

DAIKIN

ZUWV

HFC-R134a

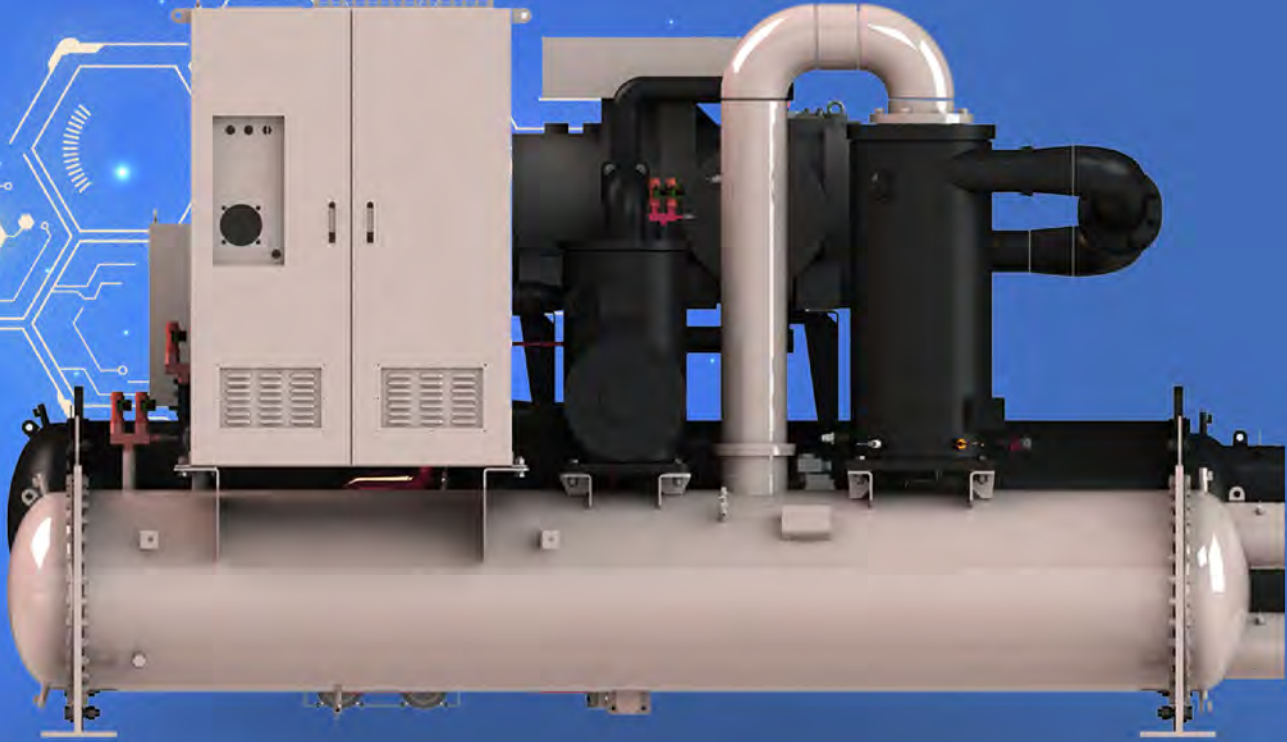
200~500RT

**HIGH
EFFICIENCY
SINGLE SCREW**

**WATER COOLED
CHILLER WITH VFD**



EFFICIENT & RELIABLE



COP up to

6.5
kW/kW

IPLV up to
10.7 kW/kW



**Chiller performance
based on
AHRI condition**

As one of the world's largest HVAC manufacturers, Daikin has earned a worldwide reputation for delivering high-quality expertise to meet various requirements from different customers.

The Water Cooled Screw Inverter Chiller, ZUWV was developed utilizing Daikin's Single Screw compressor with Zero ODP HFC-R134A refrigerant providing an efficient, reliable and sustainable chiller. Cooling capacity offers from 200RT to 500RT with the full load efficiency, COP can go up to ~6.5 kW/kW. With the VVR and Inverter Technology, the part-load efficiency of the chiller can go as high as ~10.7 at AHRI Conditions.

