Residential Geothermal Heat Pump 8kW-40kW

Vicot Air Conditioning Co., Ltd

ABOUT US

Vicot Group is a high-tech corporation specialized in R&D, production, sales and service of renewable energy products.

The corporation has almost 2000 staff and nine business divisions and/or centers as following: Solar Thermal Energy Equipment Division, Vacuum Tube Division, Gas Fired Air Conditioning Division, Electrical Air Conditioning Division, Domestic Marketing & Sales Division, Export & Import Division, Administrative & Human Resource Center, Company Management Center and General Manager Office.

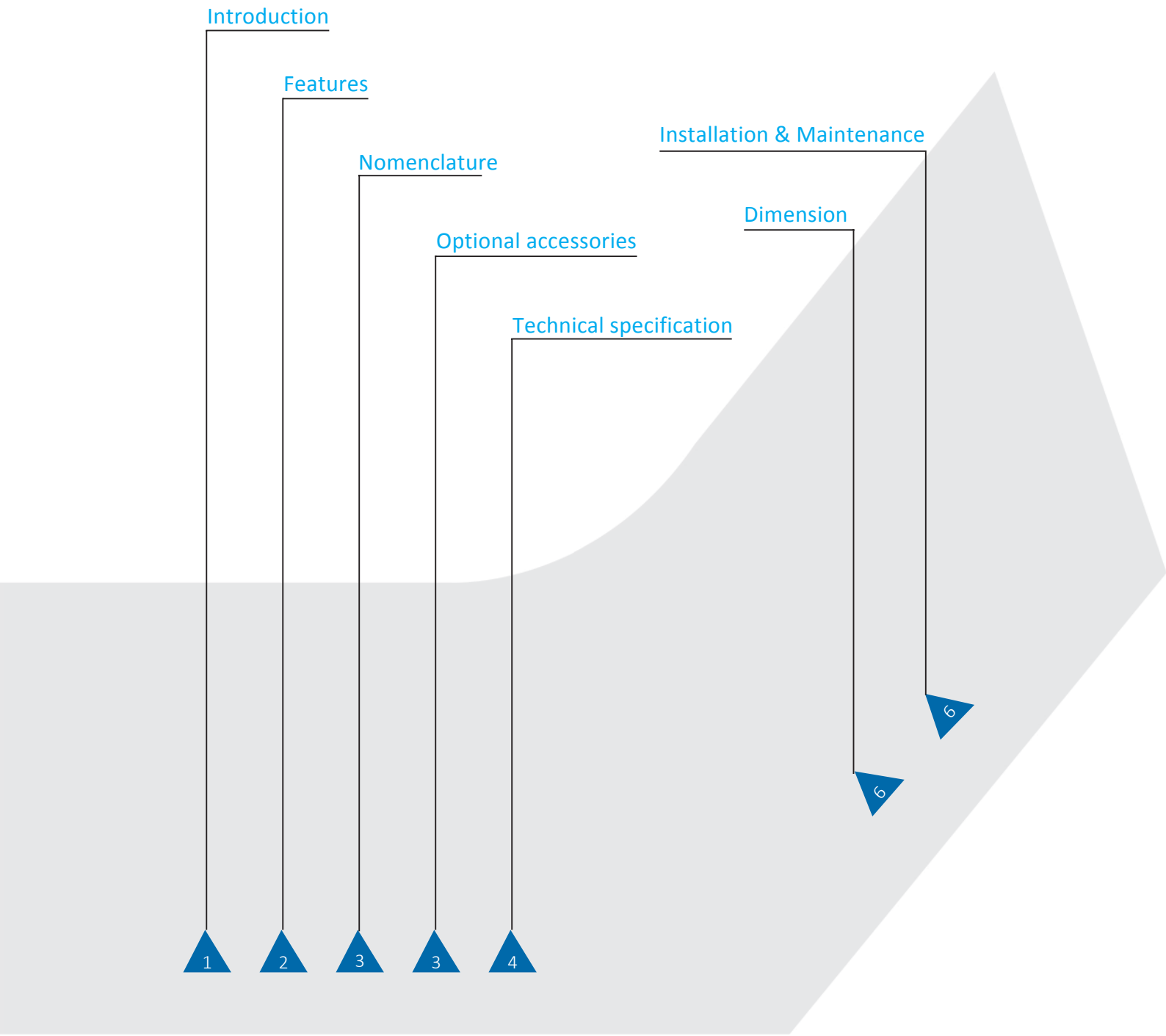
Our production base locates in Solar City, Dezhou, China, it covers an area of 150,000 m^2 with modern workshops and office buildings of more than 80,000 m^2. Annual yield capabilities are as follows: 100,000 electrical AC units; 10,000 gas fired AC units; 200,000 m^2 of collectors; 100,000 pieces of tubes; 5,000 standard sets of solar air conditioning system (20kW/ standard set), 200,000 standard sets of S.A.P central hot water system (10T/ standard set), 10,000 standard sets of S.A.P central distributed heating system (40kW/ standard set) and 500 standard sets of solar boiler system (700kW/ standard set). Designed annual production value reaches RMB 5 billion.

