HITACHI

Hitachi Horizontal Scroll Compressor **for Refrigeration Use**

Total Solution for Refrigeration

Cold chains play an important role in delivering fresh foods and pharmaceutical drugs in a safe, fresh state to consumers, by keeping products at low temperature without interruption between the producing, transporting and consuming processes.
Hitachi' s high quality compressors contribute at various stages in the cold chain, from large refrigerated warehouses at ports to showcases in street-corner convenience stores.

Feature

Compact & Light Weight

Low Noise & Low Vibration

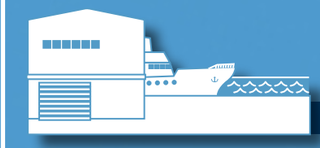
High Reliability by Long Experience

High Efficiency by Advanced Technology

Z Series

DS Series

FL Series



Producing areas and
Refrigerated warehouses

Processing plants

Transport centers

Supermarkets and retail stores

General consumers

Pharmaceutical companies

Distribution centers

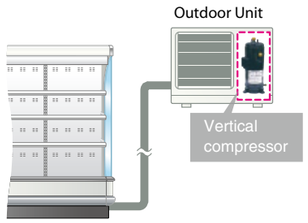
Hospitals

Compact & Light Weight

Space-saving for Showcase

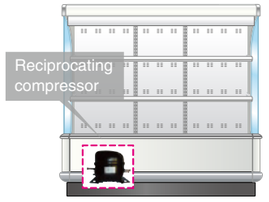
Hitachi's light, compact compressors are ideal for self-contained showcase units.

Split type units



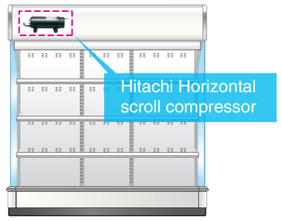
- Space for the outdoor unit is required outside the shop.
- Installation work for outdoor unit is needed.
- The showcase is fixed in position so there is no way to change the layout of the store.

Self-contained units



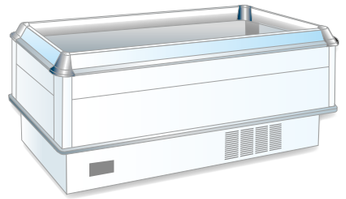
- Less display space by bigger machine room compared with horizontal scroll compressor.

Self-contained units



- No outdoor unit to be installed.
- Smaller machine room, more display space.
- The show case can be moved about freely without piping and outdoor unit.
- Low-noise, low-vibration

Special low height island design

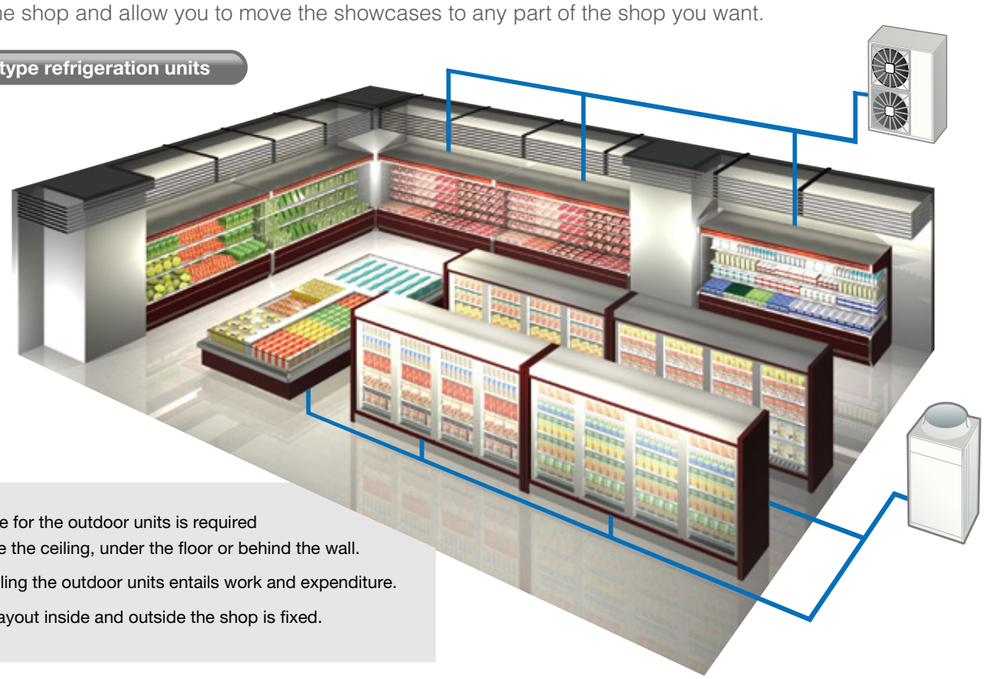


- Ideal for ice cream show case.
- Special low height design by smaller machine room making the unit easier to use.
- The show case can be moved about freely without piping and outdoor unit.
- Low noise & low vibration

Space-saving Design and Fexible Shop Layout

Showcases that use Hitachi's horizontal scroll compressors save space both inside and outside the shop and allow you to move the showcases to any part of the shop you want.

Split type refrigeration units



- Space for the outdoor units is required above the ceiling, under the floor or behind the wall.
- Installing the outdoor units entails work and expenditure.
- The layout inside and outside the shop is fixed.

self-contained units

Flexible shop layout

- No space is required for outdoor units.
- No outdoor unit installation work or cost is required.
- The layout of the shop can be changed at will.
- Ideal for small shops

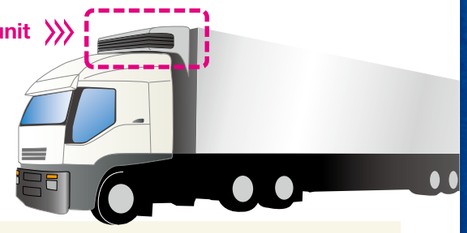
No need outdoor unit and installation

Transportation Solution

With the development of cold chains, demand for large refrigerator trucks and small refrigerator vans for transportation has soared. Hitachi's small, quiet, low-vibration compressors open the door to lighter and more compact vehicle-mounted refrigeration units.

Refrigeration unit for transportation

Down sizing unit



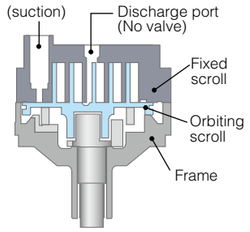
- Energy saving by light compressor.
- Larger refrigeration space by compact compressor.
- Low noise & low vibration

Low Noise & Low Vibration

Low-noise low-vibration compressors provide a safe and pleasant low-temperature environment.

Low Noise

The human ear is sensitive to low-frequency sounds, so noise generated in low frequencies causes particular discomfort. With Hitachi scroll compressors there is little low-frequency noise and ear-grating mechanical sounds are greatly reduced.



