



**ZUW.C-B** Refrigerant: R134a  
ZUW.C-B 100-540Tons  
**Water Cooled Single-Screw Chillers**  
Power supply: 380V/400V/415V/3P/50Hz



**R-134a**



ISO9001:2008  
ISO14001:2004  
OHSAS18001:1999



CNAB002-Q  
CNAB002-E



Product Safety  
Certification



AHRI CERTIFIED®  
Water-Cooled Water Chilling and  
Cooling Units (Manufacturing Standard  
ANSI Standard 115.15-2013 and 115.15-2011)



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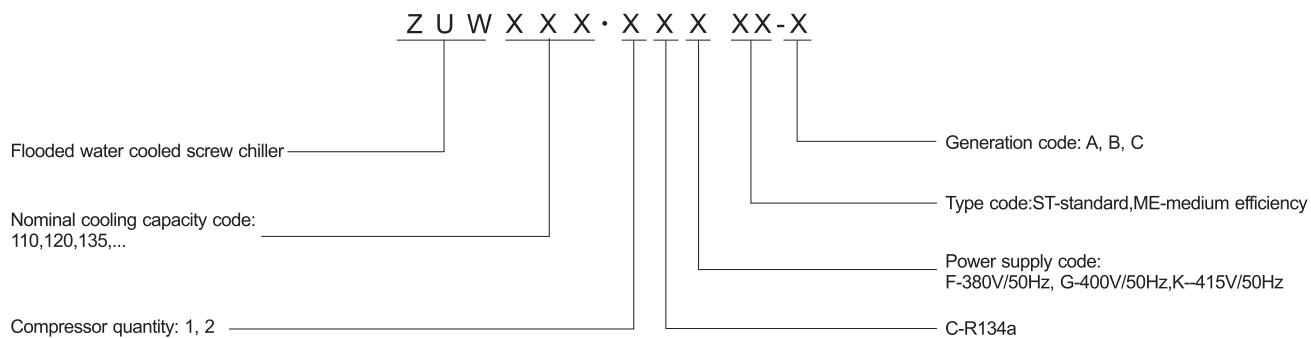


# 1.Introduction



- Since 1970s, with the ecological design, DAIKIN single screw series product has been approved as efficient and reliable product in the world. It's unmatched advantage at various applications attracted millions of customers globally.
- DAIKIN single screw product ZUW.C-B series use R134a as refrigerant, Which is the most popular "Green" refrigerant in the world.
- Since 1990s, with most innovative design, excellent performance and proved reliability, DAIKIN single screw product series ZUW.C-B has been accepted as top class energy saving product in many countries.
- Typical application
  - Cooling system (standard)
  - Heat recovery system
  - Ice storage
 For other system applications, please consult factory for details.

## Nomenclature



# 2. Chiller Features

## 2.1 Environmental R134a refrigerant

- More environmental: No chlorine and zero ODP ( Ozone Depletion potential )



- Less consumption comparing with R123a refrigerant
- No phase out time according to Montreal Protocol

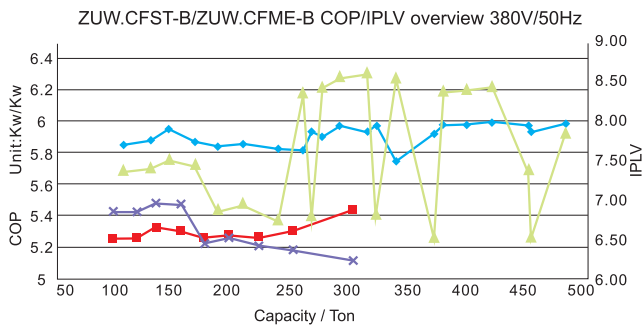
## 2.2 High efficiency , More energy-saving



- Casted steeled 6 teeth main rotor coats with aluminum film and 11 teeth star rotor in “silver shield” composite material (imported from Netherlands). Mesh of metal main screw and non-metalaed stars result in zero gap and low leakage. High efficiency can be produced in this way.



- ZUW.CFST-B /ZUW.CFME-B COP/IPLV overview

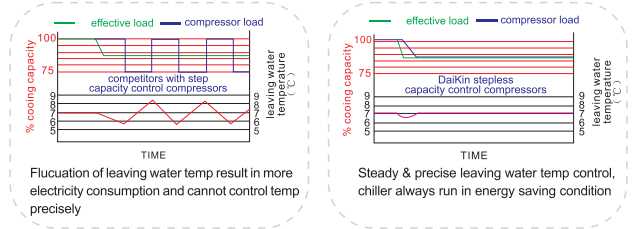


- ZUW.CFST-B COP
- ZUW.CFME-B COP
- ZUW.CFST-B IPLV
- ZUW.CFME-B IPLV

Above curves base on technical data of page 8~11 under AHRI standard.

- Infinite capacity control to control precisely evaporator leaving water temperature.

ZUW.C-B equips with advanced throttling device: liquid sensor and electronic expansion valve (EXV) control. Unload/load can be automatically operated by control system, plus with excellent part load performance ( IPLV/ NPLV) refer to parameter sheet in page thus making chiller always running in energy -saving condition.



- The majority of comfort cooling systems operate at 60% or less of building design load for most of the year. For that reason, ZUW.C-B chiller was designed to obtain excellent part load performance. This is achieved by a combination of individual component features that include compressor design, operating control, and more heat transfer surface available when only one compressor running
- Single compressor lowest load can reach 25%

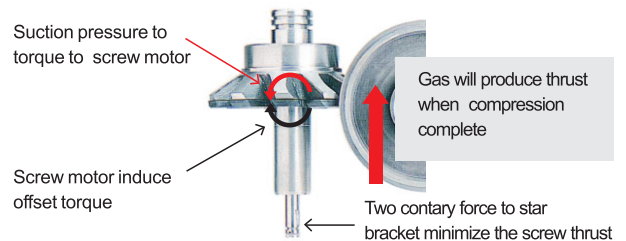
## 2.3 Long lifetime by accepting “lead-lag” function

- DAIKIN multi-compressors water cooled screw chiller accept “lead-lag” Function.

“lead-lag” principle is build-in clock will calculate individual compressor’s operation time .Based on the timer statistic data, controller can automatically select startup compressor which runs less time and stop compressor which runs longer time when just one compressor performance is needed for dual compressor systems.

For most air conditioning systems, chiller 97% operation time runs under part load, dual compressor water cooled chiller just need one compressor running at 60% part load condition. By adopting “lead-lag,” lifetime of each compressor can be extended and result in an extended chiller lifetime.

- DAIKIN compressor designs with one single screw and twin rotors (stars). Screw motor’s two axial terminals forced by equally contrary suction pressure which result in offset axial force, symmetrical layout of two starts make forces to screw motor simultaneously and thus offset radial force. Axial and radial contrarily force eliminates to zero and remove abrasion of screw motor. In this way, the balanced force technology make screw motor life exceed 100,000 working hours and greatly extent compressor lifetime.

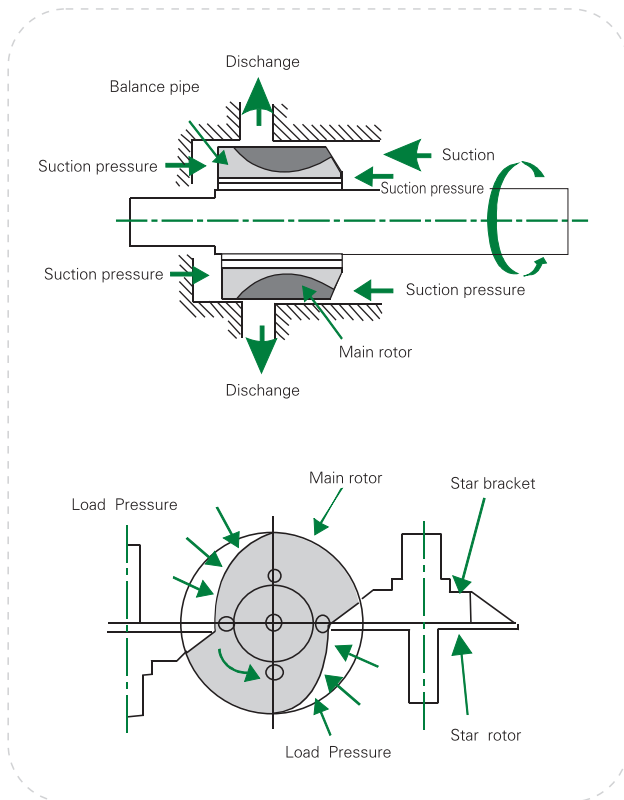




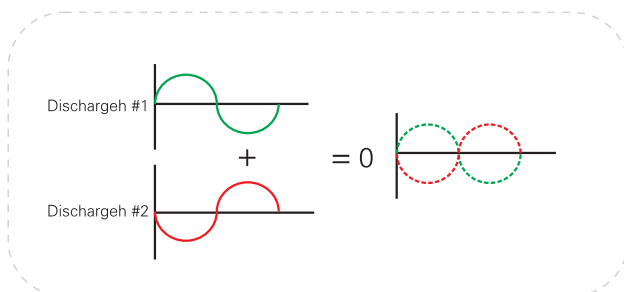
## 2. Chiller Features

### 2.4 low noise level and vibration

- Rotary compression circulation, no extra vibration result from reciprocating motion.
- The DAIKIN compressor design with a single screw and twin rotors allows a constant gas flow. Screw and rotor teeth ratio is 6:11, one circle of rotate screw will induce 12 times discharge. This design can disperse and minimize discharge pulse, while make discharge more balance and steady. In this way, it avoids stridulation result from unsteady flow of discharge in the channel and eliminates gas pulsations.



- There's a discharge vent on the upper & lower side, it makes discharge chambers act as sound attenuators. Two different low frequency noises form two sine waves, one sine wave's peak always meet another's trough, it will offset the low frequent noise.



- Much lower vibration data than AHRI requirement and spring isolator as optional accessory to help you minimize vibration to hold a coin.



Everyone can do a nickle test

### 2.5 Low maintenance charge and convenient serviceability

- DAIKIN ZUW.C-B screw chiller adopts semi-hermetic compressor, which allows visual inspection of main screw and gate rotors. You can easily replace new stars bearings or star material if star is broken by accident.
- Suction shut off valves (optional) allow easy isolation and field service of compressors. Easy compressor maintenance on site is available.



### 2.6 More reliable

- Every ZUW.C-B screw chiller will be strictly tested in DAIKIN Wuhan factory to ensure a trouble-free start-up. Factory test bench is AHRI certified to guarantee the performance and reliability in conform to AHRI requirement before chiller ex-factory.

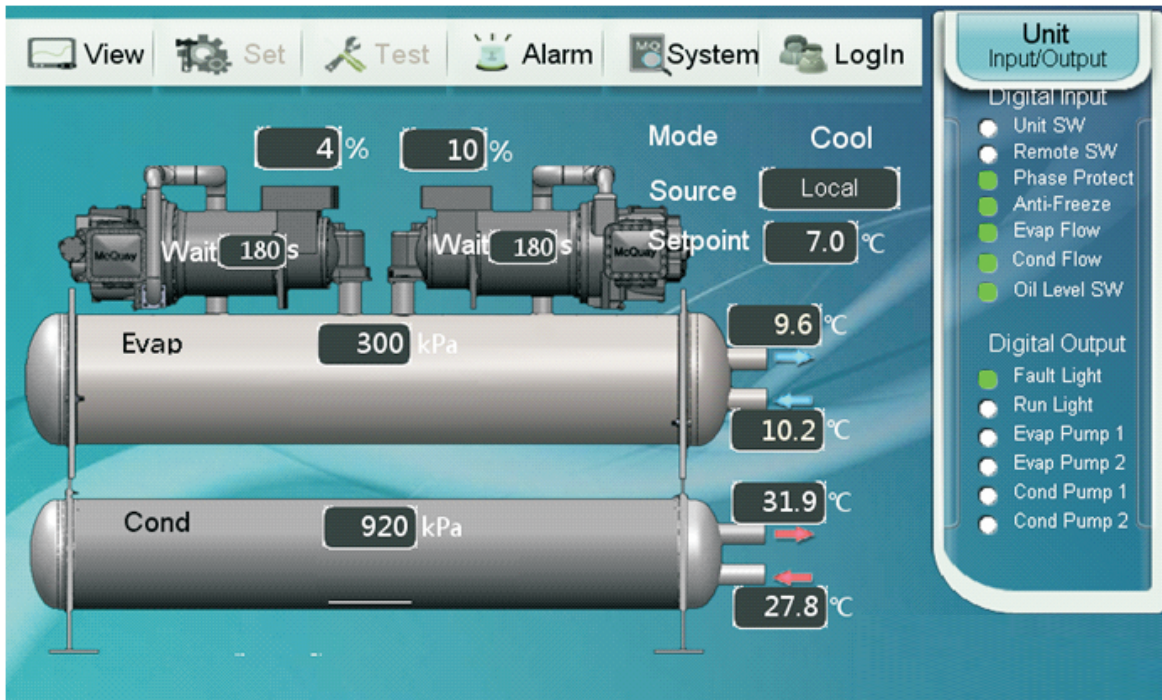


- From 2005 year, DAIKIN China already have sold thousands of screw chiller to Australia, Asia and Latin America, covering projects of national lab center, hospital, hotel, airport, subway, chemical factory, ect. Widely usage of screw chillers have proven a reliable quality and a remarkable success in market.



