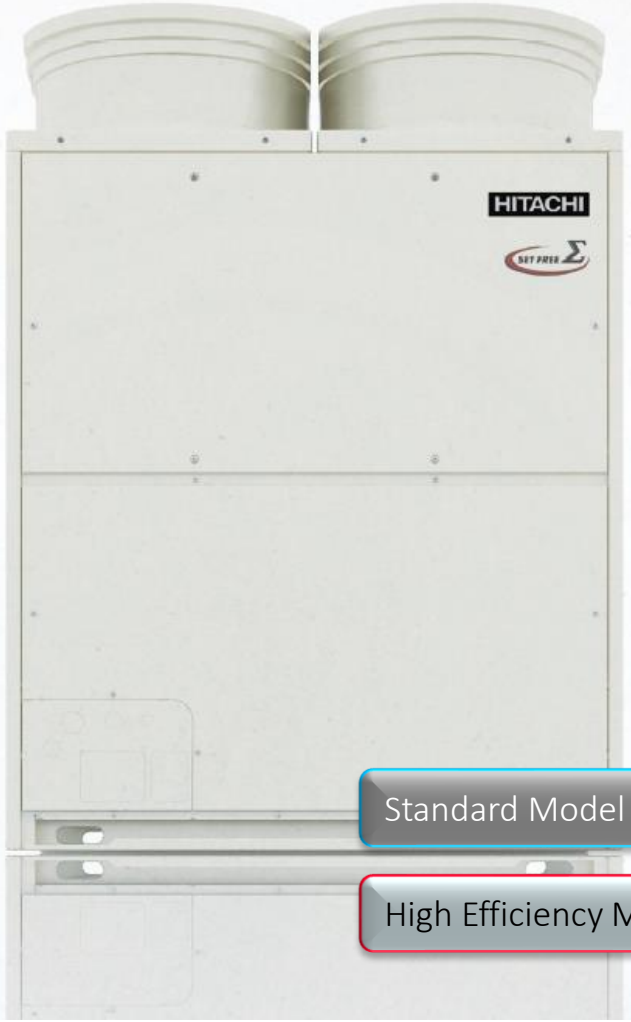


4) Compressor Control





3. Design Flexibility



New

Standard Model (FSNS series)

High Efficiency Model (FSNP series)

1-3. Design Flexibility

Sum-up

✓ Standard type

8HP to 96HP

New

- Smaller footprint
  (-11% on average compared to Current)
- Lighter cabinet
  (-16% on average compared to Current)
- Higher ESP
  (Up to 80 Pa)
- Better piping limit
  (Level difference between IDU & ODU up to 110M)
- Wider operation temperature range
  (Up to 48℃)
- Wider IDU combination range
  (Up to 130%)

✓ High Efficiency type

5HP to 72HP

New

- Smaller footprint
  (-11% on average compared to Current)
- Lighter cabinet
  (-16% on average compared to Current)
- Higher ESP
  (Up to 80 Pa)
- Better piping limit
  (Level difference between IDU & ODU up to 110M)
- Wider operation temperature range
  (Up to 52℃)
- Wider IDU combination range
  (Up to 150%)

1-3. Design Flexibility

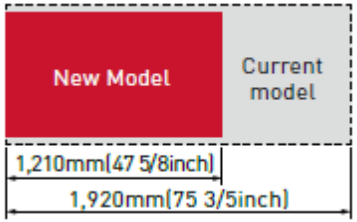
SET FREE HITACHI

Compact

Standard Model (FSNS series)

Improved!

18HP class 50.0kW



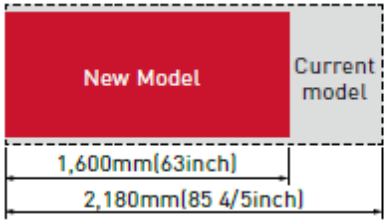
Space -37%

Weight -30%

Space:1.47m² → 0.93m²

Weight:445kg → 311kg

24HP class 67.0kW



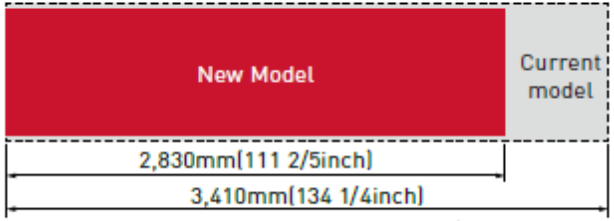
Space -27%

Weight -32%

Space:1.67m² → 1.22m²

Weight:540kg → 365kg

42HP class 118.0kW



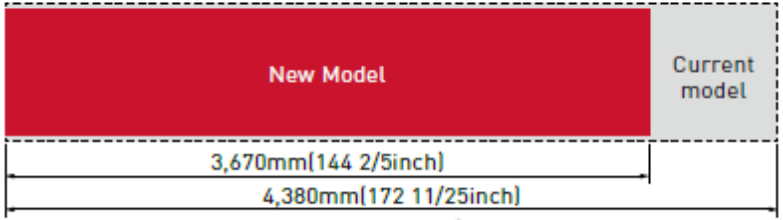
Space:2.61m² → 2.16m²

Weight:850kg → 676kg

Space -17%

Weight -20%

54HP class 150.0kW



Space:3.35m² → 2.81m²

Weight:1080kg → 933kg

Space -16%

Weight -14%

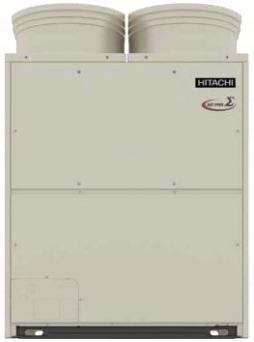
1-3. Design Flexibility

Compact

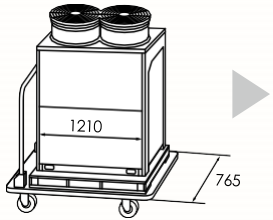
Standard Model (FSNS series)

Smaller

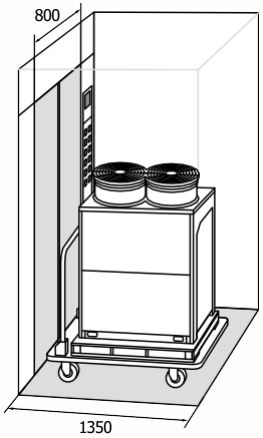
Lighter



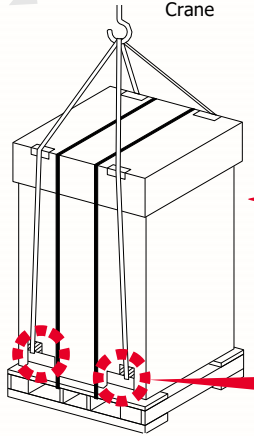
Can be transported in an elevator by pallet jack (up to 18HP class(50.0kW))



Lift



Crane



New

New package design to be craned more easily

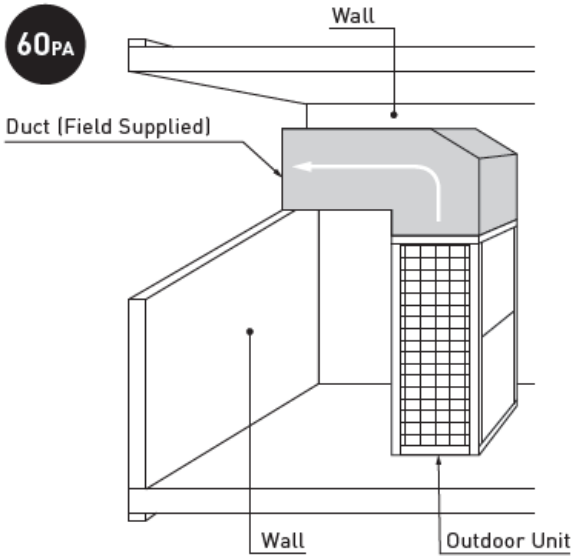
1-3. Design Flexibility

Higher ESP

Improved!