PREMIUM TECHNOLOGY

CHILLER COMPONENTS

COMPRESSOR

CONTROL PANEL

LIQUID LEVEL
SENSOR

VFD
STARTER

EXV

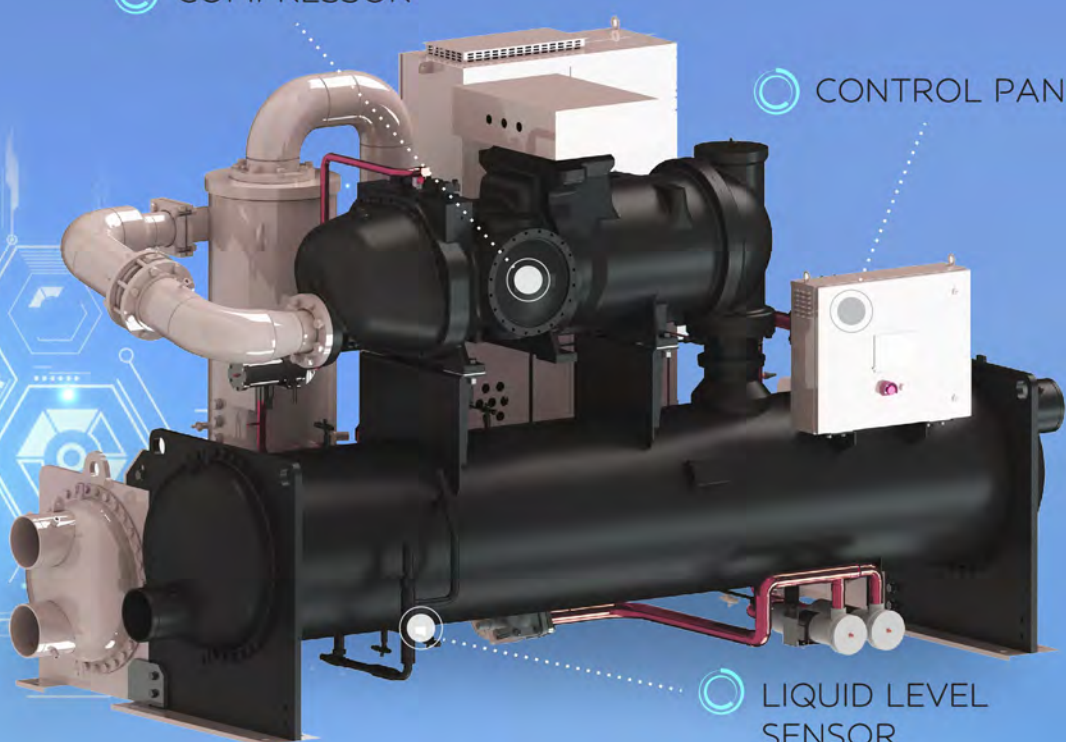
ECONOMIZER

OIL SEPARATOR

RELIEF VALVE

CONDENSER

EVAPORATOR

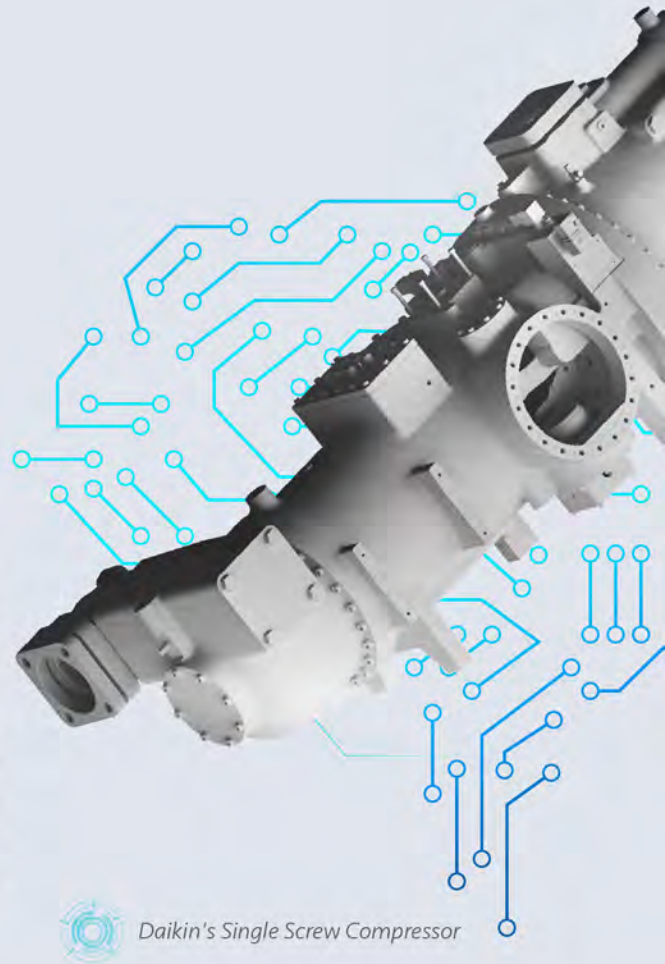


INNOVATIVE TECHNOLOGY

KEY FEATURES

1 COMPRESSOR TECHNOLOGY

The second-generation ZUWV chiller utilizes the high-efficiency single screw compressor design. It is designed with fewer moving parts and to be mechanically balanced. The motor-driven main rotor meshes perfectly with two opposing star rotors, creating a space that compresses the refrigerant, generating a compression cycle. The two opposing star rotors are freely rotating, only being moved by the main rotor. This allows the main rotor to remain well-balanced in both radial and axial directions. A well-balanced main rotor leads to much higher compressor reliability and longer compressor lifespan. Additionally, it greatly reduces the vibration level, generating little vibration and a low acoustic value.



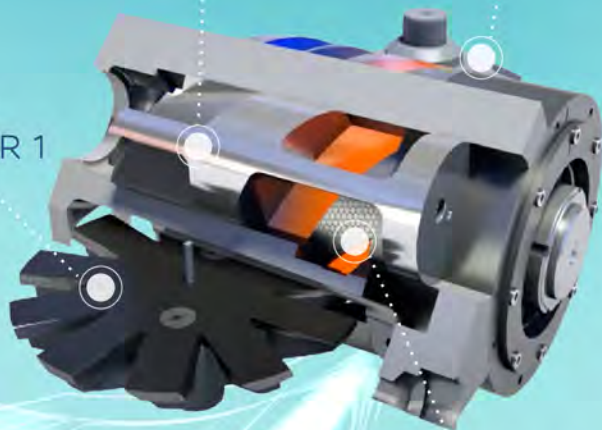
Daikin's Single Screw Compressor

2 VARIABLE VOLUME RATIO TECHNOLOGY

SLIDES VALVE

GATE ROTOR 2

GATE ROTOR 1



SINGLE MAIN SCREW

The ZUWV chiller integrates the latest distinct Variable Volume Ratio (VVR) technology to offer premium chiller efficiency, achieving superior chiller part-load efficiency in a real-world operation setting, since chillers are operating at part load most of the time. With VVR technology, the compressor can control its volumetric ratio during part-load operation to exactly meet the required pressure difference across the compressor, avoiding inefficiency caused by over-pressure or under-pressure.

VVR TECHNOLOGY



Senses the lift needed



Optimal efficiency at any condition



NO OVER COMPRESSION resulting in energy saving



Only modulates compression ratio



Inverter modulates capacity



Daikin's Single Screw Compressor Technology With VVR

3 VARIABLE FREQUENCY DRIVE