### 3. Control Features

DAIKIN ZUW.C-B utilizes colorful touch screen with humanity design to convenient operation and maintenance. English/Chinese version can be switched easily. Operators can view all running status & parameters, change setting points and clear alarms, as well as download data logging to PC.



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

- Emergency stop switch
- Unit/compressor switch (compressor switch only on ZUW.2C-B)
- Power/running/alarm indicator lights
- Compressor running lights

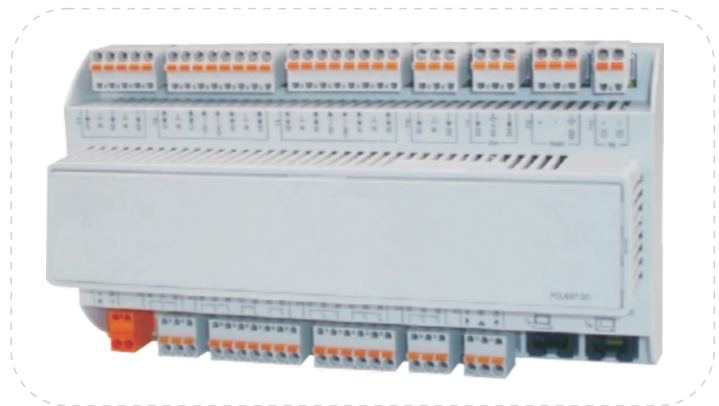
#### 3.1 Control display, alarm and protection function:

##### 3.1.1 Display:

- Leaving chilled water setting temp;
- Entering/leaving chilled/condensing water temp;
- Compressor suction/discharge pressure;
- Compressor total operating time and load %
- Alarm information
- Compressor discharge temperature/superheat
- Compressor oil supply pressure
- Chiller's condensing /evaporating temperature;

##### 3.1.2 Alarm protection function:

- Refrigerant high/low pressure protection;
- Phase monitor: phase unbalance/failure/fault ;
- Chilled water freezing protection
- Motor overheat protection;
- Compressor abnormal frequently start protection;
- Oil level, oil different pressure protection;
- Low/high voltage protection;

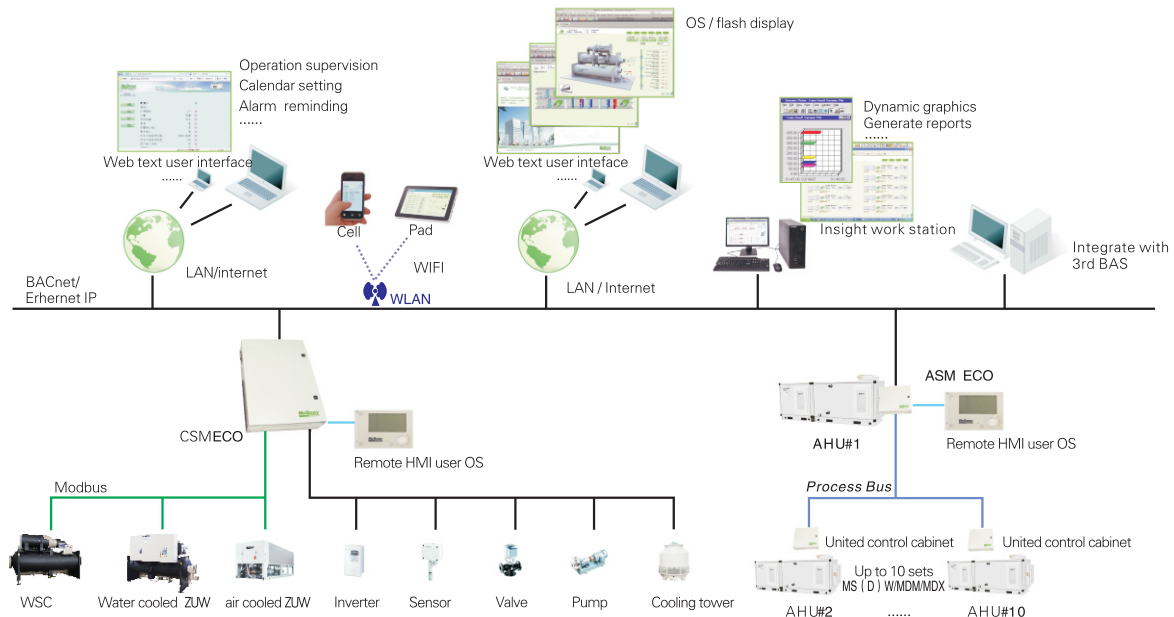


# 3. Control Features

## 3.2 Main control function(option)

RS485 port can be connected to the computer and download control programs to update control system.

### Water cooled chiller unit-control system



### ZUW.C-B control system function as below:

- RS485 building communication to communicate directly with 3rd part control system via public protocol. It then can realize quickly and precisely 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;
- Touch screen display chiller operation data and alarm information, easy operation and maintenance;
- Control output time signal of Wye-delta conversion which will result in a more stable startup without extra electric maintenance.
- Condensing/chilled water pump automatically ON/ OFF: water pump will be pre-startup before chiller startup and stop after chiller shutoff ;
- Cooling tower fan automatically ON/ OFF : Controller analyzes chiller's operation load % and ELWT, select ON/ OFF logic ,send ON/OFF signal, to make system always runs in energy-saving condition.
- Two chiller auto master-slave control: one shield cable between two chillers' controller. Two chillers will automatically ON/OFF according to different loadings when LAN is formed. Chillers can always run in the most comfortable condition.
- Multi-compressor lead-lag balance control: before chiller startup, control will analyze each compressor's total working hours, automatically select startup compressor which runs less working hours and stop compressor which runs longer working hours. In this way, every compressor's working hours can be balanced.
- Stabilized PID (Proportional - Integral -Derivative) regulation by microprocessor via analyzing the signal sensed by the evaporator leaving water sensor with an accuracy of  $\pm 0.1^{\circ}\text{C}$ .
- Remote on/off
- 4~20mA demand limit
- Chilled water temperature reset

# 4. ZUW.C-B Technical Data

## ZUW.CFST-B technical data

Model		ZUW110.1	ZUW135.1	ZUW150.1	ZUW170.1	ZUW190.1	ZUW215.1	
Cooling capacity	kW	374.0	453.2	509.6	586.6	655.0	728.9	
	USRT	106.4	128.9	144.9	166.8	186.3	207.3	
Power input		kW	63.8	77.0	85.4	99.6	111.8	124.1
COP	100%		5.86	5.89	5.96	5.89	5.86	5.87
	75%		7.03	7.05	7.14	7.07	6.63	6.68
	50%		7.78	7.80	7.90	7.84	7.31	7.47
	25%		6.93	6.94	7.04	7.00	5.45	5.59
IPLV			7.34	7.36	7.46	7.40	6.79	6.90
Evap. flow rate		l/s	16.1	19.5	21.9	25.3	28.2	31.4
Evap. pressure drop		kPa	16.0	17.2	15.3	19.6	16.1	15.3
Cond. flow rate		l/s	20.1	24.4	27.4	31.6	35.2	39.2
Cond. pressure drop		kPa	23.3	23.2	24.8	31.6	31.6	32.0
Compressor	Type	Semi-hermetic Single Screw Compressor						
	Quantity	1	1	1	1	1	1	
Starter type		Y-Δ						
Capacity control		25% ~ 100% stepless regulation						
Condenser	Type	Shell-And-Tube						
	Quantity	1	1	1	1	1	1	
Evaporator	Type	Shell-And-Tube Flooded						
	Quantity	1	1	1	1	1	1	
Refrigerant	Type	R134a						
	Charge	kg	215	215	215	215	315	315
Oil	Brand	DAIKIN oil E						
	Charge	L	74	74	74	74	85	85
Temp. Control		Evaporator Leaving water temprature PID						
Evap. Water Pipe		mm	φ 168	φ 168	φ 168	φ 168	φ 219	φ 219
Cond. Water Pipe		mm	φ 168	φ 168	φ 168	φ 168	φ 219	φ 219
Thermal insulation material		Polyurethane insulation						
Chiller weight		kg	3298	3347	3484	3522	5030	5078
Operation weight		kg	3552	3617	3772	3818	5453	5501
Rated load amps		A	109.6	129.6	143.0	166.0	186.3	210.9
Inrush Amps		A	329.7	329.7	329.7	329.7	545.9	637.8
Max Inrush amps		A	329.7	329.7	329.7	329.7	545.9	637.8
Dimension L x W x H		mm	3340*1836*2050			3462*1914*2275		

**Note:**

- Above chiller cooling capacity is based on condition: Evap: LWT 44°F , flow rate 0.043 l/s • kW), fouling factor 0.0001(° F.ft<sup>2</sup>.h/Btu)  
Cond: EWT 85°F , flow rate 0.054 l/s • kW), fouling factor 0.00025(° F.ft<sup>2</sup>.h/Btu)  
Voltage: 380V/3P/50Hz,400-415V/3P/50Hz, please refer to selection program.  
Capacity control range relate with specified job condition.
- Within the scope of AHRI certification program, ratings are certified in accordance with AHRI 550/590 and AHRI 551/591. All other ratings are in accordance with AHRI 550/590 and AHRI 551/591.
- Standard: Power supply 380V/50Hz, Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser Victaulic groove right side connection.
- IPLV/NPLV=0.01\*A+0.42\*B+0.45\*C+0.12\*D (A: COP@100% load; B: COP@75% load; C: COP@50% load; D: COP@25% load based on standard job condition of AHRI550/590;)
- Min Shipment size =(L+13+400)\*(W+13+300)\*(H+13+140) include packing wood skid for container shipment, this size is for transportation and plant room access.
- Consult factory for, ASME code vessel, Solid state starter.
- Voltage tolerance: ± 10%, for other Volt ratings please refer to corresponding AHRI certified selection program.
- Chiller size hereunder may be changed if it equips with solid state starter, flange, water pipe left connection(in front of control panel), Please consult factory to get the exact size.
- Model# in the table above omit CFST-B.

\* Single compressor chiller capacity use the compressor capacity control (25%~100% stepless control). Please refer to latest software selection for actual chiller capacity control.





