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Turn to Experts - HVAC&R

Ningbo Longwell Electric Technology Co., Ltd

Headquarter: NO.100, South of Xuxiang River, Yuyao, Zhejiang Province, China 315400
Tell: +86 574 6218 9863
Fax: +86 574 6218 9863
Phone: 0086 183 5827 4663
Web: www.longwellfans.com | www.longwell-group.com | www.longwell-media.com
Email: sales@zjlongwell.com

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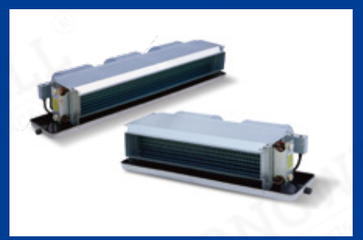


Longwell Technology Ventilation Equipment

—— Air Source Heat Pump Unit

Ningbo Longwell Electric Technology Co., Ltd

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Fan Coil Unit



Combined Air Conditioner



Air Source Heat Pump Unit



Screw-Type Air-Cooled Chiller Heat Pump Unit



Precision Constant Temperature and Humidity Unit



Rooftop Air Conditioning Unit



Screw-Type Water-Cooled Chiller Unit



Water and Ground Source Heat Pump Unit



Cabinet Air Handling Unit--Suspended Ceiling



Air Handling Unit-Horizontal



Remote Jet Unit



Air Handling Unit-Vertical

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About Longwell

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The Ventilation and Drive Technology Partner for Mission-Critical Environments

Longwell Technology - Ventilation Equipment Division - primarily engages in the production and sales of central air conditioning equipment. Our products are sold all over the country and exported to more than 50 countries and regions worldwide. LONGWELL central air conditioning series includes a comprehensive range of products, such as air source heat pump units, Air-cooled chillers (heat pump) units, water (ground) source heat pump units, sewage source heat pump units, seawater source heat pump units, water-cooled chiller units, constant temperature and humidity units, heat pump drying units, combined air conditioners, roof air conditioning units, air handling units, remote jet units, fan coil units, etc. These products are widely used in factories, schools, hotels, hospitals, office buildings, shopping malls, residential communities, and other buildings.

We have passed the ISO9001 Quality Management System Certification, ISO45001 Occupational Health and Safety Management System Certification, ISO14001 Environmental Management System Certification, etc. Our company is committed to survival by product quality and development by technological innovation, continually researching and producing green, clean, environmentally friendly and energy-saving innovative products. With full work enthusiasm, swift and decisive actions, higher standards, continuous improvement, and innovation, we will strive to create more value for our customers.



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Factory Display

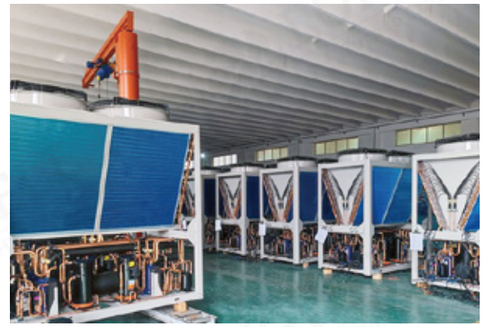
LONGWELL central air conditioning series includes a comprehensive range of products, such as air source heat pump units, Air-cooled chillers (heat pump) units, water (ground) source heat pump units, sewage source heat pump units, seawater source heat pump units, water-cooled chiller units, constant temperature and humidity units, heat pump drying units, combined air conditioners, roof air conditioning units, air handling units, remote jet units, fan coil units, etc. These products are widely used in factories, schools, hotels, hospitals, office buildings, shopping malls, residential communities, and other buildings.















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Certificate Display

We have passed the ISO9001 Quality Management System Certification, ISO45001 Occupational Health and Safety Management System Certification, ISO14001 Environmental Management System Certification, etc.


Patent


Patent


ISO


ISO


CRAA


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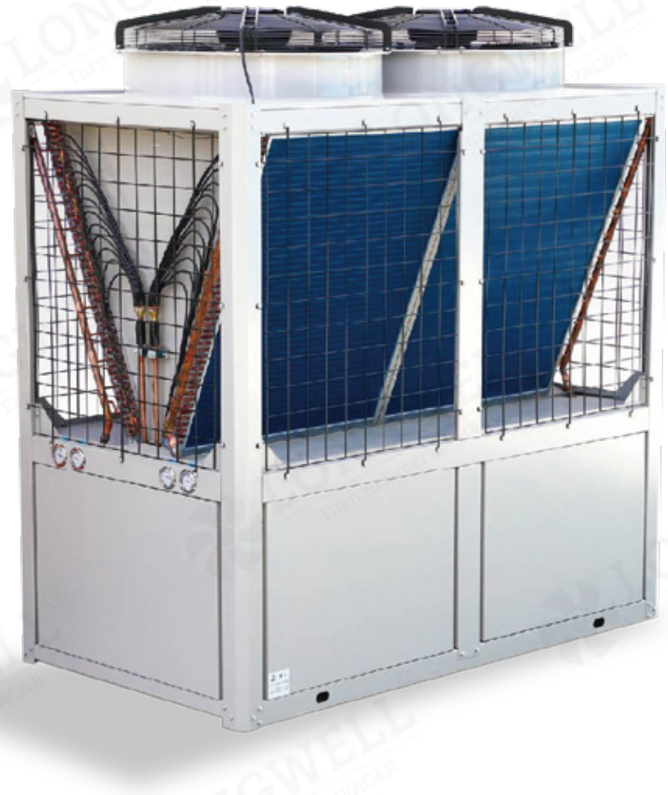
Type Code

LW HC S A 65 F H A

- A-R410a
- Single cold
  H-Conventional heat pump
  D-Low-temperature heat pump
  CD-Ultra-low temperature heat pump
  X-high efficiency
- F-Frequency Conversion
  Fixed Frequency
- 65-Cooling Capacity
- A-Air-cooled
  W-Water-cooled
- S-Scroll Compressor
  LG-Screw Compressor
- HC-Water Chiller
- LW-Longwell

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Air Source Heat Pump Unit



Diverse In Form,Widely Applicable

There are both conventional units and low-temperature units, ultra-low-temperature units, variable frequency units, and new refrigerant R410a units, which can meet the needs of different locations.

