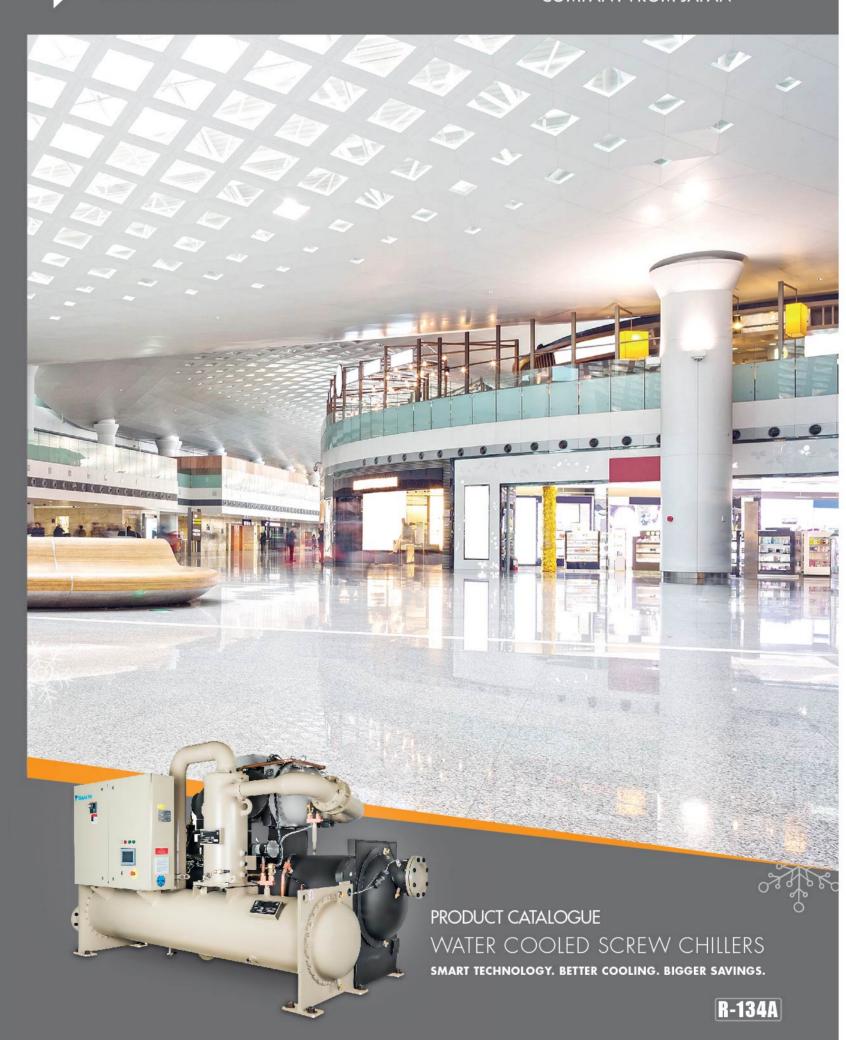
DAIKIN

WORLD'S LEADING AIR CONDITIONING COMPANY FROM JAPAN



DAIKIN AIRCONDITIONING INDIA PVT. LTD.

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5592H_Daikin Chillers Catalogue_8.25 x 11.75 inch

Contents

About Daikin	1-3
Daikin India At A Glance	4
Engine of Growth	5
Chillers Milestone	6
About Chiller	7-9
PFS - B/C Series	10-12
PFS - FF Series	13-15
PFS - VFD Series	16-18
PFS - DX Series	19-21

About Daikin

Daikin is a Leading innovator and provider of advanced, high-quality airconditioning solutions for residential, commercial and industrial applications.

As World's Leading Airconditioning Company, Daikin is committed to delivering airconditioning solutions that enhance the quality of life all around the world.

A diverse multinational company, Daikin Industries Ltd. active in airconditioning, chemicals and oil hydraulics, was established in 1924. With headquarters at Osaka, Japan, the Daikin family has more than 51,000 members, working across 60 production base units and 208 consolidated subsidiaries worldwide.