## 4. ZUW.C-B Technical Data

### ZUW.CFST-B technical data

Model		ZUW245.1	ZUW270.1	ZUW330.1	ZUW380.1	ZUW460.1
Cooling capacity	kW	834.8	935.7	1126.9	1298.1	1587.7
	USRT	237.4	266.1	320.5	369.2	451.6
Power input	kW	143.2	157.6	188.6	219.1	268
COP	100%	5.83	5.94	5.98	5.92	5.93
	75%	6.94	6.63	6.69	6.81	6.81
	50%	7.30	6.86	6.93	6.92	6.92
	25%	5.54	4.44	4.49	4.10	4.11
IPLV		6.92	6.46	6.53	6.53	6.53
Evap.flow rate	l/s	35.9	40.3	48.5	55.9	68.4
Evap. pressure drop	kPa	19.6	26.6	37.3	57.1	57.7
Cond. flow rate	l/s	44.9	50.4	60.7	69.9	85.4
Cond. pressure drop	kPa	30.9	46.5	49.3	68.7	70.1
Compressor	Type	Semi-hermetic Single Screw Compressor				
	Quantity	1	1	1	1	1
Starter type		Y-Δ				
Capacity control	%	25% ~ 100% stepless regulation				
Condenser	Type	Shell-And-Tube				
	Quantity	1	1	1	1	1
Evaporator	Type	Shell-And-Tube Flooded				
	Quantity	1	1	1	1	1
Refrigerant	Type	R134a				
	Charge kg	315	315	350	495	565
Oil	Brand	DAIKIN oil E				
	Charge L	85	85	85	145	174
Temp. Control		Evaporator Leaving water temprature PID				
Evap. Water Pipe	mm	φ 219	φ 219	φ 219	φ 219	φ 219
Cond. Water Pipe	mm	φ 219	φ 219	φ 219	φ 219	φ 219
Thermal insulation material		Polyurethane insulation				
Chiller weight	kg	5117	5876	5963	8301	8741
Operation weight	kg	5556	6406	6513	8965	9405
Rated load amps	A	242.1	281.1	331.2	377.8	455.6
Inrush Amps	A	637.8	731.5	882.3	1107.9	1242.7
Max Inrush amps	A	637.8	731.5	882.3	1107.9	1242.7
Dimension L x W x H	mm	3462*1914*2275	3764*2010*2345		4308*2167*2585	

#### Note:

- Above chiller cooling capacity is based on condition: Evap: LWT 44°F , flow rate 0.043 l/(s · kW), fouling factor 0.0001(° F.ft<sup>2</sup>.h/Btu)  
Cond: EWT 85°F , flow rate 0.054 l/(s · kW), fouling factor 0.00025(° F.ft<sup>2</sup>.h/Btu)  
Voltage: 380V/3P/50Hz,400-415V/3P/50Hz,please refer to selection program.  
Capacity control range relate with specified job condition.
- Within the scope of AHRI certification program, ratings are certified in accordance with AHRI 550/590 and AHRI 551/591. All other ratings are in accordance with AHRI 550/590 and AHRI 551/591.
- Standard: Power supply 380V/50Hz, Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser Victaulic groove right side connection.
- IPLV/NPLV=0.01\*A+0.42\*B+0.45\*C+0.12\*D (A: COP@100% load; B: COP@75% load; C: COP@50% load; D: COP@25% load based on standard job condition of AHRI550/590;)
- Min Shipment size =(L+13+400)\*(W+13+300)\*(H+13+140) include packing wood skid for container shipment, this size is for transportation and plant room access.
- Consult factory for, ASME code vessel, Solid state starter.
- Voltage tolerance: ± 10%, for other Volt ratings please refer to corresponding AHRI certified selection program.
- Chiller size hereunder may be changed if it equips with solid state starter, flange, water pipe left connection(in front of control panel), Please consult factory to get the exact size.
- Model# in the table above omit CFST-B.
- \* Single compressor chiller capacity use the compressor capacity control (25%~100% stepless control). Please refer to latest software selection for actual chiller capacity control.



# 4. ZUW.C-B Technical Data

## ZUW.CFST-B technical data

Model		ZUW265.2	ZUW280.2	ZUW300.2	ZUW325.2	ZUW350.2	ZUW380.2	
Cooling capacity	kW	906.7	963.4	1019.5	1100.0	1186.5	1325.3	
	USRT	257.9	274.0	290.0	312.9	337.5	376.9	
Power input	kW	156.0	163.3	170.8	185.3	206.7	221.8	
COP	100%	5.81	5.90	5.97	5.94	5.74	5.98	
	75%	6.93	6.99	7.12	7.07	6.84	6.96	
	50%	9.72	9.81	9.98	10.06	9.60	9.85	
	25%	8.36	8.53	8.58	8.79	8.25	8.04	
IPLV		8.35	8.43	8.57	8.62	8.24	8.38	
Evap. flow rate	l/s	39.0	41.5	43.9	47.4	51.1	57.1	
Evap. pressure drop	kPa	30.2	38.9	39.8	42.4	44.7	67.7	
Cond. flow rate	l/s	48.8	51.9	54.9	59.2	63.9	71.3	
Cond. pressure drop	kPa	36.6	42.5	48.1	54.9	55.6	61.8	
Compressor	Type	Semi-hermetic Single Screw Compressor						
	Quantity	2	2	2	2	2	2	
Starter type		Y-Δ						
Capacity control	%	12.5% ~ 100% stepless regulation						
Condenser	Type	Shell-And-Tube						
	Quantity	1	1	1	1	1	1	
Evaporator	Type	Shell-And-Tube Flooded						
	Quantity	1	1	1	1	1	1	
Refrigerant	Type	R134a						
	Charge kg	315	350	350	350	380	495	
Oil	Brand	DAIKIN oil E						
	Charge L	85	85	85	85	85	120	
Temp. Control		Evaporator Leaving water temperature PID						
Evap. Water Pipe	mm	φ 219	φ 219	φ 219	φ 219	φ 219	φ 219	
Cond. Water Pipe	mm	φ 219	φ 219	φ 219	φ 219	φ 219	φ 219	
Thermal insulation material		Polyurethane insulation						
Chiller weight	kg	5462	5732	5769	5793	5848	8578	
Operation weight	kg	5914	6209	6260	6293	6360	9242	
Rated load amps	A	262.4	273.9	286.0	309.6	344.4	369.8	
Inrush Amps	A	329.7	329.7	329.7	329.7	329.7	545.9	
Max Inrush amps	A	460.9	472.6	472.9	496.0	495.7	754.7	
Dimension L x W x H	mm	3462*1870*2180	3764*1900*2297				4308*2098*2322	

**Note:**

- Above chiller cooling capacity is based on condition: Evap: LWT 44°F , flow rate 0.043 l/(s · kW), fouling factor 0.0001(° F.ft<sup>2</sup>.h/Btu)  
 Cond: EWT 85°F , flow rate 0.054 l/(s · kW), fouling factor 0.00025(° F.ft<sup>2</sup>.h/Btu)  
 Voltage: 380V/3P/50Hz,400-415V/3P/50Hz, please refer to selection program.  
 Capacity control range relate with specified job condition.
- Within the scope of AHRI certification program, ratings are certified in accordance with AHRI 550/590 and AHRI 551/591. All other ratings are in accordance with AHRI 550/590 and AHRI 551/591.
- Standard: Power supply 380V/50Hz, Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser Victaulic groove right side connection.
- IPLV/NPLV=0.01\*A+0.42\*B+0.45\*C+0.12\*D (A: COP@100% load; B: COP@75% load; C: COP@50% load; D: COP@25% load based on standard job condition of AHRI550/590;)
- Min Shipment size =(L+13+400)\*(W+13+300)\*(H+13+140) include packing wood skid for container shipment, this size is for transportation and plant room access.
- Consult factory for 3 pass, ASME code vessel, Solid state starter.
- Voltage tolerance: ± 10%, for other Volt ratings please refer to corresponding AHRI certified selection program.
- Chiller size hereunder may be changed if it equips with solid state starter, 3 pass Evaporator or Condenser, flange, water pipe left connection(in front of control panel), or suction line shut off valve. Please consult factory to get the exact size.
- Model# in the table above omit CFST-B.
- Single compressor chiller capacity use the compressor capacity control (25%~100% stepless control).  
 Dual compressor load can reach 12.5%, as two compressors share one Evaporator.  
 Please refer to latest software selection for actual chiller capacity control.



## 4. ZUW.C-B Technical Data

### ZUW.CFST-B technical data

Model		ZUW405.2	ZUW430.2	ZUW460.2	ZUW490.2	ZUW510.2	ZUW540.2	
Cooling capacity	kW	1396.2	1472.1	1580.1	1689.1	1760.0	1865.2	
	USRT	397.1	418.7	449.4	480.4	500.6	530.5	
Power input		kW	233.6	245.9	264.5	282.6	305.2	323.5
COP	100%	5.98	5.99	5.97	5.98	5.77	5.77	
	75%	6.80	6.83	6.66	6.77	6.73	6.55	
	50%	10.01	10.06	8.85	8.99	8.46	8.65	
	25%	8.23	8.25	7.34	7.56	6.81	7.08	
IPLV		8.41	8.44	7.72	7.85	7.50	7.55	
Evap. flow rate		l/s	60.1	63.4	68.0	72.7	75.8	80.3
Evap. pressure drop		kPa	68.9	64.9	60.1	67.7	64.6	64.7
Cond. flow rate		l/s	75.1	79.2	85.0	90.9	94.7	100.4
Cond. pressure drop		kPa	64.6	70.8	71.6	71.9	66.5	66.8
Compressor	Type	Semi-hermetic Single Screw Compressor						
	Quantity	2	2	2	2	2	2	
Starter type		Y-Δ						
Capacity control		12.5% ~ 100% stepless regulation						
Condenser	Type	Shell-And-Tube						
	Quantity	1	1	1	1	1	1	
Evaporator	Type	Shell-And-Tube Flooded						
	Quantity	1	1	1	1	1	1	
Refrigerant	Type	R134a						
	Charge	kg	495	565	565	595	600	600
Oil	Brand	DAIKIN oil E						
	Charge	L	120	120	120	120	150	150
Temp. Control		Evaporator Leaving water temprature PID						
Evap. Water Pipe		mm	φ 219	φ 219	φ 219	φ 219	φ 273	φ 325
Cond. Water Pipe		mm	φ 219	φ 219	φ 219	φ 219	φ 273	φ 273
Thermal insulation material		Polyurethane insulation						
Chiller weight		kg	8613	8747	8747	8880	9402	10578
Operation weight		kg	9277	9411	9411	9583	10342	11636
Rated load amps		A	393.5	418.0	448.5	478	530.0	574.8
Inrush Amps		A	637.8	637.8	637.8	637.8	731.5	731.5
Max Inrush amps		A	822.8	846.8	878.0	876.8	974.5	1015
Dimension L x W x H		mm	4308*2098*2322			4308*2230*2502		4398*2300*2650

#### Note:

- Above chiller cooling capacity is based on condition: Evap: LWT 44°F , flow rate 0.043 l/(s · kW), fouling factor 0.0001(° F.ft<sup>2</sup>.h/Btu)  
Cond: EWT 85°F , flow rate 0.054 l/(s · kW), fouling factor 0.00025(° F.ft<sup>2</sup>.h/Btu)  
Voltage: 380V/3P/50Hz,400-415V/3P/50Hz, please refer to selection program.  
Capacity control range relate with specified job condition.
- Within the scope of AHRI certification program, ratings are certified in accordance with AHRI 550/590 and AHRI 551/591. All other ratings are in accordance with AHRI 550/590 and AHRI 551/591.
- Standard: Power supply 380V/50Hz, Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser Victaulic groove right side connection.
- IPLV/NPLV=0.01\*A+0.42\*B+0.45\*C+0.12\*D (A: COP@100% load; B: COP@75% load; C: COP@50% load; D: COP@25% load based on standard job condition of AHRI550/590;)
- Min Shipment size =(L+13+400)\*(W+13+300)\*(H+13+140) include packing wood skid for container shipment, this size is for transportation and plant room access.
- Consult factory for 3 pass, ASME code vessel, Solid state starter.
- Voltage tolerance: ± 10%, for other Volt ratings please refer to corresponding AHRI certified selection program.
- Chiller size hereunder may be changed if it equips with solid state starter, 3 pass Evaporator or Condenser, flange, water pipe left connection(in front of control panel), or suction line shut off valve. Please consult factory to get the exact size.
- Model# in the table above omit CFST-B.

- \* Single compressor chiller capacity use the compressor capacity control (25%~100% stepless control).  
Dual compressor load can reach 12.5%, as two compressors share one Evaporator.  
Please refer to latest software selection for actual chiller capacity control.