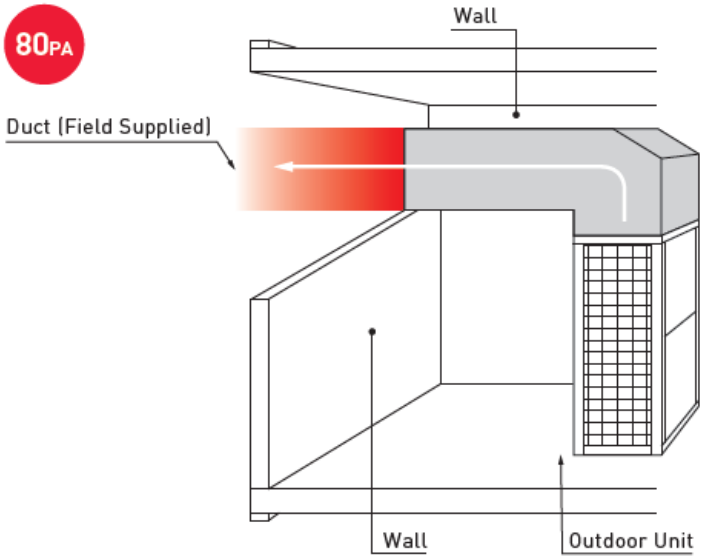
Current Model

60PA



New Model

80PA



offers more options for the indoor installation of the outdoor unit

- Less piping length
- Lower installation cost
- Visual aesthetics

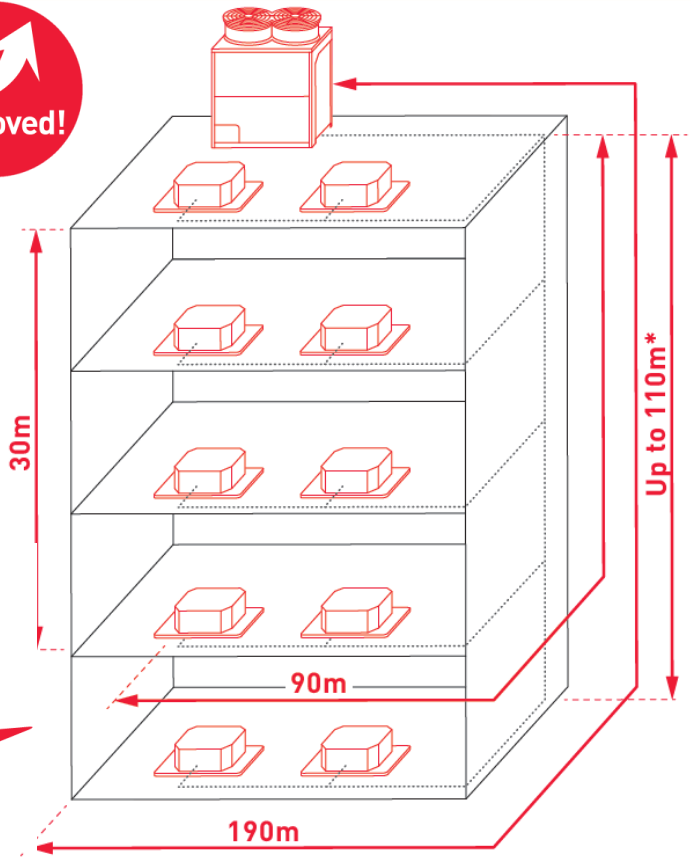
1-3. Design Flexibility

Better Piping Limit

Total piping length		1000m
Longest length actual (Equivalent)		165m (190m)
Longest length after first branch		90m
Level difference between ODU and IDU	**Higher ODU**	Standard 50m Optional 110m(*)
	Lower ODU	40m
Level difference between IDUs		30m

* Please consult your distributor or dealer if the height difference is over 50m.

Improved!



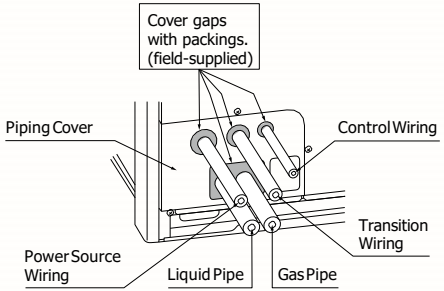
- Suitable for a high-rise building or complex facilities.
- Leads to cost/time saving for designers, with more efficient design.

1-3. Design Flexibility

Piping Direction

4 directions
→←↓↑

For Piping from Front cover



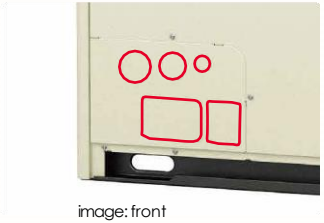
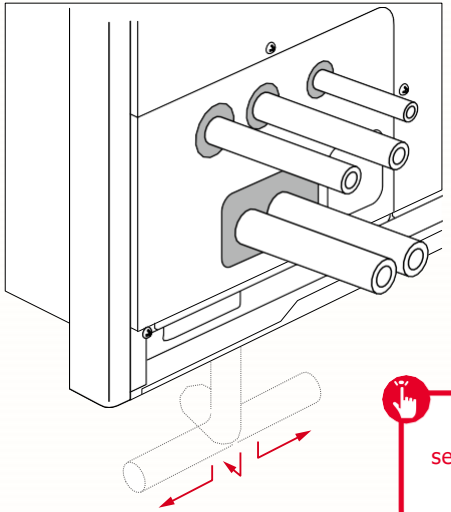
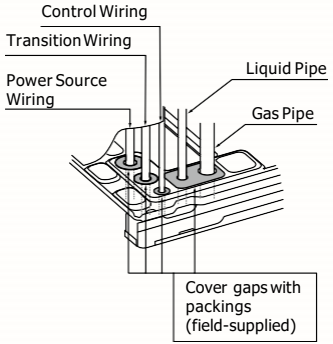


image: front



For Piping from Bottom base to Left, Right and Rear side



For more service space in front.

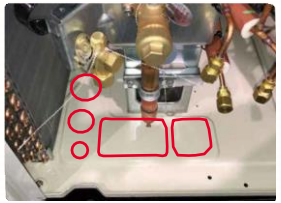
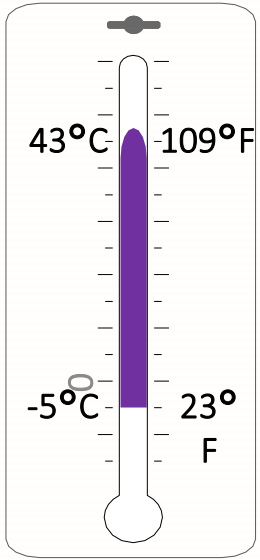


image: bottom

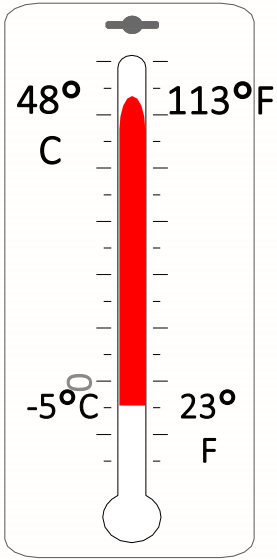
1-3. Design Flexibility

Wider operation range in Cooling

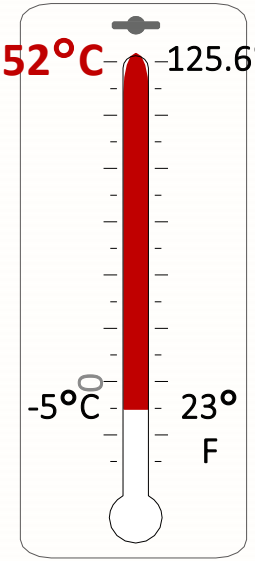
Improved!