With the mission of “The same breath, energy saving together”, the corporation realizes energy saving and environment protection by focusing on effective utilization of solar energy, air source energy, geothermal energy and other renewable energies in cooling, heating and domestic hot water fields, in pursuit of technology innovations in the field of global renewable energy utilization.

After years’ practice in geothermal chiller & heat pump, air source chiller and heat pump and floor heating fields, Vicot accumulates rich experience in development and production and reaches a nationally advanced level. With a total investment of RMB 16 million in April 2008, after 3 years’ collaboration with more than 20 global universities and research institutes in sequence, Vicot successfully and innovatively launched solar air conditioning system, S.A.P central hot water system, S.A.P central distributed heating system, solar boiler system, having more than 150 patents, large scale production of them has been realized, the past and current scientists and engineers’ cherished wish has been realized. It places China at the world top level in solar medium temperature application field, it turns the dream into truth, for solar energy scale application in commercial and industrial field.

In the meantime of developing the technology of world leading new energy product, the corporation is operated with global advanced ERP technique, UPDI\WMS barcode storage system and ABC cost control system. Information, logistics and cash flow are highly integrated, which austerely shows its concept of “Quality based on science, Price optimized for customer”.

Contents


Introduction
Features
Nomenclature
Optional accessories
Technical specification
Installation & Maintenance
Dimension
1
2
3
3
4
6
6

Introduction

Geothermal heat pump is a high efficient and energy saving air conditioning system that provides cooling or heating by using the shallow layer geothermal source (also refers as ground energy source, including soil, groundwater, surface water etc.). The ground surface is an enormous solar energy collector, which collects 47% of the total energy that arrives the earth, it's more than 500times higher than the annual energy consumption by human being.

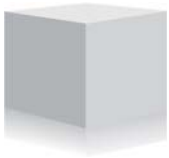
The geothermal source temperature is relatively stable in the whole year, it's higher than ambient temp. in winter, and lower than ambient temp. in summer, that characteristic makes its energy efficiency is much more than the traditional system. With little premium energy (Electric energy) input, geothermal heat pump transfers low temperature thermal energy into high temperature thermal. That is to say, Get the heat from ground and increase its temperature to supply heating to indoor space in winter, and get the heat from indoor space and release it into ground. The ground source heat pump usually gives 5KW cooling or heating capacity by using 1KW electricity.

Comparing with boiler (electricity or fuel) system, geothermal heat pump saves 2/3 electricity, or 1/2 fuel energy; as the geothermal source temperature is relatively stable, it's around 10 to 25°C, and it's cooling, heating coefficient up to 4.8 to 5.5, it's 40% higher than traditional air source heat pump, and its operation cost is 50% to 60% of the common central air conditioner.

Cooling

Heating

Features

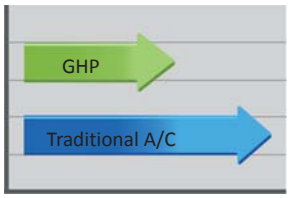


Traditional GHP

VICOT GHP

1. Compact size

Land coverage less than 1.5m^2;
Nice appearance;
Fits the application in villas and other high class places.