# 4. ZUW.C-B Technical Data

## ZUW.CFME-B technical data

Model		ZUW100.1	ZUW120.1	ZUW140.1	ZUW160.1	ZUW180.1	ZUW200.1	ZUW230.1	ZUW255.1	ZUW305.1	
Cooling capacity	kW	345.0	415.2	471.3	545.6	614.9	685.5	778.4	879.4	1057.4	
	USRT	98.1	118.1	134.0	155.2	174.9	195.0	221.4	250.1	300.7	
Power input	kW	65.7	79.0	88.6	102.9	116.8	130.1	148.0	166.0	194.7	
COP	100%	5.25	5.26	5.32	5.30	5.26	5.27	5.26	5.30	5.43	
	75%	6.44	6.43	6.53	6.52	6.29	6.29	6.38	6.14	6.26	
	50%	7.29	7.29	7.41	7.40	6.90	7.02	6.79	6.45	6.54	
	25%	6.69	6.70	6.85	6.83	5.40	5.53	5.22	4.39	4.43	
IPLV		6.84	6.84	6.95	6.94	6.45	6.52	6.41	6.06	6.16	
Evap.flow rate	l/s	14.9	17.9	20.3	23.5	26.5	29.5	33.5	37.9	45.5	
Evap. pressure drop	kPa	39.5	42.4	44.3	44.9	42.7	46.5	51.7	56.7	64.0	
Cond. flow rate	l/s	18.6	22.3	25.4	29.4	33.1	36.9	41.9	47.3	56.9	
Cond. pressure drop	kPa	33.0	36.7	39.4	43.3	51.2	46.0	49.4	66.4	71.2	
Compressor	Type	Semi-hermetic Single Screw Compressor									
	Quantity	1	1	1	1	1	1	1	1	1	
Starter type		Y-Δ									
Capacity control	%	25% ~ 100% stepless regulation									
Condenser	Type	Shell-And-Tube									
	Quantity	1	1	1	1	1	1	1	1	1	
Evaporator	Type	Shell-And-Tube Flooded									
	Quantity	1	1	1	1	1	1	1	1	1	
Refrigerant	Type	R134a									
	Charge kg	170	170	170	170	230	245	245	275	275	
Oil	Brand	DAIKIN oil E									
	Charge L	74	74	74	74	85	85	85	85	85	
Temp. Control		Evaporator Leaving water temprature PID									
Evap. Water Pipe	mm	φ 168	φ 168	φ 168	φ 168	φ 219	φ 219	φ 219	φ 219	φ 219	
Cond. Water Pipe	mm	φ 168	φ 168	φ 168	φ 168	φ 219	φ 219	φ 219	φ 219	φ 219	
Thermal insulation material		Polyurethane insulation									
Chiller weight	kg	3136	3172	3284	3319	4712	4787	4816	5442	5520	
Operation weight	kg	3390	3442	3572	3615	5135	5210	5255	5972	6070	
Rated load amps	A	112.4	132.8	148.1	171.4	194.1	220.6	250.0	293.9	340.8	
Inrush Amps	A	329.7	329.7	329.7	329.7	545.9	637.8	637.8	731.5	882.3	
Max Inrush amps	A	329.7	329.7	329.7	329.7	545.9	637.8	637.8	731.5	882.3	
Dimension L x W x H	mm	3340*1836*2050				3462*1914*2275			3454*2010*2345		

**Note:**

- Above chiller cooling capacity is based on condition: Evap: LWT 44°F, flow rate 0.043 l/s • kW), fouling factor 0.0001(° F.ft<sup>2</sup>.h/Btu)  
Cond: EWT 85°F, flow rate 0.054 l/s • kW), fouling factor 0.00025(° F.ft<sup>2</sup>.h/Btu)  
Voltage: 380V/3P/50Hz, 400-415V/3P/50Hz, please refer to selection program.  
Capacity control range relate with specified job condition.
  - Within the scope of AHRI certification program, ratings are certified in accordance with AHRI 550/590 and AHRI 551/591. All other ratings are in accordance with AHRI 550/590 and AHRI 551/591.
  - Standard: Power supply 380V/50Hz, Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser, Victaulic groove right side connection.
  - IPLV/NPLV=0.01\*A+0.42\*B+0.45\*C+0.12\*D (A: COP@100% load; B: COP@75% load; C: COP@50% load; D: COP@25% load based on standard job condition of AHRI550/590.)
  - Min Shipment size =(L+13+400)\*(W+13+300)\*(H+13+140) include packing wood skid for container shipment, this size is for transportation and plant room access.
  - Consult factory for 3 pass, ASME code vessel, Solid state starter.
  - Voltage tolerance: ± 10%, for other Volt ratings please refer to corresponding AHRI certified selection program.
  - Chiller size hereunder may be changed if it equips with solid state starter, 3 pass Evaporator or Condenser, water pipe left connection(in front of control panel), or suction line shut off valve. Please consult factory to get the exact size.
  - Model# in the table above omit CFME-B.
  - 255.1/305.1 avail to 380V only, 400/415V will coming soon.
- \* Single compressor chiller capacity use the compressor capacity control ( 25%~100% stepless control). Please refer to latest software selection for actual chiller capacity control.

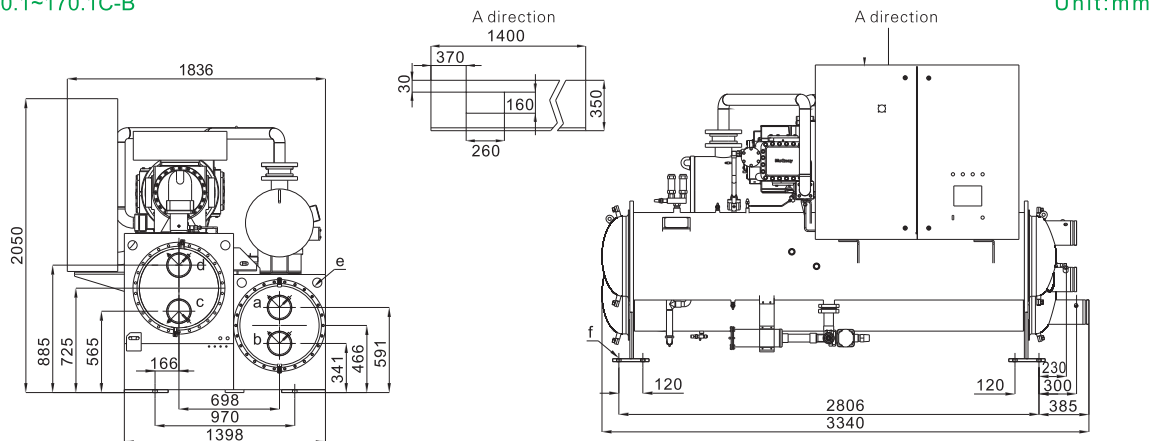




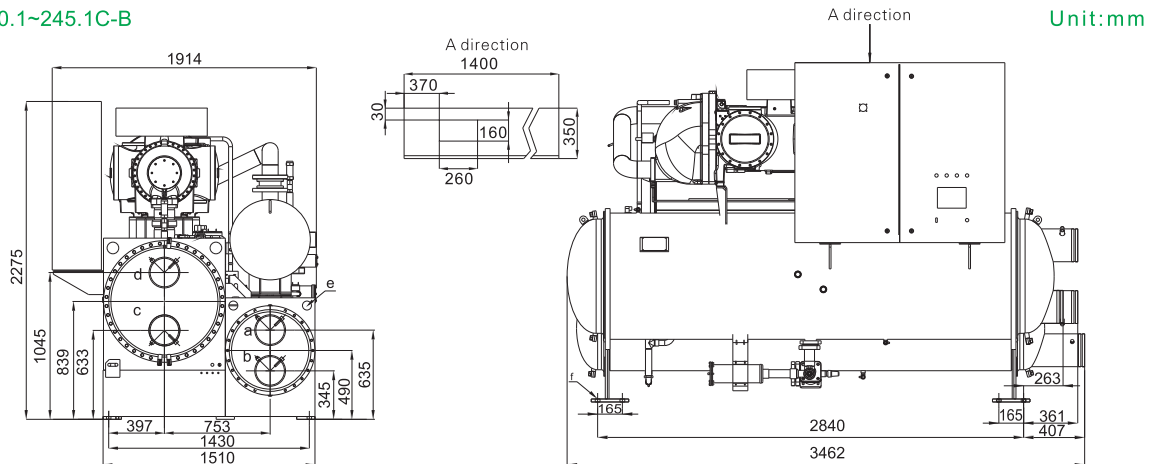
# 5. Chiller Dimension

## ZUW.C-B ST

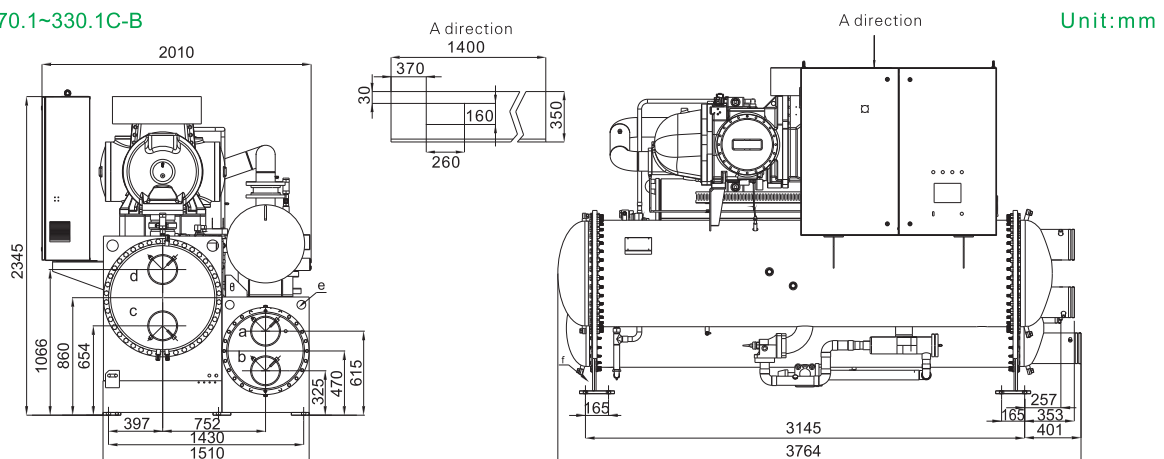
### ZUW110.1~170.1C-B



### ZUW190.1~245.1C-B



### ZUW270.1~330.1C-B



a) Condenser water outlet b) Condenser water inlet c) Evaporator water inlet d) Evaporator outlet e) Lifting hole f) Mounting hole g) Starter power cable slot

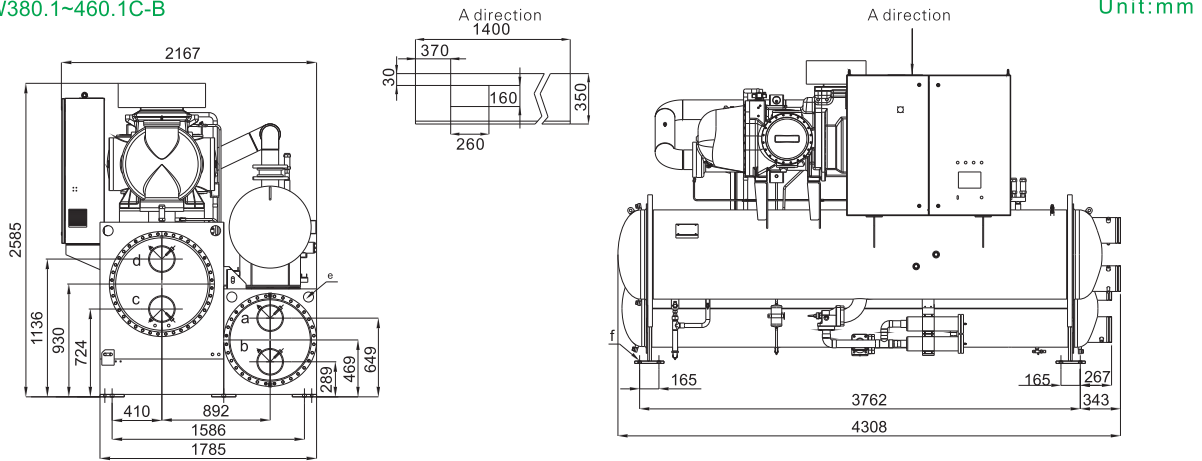
Remark:

- Above chiller dimensions base on 380V/50Hz ZUW.C-B water cooled screw with Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser. Victaulic groove right side connection.
- Actual dimension will have an accumulated  $\leq \pm 13\text{mm}$  tolerance comparing with design size due to components/chiller manufacturing tolerance exist.
- Consult factory for chiller size with ASME code vessel, Solid state starter, other special configurations.