As the world's sole manufacturer that develops a long line of products from refrigerants to air conditioners, Daikin advocates comfortable living on the strength of advanced technologies.

Daikin is present in USA, Europe and Russia, Middle East, Africa, Asia, Oceania and Middle-South America. We aim to serve our customers in each of these markets by providing optimal airconditioning products.





Worldwide Presence





Daikin Industries

Czech Republic

Daikin Chemical

DE LACE TO











US \$300mn Investment in Advanced R&D centre

Daikin India At A Glance

Daikin Airconditioning India Pvt. Ltd., a subsidiary of Daikin Industries Ltd., Japan is one of the leading global manufacturers of both Residential and Commercial airconditioning systems. Backed by the superior technology, the organisation offers a wide range of energy efficient airconditioning solutions to the Indian customers.

After introducing our superior airconditioning solutions in India in the year 2000, we gained the trust of our valuable customers with our innovative range of products and dedication towards quality. An ISO 14001 certified company, we remain committed to keep customers at the core of everything we do. Imbued with a 'Quality First' global philosophy, we at Daikin walk on to realise our dream for a better world.

"Quality First" is clearly reflected in the value delivered such as low noise level, low power consumption, cooling efficiency, ease of installation, high reliability – all targeted to improve the quality of life.

Daikin India's manufacturing plant at Neemrana, Rajasthan aims at creating products that will make people's lives more comfortable.

It is supported by a network of production bases throughout the world and showcases the application of advanced technology and equipment. Our comprehensive quality control system features centrally computerised management of quality and production data to facilitate timely production that bears the stamp of excellent quality.

Daikin Neemrana facility incorporates Daikin's global Environmental Management System (EMS) that has been implemented in the factory to promote adapting procedures for refrigerant handling, resource conservation and waste management.

2002

Daikin introduces VRV technology in India

2007

Daikin India relocates HQ to Gurugram and commences business of McQuay chillers in India

2009

Production commences at manufacturing plant in Neemrana, Rajasthan

2012

Production of High Wall Split air conditioners with R-32 refrigerant commences

2017

Second production facility opens at Neemrana, Rajasthan

2000

Daikin enters the Indian market in a JV with Usha Shriram Group at 80:20 stakes respectively as Daikin Shriram Airconditioning

2004

Daikin India becomes a wholly owned subsidiary of Daikin Industries Ltd., Japan

: 2008

Groundbreaking ceremony of Daikin India's manufacturing base at Neemrana, Rajasthan

2010

Fresh round of ₹ 250 crore investment.

Thus taking it to a total of ₹ 743 crore

2013

Fresh round of ₹ 330 crore investment

Prepared for level-next: ENGINE OF GROWTH

Manufacturing Plant

Daikin's manufacturing plant at Neemrana, Rajasthan, aims to create products that will add comfort to the lives of people. It is supported by a network of production bases throughout the world and showcases the application of advanced technology and equipment. Our comprehensive quality control system features centrally computerised management of quality and production data to facilitate high-quality production within scheduled time.



Investments*
10,299





5,088 sq mtr Investments*
1,000
mn

RESEARCH & DEVELOPMENT FACILITY

Lab facilities

- Two Psychrometric lab of 3 TR and one Lab of 5 TR
- One multi-chamber lab of 25 TR capacity
- One Full Anechoic chamber for running sound test
- 10 HP* Product Reliability test lab, CFM test lab and one
 11 TR Psychrometric lab

Test facilities

- Cyclic Corrosion test
- Salt Spray test
- Thermal Shock test*

Vibration test*

Environmental test* Drop test*

Other facilities

- Concept room
- Mock-up area
- Device test room (electronic parts test room)





Chillers Milestone

2006

Acquisition of OYLM, McQauy, JE Hall & AAF brands by Daikin Industries Limited and targeting no. 1 position in the Global HVAC Market

2008

Groundbreaking ceremony of Daikin India's manufacturing plant at Neemrana, Rajasthan

.....2010.....