Operation Cost

2. High efficiency, less operation cost

Operation cost is 50%-60% of conventional central air conditioner;
COP is up to 4.8-5.5, 40% higher than traditional central air conditioning;
Less operating cost;
International famous compressor and components are used to ensure perfect performance.

3.Environmental friendly

Save boiler when heating in winter, no emission of waste gas, waste residue or waste water;
Dramatically reduces greenhouse gas emission;
Fully enclosed design, quiet operation;
R410A earth friendly refrigerant.
No need boiler when heating in winter, no waste gas, waste residue or waste water emission, also helps to lower the carbon dioxide emission.

4.Reliable and convenient installation

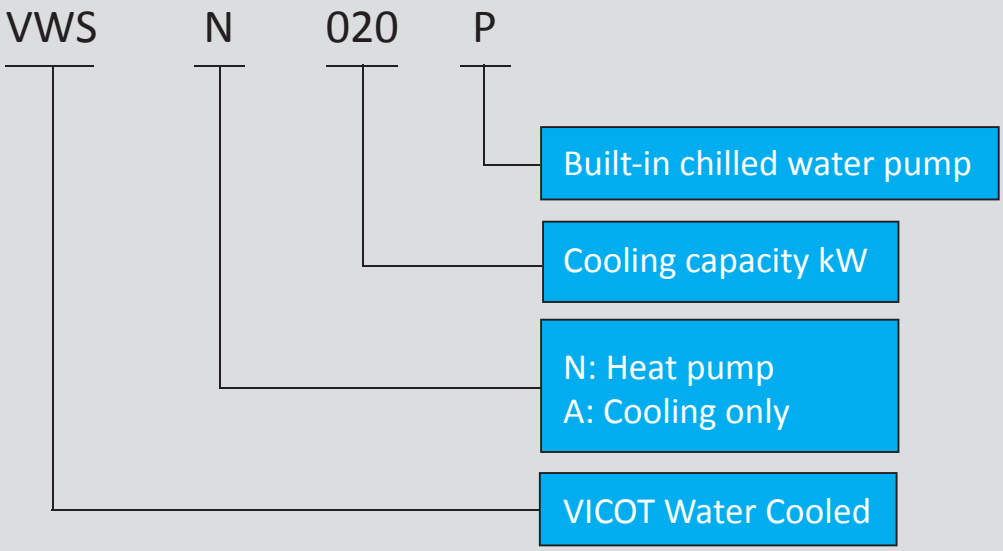
Compact dimension, light weight, convenient for installation, handling and maintenance;
Ready to use after power and water system connection;
Built-in air conditioning water pump for easy installation;
Fully enclosed design avoids potential damage to components;
Advanced microcomputer control system with fully automatic control function and protection of high and low pressure, overload, voltage insufficient, phase lack and low temperature, etc.;
Error alarm and display in controller.