Easy Installation,Cost-saving

Due to the small size and light weight of each basic unit, users can flexibly choose the combination mode according to their actual cooling or heating needs, and additional expansions can be added at any time. It is widely used in various places such as hotels, shopping malls, cinemas, office buildings, stadiums, residential areas, bath centers, greenhouses, and other locations.

Smart Defrosting

Based on heating operation parameters, it intelligently determines defrosting time, ensuring precise defrosting, avoiding unnecessary defrost cycles, and saving energy.

Intelligent Operation,Balanced Wear

Equipped with a microcomputer controller, it can automatically adjust operating modes based on environmental temperature and load changes, enabling one-touch startup. It automatically records the accumulated running time and start-up frequency of each compressor, employing an intelligent balanced operation control program to achieve balanced wear operation. This effectively enhances the unit's lifespan and ensures reliable system operation.

Efficient Configuration, Stable Performance

The compressor, fan, refrigeration system components, controller, and electrical components of the unit are all sourced from reputable brands, ensuring reliable performance. Each unit undergoes rigorous operational testing at the nationally certified standard air conditioning unit performance testing center before leaving the factory.

Advanced Design,Multiple Protections

The unit is equipped with over 10 protection functions including high-pressure protection, low-pressure protection, phase sequence protection, overload protection, and anti-freezing protection, ensuring the safe and reliable operation of the unit.

Redundant Operation,Preventing Potential Issues

Even if a single module or compressor within a module fails, the system can still operate normally, ensuring uninterrupted user experience.

Factory Pre-tuned For Easy Setup And Use

The unit is factory-charged with refrigerant and has undergone testing and tuning according to national standards. On-site installation only requires connecting the power supply and water piping, making it user-friendly.

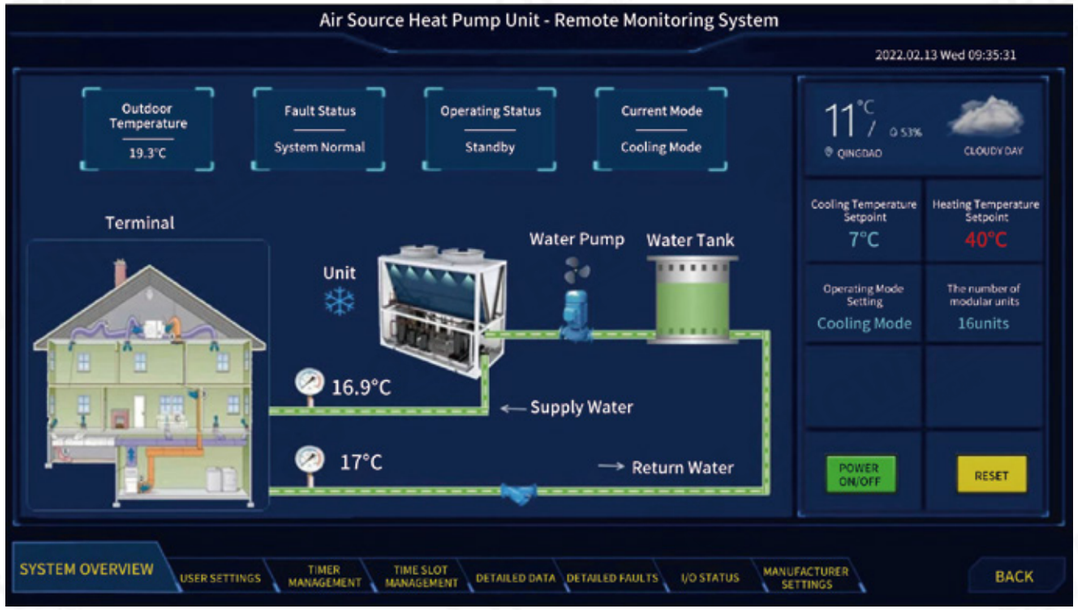
Energy Efficiency

A low-ambient-temperature variable frequency air-source heat pump unit, employing innovative third-generation DC variable frequency + jet enthalpy increasing technology, adjusts the heating or cooling capacity by continuously adjusting the operating frequency of the compressor, thereby changing the energy output of the compressor. The heating energy efficiency exceeds the highest level of the national standard, with comprehensive energy savings of over 30% compared to fixed-frequency units.

Wide-ranging Operation

Specifically designed for low-temperature conditions, significantly enhancing the stability and availability of the unit, capable of coping with harsh environments ranging from -30°C to 48°C. It can operate efficiently under both low and high temperature conditions, meeting the heating needs in winter and cooling demands in summer for over 95% of regions in China.

Remote Monitoring System



Air-cooled Chiller Heat Pump Unit Performance Parameter Table

Model		LWHCSA65HA	LWHCSA130HA
Performance	Rated Cooling Capacity(KW)	65	132
	Power(KW)	20	40.6
	EER	3.25	3.25
	Rated Heating Capacity (KW)	68	137
	Power (KW)	20.6	41.5
	COP	3.30	3.30
	Maximum Input Current(A)	48	105
	IPLV	3.70	3.70
	Power Supply(V/HZ)	Three-phase four-wire system power supply 380V/50Hz	
Compressor	Type	Fully enclosed scroll	Fully enclosed scroll
	Quantity	2	4
Fan	Type	High efficiency axial fan	High efficiency axial fan
	Quantity	2	2
Heat Exchanger	Type	Shell and tube heat exchanger	
	Water Flow Rate (m^3/h)	10.32	22.35
	Inlet and Outlet Pipe Diameter	DN50	DN65
	Water Side Pressure Drop(KPa)	60	60
Safety	Safety Protection	High pressure, low pressure, water cut-off, anti-freeze, phase loss, overload, compressor protection, fusible plug	
Refrigerant	Type	R410a	
	Charge Amount (Kg)	14	28
Dimensions	Length(mm)	2017	2300
	Width(mm)	1002	1200
	Height(mm)	2040	2317
Weight (Kg)		605	1016

Remarks:
1. Cooling nominal conditions: Inlet water temperature 12°C, outlet water temperature 7°C, ambient temperature 35°C.
2. Heating nominal conditions: Inlet hot water temperature 40°C, outlet hot water temperature 45°C, ambient temperature (dry bulb) 7°C (wet bulb) 6°C.
3. Water side fouling factor: 0.086$m^2 \cdot °C/kW$.
4. Combination method: Any combination between all models of units.
5. Specifications are subject to change without prior notice due to product improvements.