AHRI, ISO 9001 & ASME certification

2013

Becomes market leader in water cooled screw chiller segment

2015

Sold more than 2000 chillers since 2007 with over 5,00,000 TR operating in the field

2017

Started manufacturing of oil free magnetic bearing centrifugal chillers from neemrana

2007

Daikin commences chiller business in India

2009

Water cooled screw production commences at the manufacturing plant in Neemrana, Rajasthan

2012

Sold more than 1000 chillers since the commencement of chiller business with more than 3,00,000 TR operating in the field

2014

Started manufacturing of centrifugal chillers in Neemrana, Rajasthan

2016

Started state-of-the-art R&D centre at Neemrana, Rajasthan

About Chillers

A chiller is a machine that removes heat from a liquid via a vapour-compression cycle. This liquid can then be circulated through a heat exchanger to a cool equipment, or another process stream (such as air or process water). As a necessary by product, refrigeration creates waste heat that must be exhausted to ambience, or for greater efficiency, recovered for heating purposes.

Chilled water is used to cool and dehumidify air in mid to large size commercial, industrial, and institutional facilities. Water chillers can be water-cooled, air-cooled, or evaporative cooled. Water-cooled systems can provide efficiency and environmental impact advantages over air-cooled systems.



Why Daikin

- · Combination of Daikin's philosophy of Quality and Advanced Screw Technology
- Latest state-of-art "Single Screw" technology
- Most modern manufacturing facility with advanced machinery
- AHRI Certification for the chillers and AHRI approved test stand
- ASME certification for vessels (optional)
- VFD starter (optional) for a single compressor model
- Short lead times
- Customer oriented service & spare parts support over life of machine
- Service backup by factory trained engineers with intricate knowledge of equipment
- New technology retrofits & service upgrades
- Proprietary Chiller Controller Software
- Factory Back-Up at short notice







Chiller Features

Single Screw Compressor

Design philosophy provides great advantages in performances and reliability. Single screw compressor has a balanced compression mechanism which eliminates the screw rotor load in both the radial and axial directions, and results in bearing life 3-4 times greater than twin screw compressor. At the same time, noise and vibrations are the lowest in the market. Oil injection is used to improve COP at high condensing pressure.



Environment Friendly R134a Refrigerant

- Zero Ozone Depleting Potential
- No phase out time according to Montreal Protocol



High Efficiency, More Energy Saving

- Stepless capacity control for the precise chilled temperature of water
- PFS is equipped with advanced electronic expansion valve
- Excellent part load performance (IPLV / NPLV) ensures higher efficiency at variable loads, thus running the chiller at energy saving condition all the time
- Majority of cooling systems operate on 60% or less of design load for most of the time. For that reason, PFS chillers is
 designed to obtain excellent part load performance

Lower Noise

The single screw compressor is designed with twin rotors that allows a constant gas flow. Casted with steeled 6 teeth main screw and 11 teeth star rotor in "silver shield" composite material avoids metal-to-metal contact while maintaining zero gap. This helps in achieving higher efficiency and at the same time keeping the lower noise.

Electronic Expansion Valve

The Electronic Expansion Valve (EEV) operates with a much more sophisticated design. EEVs control the flow of refrigerant entering a evaporator. They do this in response to signals sent to them by an electronic controller. A small motor is used to open and close the valve port. The motor is called a step or stepper motor. Step motors do not rotate continuously. They are controlled by an electronic controller and rotate a fraction of a revolution for each signal sent to them by the electronic controller. The step motor is driven by a gear train, which positions a pin in a port in which refrigerant flows. Step motors can run at 200 steps per second and can return to their exact position very quickly.

Long Lifetime

Controller has a lead-lag function for compressors.

Built-in-clock will calculate individual compressor's operation time. Based on the timer statistic data, controller can automatically select start-up compressor, which runs for a longer time when just one compressor performance is needed for dual compressor system.