5. Reversing valve to simplify water system installation.

Underground water type

Underground piping loop type

Nomenclature



Optional accessories

Heat recovery	Rubber absorber
Cooling water pump	Water flow switch

Technical specification

Specification I -underground water condition

Model		VWSN008	VWSN012	VWSN015	VWSN020	VWSN030	VWSN040
Refrigerant	Type	R410a					
Cooling capacity	kW	8.5	12	15	20	31	40
Cooling power input	kW	1.7	2.1	2.6	3.2	6.2	6.7
Heating capacity	kW	11	15	18	23.5	36	47
Heating power input	kW	2.2	2.9	3.8	4.6	7.7	9.2
Power supply	V/Ph/Hz	220/1/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Compressor type		Fully-Hermetic scroll compressor					
Evaporator	Type	Plate heat exchanger					
Water resistance	kPa	20-50	20-50	20-50	20-50	20-50	20-50
Condenser	Type	Plate heat exchanger					
Water resistance	kPa	30-50	30-50	30-50	30-50	30-50	30-50
Standard bearing pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0
Fouling coefficient	$m^2{}^oC/W$	0.086	0.086	0.086	0.086	0.086	0.086
Cooling mode							
Chilled water flow	m^3/h	1.4	2.1	2.6	3.4	5.2	6.9
Cooling water flow	m^3/h	0.8	1.1	1.4	1.8	2.8	3.7
Chilled water temp.	^oC	12/7	12/7	12/7	12/7	12/7	12/7
Cooling water temp.	^oC	18/29	18/29	18/29	18/29	18/29	18/29
Heating mode							
Hot water flow	m^3/h	1.4	2.1	2.6	3.4	5.2	6.9
Cooling water flow	m^3/h	0.8	1.1	1.4	1.8	2.8	3.7
Hot water temp.	^oC	40/--	40/--	40/--	40/--	40/--	40/--
Cooling water temp.	^oC	15/--	15/--	15/--	15/--	15/--	15/--
Inner water pump power	kW	0.55	0.55	0.55	0.75	1.5	1.5
Water pipe	inch	1	1	1-1/4	1-1/4	1-1/2	1-1/2
Length	mm	1200	1200	1200	1200	1300	1300
Width	mm	800	800	800	800	800	800
Height	mm	970	970	970	970	970	970
Shipping weight	kg	150	180	200	220	320	410
Noise-max	dB(A)	54	56	58	60	60	60
Protection	-	Inverse phase & lack-phase protection High & low pressure protection Exhaust protection Water-break protection Anti-freezing protection					

Technical specification

Specification II -Underground Piping Loop Condition

Model		VWSN008P	VWSN012P	VWSN015P	VWSN020P	VWSN030P	VWSN040P
Refrigerant	Type	R410a					
Cooling capacity	kW	8	12	16	21	31	40
Cooling power input	kW	1.8	2.3	2.7	3.3	6.3	6.8
Heating capacity	kW	11	14	18	23	36	46
Heating power input	kW	2.2	3.1	4.0	4.6	8.0	9.2
Power supply	V/Ph/Hz	220/1/50	380/3/50	380/3/50	380/3/50	380/3/50	380/3/50
Compressor type		Fully-Hermetic scroll compressor					
Evaporator	Type	Plate heat exchanger					
Water resistance	kPa	20-50	20-50	20-50	20-50	20-50	20-50
Condenser	Type	Plate heat exchanger					
Water resistance	kPa	30-50	30-50	30-50	30-50	30-50	30-50
Standard bearing pressure	MPa	1.0	1.0	1.0	1.0	1.0	1.0
Fouling coefficient	$m^2{}^oC/W$	0.086	0.086	0.086	0.086	0.086	0.086
Cooling mode							
Chilled water flow	m^3/h	1.4	2.1	2.6	3.4	5.2	6.9
Cooling water flow	m^3/h	1.7	2.5	3.1	4.0	6.3	8.0
Chilled water temp.	^oC	12/7	12/7	12/7	12/7	12/7	12/7
Cooling water temp.	^oC	25/30	25/30	25/30	25/30	25/30	25/30
Heating mode							
Hot water flow	m^3/h	1.4	2.1	2.6	3.4	5.2	6.9
Cooling water flow	m^3/h	1.7	2.5	3.1	4.0	6.3	8.0
Hot water temp.	^oC	40/--	40/--	40/--	40/--	40/--	40/--
Cooling water temp.	^oC	10/--	10/--	10/--	10/--	10/--	10/--
Inner water pump power	kW	0.55	0.55	0.55	0.75	1.5	1.5
Water pipe	inch	1	1	1-1/4	1-1/4	1-1/2	1-1/2
Length	mm	1200	1200	1200	1200	1300	1300
Width	mm	800	800	800	800	800	800
Height	mm	970	970	970	970	970	970
Shipping weight	kg	150	180	200	220	320	410
Noise-max	dB(A)	54	56	58	60	60	60
Protection	-	Inverse phase & lack-phase protection High & low pressure protection Exhaust protection Water-break protection Anti-freezing protection					

Dimension

Model	VWSN008	VWSN012	VWSN015	VWSN020	VWSN030	VWSN040
Length (mm)	1200				1300	
Width (mm)	800				800	
Height (mm)	970				970	

Installation & maintenance

• Installation

1.Please check the units carefully referring to packing list after the units are transported to installation site. Please inform the sales department if there is any damage to the unit in transportation.