Noise level

ZS7516S1 ▶ **55dB(A)**

DS1836S1 ▶ **63dB(A)**

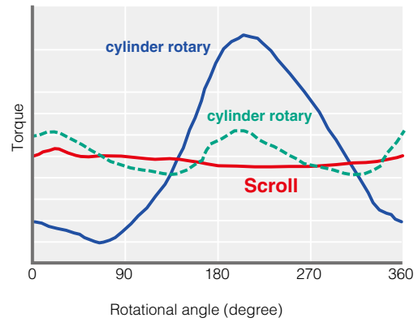
When measured at a position 30 cm away from the compressor surface (at EVP/COND=-10/45°C)

- ▶ The scroll discharge port has no discharge valve.
- ▶ Rotary compressor discharge ports generally have a valve, and noise is generated by the valve opening and closing at each rotation speed.

Scroll compressors generate much less noise than rotary compressors.

Low Vibration

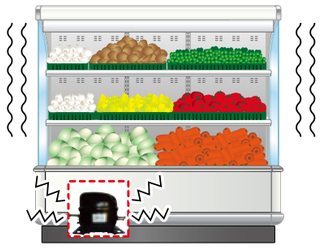
Structurally, there is far less vibration than with ordinary rotary compressors. Less vibration of the compressor means less sympathetic vibration by pipe joints and other peripheral equipment.



- ▶ Scroll compressors have less torque fluctuation than ordinary rotary compressors. Less torque fluctuation means less vibration.

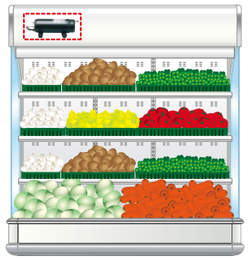
Using a low-noised and low-vibration compressor has advantages in terms of maintenance and freshness of the products. Creating a pleasanter and safer low-temperature environment.

Showcase using reciprocating compressor



- ▶ Damage to surrounding equipment by sympathetic vibration
- ▶ Maintenance costs are incurred
- ▶ Grating noise
- ▶ Cost of noise and vibration countermeasures
- ▶ Deterioration of fresh produce by vibration

Showcase using Hitachi horizontal scroll compressor



- ▶ Low vibration so less damage to surrounding equipment
- ▶ Reduced maintenance costs
- ▶ Little grating noise and a pleasant environment
- ▶ No expenditure on noise and vibration countermeasures
- ▶ No deterioration of fresh produce

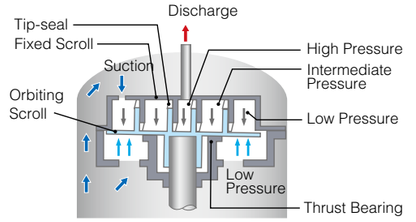
High Reliability by Long Experience

With their unique structure and long track record on the Japanese market, Hitachi scroll compressors have a reputation for outstanding reliability.

Longer Life & Higher Performance

Unique scroll structure maximizes Hitachi's advanced processing technology and experience.

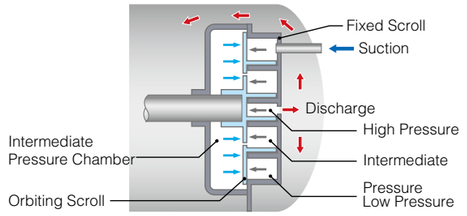
Low pressure type compressor



The end plate of the orbiting scroll is supported in the middle by the thrust bearing. Tilting the orbiting scroll creates a gap between the orbiting scroll and the fixed scroll which is covered by a tip-seal.

As the compressor uses many sliding parts, friction occurs and damage is likely. Leakage of the refrigerant may also occur.

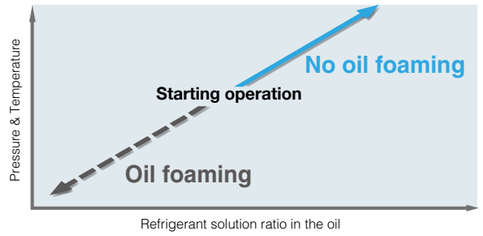
Hitachi high pressure type compressor



Without the use of a thrust bearing, the orbiting scroll plate is supported uniformly by the intermediate pressure. The gap between the orbiting scroll and the fixed scroll is controlled in microns by Hitachi's sophisticated processing technology. The gaps are uniform and few, the spaces between the components are sealed with oil and no need tip-seals.

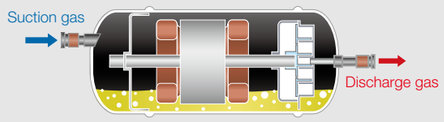
As there are few sliding parts, there is little friction and thus less chance of damage. Efficiency is high and there is less likelihood of leakage of refrigerant.

Scroll Compressor with High Pressure Chamber



Oil foaming

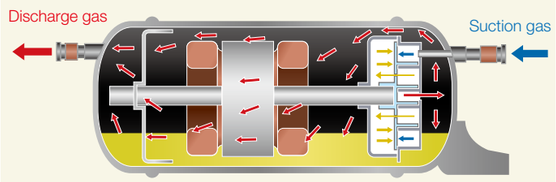
Low pressure chamber



- ▶ After starting, pressure and temperature decreases and refrigerant bubbles come over from the oil.

No oil foaming

Hitachi high pressure chamber



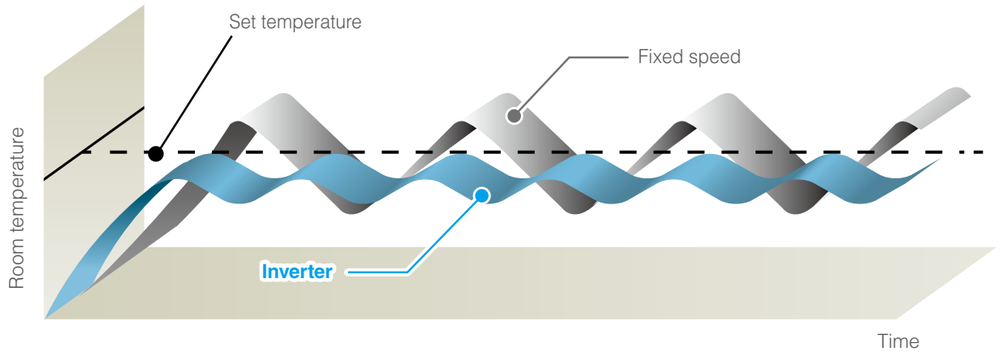
- ▶ After starting, pressure and temperature increases, and refrigerant dissolves into the oil better.
- ▶ Discharged refrigerant gas is averaged and stabilized.
- ▶ Suction gas comes directly into the scroll portion.
- ▶ Compressed high pressure gas cycling inside of chamber.