Current Model



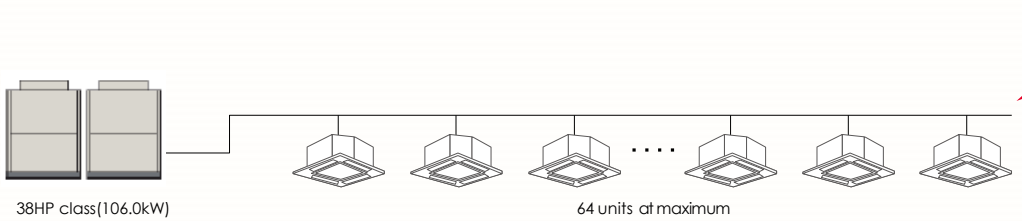
Standard Model (FSNS series)



High Efficiency Model
(FSNP series)

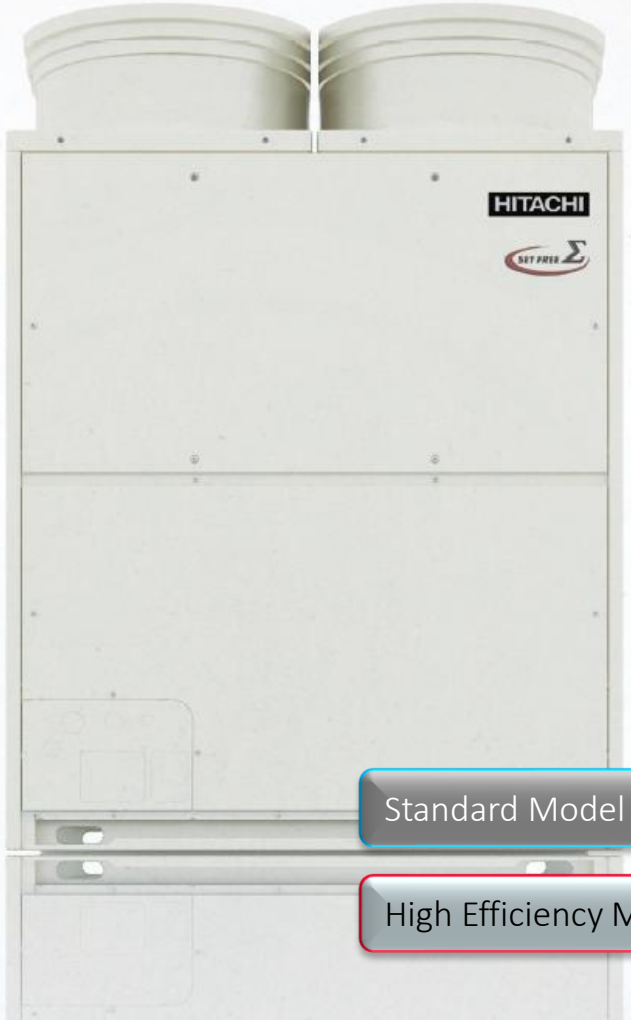
1-3. Design Flexibility

Indoor Unit combination range



Outdoor Unit Capacity_HP class	8	10	12	14	16	18	20	22	24	26	28	30	32	34	36	38-54
Cooling Capacity_kW	22.4	28.0	33.5	40.0	45.0	50.0	56.0	61.5	67.0	73.0	77.5	85.0	90.0	95.0	100.0	106.0-150.0
Range of combination capacity	Standard Type (FSNS) : 50 to 130% (In case the combination ratio exceed 130%) High Efficiency Premium Type (FSNP) : 50 to 150% (In case the combination ratio exceed 150%)															
Maximum Connectable IDU Quantity	13	16	19	23	26	26	33	36	40	43	47	50	53	56	59	64
Recommended Connectable IDU Quantity	8	10	10	16	16	16	18	20	26	26	32	32	32	32	32	38

4. Adaptability



New

Standard Model (FSNS series)

High Efficiency Model (FSNP series)

1-4. Adaptability

Sum-up

- ✓ **Standard type**
  8HP to 96HP
- ✓ **High Efficiency type**
  5HP to 72HP

- ✓ Low noise operation
- ✓ Silent mode
- ✓ To prevent failure
- ✓ Back-up function
- ✓ Maintenance ease

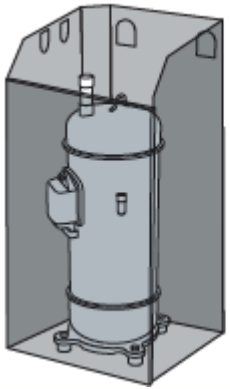
1-4. Adaptability

Low Noise operation

Sound Power Level								dB(A)
HP	8	10	12	14	16	20	22	24
Current Model	81.5	82.5	84	85.4	85.5	86	87	87
New Model	80	82	82	85	85	86	84	86

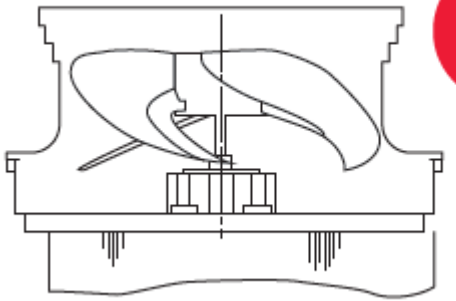
-1.5dB(A)
on Average !
The performance capability has increased, but the running Sound Power Lebel (dB(A)) has decreased.

Thanks to 2 New Designs



New Cover

New metal shielding cover for compressor



New Model

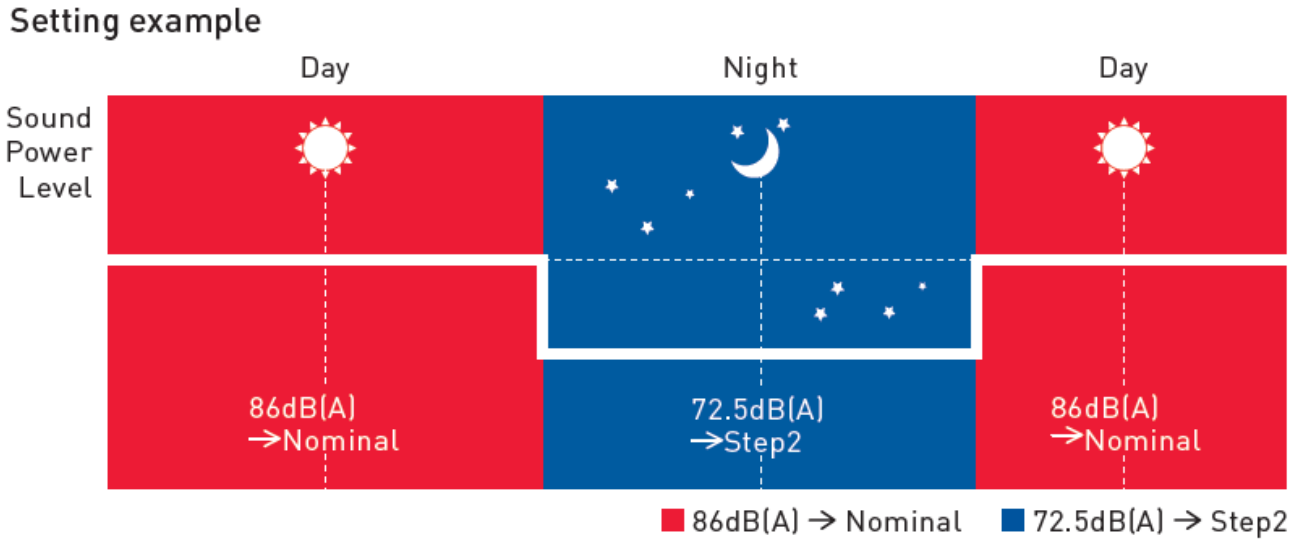
New air blower to suppress the fan noise

1-4. Adaptability

Silent Mode

Noise Reduction Mode	18HP	42HP
	Sound Power Level (dB(A))	
Nominal	86	89
Step 1	82.5	86
Step 2	77.5	81
Step 3	72.5	76