Air Source Heat Pump Units for Low Ambient Temperatures Performance Parameter Table

Model		LWHCSA65DA	LWHCSA130DA	LWHCSA150DA
Performance	Rated Cooling Capacity(KW)	65	130	150
	Power(KW)	20	40	44
	EER	3.25	3.25	3.41
	Rated Heating Capacity (KW)	76	151	160
	Power (KW)	22.7	45.1	48
	COP	3.35	3.35	3.33
	Nominal Heating Capacity(KW)	53	105	110
	Power (KW)	21	41.6	43.6
	COP	2.52	2.52	2.64
	Power Supply(V/Hz)	Three-phase four-wire system power supply 380V/50Hz		
Compressor	Type	Fully enclosed scroll	Fully enclosed scroll	Fully enclosed scroll
	Quantity	2	4	2
Fan	Type	High efficiency axial fan		
	Quantity	2	2	2
Heat Exchanger	Type	Shell and tube heat exchanger		
	Water Flow Rate (m^3/h)	10.32	22.36	25.8
	Inlet and Outlet Pipe Diameter	DN50	DN65	DN65
	Water Side Pressure Drop(KPa)	60	60	60
Safety	Safety Protection	High pressure, low pressure, water cut-off, anti-freeze, phase loss, overload, compressor protection, fusible plug		
Refrigerant	Type	R410a		
	Charge Amount (Kg)	14	28	30
Dimensions	Length(mm)	2190	2300	2300
	Width(mm)	860	1200	1200
	Height(mm)	1890	2317	2317
Weight (Kg)		605	1016	1110

Remarks:
1. Cooling Rated Conditions: Inlet water temperature 12°C, outlet water temperature 7°C, ambient temperature 35°C.
2. Heating Rated Conditions 1: Hot water outlet temperature 45°C, ambient temperature (dry bulb) 7°C (wet bulb) 6°C.
3. Heating Nominal Conditions 1: Hot water outlet temperature 41°C, ambient temperature (dry bulb) -12°C (wet bulb) -14°C
4. Water side fouling factor: 0.086$m^2 \cdot$°C/kW.
5. Combination method: Any combination between all models of units.
6. Specifications are subject to change without prior notice due to product improvements..

Direct Current Variable Frequency Low Temperature Air Source Heat Pump Unit Performance Parameter Table

Model		LWHCSA65FDA	LWHCSA80FDA
RRated Cooling Capacity(KW)		28~70	38~85
EER		2.41~3.11	2.20~3.20
Rated Heating Capacity (KW)		40~90	48~120
COP		3.10~3.81	3.10~3.85
Nominal Heating Capacity (KW)		28~65	38~80
COP		2.35~2.67	2.40~2.55
Low Temperature Heating Capacity(KW)		28~42	38~56
COP		1.83~1.87	1.80~1.90
IPLV (H)		3.08	3.08
Power Supply Form		3-Phase 380V 50Hz	
Operating Temperature Range(°C)		Heating: -35~48°C,Cooling: 18~48°C	
Operating Water Temperature Range(°C)		Heating: 30~65°C,Cooling: 5~15°C	
Type of Refrigerant		R410a	
Single Cold/Heating and Cooling/Hot Water		Heating and cooling/Hot water	
Fixed Frequency/Frequency Conversion		DC Frequency conversion	
Enhanced Vapor Injection Function		Equipped with	
Noise(dBA)		66	68
Maximum Operating Current(A)		55	84
Inlet and Outlet Pipes(mm)		DN65 Flange	DN65 Flange
Water Flow Rate(m^3/h)		11.2	12.9
Dimensions	Length(mm)	2017	2017
	Width(mm)	1002	1002
	Height(mm)	2040	2040
Total Mass of the Unit (Kg)		650	720

Remarks:
1. Cooling Nominal Conditions: Inlet water temperature 12°C, outlet water temperature 7°C, ambient temperature 35°C.
2. Heating Rated Conditions: Hot water outlet temperature 45°C, ambient temperature (dry bulb) 7°C (wet bulb) 6°C.
3. Heating Nominal Conditions: Hot water outlet temperature 41°C, ambient temperature (dry bulb) -12°C (wet bulb) -14°C.
4. Heating Low Temperature Conditions: Hot water outlet temperature 41°C, ambient temperature (dry bulb) -30°C (wet bulb) -14°C.
5. Water side fouling factor: 0.086$m^2 \cdot$°C/kW.
6. Combination method: Any combination between all models of units.
7. Specifications are subject to change without prior notice due to product improvements.

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Ultra-Low Temperature High Efficiency Air Source Heat Pump Unit Performance Parameter Table

Model		LWHCSA80XA	LWHCSA85XA
Performance	Rated Heating Capacity(KW)	80	85
	Power(KW)	22	23.6
	COP	3.63	3.60
	Nominal Heating Capacity 1 (KW)	50	55
	Power (KW)	19.5	21.1
	COP	2.56	2.61
	Nominal Heating Capacity 2 (KW)	50	60.6
	Power (KW)	26.9	28.6
	COP	2.20	2.12
	Low Temperature Heating Capacity 1 (KW)	44	48.7
	Power (KW)	20	21.7
	COP	2.2	2.25
	Low Temperature Heating Capacity 2 (KW)	44	50.6
	Power (KW)	23	25.5
	COP	1.91	1.98
	Maximum Operating Current (A)	60	74
	Power Supply (V/Hz)	Three-phase four-wire system power supply 380V/50Hz	
Compressor	Type	Fully enclosed scroll	Fully enclosed scroll
	Quantity	2	2
Fan	Type	High efficiency axial fan	High efficiency axial fan
	Quantity	2	2
Heat Exchanger	Type	Shell and tube heat exchanger	
	Water Flow Rate (m^3/h)	13.76	14.62
	Inlet and Outlet Pipe Diameter	DN50	DN65
	Water Side Pressure Drop(KPa)	60	60
Safety	Safety Protection	High pressure, low pressure, water cut-off, anti-freeze, phase loss, overload, compressor protection, fusible plug	
Refrigerant	Type	R410a	
	Refrigerant Charge (Kg)	14	16
Dimensions	Length(mm)	2017	2017
	Width(mm)	1002	1002
	Height(mm)	2040	2040
Weight (Kg)		605	778