High efficiency by Advanced Tech nology

Energy Saving & Temperature Control

As the temperature is regulated by on-off operation, with fixed speed compressors power consumption is high and fine tuning of the temperature is difficult. With no wasteful on-off operation, inverter-control compressors save energy and allow precise temperature control.

Optimal temperature control



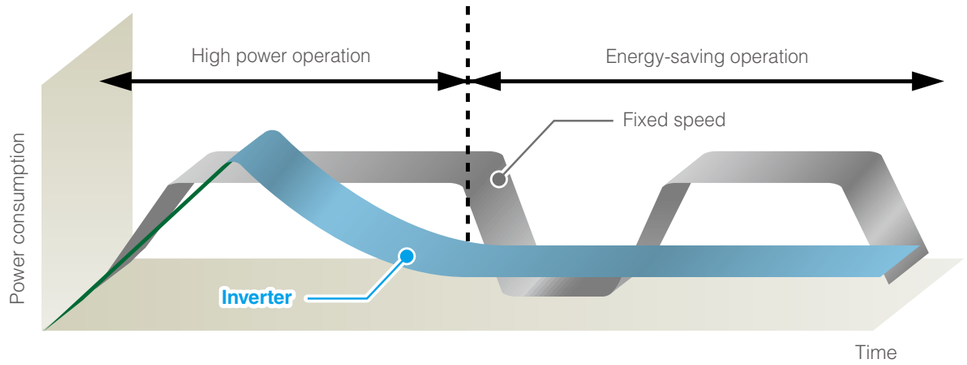
Fixed speed

- With fixed speed compressors, when the temperature deviates from the set temperature, it is adjusted by repeated on-off operation, resulting in a greater temperature variation range

Inverter

- With inverter control compressors, the set temperature can be maintained, enabling appropriate fine-tuned temperature control

Energy saving at low-frequency operation



Fixed speed

- With fixed speed, frequent on-off operation results in higher power consumption

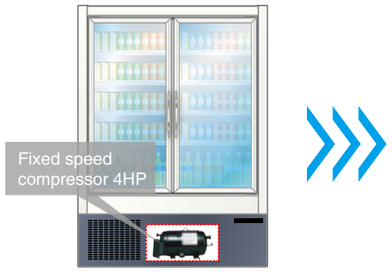
Inverter

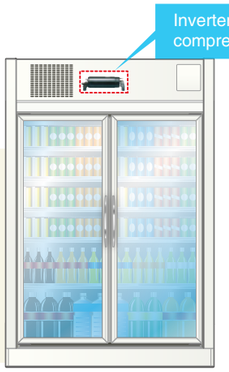
- With inverter control compressors, there is less on-off operation, ensuring a high energy-saving effect when operating at a low frequency

Space Saving by Inverter Model

As inverter compressors can operate over a wide range of frequencies, they can be used instead of large-capacity fixed speed compressors. Replacing a large fixed speed compressor with a small inverter compressor enables a smaller machine room and larger display shelves.

Large fixed speed compressors can be replaced with small inverter compressors.





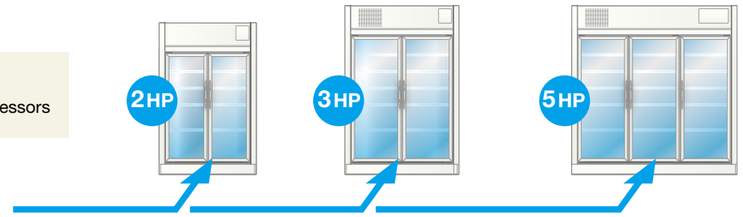
Showcase merits

- Larger display space due to the smaller machine room
- Enhanced energy-saving effect
- Option of installing the machine room on top

Plat form Design

With its ability to cover a wide range of capacities, a single inverter compressor model can be used in showcases of varying shapes and sizes.

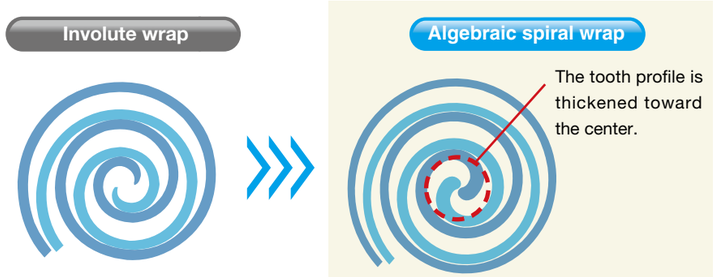
- Showcases using conventional 2HP, 3HP and 5HP fixed compressors



All the showcases can be operated by a single inverter compressor

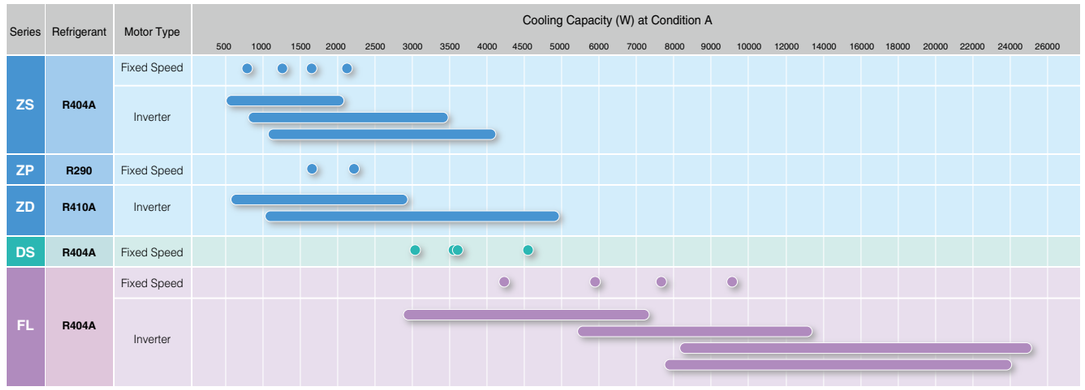
Adoption of "Algebraic Spiral Wrap"

The compressor chamber volume in the tooth profile center is smaller and the compression ratio is larger, compared with the involute, thus efficiency is higher in a low temperature zone.



