FORM NO.B3719G01

TWWH TSR/TSW

TICA

TICA SNG LLC

www.tica.pro

TICA Central Air Conditioner

Water Source Heat Pump Unit

Established in 1991,

TICA is a professional enterprise specialized in R&D, manufacturing, sales and services of environment cleaning and thermal energy utilization.

TICA is a national high-tech enterprise, a single leading enterprise cultivated by the Ministry of Industry and Information Technology, a national brand cultivation enterprise of the Ministry of Industry and Information Technology, and a vice chairman member of China Refrigeration and Air-conditioning Industry Association. It has a national-recognized enterprise technology center, an enterprise academician workstation, and a post-doctoral research workstation. Its projects cover Beijing Bird's Nest Stadium, Water Cube, Wukesong Indoor Stadium, PetroChina, Sinopec, State Grid, Nanjing Panda, Hangzhou Xiaoshan International Airport, Hainan Airlines Group, Shangri-La Hotel, Manila Ocean Park, Abu Dhabi Al Muneera, SM City in Philippines and Unilever, etc.

TICA is also the outstanding provider of central air conditioners for China's subway networks and has successfully served nearly 60 key subway lines in major cities such as Beijing, Shanghai, Guangzhou, Shenzhen, Chengdu, Suzhou, Hangzhou and Tianjin. TICA is a professional supplier and service provider in China that specializes in system integration of clean environment. While for microelectronics, hospital operating rooms, biopharmaceutical industry and other professional purification areas, our market share has achieved over 40% in each.

TICA Quality For IAQ

TICA focuses on indoor air quality (IAQ) in clean environments. Product lines include return air purifiers, heat recovery ventilators, fresh air purifiers, air purifiers, as well as the clean air handling units and digital variable-capacity air handling units used in the professional purification field. Regarding core technology, TICA established an ISO class 1 super-clean environment integration system and won the first prize of CMIST.

In the field of thermal energy utilization, TICA's product lines include modular chillers, VRF units, screw chillers, centrifugal chillers, and ORC low-temperature waste heat power generation systems. In 2015, TICA and United Technologies Corporation (UTC) established a global strategic joint venture cooperation relationship and acquired PureCycle, an ORC low-temperature power generation company owned by Pratt & Whitney under UTC. TICA obtained PureCycle trademarks and more than 100 patents and national copyrights. TICA's efficient centrifugal chillers, water-cooled screw chillers, and air-cooled screw chillers are manufactured with the technical license of Carrier under UTC.

TICA is characterized by excellent system integration capability. In the application of "Efficient Refrigeration System of Underground Railway Station", the integrated COP of the refrigeration room amounts to 6.0, and the research achievement reaches the international advanced level. In 2018, TICA merged and acquired an OFC central air conditioning enterprise **SMARDT**. TICA's excellent system integration capability and the **SMARDT** world-class OFC water chillers help increase the integrated COP of the efficient equipment room to 6.7 to 7.0.

TICA---We're striving.

TICA aims to build itself into a world-leading system integration supplier and service provider that specializes in clean environment and thermal energy utilization.

Water Source
Heat Pump Unit

Contents

TICA owns five production sites in Nanjing, Tianjin, Guangzhou, Chengdu and Kuala Lumpur, and a network of over 70 sales and service filiales around the world.
Its Nanjing HQ base received 3-star certification for national No. 001 green industrial construction.