For most airconditioning systems, 97% of the operation time chillers run under part load, dual compressor water cooled chiller just needs one compressor running at 60% part load condition. By adopting "lead-lag", life of each compressor can be extended resulting in longer chiller life.

Control Features

PFS series chillers utilizes colourful touch screen with user friendly design for convenient operation and maintenance. Operators can view all running status and parameters, change set points and clear alarms, as well as maintain data logging on PC.

Following indicator lights and switches are equipped on the control panel:

- Emergency stop switch
- Unit/ Compressor switch (compressor switch only on 2 compressor model)
- Power / running / alarm indicator lights
- Compressor running lights



Control Display, Alarm and Protection Function

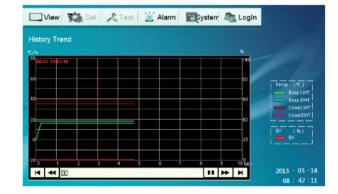
Display:

- Leaving chilled water set temperature
- Entering / Leaving chilled water temperature
- Entering / Leaving Cooling water temperature
- Compressor suction / discharge pressure
- Compressor total operating time and % load
 Alarm information
- Compressor discharge temperature / superheat
- Compressor oil supply pressure
- Condensing / evaporating temperature
- History trends



Alarm and protection function:

- Refrigerant high / low pressure
- Phase monitor phase unbalance / failure / fault
- Chilled water freezing
- Motor overheat
- Abnormal start of compressor
- · Oil level, oil differential pressure
- Low / high voltage protection



PFS Control System Function As Below

- RS485 building communication to communicate directly with 3rd party control system via public protocol. It can then realize quick and precise data transfer
- Pre-calibration and pre-alarm protection to avoid sudden shut off result from sharply unload / load
- Built in Time Clock, 7 working days automatically startup / stop setting. It can then achieve annual non-human-operation function

9





Water Cooled Screw Chillers PFS - B/C

General Features

- Cooling capacity 100 to 510 TR
- COP upto 6.0 at full load
- HFC 134a refrigerant
- 1 or 2 Semi Hermetic Single screw compressors
- Flooded evaporator
- Highest COP values at part load conditions
- Infinity variable capacity control
- Servo controlled modeling liquid level regulators





High Efficiency Heat Exchangers

Internally rifled copper tube with multiple start helix

- Internal rifling increases the heat transer areas to a large
- Internal rifling also increases the turbulence thus increasing the heat transfer coefficient
- Both these effects translate into lower approaches and lower pwer consumption

Single Screw Compressor Technology

Design philosophy provides great advantages in performances and reliability. Single screw compressor has a balanced compression mechanism which eliminates the screw rotor load in both the radial and axial directions, and results in bearing life 3-4 times greater than twin screw compressor. At the same time, noise and vibrations are the lowest in the market. Oil injection is used to improve COP at high condensing pressure.

Liquid Injection Design

- Mono screw compressors use mixture of Oil + Liquid refrigerant for cooling, lubricating and sealing
- Subcooled liquid refrigerant better than oil for cooling the
- Oil helps in better lubrication between the screw rotor and the gaterotors
- Mixture of oil + refrigerant



STANDARD COP

M	lodel		1001	1201	1401	1601	1801	2001	2301	2551	3051
Cooling Capacity		TR	100	120	140	160	180	200	230	255	305
Compressor	Туре	-	Semi-Hermetic Single Screw Compressor								
Length	mm	i -	3340	3340	3340	3340	3468	3468	3468	3470	3470
Width	mm	~ <u></u>	1485	1485	1485	1485	1676	1676	1676	1780	1780
Height	mm	-	1956	1956	1956	1956	2185	2185	2185	2337	2337
\\/-:L\	Shipping	Kg	3136	3172	3284	3319	4712	4787	4816	5442	5520
Weight	Operating	Kg	3390	3442	3572	3615	5135	5210	5255	5972	6070