Remarks:
1. Heating Rated Conditions: Hot water outlet temperature 45°C, ambient temperature (dry bulb) 7°C (wet bulb) 6°C.
2. Heating Nominal Conditions 1: Hot water outlet temperature 41°C, ambient temperature (dry bulb) -12°C (wet bulb) -14°C.
3. Heating Nominal Conditions 2: Hot water outlet temperature 55°C, ambient temperature (dry bulb) -12°C (wet bulb) -14°C.
4. Heating Low Temperature Conditions 1: Hot water outlet temperature 41°C, ambient temperature (dry bulb) -20°C (wet bulb) -14°C.
5. Heating Low Temperature Conditions 2: Hot water outlet temperature 50°C, ambient temperature (dry bulb) -20°C (wet bulb) -14°C.
6. Water side fouling factor: 0.086$m^2 \cdot °C/kW$.
7. Combination method: Any combination between all models of units.
8. Specifications are subject to change without prior notice due to product improvements.

Ultra-Low Temperature Air Source Heat Pump Unit Performance Parameter Table

Model		LWHCSA150CDA
Rated Cooling Capacity(KW)		150
Power(KW)		46.6
EER		3.21
Rated Heating Capacity(KW)		170
Power (KW)		48
Nominal Heating Capacity(KW)		115
Power (KW)		44
Compressor	Type	Fully enclosed scroll
	Quantity	2
Fan	Type	High efficiency axial fan
	Quantity	4
Mode of Operation		Manual/Automatic
Safety Protection		High pressure, low pressure, water cut-off, anti-freeze, phase loss, overload, compressor protection
Water Flow Rate(m^3/h)		25.8
Inlet and Outlet Pipe Diameter		DN65
Water Pressure Drop (KPa)		60
Refrigerant		R410a
Refrigerant Charge Quantity(Kg)		15×2
Power Supply(V/Hz)		3/380V/50Hz
Dimensions	Length(mm)	2200
	Width(mm)	1820
	Height(mm)	2200
Operating Weight (Kg)		1450

Remarks:

1. The nominal cooling capacity and nominal cooling input power are tested at rated water flow rate, outlet water temperature of 7°C, and outdoor ambient dry bulb temperature of 35°C.
2. The rated heating capacity is tested at rated water flow rate, outlet water temperature of 45°C, and outdoor ambient dry bulb temperature of 7°C/wet bulb temperature of 6°C.
3. The nominal heating capacity is tested at rated water flow rate, outlet water temperature of 41°C, and outdoor ambient dry bulb temperature of -12°C/wet bulb temperature of -14°C.
4. The unit's cooling operation range is from 5 to 48°C, and the heating operation range is from -30 to 30°C. It is not allowed to operate the unit for cooling when the ambient temperature is below 5°C.
5. The above specifications are for single module parameters, and multiple modules can be combined for use, with a maximum of 16 modules.
6. Specifications are subject to change due to product improvement without prior notice. The manufacturer reserves the right to change configurations. Please refer to the unit's factory configuration at the time of purchase.he time of purchase.

Ultra-Low Temperature Variable Operating Condition Parameter Table

Outlet Water Temperature (°C)		Ambient Temperature (°C)														
		-30	-25	-20	-15	-10	-7	-5	0	2	5	7	10	15	20	25
30	Heating Capacity	0.45	0.51	0.56	0.64	0.74	0.77	0.80	0.87	0.90	0.95	1.01	1.11	1.15	1.23	1.28
	Input Power	0.81	0.81	0.81	0.81	0.81	0.82	0.82	0.82	0.82	0.82	0.83	0.83	0.83	0.83	0.83
41	Heating Capacity	0.45	0.52	0.57	0.65	0.74	0.78	0.81	0.87	0.91	0.96	1.01	1.11	1.15	1.24	1.29
	Input Power	0.90	0.91	0.92	0.92	0.95	0.95	0.95	0.95	0.96	0.97	0.97	0.98	0.98	0.98	0.99
45	Heating Capacity	0.45	0.52	0.58	0.66	0.74	0.78	0.81	0.87	0.91	0.96	1.00	1.11	1.15	1.24	1.29
	Input Power	0.95	0.96	0.96	0.96	0.97	0.97	0.97	0.97	0.97	0.98	1.00	1.00	1.00	1.01	1.02
50	Heating Capacity		0.52	0.60	0.66	0.74	0.78	0.82	0.88	0.91	0.96	1.01	1.11	1.15	1.24	1.30
	Input Power		1.07	1.08	1.08	1.08	1.09	1.09	1.09	1.09	1.10	1.11	1.11	1.11	1.12	1.12
55	Heating Capacity			0.60	0.67	0.74	0.79	0.82	0.88	0.91	0.97	1.01	1.11	1.15	1.24	1.30
	Input Power			1.20	1.21	1.21	1.22	1.22	1.22	1.22	1.22	1.23	1.23	1.23	1.24	1.25
60	Heating Capacity			0.62	0.68	0.74	0.79	0.82	0.89	0.92	0.97	1.02	1.12	1.16	1.25	1.29
	Input Power			1.36	1.36	1.36	1.36	1.36	1.37	1.38	1.38	1.39	1.39	1.39	1.40	1.41