Nanjing Headquarter


Tianjin Base


Guangzhou Base

Chengdu Base

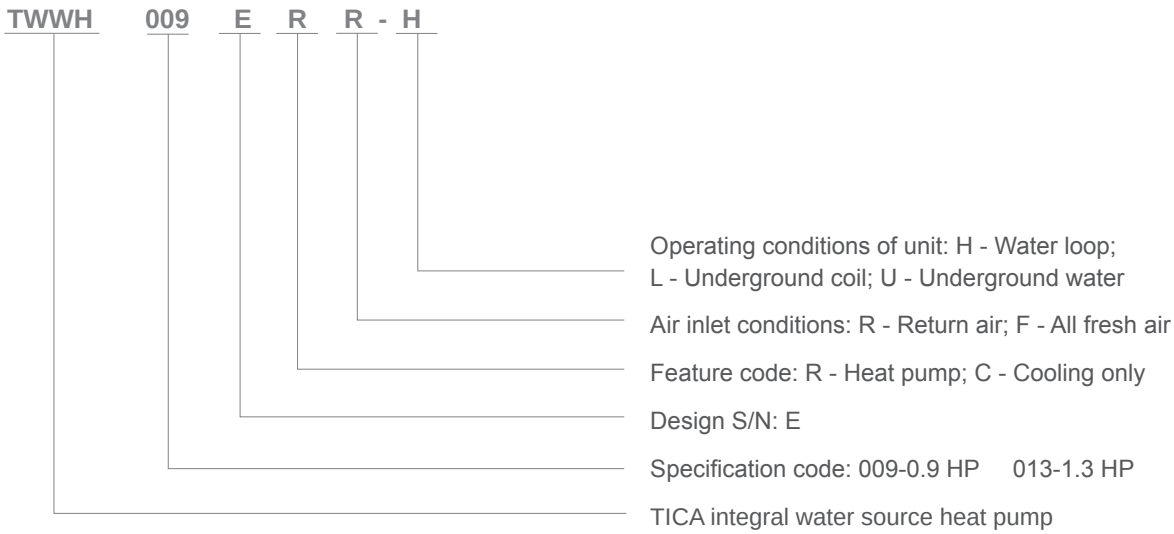
Overview

The water source heat pump unit is an efficient and energy-saving environment-friendly central air conditioner, supporting cooling and heating modes. Powered by electricity, the water source heat pump unit uses water as heat exchange medium and cold and heat sources. It develops and utilizes the low-grade energy in water through advanced devices. The water source heat pump unit utilizes natural energies of the earth (such as underground water, surface water, and soil). When running in cooling conditions, the unit transfers heat inside buildings into the earth. When running in heating conditions, the unit transfers low-grade heat of the earth into buildings via the compressor and refrigerant system. Since water is taken as the cold and heat sources, 1 kW electric energy input can usually generate over 4 kW cooling or heating capacity output. Therefore, the OpEx of the water source heat pump unit is much lower than the traditional air conditioners.

Among diversified heat pump units, the water source heat pump unit has the following advantages: high energy efficiency ratio, stable operating conditions, less OpEx and initial investment, and easy management. Categorized into integral and split-type units, TICA water source heat pump unit has diversified types, with a complete range of specifications. It applies to various places with different usage areas, such as villas, apartment buildings, office buildings, hotels, banks, schools, commercial buildings, and department stores.

Nomenclature

Integral



Split-type IDU

TSR 009 E R S - H

- H: Operating conditions of unit: H - Water loop; L - Underground coil; U - Underground water
- S: S - Water source heat pump IDU
- R: Feature code: R – Cooling/heating C - Cooling-only
- E: Design S/N: E
- 009: Specification code: 009-0.9 HP 013-1.3 HP
- TSR: TICA split-type water source heat pump IDU

Split-type ODU

TSW 009 E R

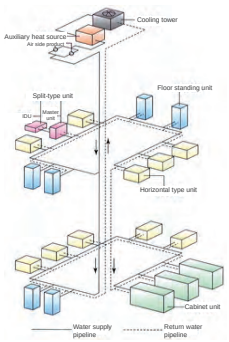
- R: Feature code: R – Cooling/heating C - Cooling-only
- E: Design S/N: E
- 009: Specification code: 009-0.9 HP 013-1.3 HP
- TSW: TICA split-type water source heat pump ODU

Features

1. High efficiency & energy saving

Low investment cost

Compared to common central air conditioners, water source heat pump units do not require an equipment room for the master unit, a chilled water pump room, or large air ventilation pipes, thus greatly saving the used space of devices and reducing civil construction cost. For newly built buildings, install the main pipe and branch pipe of the water source heat pump unit first. The unit can be configured during decoration according to the actual needs of users. For reconstruction projects, the water source heat pump unit is preferable, since there is no need for building an equipment room for air conditioners or configuring larger air ventilation pipes, thus greatly saving floor area of devices, and meeting diversified needs of users.