HIGH COP & IPLV

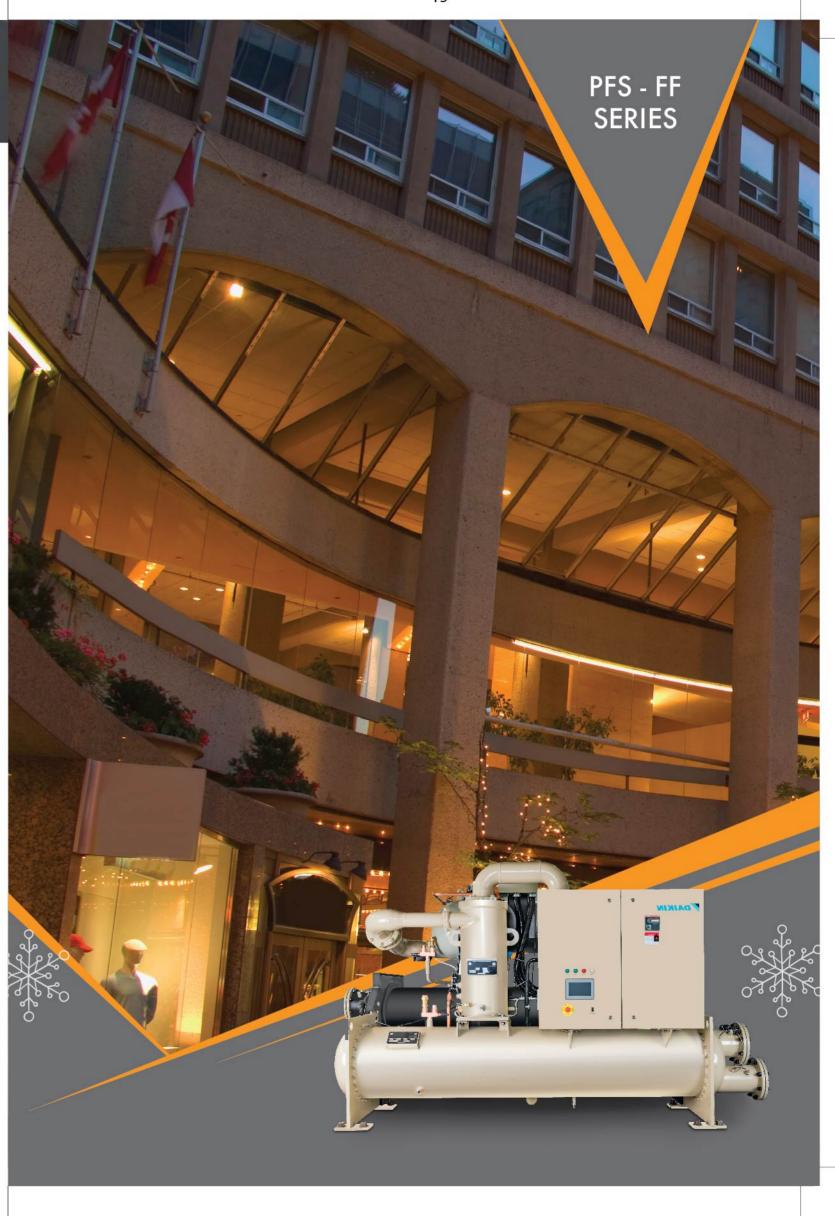
8	Model		1101B	1351B	1501B	1701B	1901B	2151B	2451B	2701B	3301B	
Cooling Capacity	600	TR	110	135	150	170	190	215	245	270	330	
Compressor	Туре	_	Semi-Hermetic Single Screw Compressor									
Length	mm	-	3340	3340	3340	3340	3468	3468	3468	3770	3770	
Width	mm	-	1485	1485	1485	1485	1676	1676	1676	1780	1780	
Height	mm	2	1956	1956	1956	1956	2185	2185	2185	2337	2337	
\A/-:- -	Shipping	Kg	3298	3347	3484	3522	5030	5078	5117	5876	5963	
Weight	Operating	Kg	3552	3617	3772	3818	5453	5501	5556	6406	6513	