The ZUWV unit-mounted Variable Frequency Drive (VFD) provides a smooth start-up as well as intelligent optimized control during part-load operation. This is done by utilizing the VFD to modulate the motor speed in response to the required cooling load, eliminating the low-efficiency slide valves for load control. This also allows the compressor to have fewer moving parts, enhancing the compressor's overall reliability. Apart from benefiting lower load operating, VFDs can also reduce operating costs sharply during extended periods of low lift conditions, such as during nighttime or lower ambient operation. Therefore with the combination of VFD and VVR technology, the ZUWV chillers are able to deliver superior performance in most operating conditions. In addition to this, VFD can also improve the power factor of the chiller.



Daikin's unique single screw design for perfectly balanced loads combined with inverter and VVR technology

4 SMART CONTROL

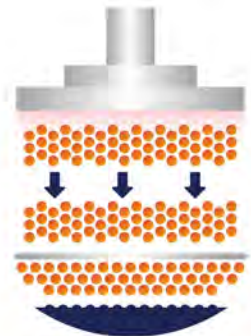
ZUWV is designed using the MicroTech as the microprocessor of choice for programmable logic controls. The MicroTech functions as the "brain" of the chiller, monitoring, controlling and protecting the chiller at all times. To minimize energy consumption over the entire operating range, the compressor will run at the minimum speed while maintaining cooling capacity and lift. Achieving this requires the microprocessor to constantly monitor the evaporator and condenser pressure. By constantly monitoring the chiller operating status and various parameters, the controller will take necessary actions to curb or prevent abnormal conditions, or even shut down the chiller if there is an alarm triggered.

The MicroTech controller also serves as the communication hub for the chiller, allowing communications between internal and external devices such as water pumps, cooling towers and valves. Moreover, it has also incorporated smart control features such as chilled water temperature reset and demand limit to optimize chiller operating efficiency in real-world conditions.