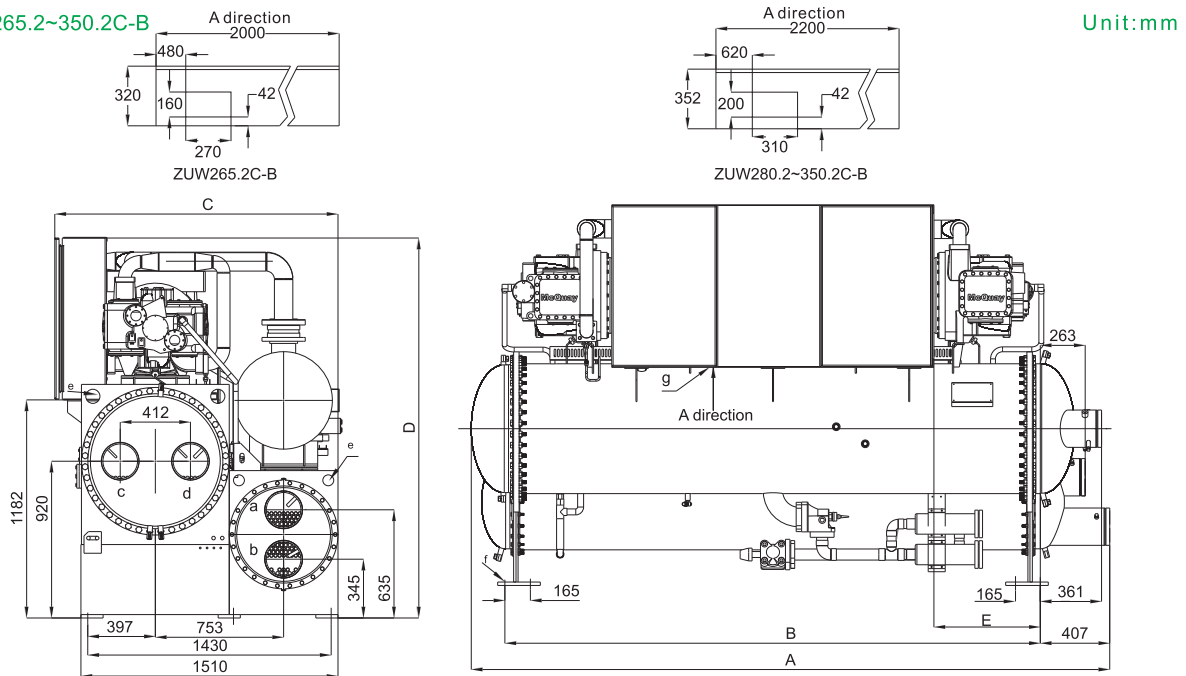
# 5. Chiller Dimension

## ZUW.C-B ST

ZUW380.1~460.1C-B



ZUW265.2~350.2C-B



Model	A	B	C	D	E
ZUW265.2C-B	3462	2840	1870	2180	175
ZUW280.2~350.2C-B	3764	3145	1900	2297	228

a) Condenser water outlet b) Condenser water inlet c) Evaporator water inlet d) Evaporator outlet e) Lifting hole f) Mounting hole g) Starter power cable slot

Remark:

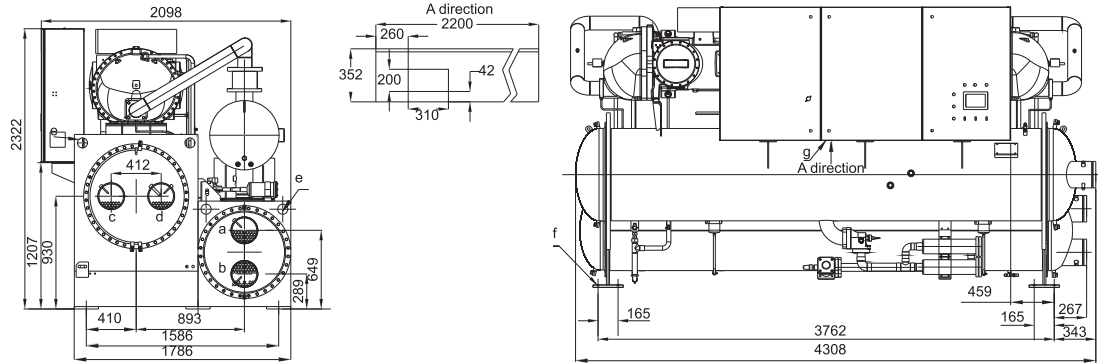
- Above chiller dimensions base on 380V/50Hz ZUW.C-B water cooled screw with Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser. Victaulic groove right side connection.
- Actual dimension will have an accumulated  $\leq \pm 13\text{mm}$  tolerance comparing with design size due to components/chiller manufacturing tolerance exist.
- Consult factory for chiller size with ASME code vessel, Solid state starter, other special configurations.

# 5. Chiller Dimension

## ZUW.C-B ST

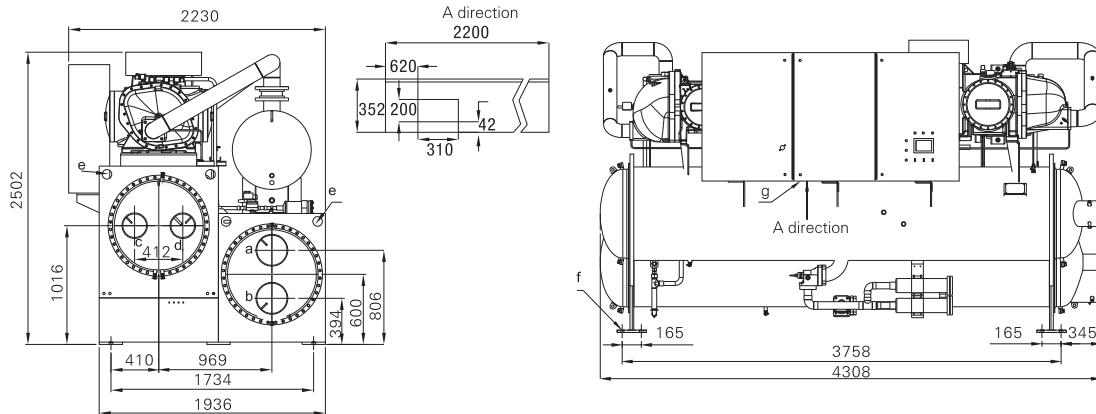
ZUW380.2-490.2C-B

Unit:mm



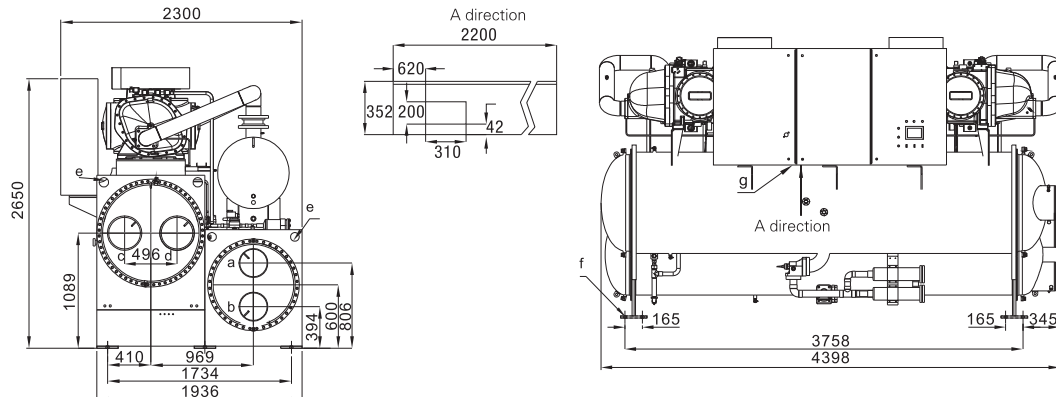
ZUW510.2C-B

Unit:mm



ZUW540.2C-B

Unit:mm



- a) Condenser water outlet   b) Condenser water inlet   c) Evaporator water inlet   d) Evaporator outlet   e) Lifting hole   f) Mounting hole   g) Starter power cable slot

Remark:

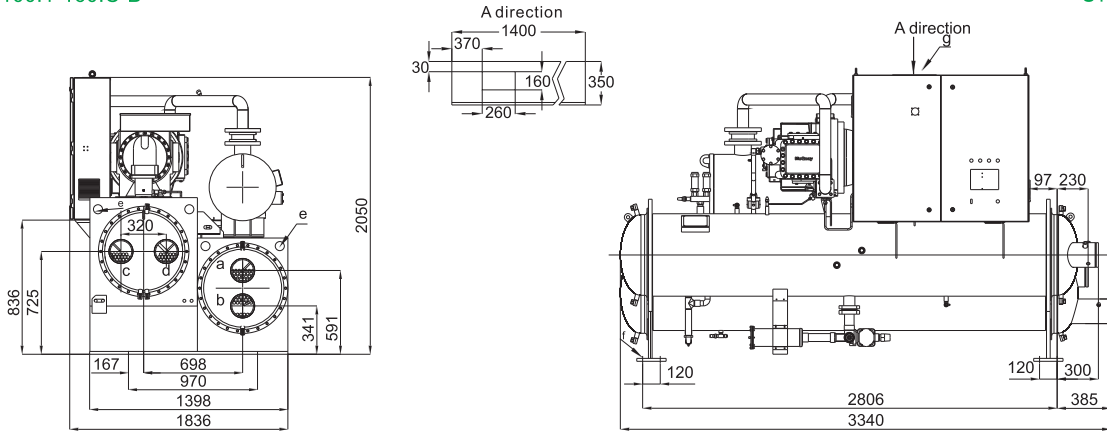
- 1) Above chiller dimensions base on 380V/50Hz ZUW.C-B water cooled screw with Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser, Victaulic groove right side connection.
- 2) Actual dimension will have an accumulated  $\leq \pm 13$ mm tolerance comparing with design size due to components/chiller manufacturing tolerance exist.
- 3) Consult factory for chiller size with 3 pass, ASME code vessel, Solid state starter, other special configurations.

# 5. Chiller Dimension

## ZUW.C-B ME

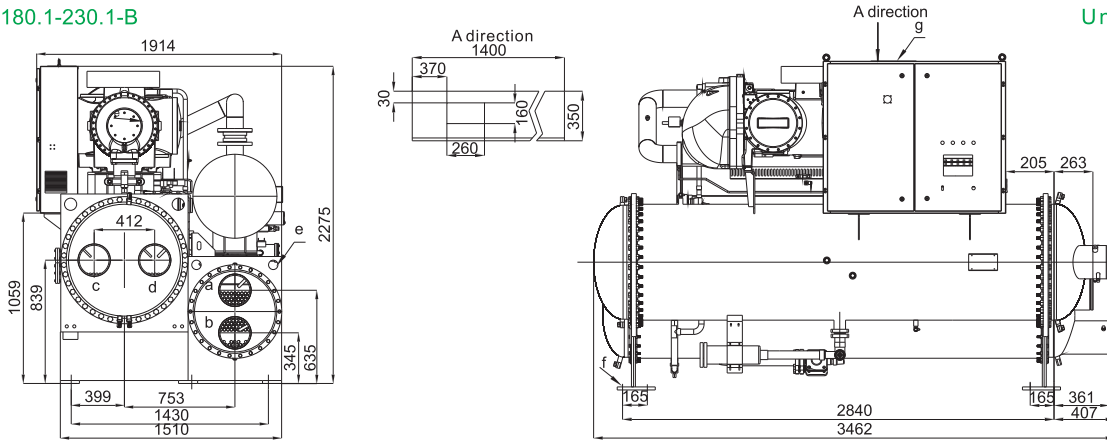
ZUW100.1-160.C-B

Unit:mm



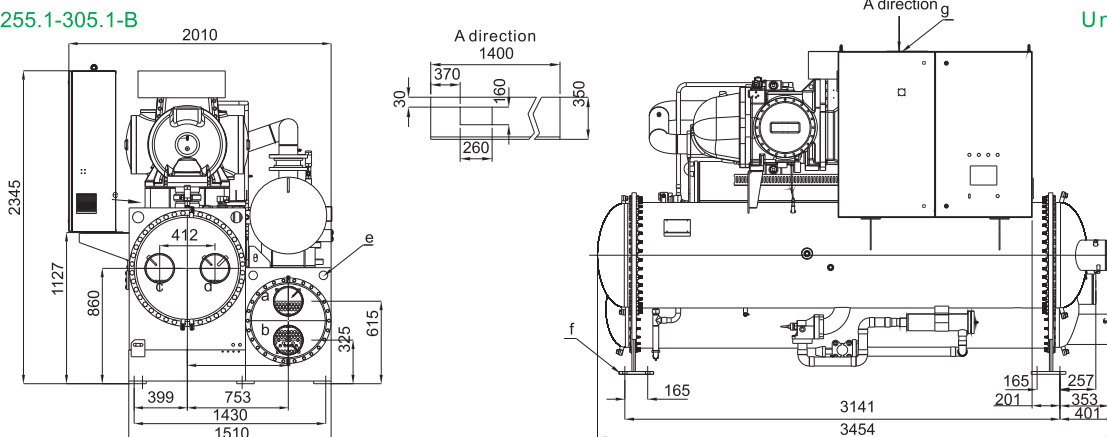
ZUW180.1-230.1-B

Unit:mm



ZUW255.1-305.1-B

Unit:mm



a) Condenser water outlet b) Condenser water inlet c) Evaporator water inlet d) Evaporator outlet e) Lifting hole f) Mounting hole g) Starter power cable slot

Remark:

- Above chiller dimensions base on 380V/50Hz ZUW.C-B water cooled screw with Wye-Delta starter, 2 pass GB (Chinese national standard) code Evaporator and condenser. Victaulic groove right side connection.
- Actual dimension will have an accumulated  $\leq \pm 13\text{mm}$  tolerance comparing with design size due to components/chiller manufacturing tolerance exist.
- Consult factory for chiller size with 3 pass. ASME code vessel, Solid state starter, other special configurations.