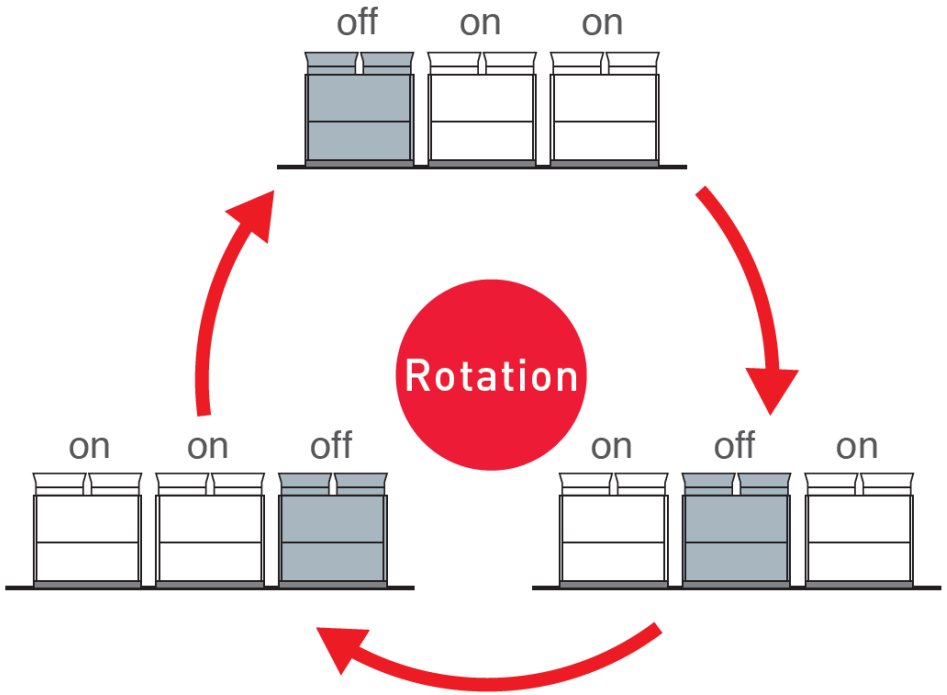
Decrease
Up to -14 dB(A)



1-4. Adaptability

To prevent failure

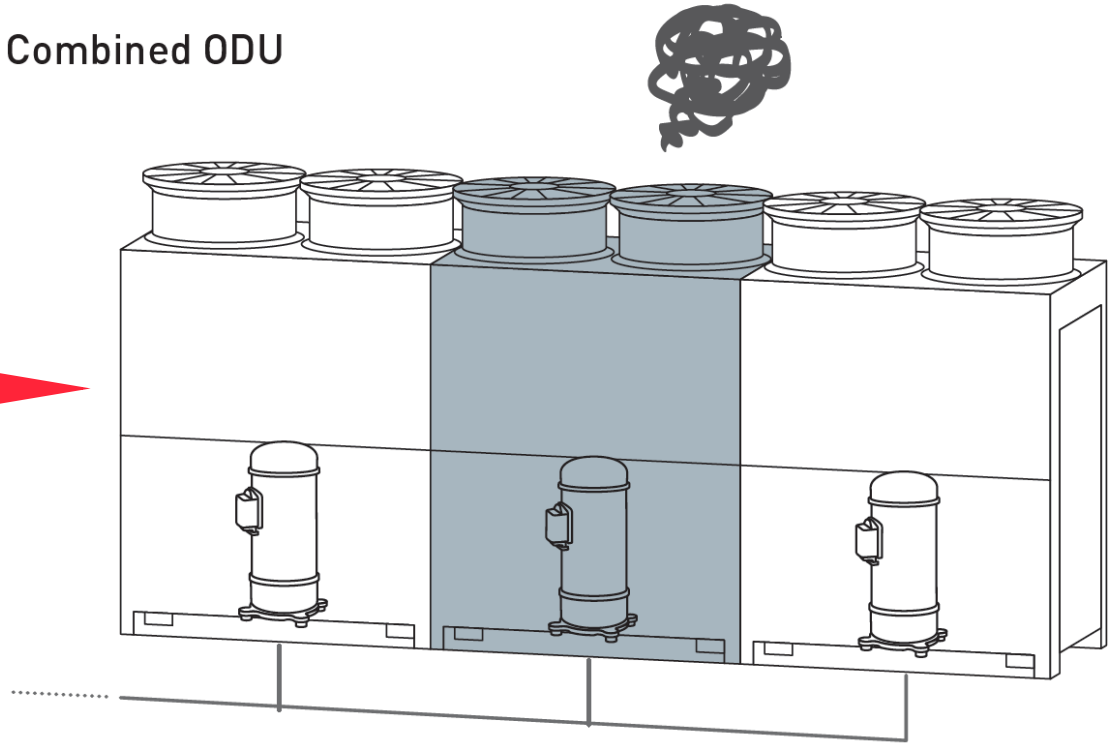
Standardize the running time of the individual outdoor units and distribute the load by rotating the order of operation of the compressors of the outdoor units.



1-4. Adaptability

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.



1-4. Adaptability

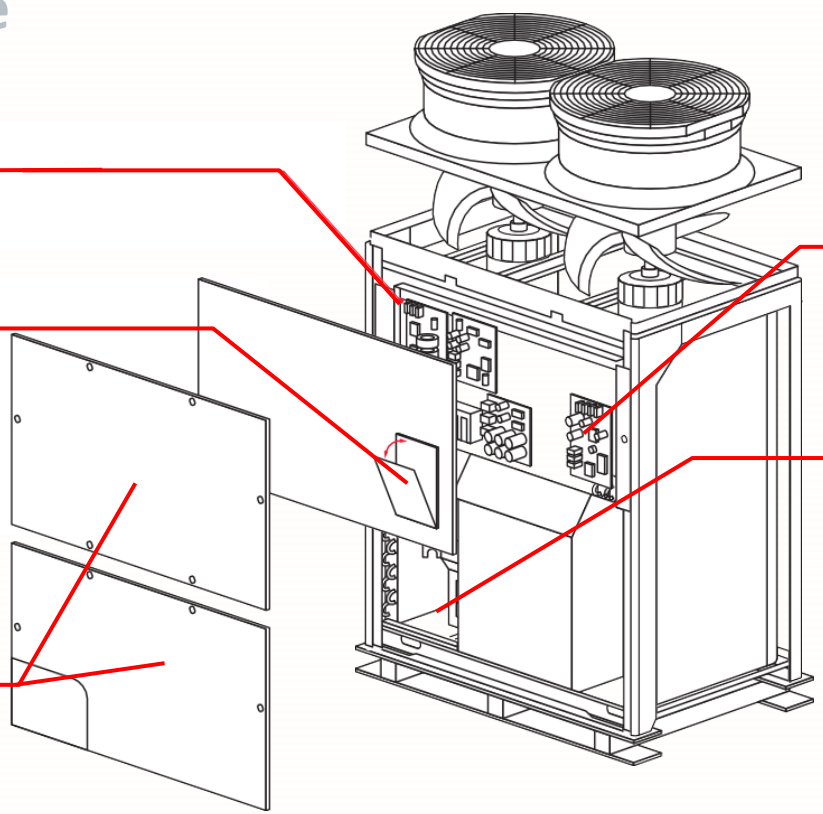
Maintenance Ease

New

New Structure:
In upper section, all PCB visible and easily accessible

Newly adopted window for 7-segment display:
Adopting access door to the electrical box in the upper panel, which leads to easy access to 7-segment display, PSW & DSW and so on.