Conventional/Low-Temperature Variable Operating Condition Parameter Table

The coefficient of cooling performance correction

Outlet Water Temperature (°C)	Ambient Temperature (°C)					
	20	25	30	35	40	45
5	0.98	0.97	0.96	0.95	0.94	0.92
7	1.04	1.02	1.01	1	0.98	0.97
9	1.10	1.08	1.06	1.05	1.03	1.01
11	1.15	1.14	1.12	1.10	1.09	1.06
13	1.21	1.20	1.18	1.16	1.14	1.11
15	1.28	1.26	1.24	1.22	1.19	1.17

Cooling Input Power Correction Factor

Outlet Water Temperature (°C)	Ambient Temperature (°C)					
	20	25	30	35	40	45
5	0.79	0.83	0.91	0.99	1.09	1.19
7	0.80	0.83	0.91	1	1.1	1.2
9	0.80	0.84	0.92	1.01	1.1	1.21
11	0.81	0.84	0.92	1.01	1.11	1.22
13	0.81	0.85	0.93	1.02	1.12	1.23
15	0.82	0.85	0.94	1.03	1.13	1.23

Heating Performance Correction Factor

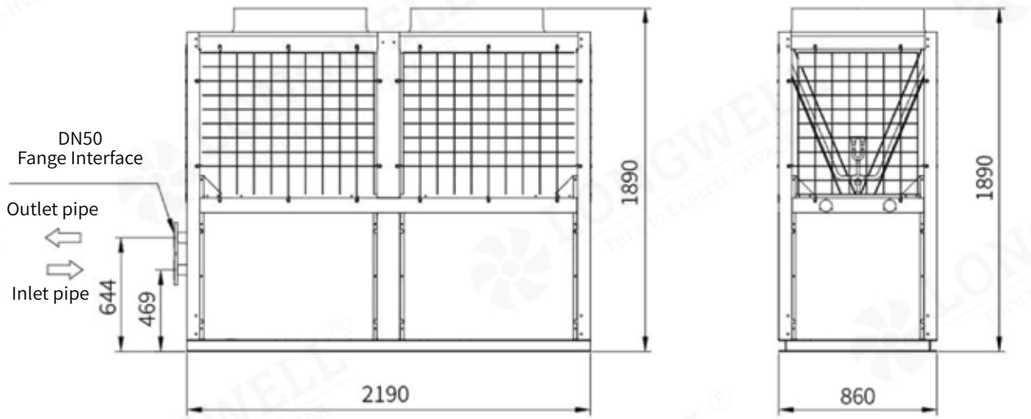
Outlet Water Temperature (°C)	Ambient Temperature (°C)										
	-20	-15	-12	-10	-7	0	5	7	10	15	20
35	0.52	0.59	0.66	0.67	0.72	0.86	0.98	1.03	1.11	1.27	1.44
40	0.52	0.59	0.65	0.67	0.72	0.84	0.97	1.02	1.10	1.25	1.42
45	0.51	0.58	0.63	0.66	0.71	0.85	0.96	1.00	1.08	1.22	1.38
50	0.50	0.57	0.61	0.64	0.69	0.81	0.92	0.96	1.03	1.17	1.32

Heating Input Power Correction Factor

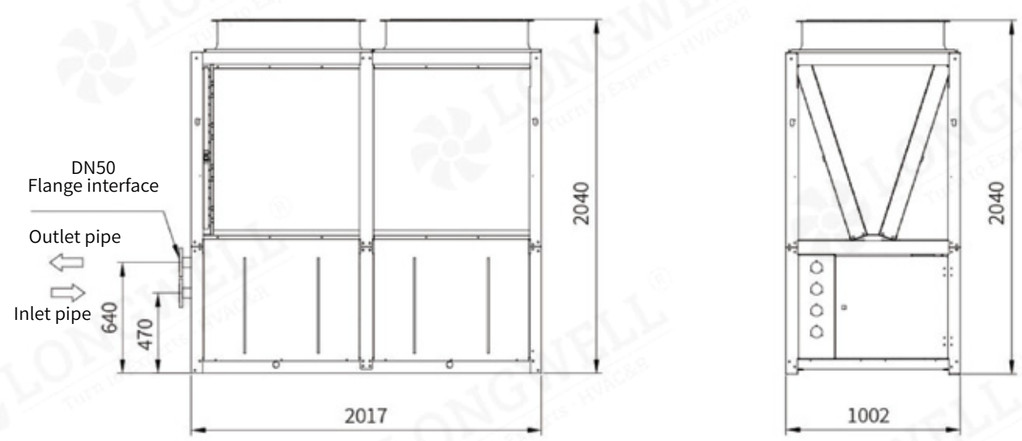
Outlet Water Temperature (°C)	Ambient Temperature (°C)										
	-20	-15	-12	-10	-7	0	5	7	10	15	20
35	0.76	0.77	0.78	0.78	0.79	0.81	0.83	0.83	0.84	0.85	0.87
40	0.83	0.85	0.86	0.86	0.87	0.89	0.91	0.91	0.92	0.94	0.95
45	0.91	0.93	0.94	0.94	0.95	0.98	0.99	1.00	1.01	1.03	1.04
50	1.00	1.02	1.03	1.04	1.05	1.07	1.09	1.10	1.11	1.13	1.15