٨	1 odel		1101C	1351C	1501C	1701C	1901C	2151C	2451C	2701C	3301C
Cooling Capacity		TR	110	135	150	170	190	215	245	270	330
Compressor	Туре	-	Semi-Hermetic Single Screw Compressor								
Length	mm	-	3340	3340	3340	3340	3468	3468	3468	3770	3770
Width	mm	-	1485	1485	1485	1485	1676	1676	1676	1780	1780
Height	mm	-	1956	1956	1956	1956	2185	2185	2185	2337	2337
\\/-:-L+	Shipping	Kg	3298	3347	3484	3522	5030	5078	5117	5876	5963
Weight	Operating	Kg	3552	3617	3772	3818	5453	5501	5556	6406	6513

MULTI COMPRESSOR

M	odel		2652	2802	3002	3252	3502	3802	4052	4302	4602	4902
Cooling Capacity		TR	265	280	300	325	350	380	405	430	460	490
Compressor	Туре	-	Semi-Hermetic Single Screw Compressor x 2									
Length	mm	-	3468	3770	3770	3770	3770	3770	4314	4314	4314	4314
Width	mm	1 to -	1676	1676	1676	1676	1676	1676	1908	1908	1908	1908
Height	mm	-	2235	2235	2235	2235	2235	2235	2152	2152	2152	2152
Weight	Shipping	Kg	5462	5732	5769	5793	5848	8578	8613	8747	8747	8880
vveigni	Operating	Kg	5914	6209	6260	6293	6360	9242	9277	9411	9411	9583

- Nominal cooling capacity is based on AHRI conditions 6.7°C leaving evaporator water temperature; 29.4°C entering condenser water temperature.
 Within the scope of AHRI certification program, ratings are certified in accordance with AHRI 550/590. All other ratings are in accordance with AHRI 550/590.
- 3. Power supply: 415V/3Ph/50Hz, Voltage tolerance: ±10%.
- 5. The dimensions given are approximate values and shall change with configuration. For exact details please contact Daikin sales representative.



Chiller Features

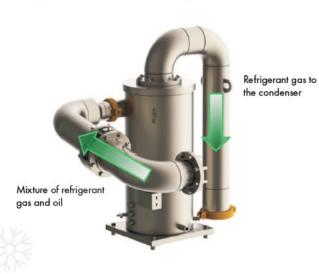
PFS falling film chillers are Daikin's most efficient water cooled screw chiller. The design includes the latest technology such as falling film evaporator and cyclone oil separator. It is more efficient, more stable, and more dependable.



Cyclone Oil Separator

The cyclone oil separator is vertical type. Daikin adopted this new technology design to reduce the internal resistance loss of oil separator, to guarantee the pressure for improving the efficiency.

Meanwhile, cyclone oil separator also reduces oil charge by more than 45%. And it can fully separate the refrigerant and oil. Its effect is as high as 99.7% compared to the traditional oil separator.



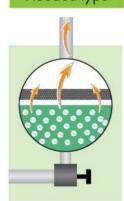
Falling Film Evaporator

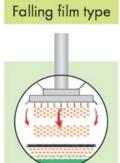
The evaporator is a shell and tube, falling film type heat exchanger. It contains a patented 3 stage distributor, mixed tube design and falling film technology to optimize efficiency, minimize refrigerant charge, and maintain reliable control.

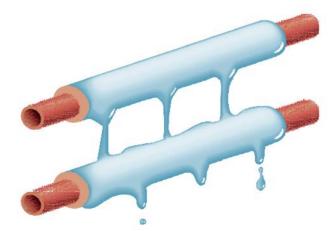
The 3 stage distributor is specifically designed distribution system, provides uniform refrigerant flow for optimum performance.

Falling film evaporator gives the customer maximum efficiency and reduced refrigerant charge compared to previous flooded evaporator designs, with up to a 20% improvement in real world efficiency versus current product.