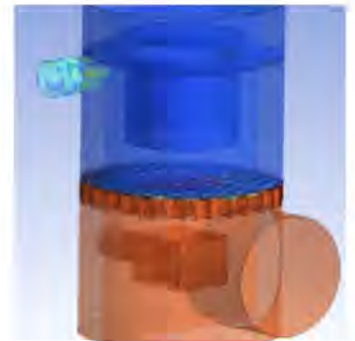
5 HEAT EXCHANGER

Besides the cutting-edge compressor technology, ZUWV has also incorporated high-performance heat exchangers to optimize the heat transfer in full measure. Unlike an ordinary screw chiller, ZUWV evaporators are designed using a patented falling film design. This choice has been widely recognized as the best choice for heat exchangers, as it reduces the refrigerant charge required, greatly reducing the cost of the chiller. All ZUWV chillers come with a 2-pass falling film evaporator as a standard configuration, allowing for great flexibility in water piping connection. Both the evaporator and condenser employ enhanced finned copper tubes to realize high efficient heat exchange.



Falling Film Evap.

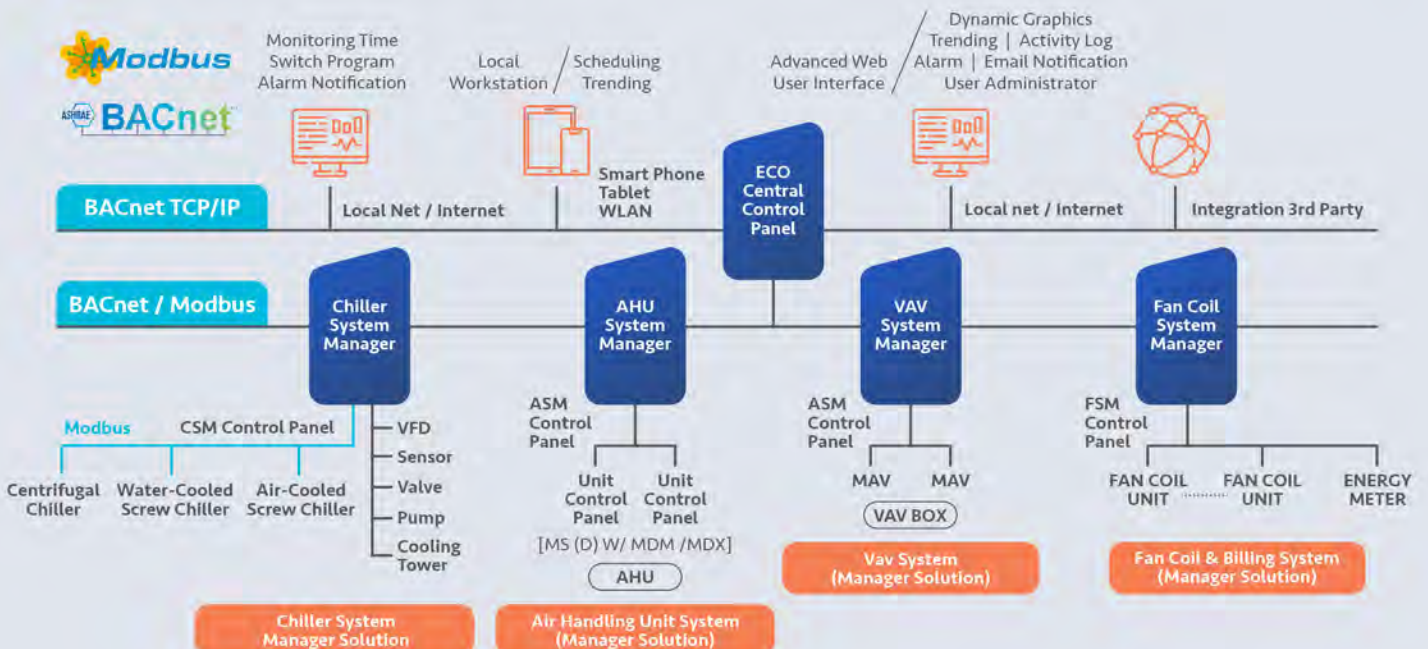
Economizer (an extra vessel) is also made standard for every ZUWV chiller. This vessel is a vertical flash tank, comprising separation baffles to separate liquid refrigerant from refrigerant gas, as well as a mechanical floating valve to control the liquid level. The economizer helps to increase the efficiency of the chiller by removing the inefficient refrigerant gas. Moreover, this allows the compressor to consume less power while maintaining the same cooling capacity. This, among others, is one of the secrets behind ZUWV's stellar performance.