New Panel:
The upper panel (on the side of an electric box) can be independently detached from the lower panel (on the compressor chamber side)



New DSW setting for Refrigerant pump-down: Refrigerant evacuation: Enforced operation to open ODU EVO/EVB, IDU EVI, and Hi/Low pressure Bi-pass SVB

New Structure:
More Space in lower section, easy access to compressors or valves

5. Appendix

HITACHI

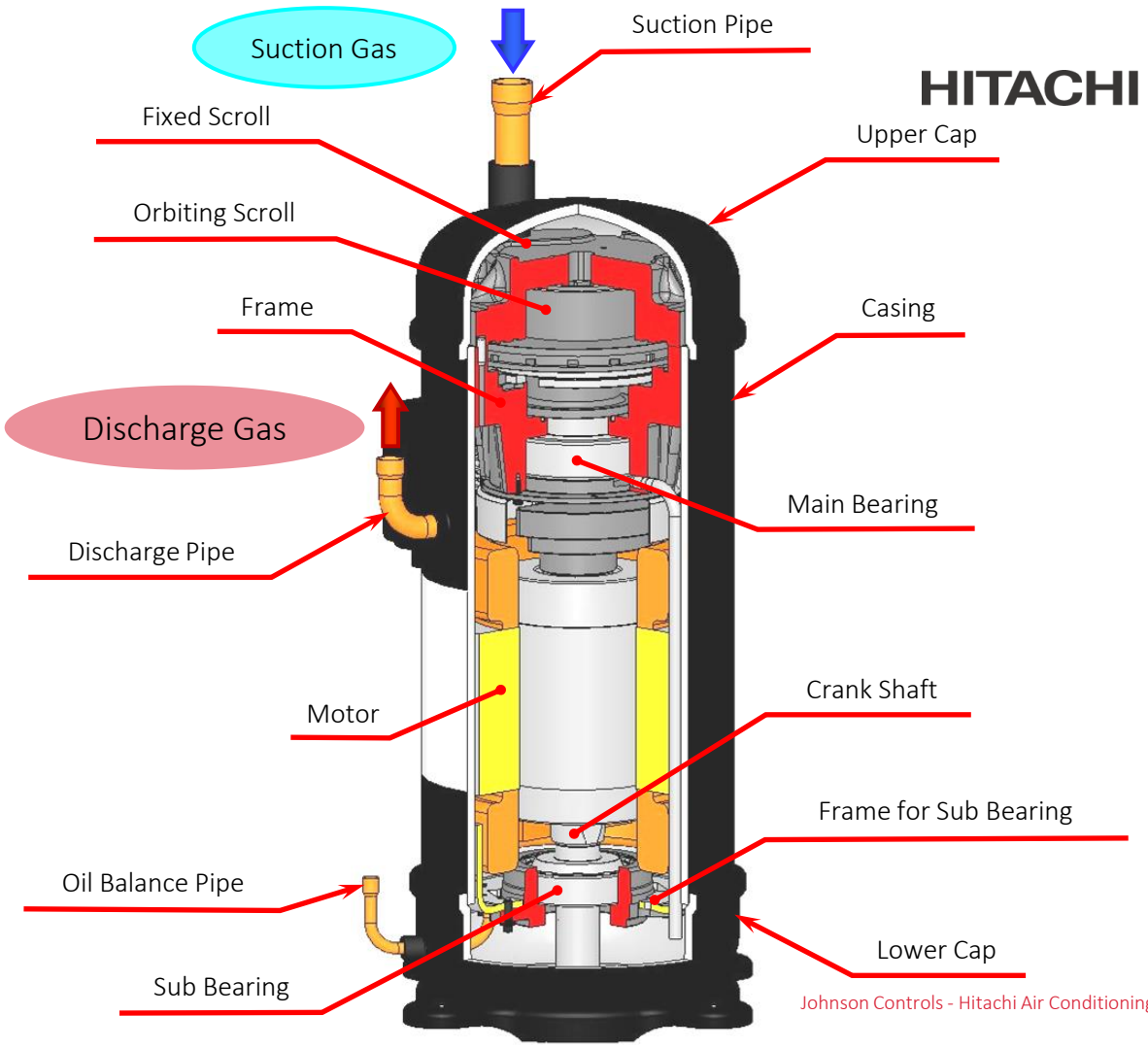
Index	
1	Scroll Compressor History
2	Advancement in Hitachi Scroll Compressor
3	Optional Parts
4	





5-1. History

Structure for R410A Compressor



In 1983

WORLD'S FIRST **high-pressure-chamber** Scroll Compressor production for AC.

Idea itself was born in USA in 1905, but Hitachi, for the first time in the world, succeeded in mass production for scroll compressor for Air conditioner, after 13 years of development.
Scroll Compressor technology led to a lot of merits in AC unit; higher efficiency, compact, less noise and reliability.

World's First

HITACHI

Scroll Compressor

Production for AC unit.

Award:

"1983 Medal for new technology"

- Development of scroll compressors for air conditioning-
By The Japan Society of Mechanical Engineers

Patents Nos.

276 in 1983

Refrigerant

R22

Scroll Parts: casting in-house
Thanks to the 40years experience

In 2003

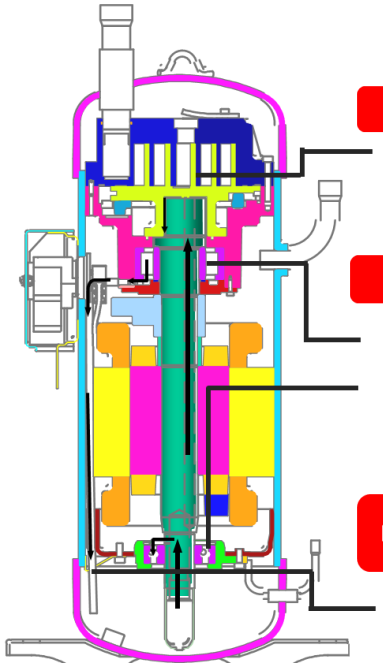
In 2003,
Hitachi released the WORLD'S FIRST high-pressure chamber scroll compressor in the industry which has the function of interior oil separating.

Refrigerant
R410A

World's First

HITACHI

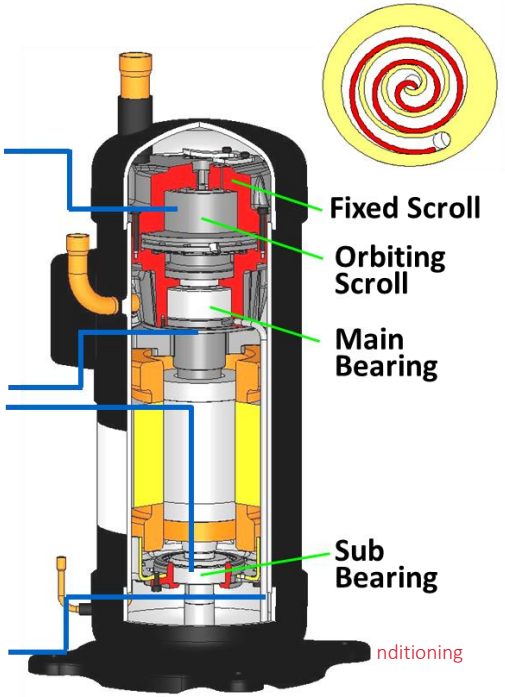
Scroll Compressor With
Oil Circulation Structure



Asymmetrical scroll profile
Cutting gas leakage loss
→ Performance Improved !

Double bearing structure
Reduction of bearing load
Centering shaft
→ Reliability Improved !

Internal oil circulation structure
Reduction of heating loss
→ Performance Improved !



5-2. Hitachi Scroll Compressor

5.2 Hitachi Scroll Compressor

HITACHI

Advanced point in Hitachi Scroll Compressor

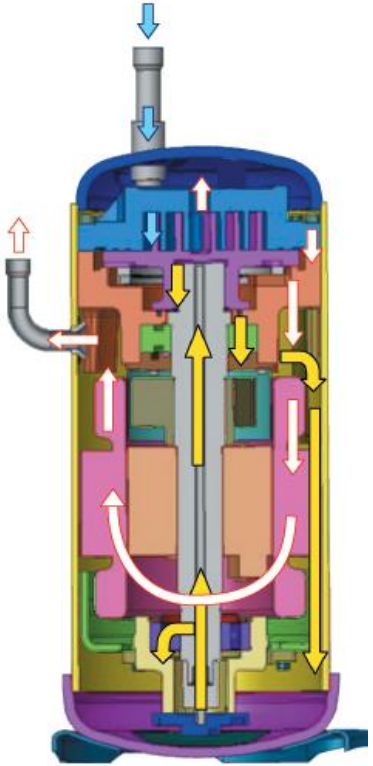
→

Higher reliability

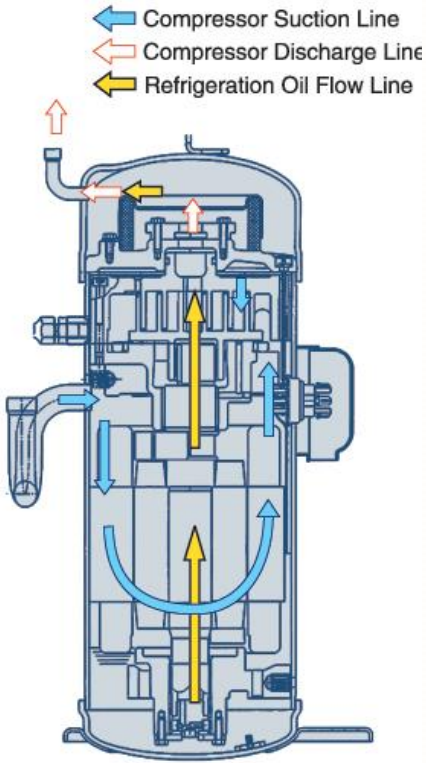
→

Thanks to **High-Pressure Chamber**

What is High-Pressure Chamber ?