Flooded type







The flow process of refrigerant in the evaporation duct

٨	Model		AX1	AX2	BX1	BX2	схі	CX2	DX1	
Cooling Capacity		TR	175	185	190	210	220	240	250	
Compressor	Туре	-	Semi-Hermetic Single Screw Compressor							
Length	mm	-	2910	3520	2910	3520	2910	3520	3448	
Width	mm	-	1658	1660	1658	1660	1658	1660	1745	
Height	mm	-	2050	2050	2050	2050	2050	2050	2346	
\\/L\	Shipping	Kg	3758	4128	3797	4213	3836	4306	5024	
Weight	Operating	Kg	4181	4551	4220	4636	4259	4745	5554	

,	Model		DX2	DX3	EX1	EX2	EX3	FX1	FX2	FX3	
Cooling Capacity		TR	270	275	280	300	305	295	320	325	
Compressor	Туре	-		Semi-Hermetic Single Screw Compressor							
Length	mm	-	3592	3863	3448	3592	3863	3448	3592	3863	
Width	mm	-	1745	1885	1745	1745	1885	1745	1745	1885	
Height	mm	-	2346	2393	2346	2346	2393	2346	2346	2393	
W - 1.	Shipping	Kg	5117	5601	5050	5206	6084	5075	5253	6143	
Weight	Operating	Kg	5647	6131	5580	5736	6671	5605	5840	6730	

۸	Nodel		GX1	GX2	HX1	HX2	нхз
Cooling Capacity		TR	330	355	345	370	380
Compressor	Туре	-		Semi-He	rmetic Single Screw Con	pressor	
Length	mm		3444	4432	3444	3602	4432
Width	mm	-	1745	1785	1745	1745	1785
Height	mm	-	2420	2420	2420	2420	2420
\\/-:-L+	Shipping	Kg	6522	7633	6522	6703	8011
Weight	Operating	Kg	7186	8297	7186	7367	8675

٨	Model		JX1	JX2	JX3	KX1	KX2	кхз		
Cooling Capacity		TR	385	415	425	420	455	470		
Compressor	Туре	-	Semi-Hermetic Single Screw Compressor							
Length	mm	-	3444	3546	4432	3405	3546	4432		
Width	mm	-	1745	1785	1785	1785	1785	1785		
Height	mm		2420	2420	2420	2420	2420	2420		
Weight	Shipping	Kg	6547	6849	8075	6677	6937	8158		
vveigiii	Operating	Kg	7211	7513	8739	7341	7601	8822		

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- 2. Within the scope of AHRI certification program, ratings are certified in accordance with AHRI 550/590. All other ratings are in accordance with AHRI 550/590.
- 3. Power supply: 415V/3Ph/50Hz, Voltage tolerance: ±10%.
- 4. Actual minimum value of capacity control varies with operating conditions
- 5. The dimensions given are approximate values and shall change with configuration. For exact details please contact Daikin sales representative.





Introduction

A Variable Frequency Drive (VFD) is a type of motor controller that drives an electric motor by varying the frequency and voltage supplied to the electric motor. Other names for a VFD are variable speed drive, adjustable speed drive, adjustable frequency drive, AC drive, microdrive, and inverter.

Frequency (or hertz) is directly related to the motor's speed (RPMs). In other words, the faster the frequency, the faster the RPMs go. If an application does not require an electric motor to run at full speed, the VFD can be used to ramp down the frequency and voltage to meet the requirements of the electric motor's load. As the application's motor speed requirements change, the VFD can simply turn up or down the motor speed to meet the speed requirement.



Why VFD?

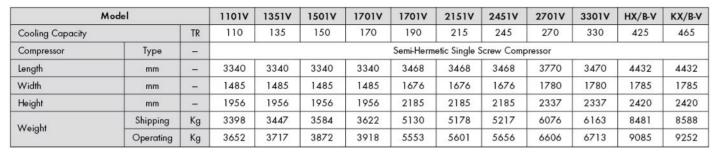
Reduce Energy Consumption and Energy Costs

If you have an application that does not need the motor to run at full speed, then you can cut down energy costs by controlling the motor with a variable frequency drive, which is one of the benefits of Variable Frequency Drives. VFDs allow you to match the speed of the motor-driven equipment to the load requirement. There is no other method of AC electric motor control that allows you to accomplish this.