Unit Outline Drawing

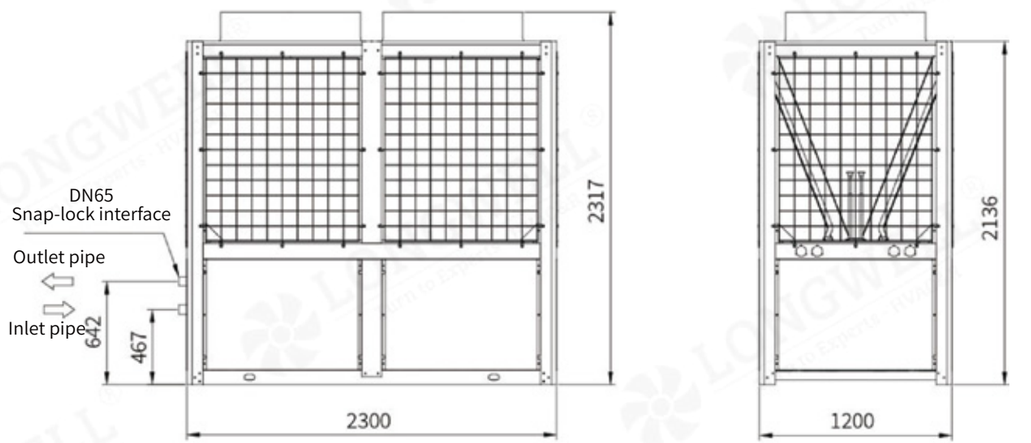
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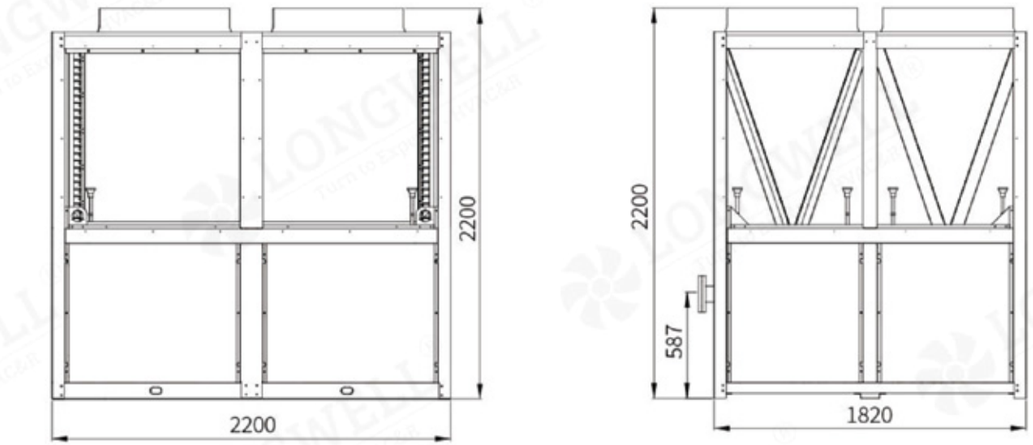
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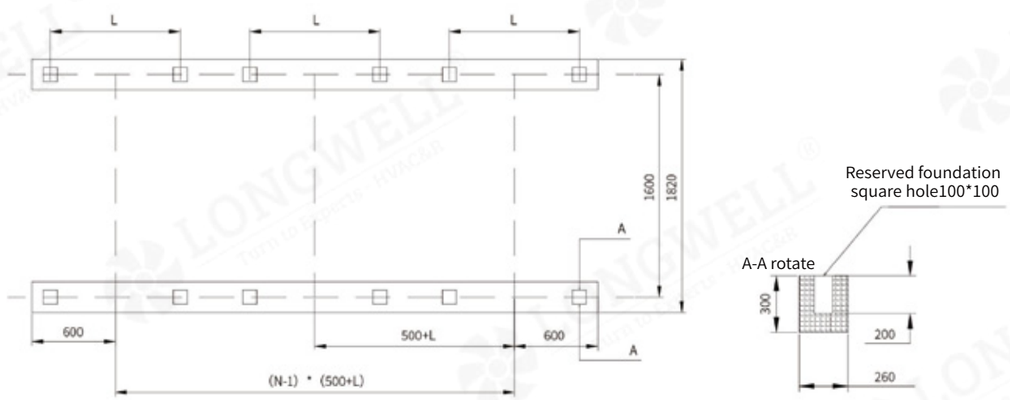
LWHCSA130HA/LWHCSA130DA/LWHCSA150DA