High Pressure Chamber Compressc



Low Pressure Chamber Compressor

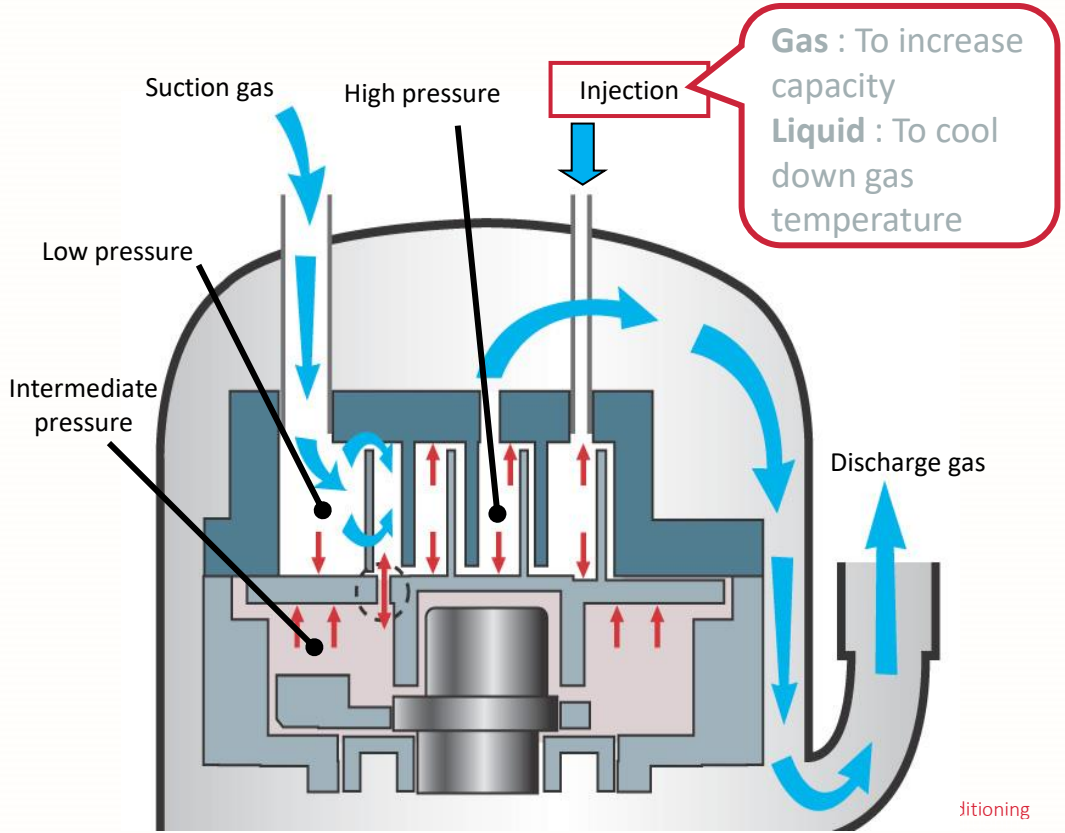
5.2 Hitachi Scroll Compressor

HITACHI

What is High-Pressure Chamber? ?

- The orbiting scroll is properly pressurized from the rear side to the fixed scroll by intermediate pressure assuring perfect sealing.
- Simple structure without the tip-seal and thrust bearing assures stable operation and long life.

Higher reliability (Lower failure ratio) with fewer sliding parts!



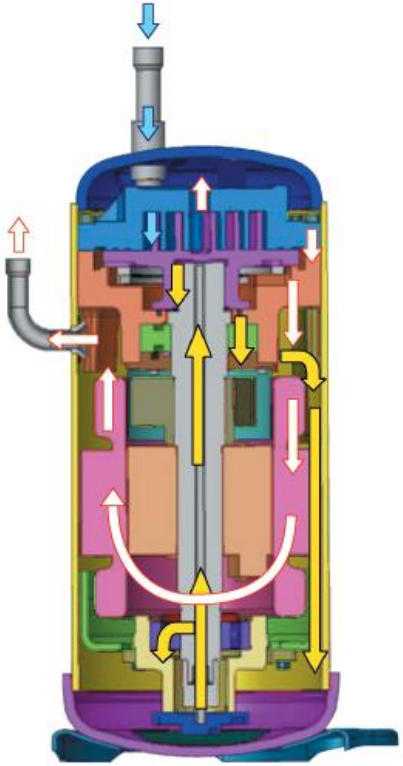
5.2 High-pressure chamber “Merit”

HITACHI

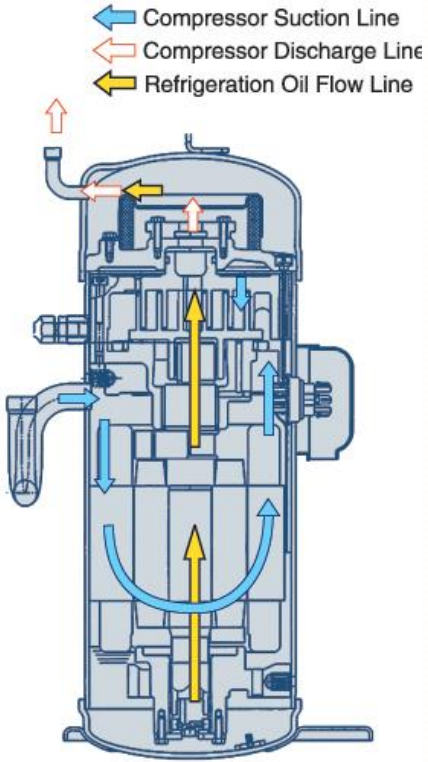
What is the merit in high-pressure chamber?

① . Less Oil Foaming

② . Automatic Oil supply



High Pressure Chamber Compressor



Low Pressure Chamber Compressor

5.2 ①High-pressure chamber “Merit”

HITACHI

Why “oil foaming” is bad ?