Electric motor systems are responsible for more than 65% of the power consumption in industry today. Optimizing motor control systems by installing or upgrading to VFDs can reduce energy consumption in your facility by as much as 70%. Additionally, the utilization of VFDs improves product quality, and reduces production costs. Combining energy efficiency tax incentives, and utility rebates, returns on investment for VFD installations can be as little as 6 months.

Extend Equipment Life and Reduce Maintenance

Your equipment will last longer and will have less downtime due to maintenance when it's controlled by VFDs ensuring optimal motor application speed. Because of the VFDs optimal control of the motor's frequency and voltage, the VFD will offer better protection for your motor from issues such as electro thermal overloads, phase protection, under voltage, overvoltage, etc.. When you start a load with a VFD you will not subject the motor or driven load to the "instant shock" of across the line starting, but can start smoothly, thereby eliminating belt, gear and bearing wear. It also is an excellent way to reduce and/or eliminate water hammer since we can have smooth acceleration and deceleration cycles.



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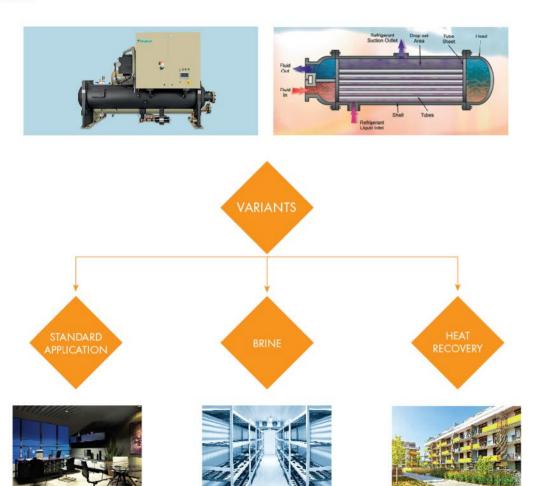


Introduction

DX evaporators are used in the vast majority of comfort air conditioning systems below 100 tons of cooling capacity. They are also used on some refrigeration and industrial process cooling equipment.

22

Daikin DX chillers comes with a number of modification to cater any and all requirements of a building and are quite efficient while at it.



Single Screw Compressor

Design philosophy provides great advantages in performances and reliability. Single screw compressor has a balanced compression mechanism which eliminates the screw rotor load in both the radial and axial directions, and results in bearing life 3-4 times greater than twin screw compressor. At the same time, noise and vibrations are the lowest in the market. Oil injection is used to improve COP at high condensing pressure.

Environment Friendly R134a Refrigerant

- Zero Ozone Depleting Potential
- No phase out time according to Montreal Protocol



Available Customization

- Marine water Box-condenser only
- Soft starter
- Energy Meter
- MODBUS Communication module
- 38mm insulation: evaporator only
- Water head orientation change

APPLI	CATION			COOLING	NG BRINE				Н	HEAT RECOVERY			
М	odel		801	1001	1201	0801Z	1001Z	1201Z	0801H	1001H	1201H		
Capacity		TR	80	100	120	45	55	70	80	100	120		
Compressor	Туре	-	Semi-Hermetic Single Screw Compressor										
Length	mm	-	2990	2990	2990	2990	2990	2990	2990	2990	2990		
Width	mm	-	775	775	775	775	775	775	814	814	814		
Height	mm	-	1990	1990	1990	1990	1990	1990	1990	1990	1990		
\A/-:-L4	Shipping	Kg	1650	1830	1930	1650	1830	1930	1650	1830	1930		
Weight	Operating	Kg	1780	2030	2120	1780	2030	2120	1780	2030	2120		

Notes:

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