LWHCSA150CDA

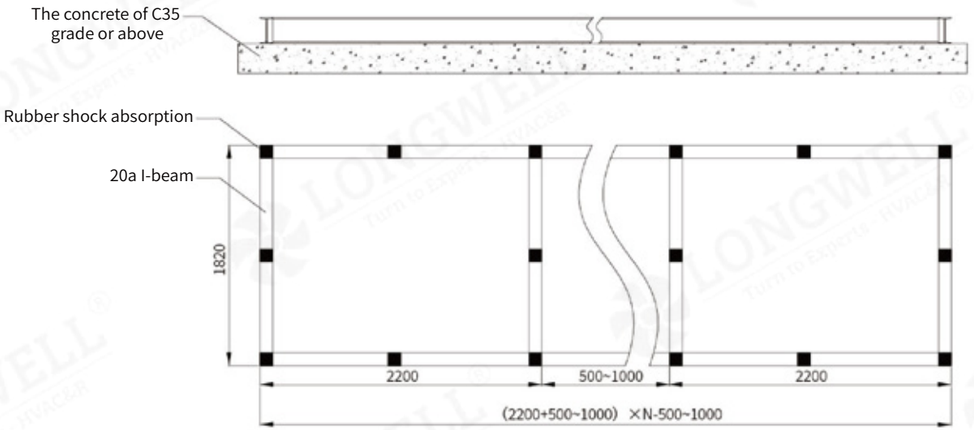


Installation Foundation Diagram



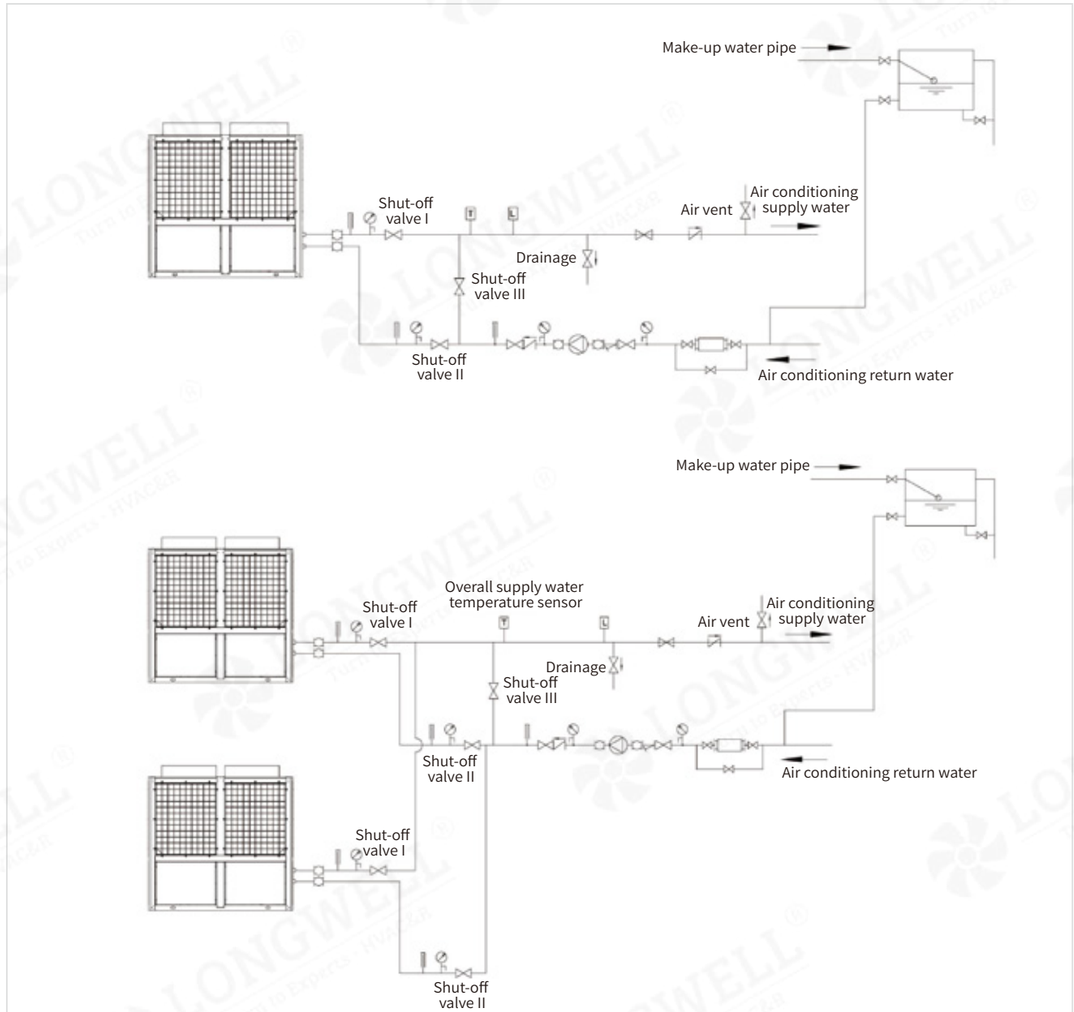
Parameter Description:
LWHCSA130HA/LWHCSA130DA/LWHCSA150DA: L=1135
LWHCSA65HA/LWHCSA65FDA/LWHCSA65CDA/LWHCSA80CDA/LWHCSA80FDA/LWHCSA80XA/LWHCSA85XA: L=935
LWHCSA65DA: L=795
N=Number of units

LWHCSA150CDA Installation Foundation Diagram



1. The concrete grade used shall not be lower than C35#.
2. The quantity of foundations shall increase according to the number of modules.
3. The spacing between modules shall be determined by the user based on site conditions, with a recommended maintenance operation space of not less than 300-500mm.
4. The foundation load-bearing capacity shall be designed based on the weight during unit operation.
5. The foundation can be made of channel steel (designed by the user according to the unit's shape) or concrete structure, with a flat surface.
6. The unit and the foundation can be fixed with M12 anchor bolts.

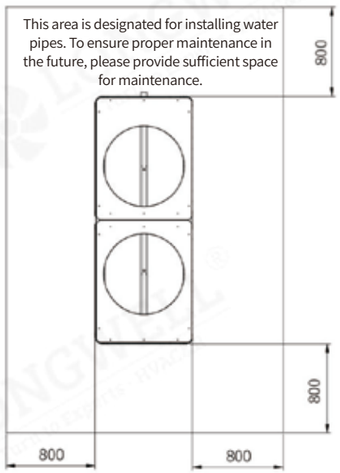
Pipeline Schematic Diagram

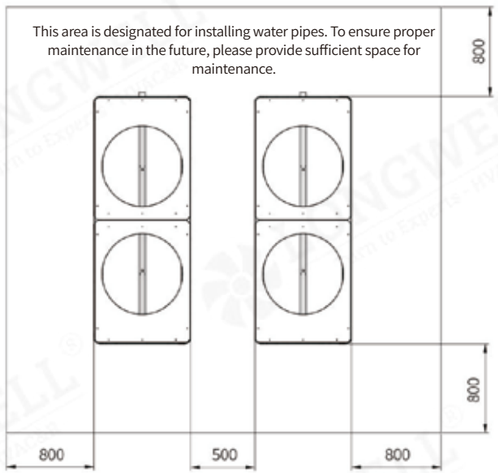


Remarks:
1. The piping of the unit's inlet and outlet pipes must be installed in the same way.
2. The assembly of the unit's inlet and outlet pipes can be rotated, but the assembly sequence must be consistent with the diagram above.
3. Target-type flow controllers must be installed directly above the main outlet pipe and installed correctly according to the instructions for use.
4. Anti-vibration flexible joints must be installed between the inlet and outlet pipes and the unit, between the pump and the unit, or between the inlet and outlet pipes.
5. The unit's inlet and outlet pipes must be equipped with main return and outlet temperature sensor pipes.
6. There must be a maintenance space of 1600 between the main inlet and outlet pipes and the unit.
7. The lower part of the water-side heat exchanger is equipped with a drain valve for winter drainage and maintenance of the water system.
8. Before commissioning the unit, close shut-off valves I and II, open shut-off valve III, run the pump for 4 hours, clean the filter, drain the water from the system, repeat the above operation once, then open shut-off valves I and II, and close shut-off valve III.