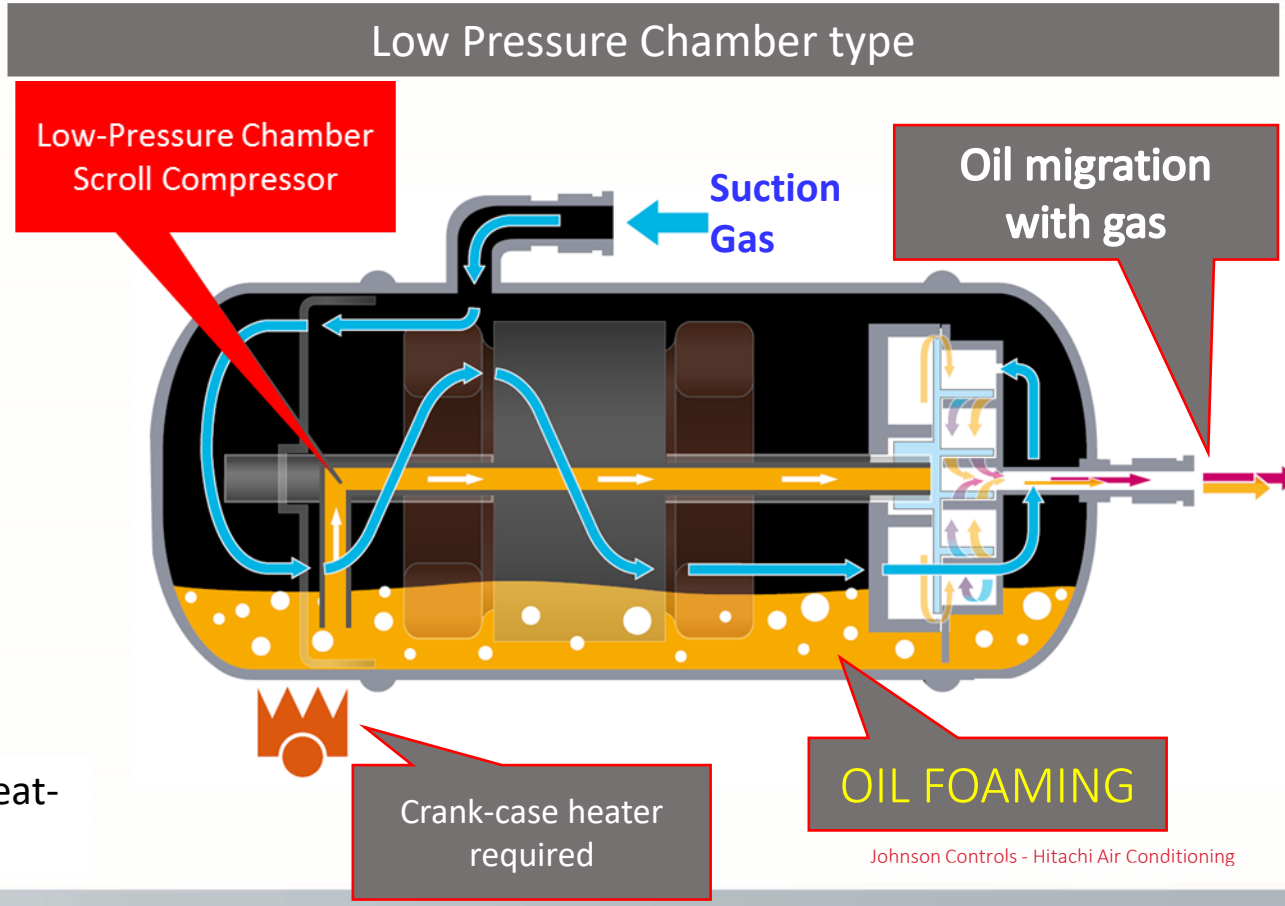
Because it causes 1. increase in oil-migration to the gas & 2. decrease in oil level in compressor (poor lubrication).

Why it takes place?

Because the oil stays in cold temperature state.

How to avoid?

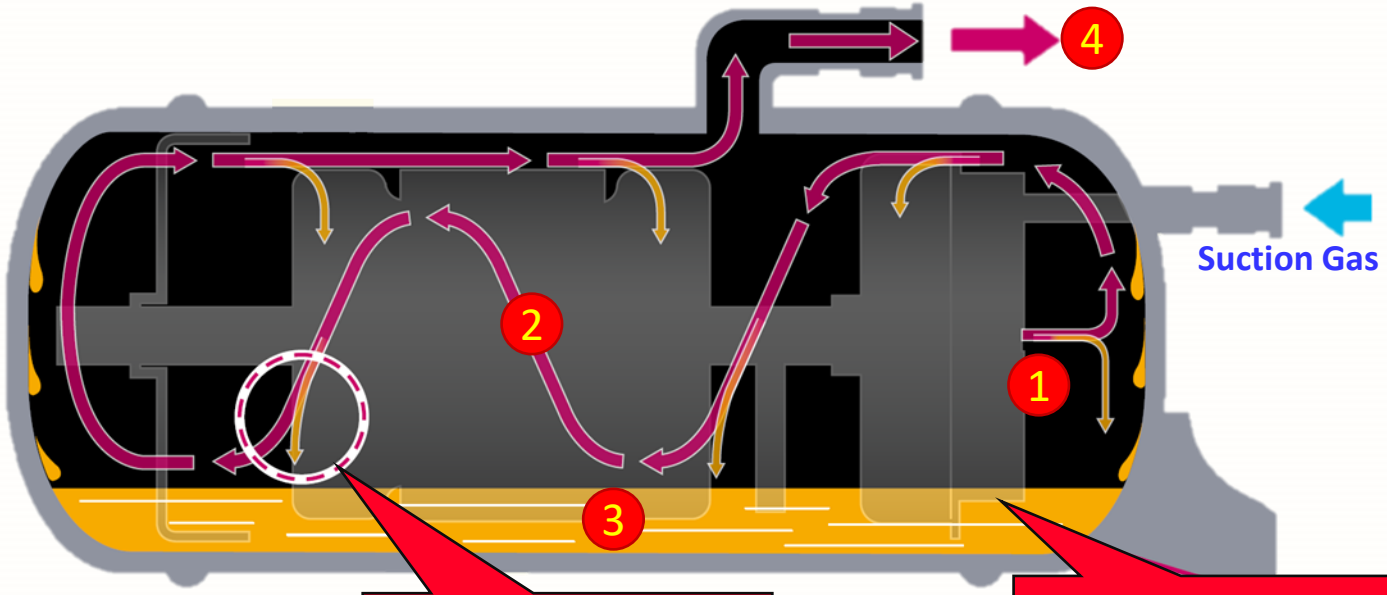
Install the Crank-Case-Heater to heat-up the oil, to evaporate gas in oil



5.2 ①High-pressure chamber “Merit”

HITACHI

Hitachi High Pressure Chamber type

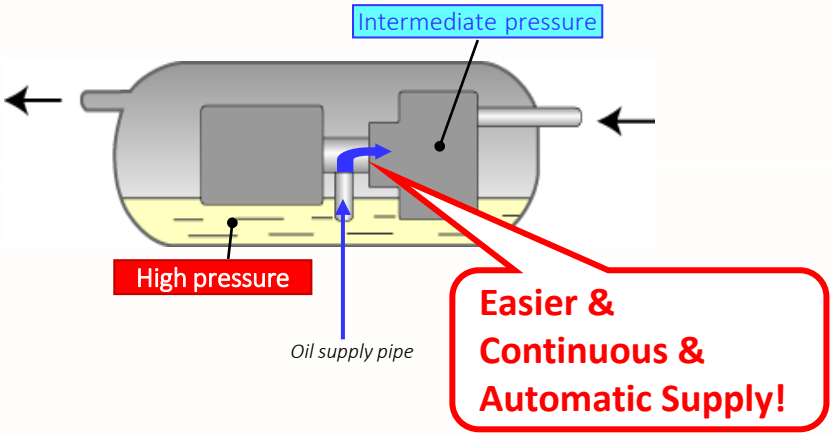


①	Suction gas comes into scroll part directly.
②	High Pressure gas cycles around after scroll part, resulting in high temperature & high pressure inside the casing !
③	Oil temperature rises, thanks to the high temperature & high pressure gas resulting in the better lubricating state of oil !
④	Since high-pressure gas goes out after moving around in casing, oil cannot stay accompanied, resulting in migration of gas without oil !