# 6. Accessory

## 6.1 Standard accessories (furnished on basic unit)

### 6.1.1 Unit part

- GB vessel code: Vessels constructed under Chinese standard
- 2-pass evaporator and condenser design
- Discharge line check valve
- Water side working pressure 1.0MPa. Vessel constructed under Chinese vessel code
- Water connection: victaulic connection groove ready without coupling
- Suction shut-off valve(Only dual compressor models): Installed on the suction port of compressor to facilitate maintenance operation

### 6.1.2 Electric part

- Star-delta compressor starter and control panel: Low inrush current, reduce starting torque
- Compressor thermal relay: Insures protection from over current condition
- Phase monitor: Sense phase sequence and phase loss and shuts down system

### 6.1.3 Other part

- Insulation: Factory finished 3/4" insulation on evaporator and cold surfaces
- Wood shipping skid with bagging for container shipment: units will be covered with protective shield which has moisture inhibitors that help protect the unit against corrosion and rust. Wooden skid are required to facilitate handling of the product in transit
- Initial oil and R134a refrigerant precharge
- 100% factory performance test, report not include



## 6.2 Optional accessories (On request)

### 6.2.1 Unit part

- ASME vessel code: Vessels constructed under ASME standard
- 3-pass evaporator and condenser( Dual compressor models only)
- Marine water box: Change the direction of water pipe connection in tight plant space

### 6.2.2 Electric part

- Solid state starter: Electronic device to provide smooth start
- Ground fault contactor: monitors the motor current for residual ground fault currents
- Multi-function meter: Digital meters installed on the electrical control panel. display voltage, current and power consumption
- Power factor correction capacitors: Calibrate power factor  
Communication: Modbus/Bacnet
- Flow switch: Pressure differential flow switch (unit mounted) or paddle type flow switch (to be mounted at site)
- 4-20mA demand limit
- Chilled water reset: Provide a function of remote water temperature reset.
- General fault relay: output fault signal

### 6.2.3 Other part

- Extended warranty: 1-4 years warranty extension, compressor only or entire units
- Factory certified testing: AHRI certified test at AHRI or customized condition, 1~4 point, test report, witness available on request

\*Please consult local sales for more options.

# 7. Water System

## System Water Volume

Chilled water systems need adequate time to recognize a load change, respond to that load change and stabilize, without undesirable short cycling of the compressors or loss of control. In air conditioning systems, the potential for short cycling usually exists when the building load falls below the minimum chiller plant capacity or on close-coupled systems with very small water volumes.

Some of the things the designer should consider when looking at water volume are the minimum cooling load, the minimum chiller plant capacity during the low load period and the desired cycle time for the compressors.

Assuming that there are no sudden load changes and that the chiller plant has reasonable turndown, A properly designed storage tank should be added if the system components do not provide sufficient water volume. The plant side should therefore ensure that the overall water volume allows a more constant functioning of the unit and consequently greater environmental comfort. The minimum water retaining capacity of the chilled water system shall exceed the following calculation value.

$$Q(m^3) = (T \times 60) \times H / (\Delta t \times C_p \times \rho)$$

Wherein

T : Compressor's minimum running time :calculated by 5 min

H: Chiller's capacity control capacity (kW) = cooling capacity under full load (kW) × 0.3

Δ t: Constant temperature fluctuation = 4°C.

Cp: Secondary refrigerant specific heat (kJ/kg°C) ρ : secondary refrigerant proportion (kg/m<sup>3</sup>)

The cooling capacity under full load: calculated by the chiller's maximum cooling capacity as for the single compressor chiller; calculated by 50% of the maximum cooling capacity as for the double compressor chiller.

## Water Flow Rate Range

Chiller Model	Cooling water flow (l/s)		Chilled water flow (l/s)	
	Min	Max	Min	Max
ZUW110.1 CFST-B	7.8	38.2	9.2	36.3
ZUW135.1 CFST-B	9.5	46.4	10.8	42.6
ZUW150.1 CFST-B	10.2	50.1	13.6	48.9
ZUW170.1 CFST-B	10.2	50.1	13.6	48.9
ZUW190.1 CFST-B	12.1	59.6	16.3	62.7
ZUW215.1 CFST-B	13.3	65.8	17.4	75.3
ZUW245.1 CFST-B	15.2	75.3	17.4	75.3
ZUW270.1 CFST-B	14.6	72.1	17.4	75.3
ZUW330.1 CFST-B	16.6	81.9	17.4	75.3
ZUW380.1 CFST-B	19.8	97.9	17.4	75.3
ZUW460.1 CFST-B	23.8	118.3	21.3	91.0
ZUW265.2 CFST-B	17.1	84.7	15.9	78.4
ZUW280.2 CFST-B	17.1	84.7	14.6	72.1
ZUW300.2 CFST-B	17.7	87.8	15.2	75.3
ZUW325.2 CFST-B	17.7	87.8	15.9	78.4
ZUW350.2 CFST-B	19.1	94.4	16.6	82.2
ZUW380.2 CFST-B	21.8	107.9	14.6	72.1
ZUW405.2 CFST-B	22.4	111.1	15.2	75.3
ZUW430.2 CFST-B	22.4	111.1	16.6	82.2
ZUW460.2 CFST-B	23.8	118.3	18.5	91.6
ZUW490.2 CFST-B	25.5	126.8	18.5	91.6
ZUW510.2 CFST-B	25.7	127.4	19.0	94.1
ZUW540.2 CFST-B	27.2	135.3	20.1	99.8

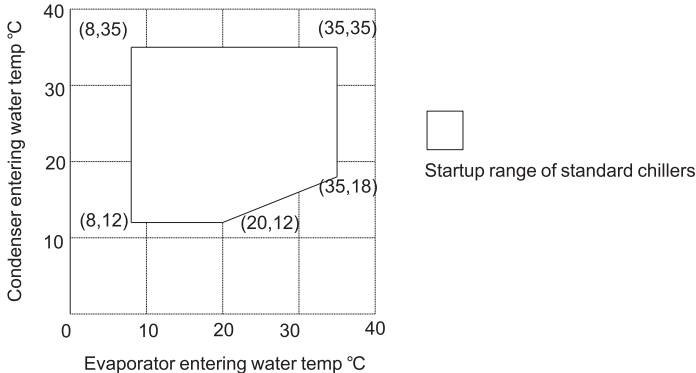
Notes:

- Water flow range is given to ensure that the chiller can running properly in conditions required by users.
- When the chiller water flow rate is too low, chiller water temperature might fluctuate rapidly, which would cause frequent start and stop, When evaporator water flow rate is low, DAIKIN can provide 3 pass chiller according to user's water flow demand.  
Caution: ZUW .C-B chillers have been considered interlocked with water pump, Water flow range listed above is for constant flow system under certain water flow condition.
- If variable primary flow system is required, ZUW.C-B chillers can also adapt to variable flow job condition, in which chiller can be adjusted automatically to the best state as users expect. Recommended water flow rate change is controlled within 10% per minute( not more than 30% per minute),and water flow change range must control in 60%-100%. at the same time,Only Evapreator variable primary flow is recommended.
- Pressure drop please refer to selection.

# 8. Operating range

## 8.1 Startup Range

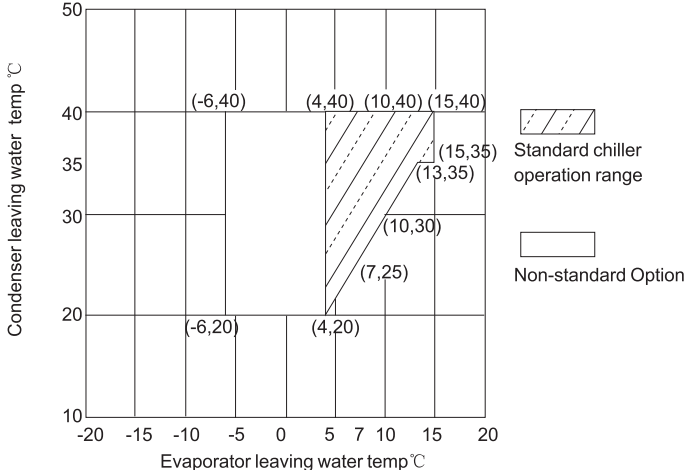
Startup Range of ZUW.C\*ST-B, ZUW.CFME-B and ZUW Series



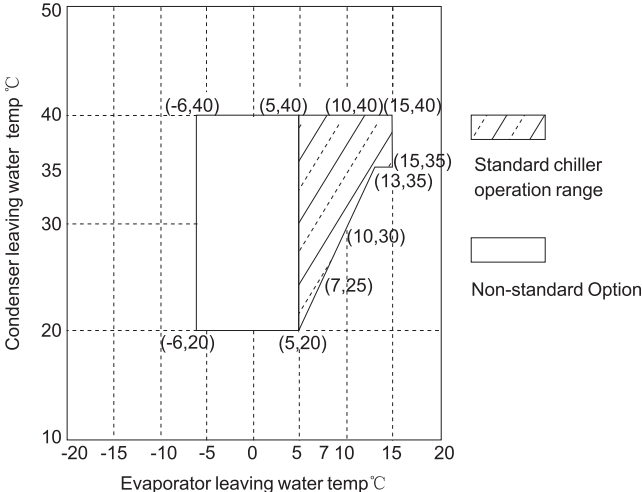
## 8.2 Limits of ZUW.C-B Operating Range

The limits of ZUW.C-B operating range are shown in the figure below. The operating range is different according to the chiller model varies ZUW.CFST-B, ZUW.CFME-B.

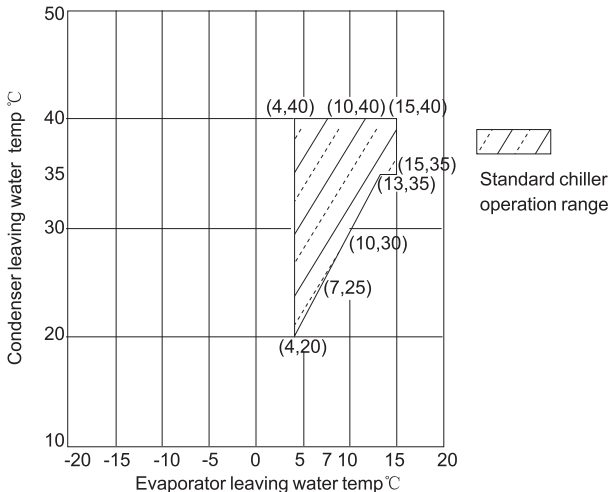
ZUW.C\*ST-B Operating Range



ZUW.CFME-B Operating Range



FS380.1/ZUW460.1 Operating Range



# 9. Installation Notes

- Installation and maintenance are to be performed only by qualified personnel who are familiar with local codes and regulations, experienced with this type of equipment, and authorized by DAIKIN or its distributions.

## 9.1 Handling

- The chiller is shipped on heavy wooden skids to protect the unit from accidental damage and to permit easy handling and moving. It is recommended that all moving and handling be performed with the skids under the unit when possible and that the skids not be removed until the unit is in the final location. If the unit must be hoisted, it is necessary to lift the unit by attaching cables or chains at the lifting holes in the evaporator tube sheets. Spreader bars must be used to protect the control cabinet and the other areas of the chiller. Refer to latest version of ZUW.C-B-IOMM

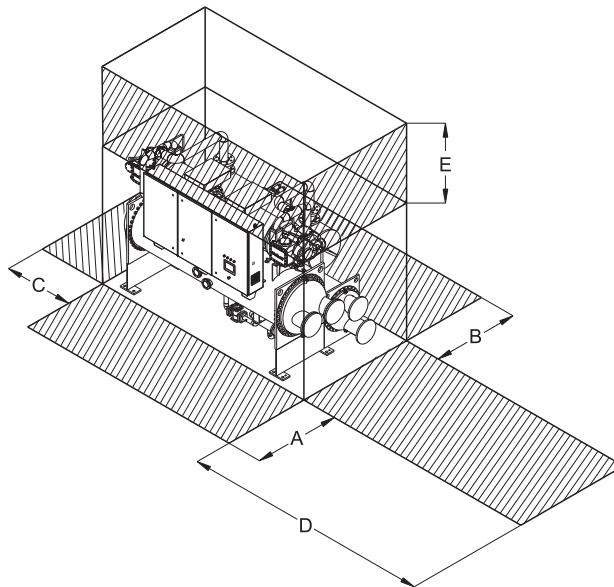
## 9.2 Location

- A horizontal and sufficiently strong ground is required.
- Rubber-in-shear isolators can be furnished and field placed under each corner of the package. Vibration isolators on all water piping connected to the chiller are recommended to avoid straining the piping and transmitting vibration and noise. Refer to latest version of ZUW.C-B-IOMM for the typical drawings.