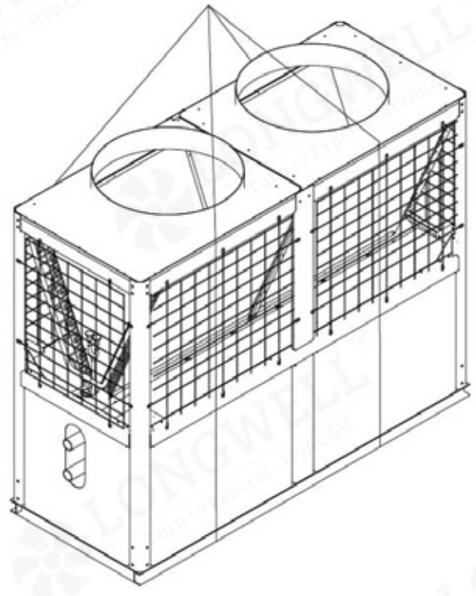
Legend	Name
	Spherical flexible joint
	Check valve
	Valve
	Y-type filter
	Pressure gauge
	Thermometer
	Electronic water processor
	Recirculating water pump
	Flow switch
	Temperature sensor

Installation Layout Diagram





Lifting Schematic Diagram



Range Of Unit Application

Project		Fixed-frequency Standard Type	Low Ambient Temperature Type	Ultra-low Temperature Type
On The Usage Side	Cold Water Outlet Temperature (°C)		5~15	
	Hot Water Outlet Temperature (°C)		35~50	
On The Environmental Side	Cooling Dry Bulb Temperature (°C)	21~43	21~45	21~45
	Heating Dry Bulb Temperature (°C)	-7~21	-25~21	-30~21
Water Fow Rate (m^3/h)			Rated flow rate ±15%	
Allowable Voltage Range (V)			Rated voltage ±10%	
Three-phase Voltage Imbalance Ratio			±2%	
Power supply allowable frequency range (Hz)			Rated power ±2%	

User Instructions

Before starting up, the following tasks must be completed:
1. Connect all power supply systems and external power control devices as required.
2. Power on the unit for preheating of lubricating oil, for a duration of no less than 12 hours.
3. Check whether the terminal equipment is operating normally.
4. Start the water pump, confirm the rotation direction, and check if the water system is functioning properly.
5. Check the water source of the expansion water tank, open the exhaust valve, and remove the air from the pipeline.
6. Check whether the compressor and fan are rotating in the correct direction.
7. Conduct a trial run with the main circuit power off to check if the sequence of actions is normal.
8. Set the cooling (heating) operation mode as required. Once all the above tasks are completed, the main power supply can be connected, and the air conditioning unit can be started. After the water temperature reaches the required level, the terminal equipment can be started for normal cooling (heating) operation. Once the unit is commissioned and put into normal operation, its power phase sequence must remain unchanged.

Installation Notes

1. When transporting the unit, it should be kept as level as possible, avoiding tilting more than 30 degrees. The upper part of the lifting appliance should have support rods to avoid damaging the equipment.
2. The unit can be installed on the roof or in an outdoor courtyard, and the supporting surface must have sufficient strength to withstand the weight of the unit during operation.
3. The unit should not be installed in places with high dust, corrosive gases, or high humidity.
4. Adequate space must be left for installation, with at least 1.5 meters of space available on all sides for heat dissipation and for maintenance personnel to enter and exit.
5. When the unit is in place, shock-absorbing pads or shock absorbers should be placed under the unit frame. After adjusting the unit to be level, the anchor bolts can be tightened.
6. The unit should be shielded from direct sunlight and rain as much as possible. It is recommended to install a rainproof and sunshade shed. However, ensure that there is at least 3 meters of space above the air outlet to facilitate air circulation.
7. The installation and insulation of the air conditioning system piping should be designed, guided, and executed by professional personnel according to the relevant provisions of HVAC installation standards.
8. External piping systems must be equipped with shock-absorbing flexible joints, filters, electronic descaling devices, check valves, drain valves, exhaust valves, shut-off valves, and expansion tanks. The expansion tank should be installed 1 to 1.5 meters higher than the highest point of the system. The tank's capacity should be about 1/10 of the entire system's water volume. The exhaust valve should be installed between the highest point of the system and the expansion tank. The refrigerant piping system and expansion tank should be insulated.
9. Shock-absorbing flexible joints should be used to connect the water pump to the unit and the water pump to the system piping. Pipe brackets should be installed to prevent the unit from being subjected to force.
10. Pipe flushing and insulation of the system piping should be performed before connecting the pipes to the unit. Connecting pipes to the unit before they are thoroughly flushed is strictly prohibited.
11. Lightning protection should be considered according to the actual installation height of the unit.

Water Quality Requirements

Proper water treatment can effectively prevent corrosion of copper pipes, accumulation of algae, and formation of scale. Poor water quality can cause serious problems such as copper pipe rupture or corrosion of heat transfer tubes, leading to unit failure. Although the chilled water system is a closed-loop circulation system, it is still recommended to conduct appropriate water treatment. Water quality treatment should be carried out according to GB18430.1-2007 "Steam Compression Cycle Chilled Water (Heat Pump) Unit" or as determined by professional water treatment personnel. Water analysis should be performed regularly during unit operation, and the water quality should meet the requirements in the table below.

	Project		Baseline Value	Tendency	
				Corrosion	Scale Formation
Baseline Item	Alkalinity pH(25°C)		6.5~8.0	○	○
	Conductivity(25°C)	μS/cm	<800	○	○
	Chloride Ions Cl^-	mg(Cl^-)/L	<200	○	
	Sulfate Ions SO^{2-}	mg(SO^{2-})/L	<200	○	
	Acid Consumption(pH=4.8)	mg($CaCO_3$)/L	<100		○
	Total Hardness	mg($CaCO_3$)/L	<200		○
Reference Project	Iron (Fe)	mg(Fe)/L	<1.0		○
	Sulfide Ions(S^{2-})	mg(S^{2-})/L	Non-detectable	○	
	Ammonium Ions (NH^+)	mg(NH^-)/L	<1.0	○	
	Silica SiO_2	mg(SiO_2)/L	<5.0		○

Note: ○ Indicates factors related to corrosion or scale formation tendency.