Vertical Economizer

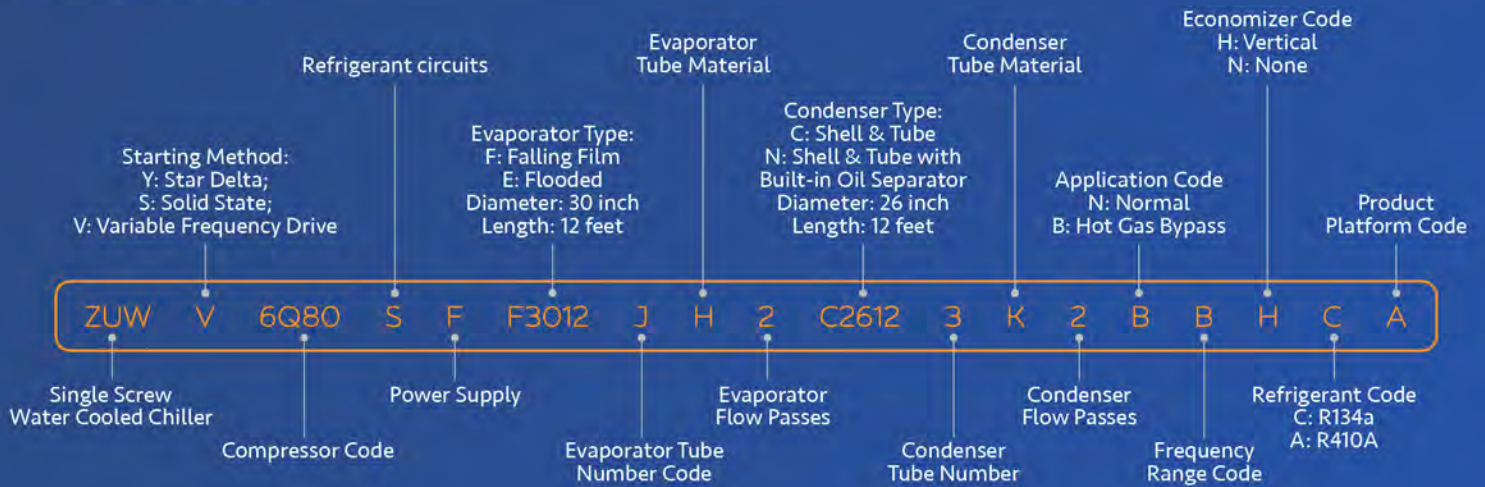
6 EASY INTEGRATION INTO BAS SYSTEM

ZUWV is capable of providing seamless data communication using common industrial protocols, such as Modbus and BACnet. This flexibly gives the customer effortless integration into BAS systems, allowing for user-friendly monitoring and controlling of the chiller.



DETAILS MATTER

NOMENCLATURE



NOTES:

Power supply: F: 380V/50Hz/3ph | G: 400V/50Hz/3ph | K: 415V/50Hz/3ph | R: 460V/60Hz/3ph | U: 380V/60Hz/3ph