Line up & General Data

Line Up



Test Condition

Condition	A	B	C	D	E
Evaporating Temperature	-10˚C (14˚F)	-30˚C (-22˚F)	-6.7˚C (20˚F)	-15˚C (5˚F)	-10˚C (14˚F)
Condensing Temperature	45˚C (113˚F)	40˚C (104˚F)	48.9˚C (120˚F)	45˚C (113˚F)	45˚C (113˚F)
Liquid Temperature	40˚C (104˚F)	35˚C (95˚F)	48.9˚C (120˚F)	40˚C (104˚F)	40˚C (104˚F)
Return Gas Temperature	20˚C (68˚F)	18˚C (64.4˚F)	4.4˚C (40˚F)	18˚C (64.4˚F)	18˚C (64.4˚F)
Ambient Temperature	32˚C (89.6˚F)	32˚C (89.6˚F)	32˚C (89.6˚F)	32˚C (89.6˚F)	32˚C (89.6˚F)
Rotation Spped (DC inv.model only)	-	3450min^{-1}	-	3470min^{-1}	3586min^{-1}: FL800ELV 4338min^{-1}: FL1000ELV
Compressor Cooling	Fan cooling + Liquid injection	Fan cooling + Liquid injection	Fan cooling + Liquid injection	Liquid injection	Liquid injection

General Data

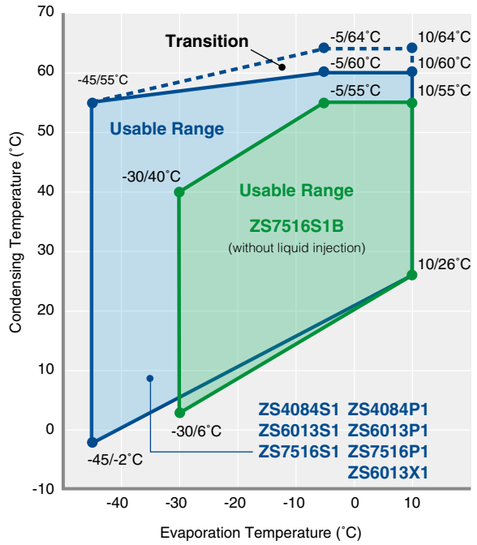
Series	Refrigerant	Motor Type	Model Name	Scroll Profile	Rated Output	Displacemet	Performance			Performance	Power Supply			Oil Charge	Weight	Pipe Connection	IP Rating	Production
							Cooling Capacity		Input	Test Condition	Phase	Voltage	Frequency					
					W	cm^3/rev.	W	BTU/h	W		ϕ	V	Hz	cm^3	kg			
ZS	R404A	Fixed Speed	ZS4084S1	Involute	400	8.4	778	2,655	624	A	1	220-240	50	550	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS4084P1	Involute	400	8.4	877	2,992	660	C	1	110	60	550	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS6013S1	Involute	600	12.5	1,254	4,279	850	A	1	220-240	50	550	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS6013P1	Involute	600	12.5	1,395	4,760	930	C	1	110	60	550	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS6013X1	Involute	600	12.5	1,448	4,941	1,206	C	1	208-230	60	550	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS7516S1(B)*1	Involute	750	15.9	1,655	5,647	890	A	1	220-240	50	550	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS7516X1	Involute	750	15.9	1,728	5,896	1,110	C	1	208-230	60	550	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS1120S1(B)*1	Involute	1,100	20.1	2,130	7,268	1,145	A	1	220-240	50	650	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS1120S2	Algebraic	1,100	20.1	1,116	3,808	1,010	B	1	220-240	50	650	13	Brazing	44	Tochigi / Japan
	R404A	Fixed Speed	ZS1120X1	Involute	1,100	20.1	2,175	7,421	1,400	C	1	208-230	60	650	13	Brazing	44	Tochigi / Japan
	R404A	DC Inverter	ZS7798D1	Algebraic	770	9.8	570	1,945	505	B	1	220-240	25-100	550	13	Brazing	44	Tochigi / Japan
	R404A	DC Inverter	ZS1216D1	Algebraic	1,250	15.9	960	3,276	775	B	1	220-240	25-100	650	13	Brazing	44	Tochigi / Japan
	R404A	DC Inverter	ZS1520D1	Algebraic	1,500	20.1	1,260	4,299	940	B	1	220-240	25-91.7	650	13	Brazing	44	Tochigi / Japan
ZP	R290	Fixed Speed	ZP7519S1	Involute	750	19.0	1,661	5,667	830	A	1	220-240	50	400	13	Brazing	54	Tochigi / Japan
	R290	Fixed Speed	ZP1124S1	Involute	1,100	24.1	2,219	7,571	1,080	A	1	230	50	550	14	Brazing	54	Tochigi / Japan
ZD	R410A	DC Inverter	ZD125XC1	Algebraic	750	12.5	1,010	3,446	900	B	1	220-240	16.7-80	510	11	Brazing	44	Tochigi / Japan
	R410A	DC Inverter	ZD201XC1	Algebraic	1,500	20.1	1,740	5,937	1,295	B	1	220-240	16.7-80	600	11	Brazing	44	Tochigi / Japan
DS	R404A	Fixed Speed	DS1836S1	Involute	1,800	35.7	3,620	12,351	2,443	A	1	220-240	50	850	23	Brazing	44	Taiwan
	R404A	Fixed Speed	DS1529S1	Algebraic	1,500	29.1	1,500	5,118	1,190	B	1	220-240	50	850	23	Brazing	44	Taiwan
	R404A	Fixed Speed	DS1529X1	Algebraic	1,500	29.1	3,368	11,492	1,881	C	1	208-230	60	850	23	Brazing	44	Taiwan
	R404A	Fixed Speed	DS1529V1	Algebraic	1,500	29.1	1,500	5,118	1,180	B	3	380-415	50	850	23	Brazing	44	Taiwan
	R404A	Fixed Speed	DS1834S1	Algebraic	1,800	34.0	1,740	5,937	1,390	B	1	220-240	50	850	23	Brazing	44	Taiwan
	R404A	Fixed Speed	DS1834X1	Algebraic	1,800	34.0	3,850	13,136	2,199	C	1	208-230	60	850	23	Brazing	44	Taiwan
	R404A	Fixed Speed	DS1834V1	Algebraic	1,800	34.0	1,740	5,937	1,360	B	3	380-415	50	850	23	Brazing	44	Taiwan
	R404A	Fixed Speed	DS2244V1	Algebraic	2,200	44.0	2,230	7,609	1,700	B	3	380-415	50	1,150	24	Brazing	44	Taiwan
FL	R404A	Fixed Speed	FL200DL-40D7C	Involute	1,500	40.1	3,510	11,980	2,120	D	3	380-415	50	1,200	36	Rotalock	54	Shimizu / Japan
	R404A	Fixed Speed	FL300DL-56D7C	Involute	2,250	56.0	4,910	16,750	2,910	D	3	380-415	50	1,200	37	Rotalock	54	Shimizu / Japan
	R404A	Fixed Speed	FL400DL-72D7C	Involute	3,000	71.7	6,350	21,670	3,630	D	3	380-415	50	1,700	50	Rotalock	54	Shimizu / Japan
	R404A	Fixed Speed	FL500DL-90D7C	Involute	3,750	90.0	7,970	27,190	4,560	D	3	380-415	50	1,700	51	Rotalock	54	Shimizu / Japan
	R404A	AC Inverter	FL300DLV-56A3	Involute	2,200	56.0	5,900	20,130	3,900	D	3	200	25-60	1,200	37	Flange*2	20	Shimizu / Japan
	R404A	AC Inverter	FL600DLV-90A3	Involute	4,500	90.0	9,600	32,760	6,030	D	3	200	30-70	1,700	51	Flange	20	Shimizu / Japan
	R404A	AC Inverter	FL800ELV-144A(D)3	Involute	6,000	144.0	20,400	69,610	10,000	E	3	200-220, 380-415	25-75	3,000	94	Flange*2	20	Taiwan
	R404A	AC Inverter	FL1000ELV-144A(D)3	Involute	7,400	144.0	23,600	80,530	13,200	E	3	200-220, 380-415	25-75	3,000	94	Flange*2	20	Taiwan