2.Customers supply rigid foundation or concrete foundation, the size of foundation refers to the size of four orientation holes of unit, the foundation can adopt frame structure, with the frame on girder or pole, ensure that frame can support 150% times of unit weight and the foundation levelness.

3.Installation site:

The unit can be installed on the ground indoor or outdoor. Please note the following factors:

(1) The site is horizontal and can support 1.5 times' weight of the unit.

(2)Ensure enough space around and above the unit for maintenance.

(3)Leave barrel-drain around the unit to discharge water for seasonal shut down.

Installation & maintenance

• Standard of underground water

1.To ensure the heating capacity in winter according to the variable temperature of underground water, we need revise the water flow.

(1) When the temperature is too low, increase the water flow.

(2) In cooling condition, when the temperature is too high, increase the water flow.

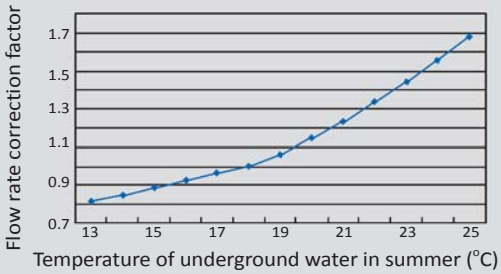
2.Check the revise coefficient according to the diagram below.

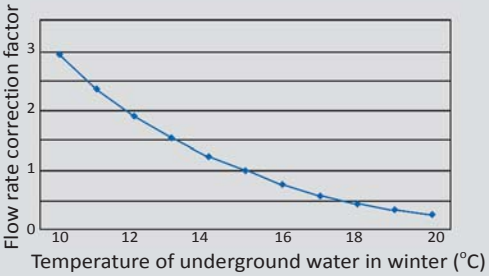
3.The actual water flow is the standard water flow multiply by the revised coefficient.

4.When the underground water flow is uncertain, select the unit model according to the cooling or heating capacity first, then calculate the water flow according to the unit's technical sheet and the temperature of underground water. Then work out the mining plan of the underground water.

5.Beside the temperature and water flow of the underground water, users need also provide a report about the corrosion of the underground water to copper, iron and other metals, special treatment should be done to heat exchanger and water piping, if necessary.

6.If the temperature of the underground water in not included in the sheet, please call the Technical Service Department.





• Water quality standard

Item	Evaporator side water	Condenser side water
PH	6.5 - 8.5	6.0 - 8.0
Electric conductivity	≤200 uv/cm (°C)	≤200 uv/cm (°C)
Chloride ion	≤50 ppm	≤200 ppm
Sulfate ion	≤50 ppm	≤200 ppm
Total Content of iron	≤0.3 ppm	≤0.5 ppm
Alkali ion	≤50 ppm	≤100 ppm
Total hardness	≤50 ppm	≤100 ppm
Sulfide ion	No	No
Ammonium ion	No	No
Sand	≤30 ppm	≤50ppm
Sodion	No requirement	No requirement

Installation & maintenance

• Power connection

1. Wire selection and connection should be carried out strictly according to requirement.

2. Should have earthing well done, no earthing to gas pipe, water pipe, telephone line, to avoid electric shock cause by improper earthing.

3. Ensure the phase sequence is correct, to avoid not running.

• Maintenance

1. The qualified technician is required for the maintenance; all the protection devices and controller must be checked before restart.

2. Regular and correct maintenance is required for stability and good performance. Chilled and cooling water must be complete drained when long time no use to avoid possible freezing.

3. Scale will be accumulated gradually on water circulation side of heat exchanger, the scale should be treated after a certain time of application.

• Notice

1. Antifreezer should be added in chilled water if water temp.set below zero or near zero.

2. Clean water system regularly.

3. Pay attention to antifreeze when ambient temp. is around 0°C in winter.

4. Antifreezer or other antifreeze measure must be used in bad ambient(under 0°C outdoor).

The Same Breath,
Energy Saving Together.

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