## 9.3 Chiller mounting points

- The unit must be mounted on a horizontal concrete or steel base and must be located to provide sufficient service clearances. Refer to figure below and table below for chiller clearances. The shaded parts in figure below represent the clearance requirements.

Chiller service clearances diagram



Service clearances Table

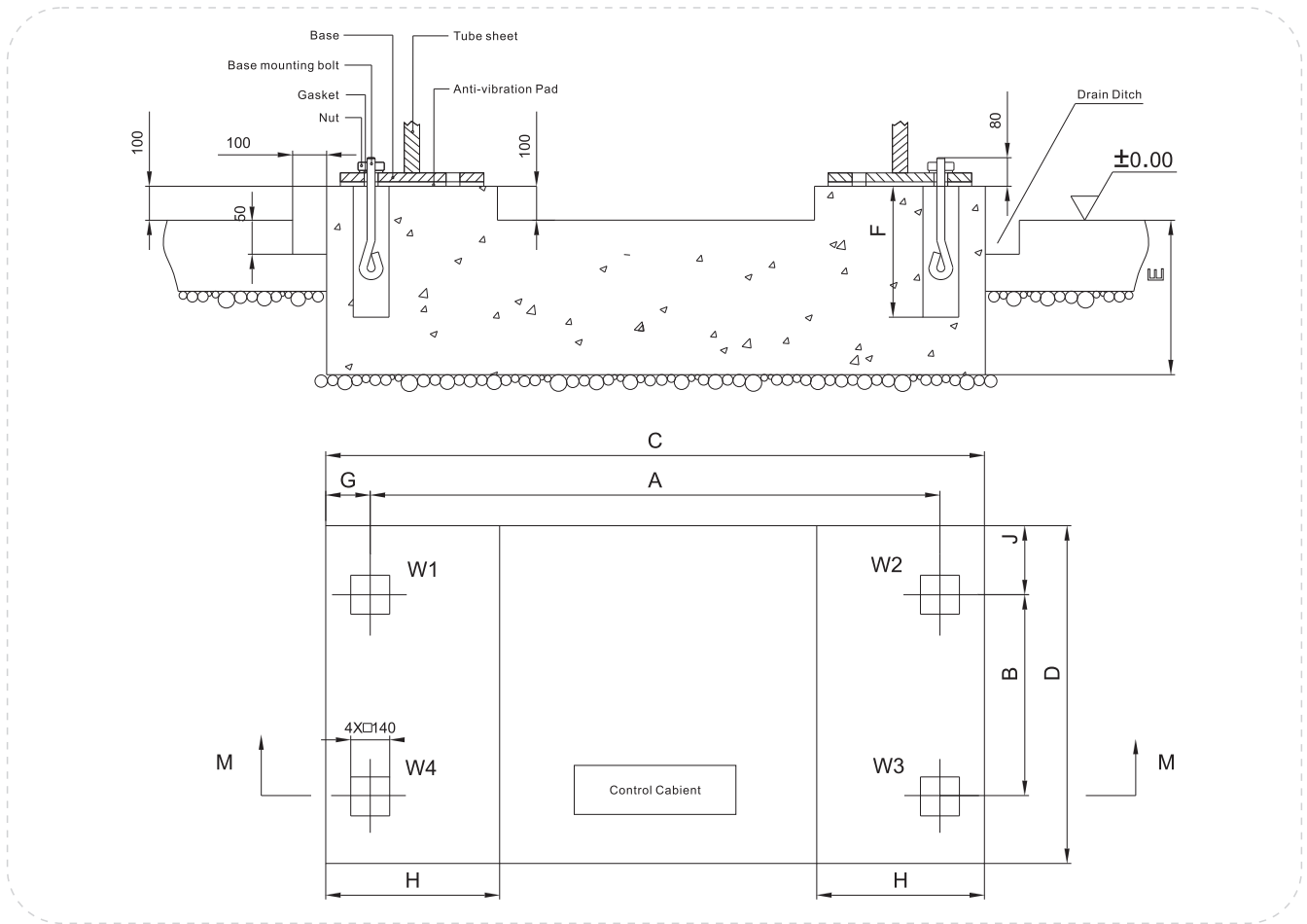
Chiller direction	Service Clearance (mm)
A–Front (where the electrical cabinet is located)	≥ 1200
B–Rear	≥ 1000
C–Left	≥ 1500 (Left or right)
D–Right (where the water piping connection is located)	※ (for tube replacement)
E–Top	≥ 500

Model	※ ( mm )
ZUW100.1~170.1	≥ 2800
ZUW180.1~265.2	≥ 2800
ZUW270.1~350.2	≥ 3100
ZUW380.1–540.2	≥ 3700



## 9. Installation Notes



Make sure that the ground support where the chiller will be placed is adequate in size and is able to support the full operating weight of the complete unit.

### Chiller mounting location

unit: mm

Model#	ZUW.C*ST-B					ZUW.CFME-B	
	ZUW110.1~170.1	ZUW190.1~265.2	ZUW270.1~350.2	ZUW380.1~490.2	ZUW510.2~540.2	ZUW100.1~160.1	ZUW180.1~305.1
A	2806	2840	3145	3762	3758	2806	2840
B	970	1430	1430	1586	1734	970	1430
C	3206	3240	3545	4162	4158	3206	3240
D	1570	1830	1830	1986	2134	1570	1830
E	450	450	450	450	450	450	450
F	440	440	440	440	440	440	440
G	200	200	200	200	200	200	200
H	500	500	500	500	500	500	500
J	300	200	200	200	200	300	200
Mounting bolt	4 X M27 X 400						

### Chiller mounting point load

Bearing partition	ZUW.C*ST-B						ZUW.CFME-B		
	110.1~170.1	190.1~270.1	330.1	380.1&460.1	265.2~350.2	380.2~490.2	510~540.2	100.1~160.1	180.1~305.1
W1	23%	24%	23%	25%	23%	22%	23%	23%	24%
W2	24%	23%	23%	23%	23%	22%	23%	24%	23%
W3	28%	28%	27%	25%	27%	28%	27%	28%	28%
W4	25%	25%	27%	27%	27%	28%	27%	25%	25%

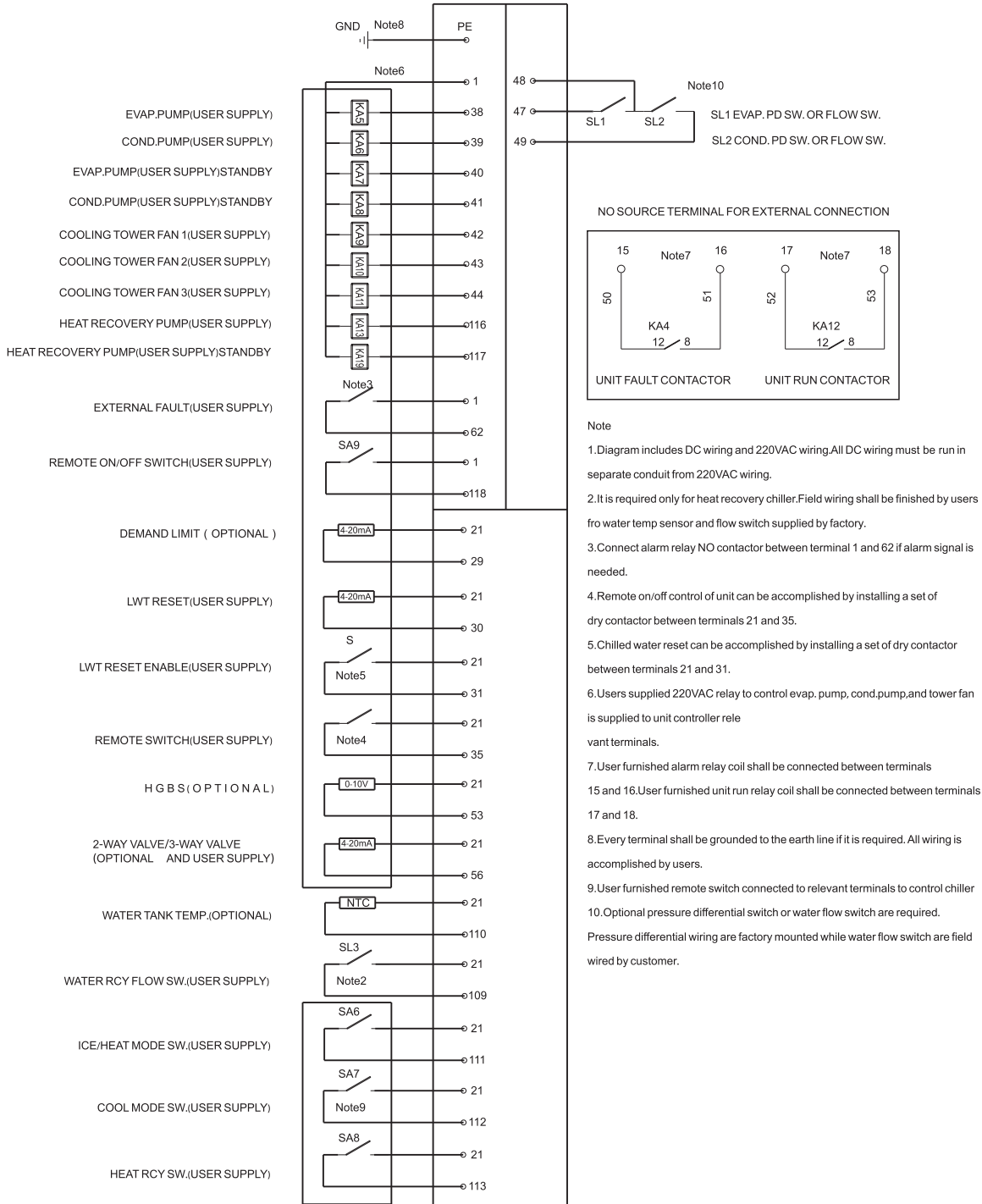
Note: Above table shows the percentage of the chiller weight in four fulcrums when chiller is running.

# 9. Installation Notes

## 9.4 Field wiring

- Wire sizes must comply with local and related electrical codes. Main power wiring between starter and motor terminal is factory-installed.
- We've supplied many optional input / output signals, such as evaporator/condenser pump relay, flow switch etc. There still exist some parts require field wiring, for example, remote on/off control of unit can be accomplished by installing a set of dry contacts between terminals.

Typical Field Wiring Diagram



Note:

- (NO1,NO2) means the corresponding terminal for (ZUW.1, ZUW.2);
- For specified chiller, field wiring should comply with the wiring diagram.
- ELWT: Evaporator Leaving Water Temperature

# 9. Installation Notes

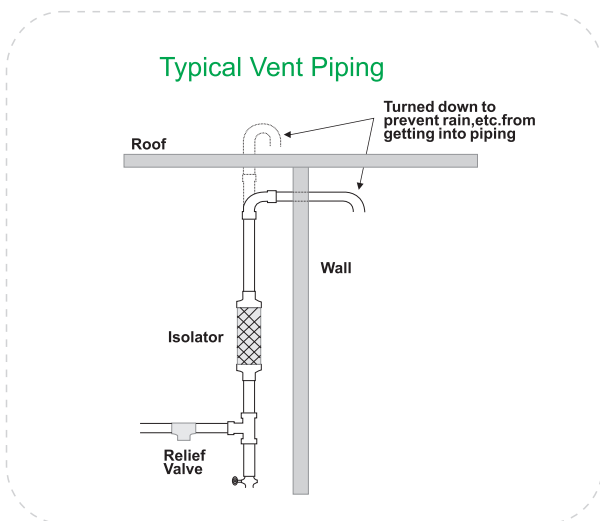
## 9.5 Relief valve

### Vessel relief valves

- Relief valve connection sizes are 1-inch NPT for the evaporator and oil separator. All relief valves shall be piped to the outside of the building in accordance with ANSI/ASHRAE 152007. The new 2007 standard has revised the calculation method compared to previous issues.
- Twin relief valves, mounted on a transfer valve, are used on the vessel so that one relief valve can be shut off and removed for testing or replacement, leaving the other in operation. Only one of the two valves is in operation at any time.
- Vent piping is sized for only one valve of the set since only one can be in operation at a time.