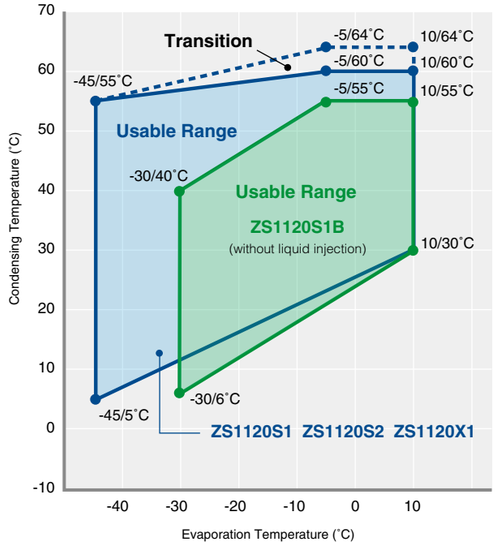
*1. ZS7516S1B, ZS1120S1B: without liquid injection *2. FL300DLV, FL800ELV, FL1000ELV discharge: Flare connection

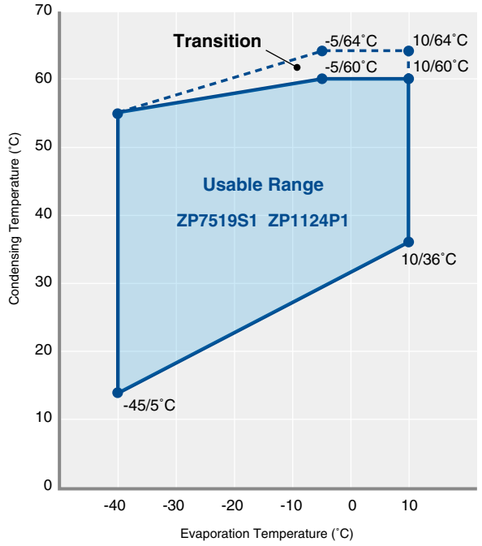
Z Series

- Rated Output: 400W~1,500W
- Low Height due to Horizontal Type.
  23% Lower Compared to Rotary Type,
  55% Lower Compared to Reciprocating Type
  (750W)
- Applications: Commercial Refrigeration,
  Show Case for Ice Cream,
  Cold Drinks and Fresh Food,
  Island Show Case.

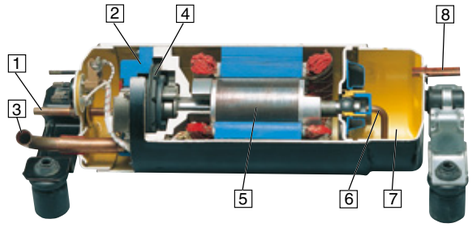
Working Range Fixed speed







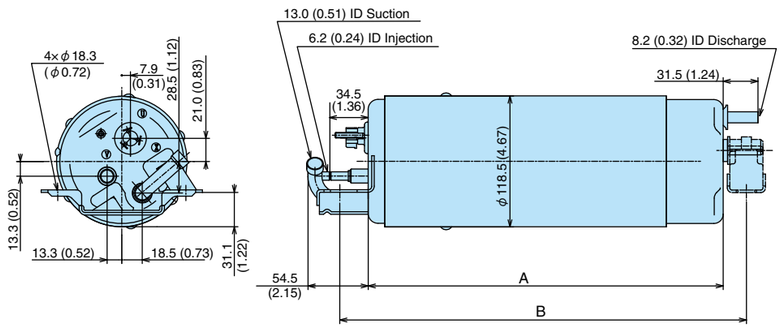
Structure



1	Liquid Injection Pipe	5	Induction Motor
2	Fixed Scroll	6	Oiling Pipe
3	Suction Pipe	7	Oil Tank
4	Orbiting Scroll	8	Discharge Pipe

Dimensions

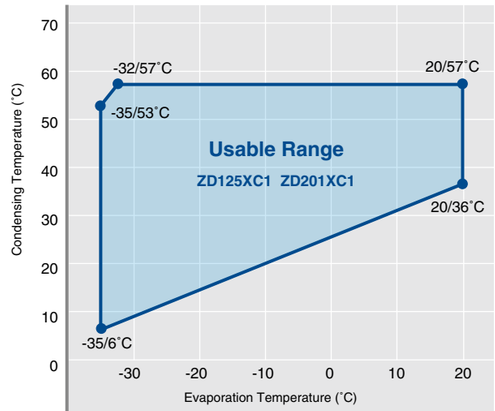
Unit:mm (inch)

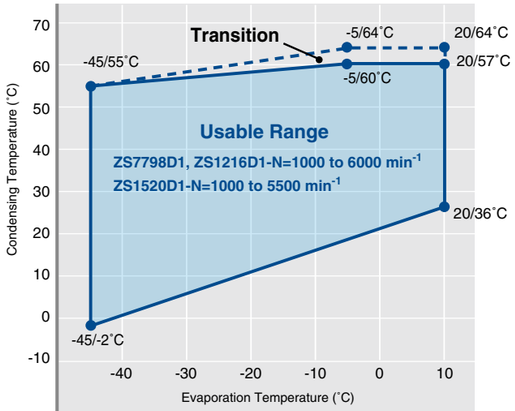


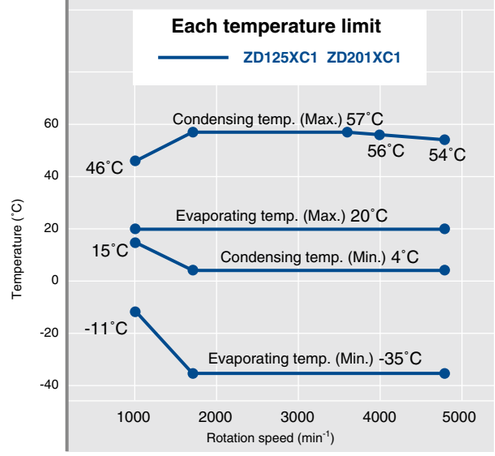
Model	A	B
ZS4084S1	311 (12.25)	357 (14.07)
ZS4084P1		
ZS6013S1		
ZS6013P1		
ZS6013X1		
ZS7516S1(B)*	316 (12.45)	362 (14.27)
ZS7516X1		
ZS1120S1(B)*	321 (12.65)	367 (14.47)
ZS1120S2		
ZS1120X1		
ZS7798D1	302 (11.90)	348 (13.70)
ZS1216D1	307 (12.09)	353 (13.90)
ZS1520D1		
ZP7519S1	298 (11.73)	344 (13.55)
ZP1124S1	322 (12.68)	368 (14.50)
ZD125XC1	302 (11.90)	348 (13.70)
ZD201XC1	307 (12.09)	353 (13.90)