5.2 ②High-pressure chamber “Merit”

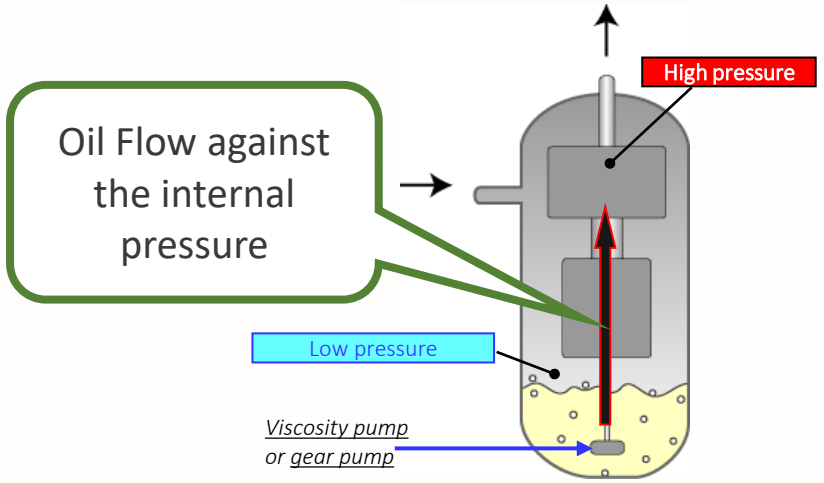
HITACHI

Hitachi High Pressure Chamber type



- The oil is supplied naturally from the high pressure side to intermediate pressure side by the pressure difference.
- Suitable for inverter control because lubrication is not affected by rotating speed of shaft !
- The oil level is stable, and stable lubrication is assured.

Low Pressure Chamber type



- Oil is mechanically supplied from the low pressure side to the high pressure side.
- Lubrication performance is affected by the oil viscosity, and rotating speed of shaft.
- Oil lubrication performance will be lowered under the foaming condition or liquid backing condition.

5-3. Optional Parts

Optional Parts	
1	Drain Boss
2	Air inlet grille
3	Protection net
4	Snow protection hood
5	Toppling protection tool

5-3. Optional Parts

Optional Parts	
1	Drain Boss
2	Air inlet grille
3	Protection net
4	Snow protection hood
5	Toppling protection tool

Model name

Name	Model
Drain Boss	DBS-TP10A

Quantity

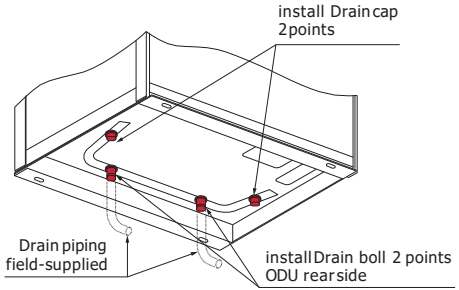
Outdoor Unit HP class [kW]	Q'ty
5 - 14 [14.0-40.0kW]	1
16 - 24 [45.0-67.0kW]	2
26 - 32 [73.0-90.0kW]	3
34 - 36 [95.0-100.0kW]	4
38 - 42 [106.0-118.0kW]	3
44 - 46 [122.0-128.0kW]	4
48 - 50 [136.0-140.0kW]	5
52 - 54 [145.0-150.0kW]	6

Drain Boss + Rubber Cap

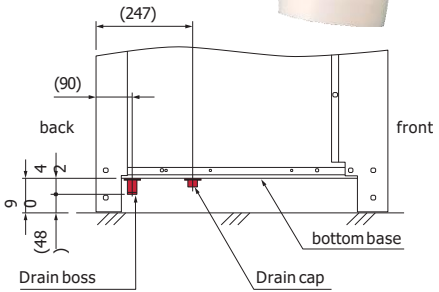
Drain Cap + Rubber Cap

How touse

Bottom view



Side view



Drain water treatment

Drain water is discharged during heating and defrosting operation. (Rain water is also discharged.) Pay attention to the following.

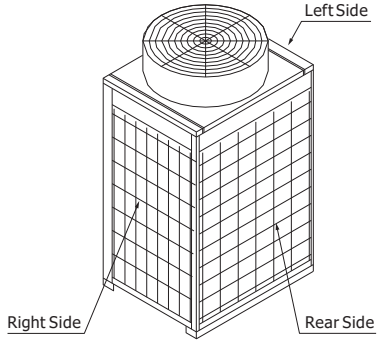
1. Choose a location where well drainage is available, or provide a drain ditch.
2. Do not install the unit over a walkway, as condensation water may drip onto people. In the case of installing the unit in such a location, provide an additional drain pan.
3. Do not use the drain boss in a cold area. The drain water in the drain pipe may freeze, and the drain pipe may crack.

5-3. Optional Parts

Optional Parts	
1	Drain Boss
2	Air inlet grille
3	Protection net
4	Snow protection hood
5	Toppling protection tool

HP class [kW]	AirInlet Grille		
	Rear	Right	Left
5 - 6 [14.0 - 16.0]	PSN-TP20BA	PSN-TP20R	PSN-TP20L
8 - 14 [22.4 - 40.0]	PSN-TP20BB	PSN-TP20R × 2	
16 - 18 [45.0 - 50.0]	PSN-TP20BC	PSN-TP20R × 2	

image:Air inlet grille

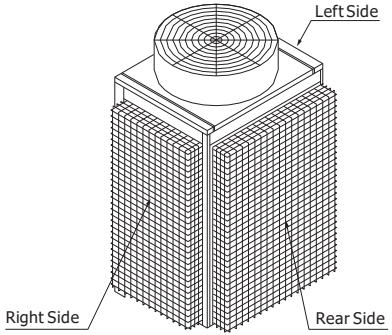


5-3. Optional Parts

Optional Parts	
1	Drain Boss
2	Air inlet grille
3	Protection net
4	Snow protection hood
5	Toppling protection tool

HP class [kW]	Protection Net		
	Rear	Right	Left
5 - 6 [14.0 - 16.0]	PN-TP20BA	PN-TP20R	PN-TP20L
8 - 14 [22.4 - 40.0]	PN-TP20BB	PN-TP20R × 2	
16 - 18 [45.0 - 50.0]	PN-TP20BC	PN-TP20R × 2	

image:Protection net



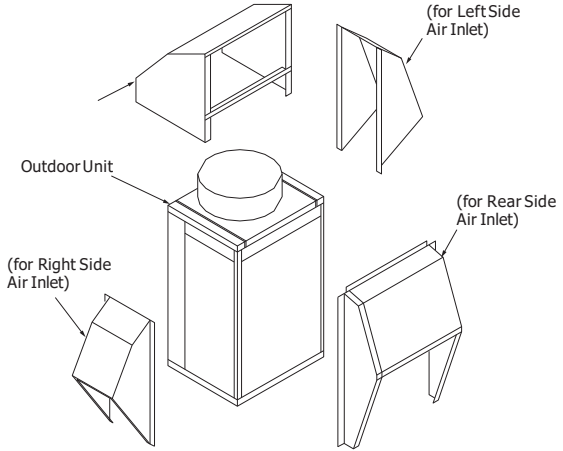
5-3. Optional Parts

Optional Parts	
1	Drain Boss
2	Air inlet grille
3	Protection net
4	Snow protection hood
5	Toppling protection tool

HP class [kW]	SnowProtection Hood			
	Upper	Rear	Right	Left
	Zinc CoatedSteel			
5 - 6 [14.0 - 16.0]	ASG-TP50FA	ASG-TP50BA	ASG-TP50R	ASG-TP50L
8 - 14 [22.4 - 40.0]	ASG-TP50FB	ASG-TP50BB	ASG-TP50R × 2	
16 - 18 [45.0 - 50.0]	ASG-TP50FC	ASG-TP50BC	ASG-TP50R × 2	
	Stainless			
5 - 6 [14.0 - 16.0]	ASG-TP50FAS	ASG-TP50BAS	ASG-TP50RS	ASG-TP50LS
8 - 14 [22.4 - 40.0]	ASG-TP50FBS	ASG-TP50BBS	ASG-TP50RS × 2	
16 - 18 [45.0 - 50.0]	ASG-TP50FS	ASG-TP50BCS	ASG-TP50RS × 2	

NOTE:Refer to the Technical Catalog for the Optional Parts selection.

image:Snow protection hood



5-3. Optional Parts

Optional Parts	
1	Drain Boss
2	Air inlet grille
3	Protection net
4	Snow protection hood
5	Toppling protection tool

HP class [kW]	ToplingPrevention Tool
5 - 18 [14.0 - 50.0]	ASG-SW20A

image:Toppling prevention tool