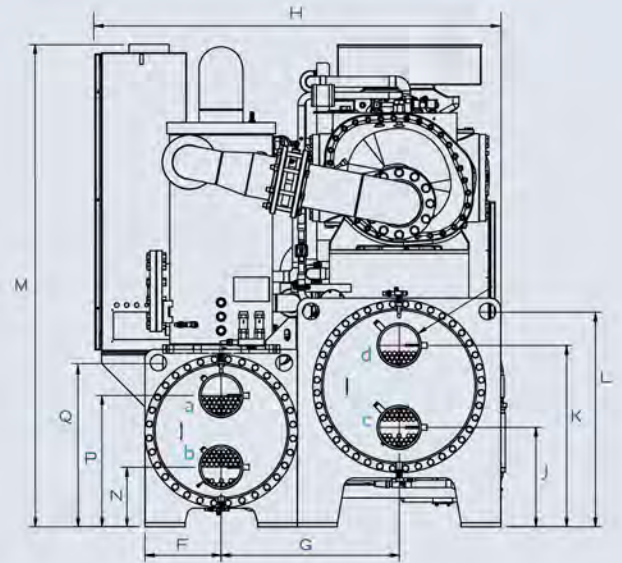
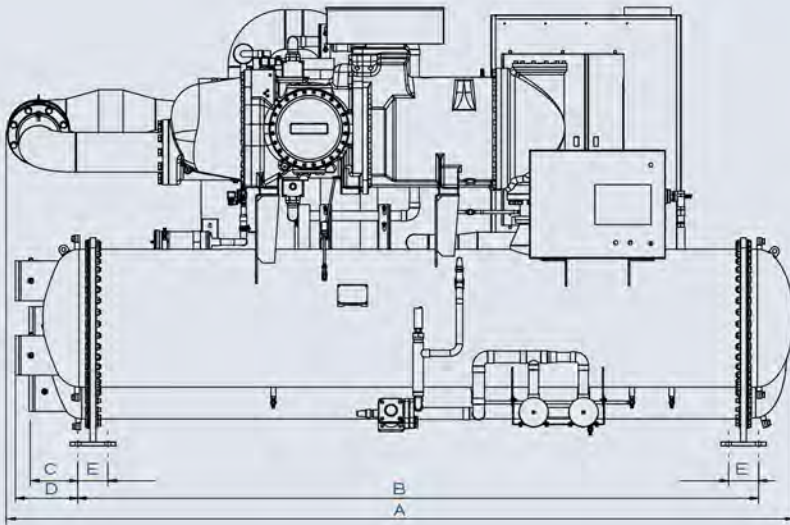
ZUWV TECHNICAL DATA

AHRI STANDARD CONDITION AT POWER SUPPLY 380~415 / 3PH / 50~60 HZ														
MODEL	NOMINAL COOLING CAPACITY		NOMINAL POWER INPUT	EFFICIENCY			RLA	EVAPORATOR		CONDENSER		SHIPPING WEIGHT	OPERATING WEIGHT	OIL CHARGE
	TR	kW		kW	COP	IPLV		A	NOMINAL WATER FLOW RATE	WATER PRESSURE DROP (MAX.)	NOMINAL WATER FLOW RATE			
	TR	kW	kW	COP	IPLV	A	L/s	kPa	L/s	kPa	kg	kg	L	
ZUWV4I2JSG/F2212-JH-2/ C2212-1K-2-BBHCA	201.1	707.3	115.5	6.122	6.122	189.1	30.45	37.1	38.10	50.4	5,084	5,592	40	
ZUWV5K8JSG/F2612-MH-2/ C2212-3K-2-BBHCA	252.4	887.9	135.9	6.535	9.970	222.0	38.23	44.7	47.39	52.8	6,620	7,282	42	
ZUWV5K8JSG/F2612-JH-2/ C2212-6K-2-BBHCA	302.8	1,065.0	166.8	6.389	10.550	270.8	45.87	32.2	57.05	46.4	6,916	7,608	45	
ZUWV5M8LSG/F2612-JH-2/ C2612-3K-2BBHCA	353.7	1,244.0	194.0	6.412	10.680	316.0	53.56	42.3	66.57	30.8	7,280	8,008	45	
ZUWV6N8MSG/F3012-KH-2/C2612-3K-2-BBHCA	403.2	1,418.0	219.4	6.460	10.080	355.7	61.03	31.8	75.78	38.3	8,564	9,421	50	
ZUWV6Q8OSG/F3012-MH-2/C2612-3K-2-BBHCA	453.5	1,595.0	247.4	6.448	10.040	403.1	68.68	55.0	85.31	46.8	8,559	9,415	60	
ZUWV6Q8OSG/F3012-JH-2/C2612-3K-2BBHCA	503.5	1,771.0	280.3	6.317	10.220	455.8	76.25	39.6	94.97	56.0	8,781	9,659	60	

NOTES:

- IPLV-IP stated in table is calculated according to AHRI 550/590 (I-P): Chilled water entering temperature 12.2°C; Chilled water leaving temperature 6.7°C; Cooling water entering temperature 29.4°C; Cooling water leaving temperature 34.6°C.
- Chiller dimension has a tolerance of ±20mm. Dimension stated not included flange thickness for waterside and lifting ring of electrical panel. Additional items such as suction stop valve, difference installation side for vessel water cover, etc. might affect chiller dimension. Please contact the manufacturer for details. Please refer chiller nameplate for the chiller actual dimension.
- Chiller starting current smaller than RLA. User shall size breaker according to RLA.
- The weight of water in heat exchanger waterside is included in the operation weight stated in the table.