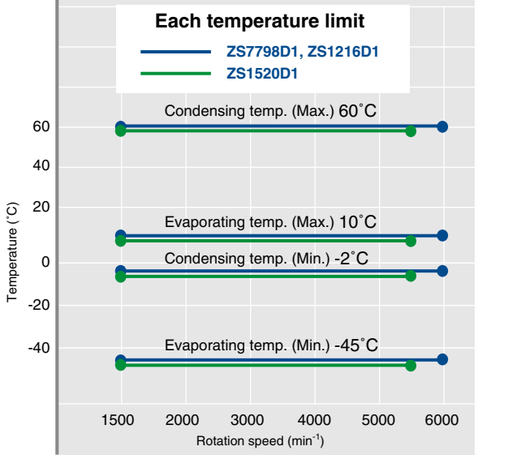
*ZS7516S1B, ZS1120S1B: without liquid injection

Working range DC inverter





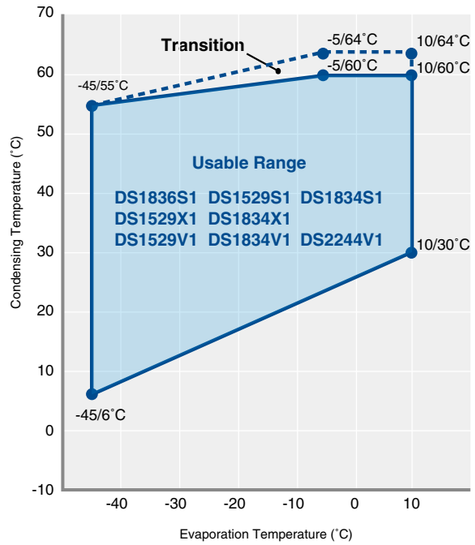




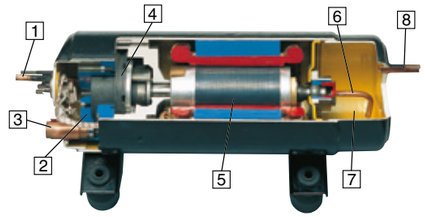
DS Series

- Rated Output: 1,500W~2,200W
- Low Height due to Horizontal Type.
  25% Lower Compared to Rotary Type,
  49% Lower Compared to Reciprocating Type (1,800W)
- Applications: Commercial Refrigeration, Show Case for Ice Cream, Cold Drinks and Fresh Food, Island Show Case.

Working Range Fixed speed



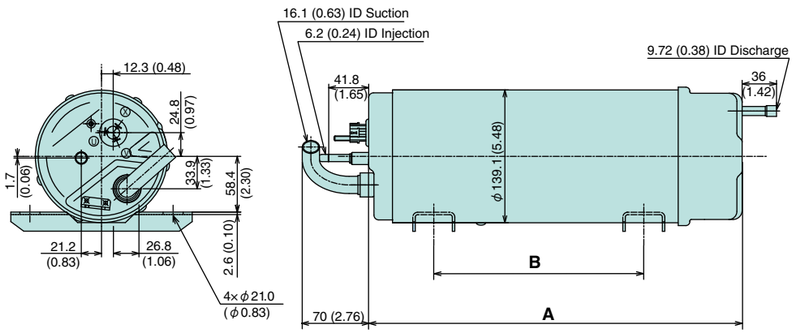
Structure



1. Liquid Injection Pipe
2. Fixed Scroll
3. Suction Pipe
4. Orbiting Scroll
5. Induction Motor
6. Oiling Pipe
7. Oil Tank
8. Discharge Pipe

Dimensions

Unit:mm (inch)

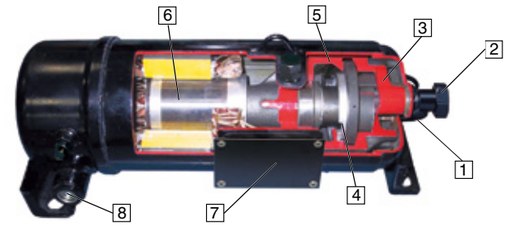


Model	A	B
DS1836S1	391 (15.39)	220 (8.66)
DS1529S1	386 (15.29)	
DS1529X1		
DS1529V1		
DS1834S1		
DS1834X1		
DS1834V1		
DS2244V1	441 (17.36)	270 (10.63)

FL Series

- Rated Output: 1,500~7,400W
- Low Height due to Horizontal Type.
- Response to IP54 Rating
- Rotalock/Frange Connection
- Overall Show Case, Especially Suitable for Self-contained Show Case

Structure

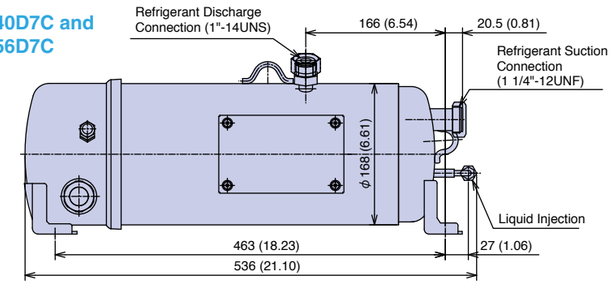


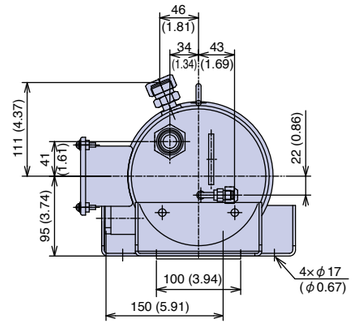
1. Liquid Injection Pipe
2. Suction Connection
3. Fixed Scroll
4. Orbiting Scroll
5. Discharge Connection
6. Induction Motor
7. Terminal Box
8. Sight Glass