### Relief pipe sizing (ASHRAE Method)

- Relief valve pipe sizing is based on the discharge capacity for the given evaporator or condenser and the length of piping to be run.
- Since the pressures and valve size are fixed for DAIKIN chillers, the ASHRAE equation can be reduced to the simple table shown below:



Pipe Size inch (NPT)	1 1/4	1 1/2	2	2 1/2	3	4
Moody Factor	0.0209	0.0202	0.0190	0.0182	0.0173	0.0163
Equivalent length (ft)	2.2	18.5	105.8	296.7	973.6	4117.4

$$D_{Common} = (D_1^2 + D_2^2 \dots D_n^2)^{0.5}$$

The above information is a guide only. Consult local codes and/or latest version of ASHRAE Standard 15 for sizing data.

### NOTE:

A 1-inch pipe is too small to handle these valves. A pipe increaser must be installed at the valve outlet.

Per ASHRAE Standard 15, the pipe size cannot be less than the relief device. The discharge from more than one relief valve can be run into a common header, the area of which shall not be less than the sum of the areas of the connected pipes. For further details, refer to ASHRAE Standard 15. The common header can be calculated by the formula.

## 9.6 Start-up

- Start-up must be done by DAIKIN authorized engineers or technician in strict accordance with Installation Operation & Maintenance Manual.

## 9.7 Warranty

- DAIKIN standard warranty period is within 18 months of chiller ex-factory or 12 months of chiller first start-up, whichever comes first.
- Extended warranty on entire unit or compressor only for 1-4 years will be available as option.

## 9.8 Application Environment

### Standard application

Chiller's Standard running environment is as below:

Voltage fluctuation	± 10%
Voltage phase unbalance rate	≅ 2%
Frequency	± 2%
Working temp	3~40 (chiller installation room temp)
Relative humidity	≅ 90%, no condensed water
Altitude	< 1000m (ultrahigh altitude will affect electrical insulation & conductivity and need to take into consideration)
Atmospheric corrosion gas composition	sulfur dioxide ≅ 10 mg/m <sup>3</sup> , hydrogen fluoride ≅ 5 mg/m <sup>3</sup> , sulfuretted hydrogen ≅ 5 mg/m <sup>3</sup> , nitrogen oxides ≅ 5 mg/m <sup>3</sup> , chlorine ≅ 1 mg/m <sup>3</sup> , hydrogen chloride ≅ 5 mg/m <sup>3</sup>
Installation	Indoor installation and avoid directly rained or sunshine (contact DaiKin sales branch for special design if chiller needs to be installed outdoor or near seaside/high concentration of corrosive gas environment such as chemical factory, ect)

# 10. Product Specifications

## Part 1 General

### 1.01 Summary

- Section includes design, performance criteria, refrigerants, controls, and installation requirements for water-cooled screw compressor packaged chillers.

### 1.02 References

- Unit is outside of the scope of AHRI Water Cooled Chilling Packages Using Vapor Compression Cycle Certification Program .but is rated in accordance with AHRI Standard 550/590 (I-P) and AHRI Standard 551/591 (SI) .

### 1.03 Submittals

- A. Submit shop drawings and product data in accordance with contract Specifications.

- B. Submittals shall include the following:

- (1) Dimensioned plan and elevation view drawings, required clearances, and location of all field connections.
- (2) Summary of all auxiliary utility requirements such as: electricity, water, compressed air, etc. Summary shall indicate quality and quantity of each required utility.
- (3) Single-line schematic drawing of the field power hookup requirements, indicating all items that are furnished.
- (4) Schematic diagram of control system indicating points for field connection. Diagram shall fully delineate field and factory wiring.
- (5) Installation, Operation and Maintenance Manual.

### 1.04 Quality assurance

- A. Qualifications: Equipment manufacturer must specialize in the manufacture of the products specified and has five years' experience with similar equipment and the refrigerant offered.
- B. Regulatory Requirements: Comply with the codes and standards specified.
- C. The chiller manufacturing facility has been ISO certified.
- D. Factory running performance test before ex-factory.

### 1.05 Delivery and handling

- A. Chillers shall be delivered to the job site completely assembled and charged with refrigerant and oil by the manufacturer.
- B. Comply with the manufacturer's instructions for rigging and handling equipment.

### 1.06 Warranty

- The equipment manufacturer's warranty shall be for a period of 12 month from date of equipment start-up but not more than 18 months from shipment. The warranty shall cover defective material and workmanship within the above period, excluding refrigerant and oil.

**Option** The equipment manufacturer's warranty shall be for a period of 2 To 5 years from date of equipment start-up but not more than 18 to 66 months from shipment. The warranty shall cover defective material and workmanship within the above period, entire unit excluding refrigerant and oil.

**Option** After standard 12/18 month entire unit warranty above mentioned, the equipment manufacturer's warranty shall extend another period of 4 years. The warranty shall cover defective material compressor only and workmanship within the above period,

# 10. Product Specifications

## Part 2 Products

### 2.01 Acceptable manufacturers

Basis of Design - DAIKIN Model ZUW.C-B, including the standard product features and all special features required per the plans and specifications.

### 2.02 Unit description

Provide and install as shown on the plans, factory assembled, factory charged, and factory run-tested water-cooled screw compressor packaged chillers in the quantity and size specified. Each chiller shall consist of one or more semi-hermetic, rotary screw compressors; one shell-and-tube evaporator; one shell-and-tube water-cooled condenser, control system and all components necessary for controlled unit operation. Rubber pad vibration isolators will be provided.

**Option:** Spring vibration isolators for field installation per plans.

### 2.03 Design requirements

- A. General: Provide a complete screw compressor packaged chiller as specified herein and as shown on the drawings. The unit(s) shall be in accordance with the standards referenced in section 1.02 and any local codes in effect.
- B. Performance: Refer to the schedule of performance on the drawings. Performance shall be in accordance with applicable AHRI Standard.

### 2.04 Chiller components

- A. Compressors: The compressors shall be semi-hermetic, single rotor, rotary screw type. Compressors must be manufactured by the chiller manufacturer, if not then the chiller manufacturer must provide a five year parts and labor warranty on the compressor.
- B. Electric Motors: Compressor motors shall be high torque, two pole Semi-hermetic, squirrel cage induction type with inherent thermal protection on all three phases and cooled by suction gas.
- C. Wye-Delta Starter: Starter shall be capable of starting the compressor under all load conditions.  
Compressor motors will be protected internally with thermal sensors and externally with an overload relay. Starters will also be equipped with a phase failure and phase reversal protection device that will safely shut down the Compressor.

**Option:** Solid State Starter unit mounted to generate smooth start.

- D. Evaporator: The evaporator shall be of the flooded design, 2-pass, shell-and-tube type with copper tubes rolled into steel tube sheets. It shall be insulated with 3/4 inch (19 mm) closed cell polyurethane insulation and

designed for 150 psi (1034 kPa) water side working pressure and 203 psi (1400 kPa) refrigerant side pressure. It shall be designed in accordance with China Pressure Vessel Codes (GB Code) and equipped with spring loaded relief valves. And inlet right hand with Victaulic connection (groove only) when viewed from control panel.

**Option:** ASME code.

**Option:** 3-pass design.

**Option:** Marine water box instead of standard water heads.

**Option:** The evaporator shall have 38 mm closed cell polyurethane insulation in lieu of standard 3/4 inch (19 mm).

**Option:** Evaporator shall have left-hand water connection when viewed from the control panel.

**Option:** ANSI flanged connections 1 or 2 pieces.

- E. Condensers: Horizontal shell and finned tube type with steel shell and integral finned copper tubes rolled into steel tube sheets. The condenser shall be equipped with intermediate tube supports and construct in accordance with the requirements of China Pressure vessel Codes It shall be designed for 150 psi (1034 kPa) water side working pressure and 203 psi (1400 kPa) refrigerant side pressure. It shall have pressure relief Valves.

**Option:** ASME code.

**Option:** 3-pass design.

**Option:** Marine water box instead of standard water heads.

**Option:** Condenser shall have left-hand water connection when viewed from the control panel.

**Option:** ANSI flanged connections 1 or 2 pieces.

- F. Refrigerant Circuit: The unit shall be equipped with one or more compressors, one microprocessor controller, a factory-mounted control circuit transformer, oil separator, discharge check valve, liquid line shutoff valves, replaceable core filter-dryers, sight-glass with moisture indicator.

**Option:** Each Compressor shall have a suction service shutoff valve and a ball valve on injection valve.

- G. Electric Panel: The control section shall contain a microprocessor controller providing operating and equipment protection controls. The power section shall include wye-delta motor starters, a control transformer with primary and secondary fusing, and microprocessor transformers with fusing, standard power blocks. The control panel shall have a hinged, tool-locked door.



# 10. Product Specifications

The control system shall stage and load the compressors based on the leaving water temperature. Equipment protection devices controlled by the microprocessor shall include motor protection, high pressure, loss of water flow, freeze protection, and low refrigerant pressure. Controls shall include auto/stop switch, chilled water set point adjustment, anti-recycle timer, and digital display with water temperature and set point, operating temperatures and pressures, and diagnostic messages.

The following features and functions shall be included:

1. The control logic shall be designed to maximize operating efficiency and equipment life with protections for operation under unusual conditions. The system shall intelligently stage the unit to sustain leaving water temperature precision and stability while minimizing compressor cycling.

2. The following features and functions shall be included:

- a. Password protection for set point adjustment.
- b. Durable colorful liquid crystal display (LCD) screen type mounted on The unit controller. Default language and units of measure shall be English and I-P respectively. Messages shall be in plain English. Coded Messages, LED indicators and LED displays are not acceptable.
- c. **Option:** Soft-load operation, protecting the compressor by preventing full-load operation during the initial chilled fluid pull-down period.
- d. **Option:** BAS communication through Protocol Selectability. Optional modular plug-ins that enable the unit controller to communicate using standardized protocols such as Modbus, BacNet without a separate Gateway.
- e. Non-volatile program memory allowing auto-restart within 2 months after a power failure without requiring a UPS (un-interruptible power Supply).
- f. Start-to-start and stop-to-start cycle timers, providing minimum Compressor Off-time while maximizing motor protection.
- g. Must have a lead-lag function with factory supplied compressor staging For part-load operation by manual selection or automatically by circuit run hours.
- h. Pro-active compressor unloading when selected operating parameters exceed design settings, such as high discharge pressure or low evaporator Pressure.
- i. Diagnostic monitoring of unit operation, providing a pre-alarm signal in advance of a potential shutdown, allowing time for corrective action.

Chilled water flow switch to be field mounted in the chilled water line and field wired to terminals in the control panel.

## Part 3 Execution

### 3.01 Installation

- Make sure chiller is installed as per below requirements, otherwise rectifying measures must be taken.
  - A. Install in strict accordance with manufacturer's requirements, shop drawings, and contract documents.
  - B. Adjust and level chiller in alignment on supports.
  - C. Coordinate electrical installation with electrical contractor.
  - D. Coordinate controls with control contractor.
  - E. Provide all appurtenances required to ensure a fully operational and functional chiller.
  - F. Local water quality & power supply under regular air condition system standard.

### 3.02 Start-up

- A. Only can be conducted by manufacture's authorized engineer.
- B. Ensure proper charge of refrigerant and oil.
- C. Provide testing, and starting of machine, and instruction to the Owner in its proper operation and maintenance.

# 11. Typical Project



Singapore Downtown Line Stage 2(DTL2)



Real Plaza Salaverry In Peru



National Library of Trinidad and Tobago

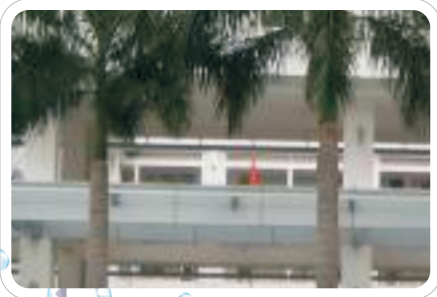


Kyocera Mita

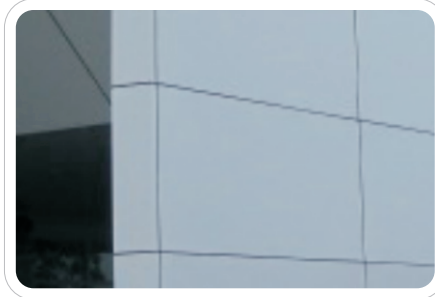


Bank of Thailand (Chiangmai)

# 11. Typical Project



Lawrence S. Ting School Ph 2 in Vietnam



Stanley in Hanoi



Wakefield House in Australia



Kilitch Drugs Factory in India



IGreen Data Center in Vietnam



Women and Children Hospital in Australia





### **Cautions on product corrosion**

- 1.The units should not be installed in areas where corrosive gases,such as acid gas or alkaline gad,are produced.
- 2.If the unit is to be installed close to the sea shore,direct exposure to the sea breeze should be avoided.If you need to install the unit close to the sea shore,contact your local distnbbutor.