DIMENSIONS



MODEL	DIMENSION (MM)						EVAPORATOR CONNECTION SIZE & LOCATIONS (MM)										
	A	B	C	D	E	H	M	G	J	K	L	OD	F	N	P	Q	OD
ZUWV412JSF/F2212-JH-2/C2212-1K-2-BBHCA	4,380	3,757	270	450	165	1,932	2,375	843	525	885	1,081	Φ219	383	325	700	808	Φ219
ZUWV5K8JSF/F2612-MH-2/C2212-3K-2-BBHCA	4,380	3,757	270	450	165	1,932	2,375	843	525	885	1,081	Φ219	383	325	700	808	Φ219
ZUWV5K8JSF/F2612-JH-2/C2212/6K-2-BBHCA	4,380	3,757	270	450	165	1,932	2,375	843	525	885	1,081	Φ219	383	325	700	808	Φ219
ZUWV5M8LSF/F2612-JH-2/C2612-3K-2-BBHCA	4,200	3,757	270	270	165	1,932	2,420	843	525	885	1,081	Φ219	383	299	659	823	Φ219
ZUWV6N8MSF/F3012-KH-2/C2612-3K-2-BBHCA	4,430	3,757	270	346	165	2,028	2,431	843	499	911	1,081	Φ219	383	299	659	823	Φ219
ZUWV6Q8OSF/F3012-MH-2/C2612-3K-2-BBHCA	4,347	3,757	270	346	165	2,028	2,431	843	499	911	1,081	Φ219	383	299	659	840	Φ219
ZUWV6Q8OSF/F3012-JH-2/C2612-3K-2-BBHCA	4,347	3,757	270	346	165	2,028	2,431	843	499	911	1,081	Φ219	383	299	659	840	Φ219

NOTES:

1. a. Condenser Outlet | b. Condenser Inlet | c. Evaporator Inlet | d. Evaporator Outlet
2. The tolerance of dimension is within 13mm.
3. The dimension of chiller include 20mm insulation for evaporator.
4. OD: The outside diameter of water connection pipe.
5. Left water cover is offered as standard. (with reference to the HMI screen)
6. Right water cover may affect the dimension. Please contact factory.

SCOPE OF SUPPLY

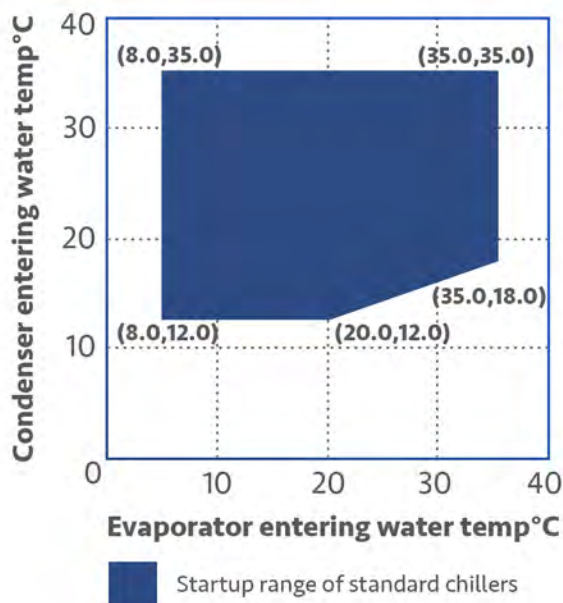
ITEMS	STANDARD	OPTIONS
Vessel Code	DOSH (Malaysia Standard)	ASME
Water Connection	Victaulic Groove	ANSI Flange
Water Box	Compact Water Cover (1.0MPa)	Marine Water Box
Insulation ¹	20mm Insulation on Evaporator & Cold Surface	40mm Insulation on Evaporator
Flow Switch ²	None	Pressure Differential, Thermal
Anti-Vibration	Rubber Cushion	Spring Isolator
Warranty Extended	None	Maximum: Extended 4 Years
Test ³	Factory Functional Test	1-4 Point Witness Test
Harmonic Distortion Filter	None	Harmonic Filter ⁴

NOTES:

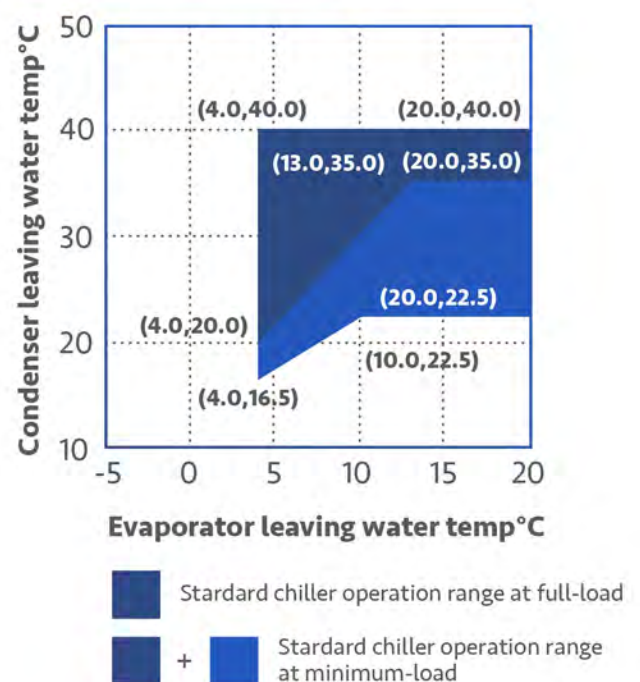
- Insulation:
 - Ambient temperature lower than 30°C:
Humidity lower than 70%, use single layer insulation (20mm); humidity equal or higher than 70% (include), use double layer insulation (40mm).
 - Ambient temperature equal or higher than 30°C (include):
Humidity lower than 65%, use single layer insulation (20mm); humidity equal or higher than 65% (include), use double layer insulation (40mm).
 - Double layer of insulation (40mm) must be used when chiller leaving water temperature lower than 5°C (include).
- Flow Switch:
If the water pressure drop is less than 20KPa, Pressure Differential switch should not be chosen. Please change to paddle type or thermal flow switch.
- Factory Testing:
To provide safe and reliable products to costumers, all Daikin chillers are factory tested before shipment. Operating and safety controls are checked for correct settings and operation. This testing helps reduce start-up issues and maintain critical construction schedules.
- Harmonic filter used is Active Filter type. For more Harmonic Filter details, please contact Daikin.

OPERATION ENVELOPE

STARTING RANGE



OPERATING RANGE



STANDARD APPLICATION

THE STANDARD RUNNING CONDITION		
SUPPLY VOLTAGE	±10%	
PHASE UNBALANCE RATE	±5%	
FREQUENCY	±2Hz	
OPERATING TEMPERATURE	3~40°C	
RELATIVE HUMIDITY	≤90%	
ATMOSPHERIC CORROSIVE GAS CONTENTS	Sulfur Dioxide	≤10mg/m ³
	Hydrogen Fluoride	≤5mg/m ³
	Hydrogen Sulfide	≤5mg/m ³
	Nitrogen Oxide	≤5mg/m ³
	Nitrogen	≤1mg/m ³
	Hydrogen Chloride	≤5mg/m ³
INSTALLATION	Indoor installation, no rain or direct sunlight (for installations of the outdoor, seaside, chemical plant, or place of high concentration of corrosive gas, please contact the local Daikin branch office and dealers)	

WATER QUALITY MANAGEMENT

During the unit running, the water quality of the cooling and chilled water will directly affect the machines performance and lifetime, so it is necessary to survey the water quality beforehand, and conduct water quality control as the unit runs.

The following table contains some parameters of the water quality of open system:

	ITEM	UNIT	REFERENCE VALUE	ITEM	
				CORROSION	SCALING
BASE ITEMS	PH (25°C)	-	6.5~8.0	○	○
	Specific (25°C)	μs/cm	<800	○	○
	Chloridion CL	Mg(CL)/L	<200	○	
	Sulfateion SO ₄ ²⁻	mgSO ₄ ²⁻ /L	<200	○	
	Acid Consumption (pH-4.8)	mg(CaCO ₃)/L	<100		○
	Full Hardness	mg(CaCO ₃)/L	<200		○
REFERENCE ITEMS	Iron Fe	mg(Fe)/L	<1.0	○	○
	Suphion S ²⁻	mg(S ²⁻)/L	Not Detected	○	
	Ammoniumion NH ⁺	mg(NH ⁺)/L	<1.0	○	
	Silicon Oxide SiO ₂	mg(SiO ₂)/L	<50.0		○

NOTES:

1. For water quality index, refer to Appendix D Cooling Water Quality of Water Chiller (Heat Pump) with Vapor Compression Cycle of GB/T18430.1
2. The "○" in the table indicates the relevant factors with corrosion or scaling.
3. If the water quality does not reach the requirements in the above table, refer to Code for Design of Industrial Recirculating Cooling (Water Treatment GB50050).



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