Dimensions

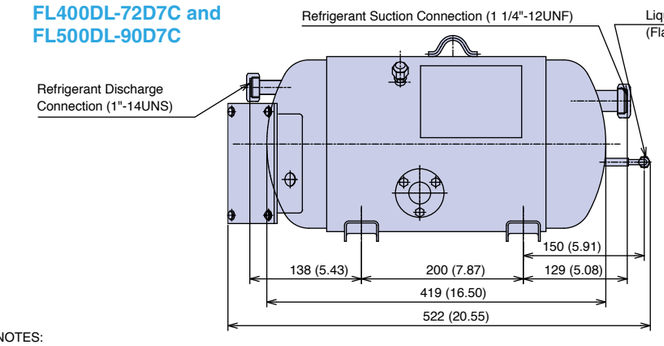
Unit:mm (inch)

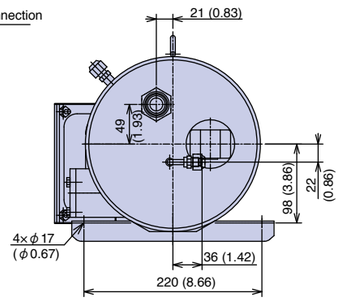
FL200DL-40D7C and FL300DL-56D7C





FL400DL-72D7C and FL500DL-90D7C



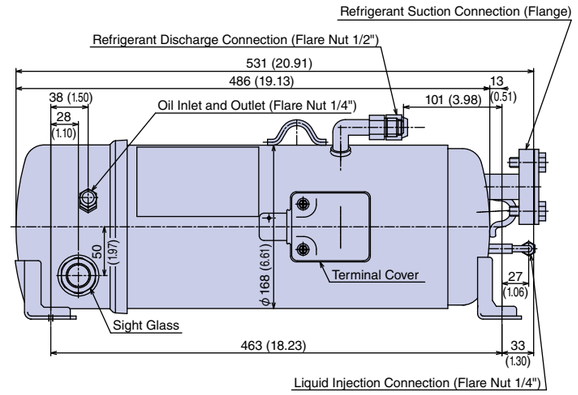


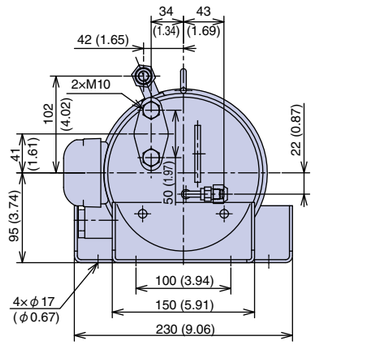
NOTES:
1.The aforementioned piping connection sizes show the piping size to be connected on suction and discharge of the compressors by rotalock.
2.These compressors should be installed indoors or a location equivalent to an indoor environment.

Dimensions

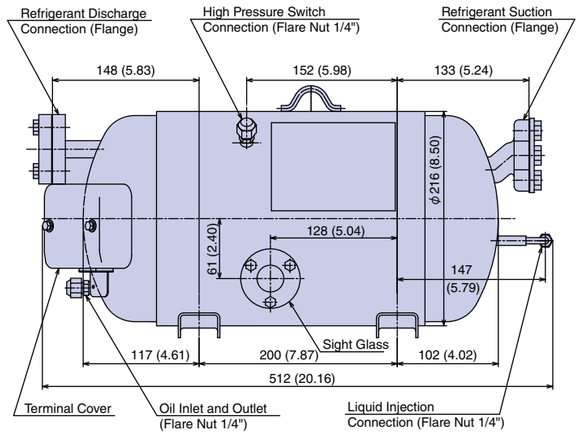
Unit:mm (inch)

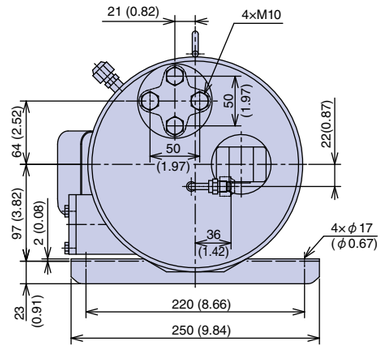
FL300DLV-56A3



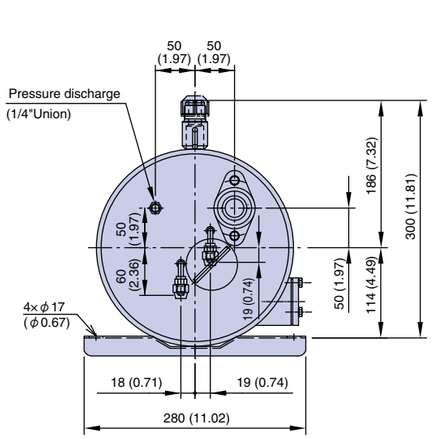


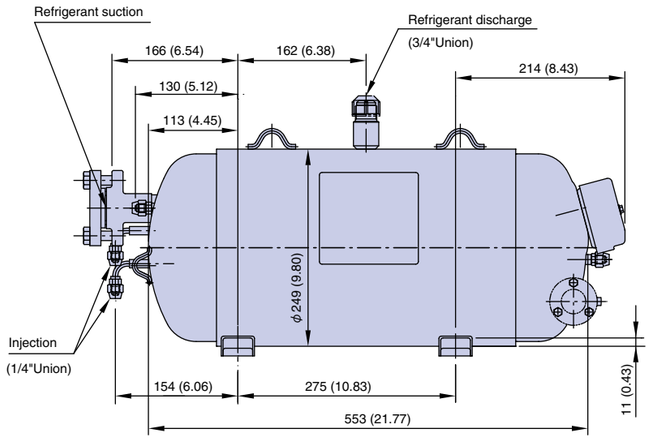
FL600DLV-90A3



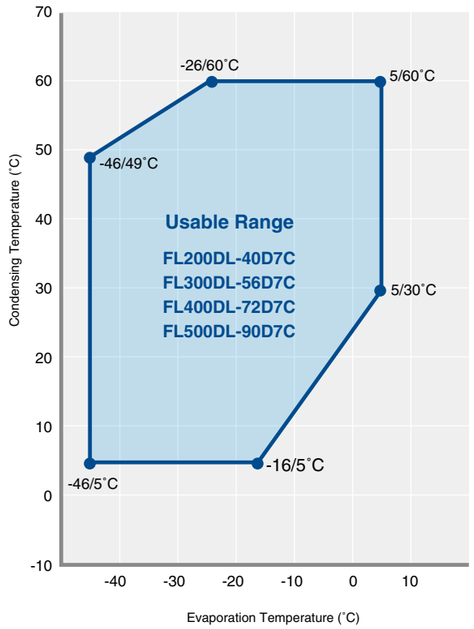


FL800ELV-144A (D) 3 and FL1000ELV-144A (D) 3

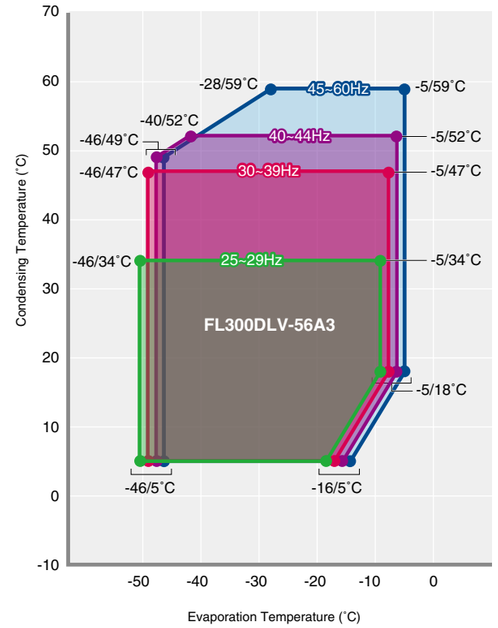


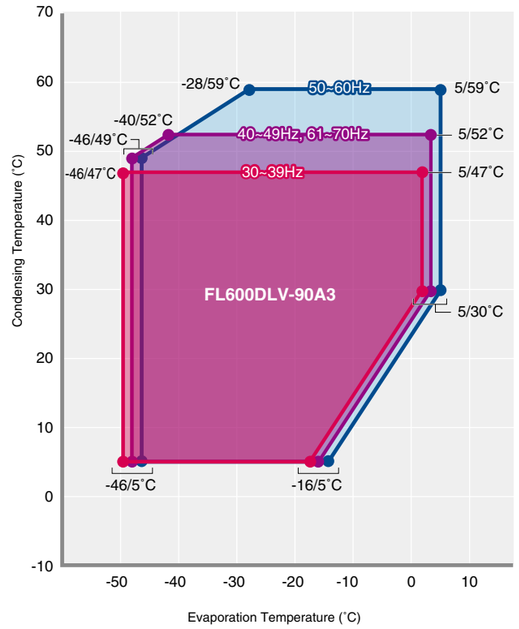


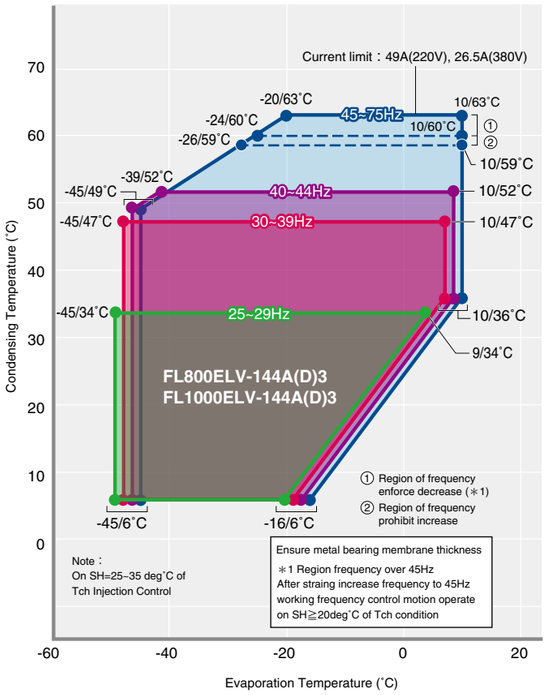
Working Range Fixed speed



Working Range AC inverter







Model Nomenclature

Z & DS Series

Type A

Z	S	7	5	1	6	S	1
1	2	3		4		5	6

	Mark	Series (Appearance Classification)
1	Z	Horizontal Type (Stator core O/D ϕ112mm)
	D	Horizontal Type (Stator core O/D ϕ132mm)

	Mark	Refrigerant	Application
2	S	R404A	Refrigeration
	P	R290	Refrigeration

	Mark	Rated Output	Mark	Rated Output
3	40	400W (0.5HP)	12	1,250W (1.7HP)
	60	600W (0.75HP)	15	1,500W (2.0HP)
	75	750W (1.0HP)	18	1,800W (2.5HP)
	77	770W (1.0HP)	22	2,200W (3.0HP)
	11	1,100W (1.5HP)		

	Mark	Displacement
4	84	8.4cm³/ revolution
	98	9.8cm³/ revolution
	13	12.5cm³/ revolution
	16	15.9cm³/ revolution
	20	20.1cm³/ revolution
	29	29.1cm³/ revolution
	34	34.0cm³/ revolution
	36	35.7cm³/ revolution
	44	44.0cm³/ revolution

	Mark	Power Source (Rated)
5	S	1phase 220-240V 50Hz
	V	1phase 380-415V 50Hz
	P	1phase 110V 60Hz
	X	1phase 208-230V 60Hz
	D	DC inv (1phase 220-240V 50/60Hz)

	Mark	History
6	1	original

Type B

Z	D	1	2	5	X	C	1
1	2	3			4	5	6

	Mark	Series (Appearance Classification)
1	Z	Horizontal Type (Stator core O/D ϕ112mm)
	D	Horizontal Type (Stator core O/D ϕ132mm)

	Mark	Refrigerant	Application
2	D	R410A	Refrigeration

	Mark	Displacement
3	125	12.5cm³/ revolution
	201	20.1cm³/ revolution

	Mark	Motor Version
4	X	X

	Mark	Development year
5	C	Oct/ 2012 -Sep/ 2013
	D	Oct/ 2013 -Sep/ 2014

	Mark	History
6	1	original

FL Series

Type A

F	L	50	0	D	L	V	–	90	D	7	C
1	2	3	4	5	6	7		8	9	10	11

	Mark	Refrigerant
1	F	R404A

	Mark	Application
2	L	Refrigeration (Low temp.)

	Mark	Nominal Horse Power	Mark	Nominal Horse Power
3	20	2.0	60	6.0
	30	3.0	80	8.0
	40	4.0	100	10.0
	50	5.0		

	Mark	History
4	0	original

	Mark	Series (Chamber Casing Size)
5	D	D series (Inner Diameter: ϕ160)
	E	E series (Inner Diameter: ϕ235)

	Mark	Apparance Classification
6	L	Horizontal Type

	Mark	Motor Version
7	V	AC Inverter

	Mark	Displacement
8	40	40.1cm³/ revolution
	56	56.0cm³/ revolution
	72	71.7cm³/ revolution
	90	90.0cm³/ revolution
	144	144.0cm³/ revolution

	Mark	Power Source (Rated)
9	A	3phase 200, 200-220V 50/60Hz
	D	3phase 380-415V 50, 50/60Hz

	Mark	Other Specification
10	3	Main Connection: Flange Terminal Box: IP20
	7	Main Connection: Rotalock Terminal Box: IP54

	Mark	Additional Specification
11	C	CE

Johnson Controls-Hitachi Air Conditioning

http://www.jci-hitachi.com

Printed in Japan (H) **HR-E614Q** Oct. 2015