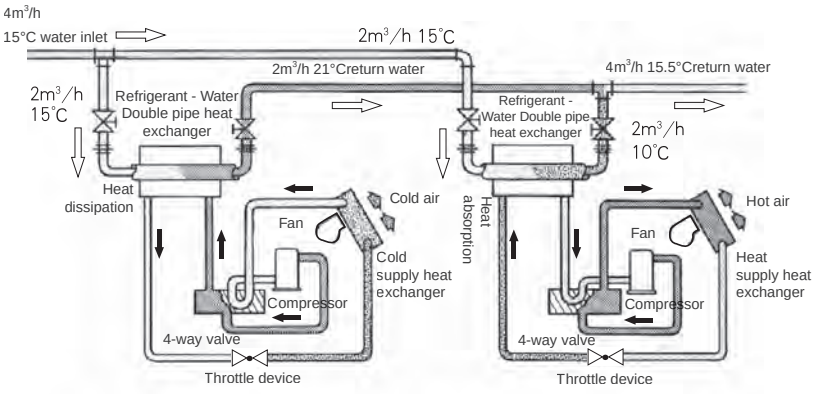


Energy-saving for system

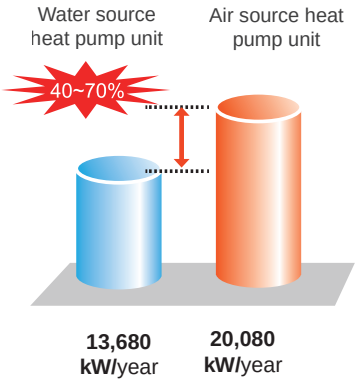
Using water as cooling and heating medium, the water source heat pump unit runs in greatly improved conditions. Therefore, the energy efficiency ratio of the unit is higher than that of air-cooled units, and the OpEx is 30% to 40% less than that of common air conditioners.

Within a period in a year, when only some users use air conditioners or a large building contains external and internal areas, only the unit and circulating water pump need to be started. When cooling and heating are required at the same time, the unit can balance the internal energy, retrieve waste heat, and shorten the running time of the cooling tower and heating device. As shown in the figure on the right, the entering water at 15°C is changed into return water at 15.5°C after passing the cooling and heating devices. The ground source heat pump air-conditioning system uses renewable natural energy of the soil. When it runs, only the circulating water pump of the unit needs to be started, featuring efficient and cost effective operation.

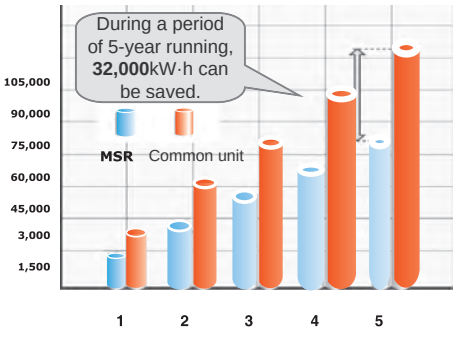
Users can select cooling or heating mode, or partial cooling and partial heating mode according to seasons or actual needs. System efficiency is not affected by outdoor temperature changes.



Cold supply unit　　Heat supply unit



a) One-year power consumption comparison of a single unit



b) Five-year power consumption comparison of a single unit

Annual power consumption comparison between a single TWWH062 unit and an air source unit

Eco-friendly refrigerant

The units use eco-friendly refrigerant R410A. The chlorine-free refrigerant does not harm the ozone layer (zero-ODP), and is stable and non-toxic. It is green and unlikely to be replaced. Thanks to the high heat exchange coefficient, it can lower the power consumption.

2. Stable operation

Reliable quality

The unit is equipped with a high-efficiency compressor, high-efficiency tube in tube heat exchanger or shell-and-tube heat exchanger as well as an optimized cooling system. All of these ensure that the system runs efficiently and reliably. Therefore, energy efficiency ratio of the unit is well above the target set by relevant national standards. TICA has established a perfect quality control system, which ensures that each production process produces up-to-standard products. Before delivery, units will be strictly tested and shall meet the requirements.
The hermetic compressor does not require maintenance during application. In the stable water loop and underground coil conditions, compressor's service life is longer than that in air cooling conditions.

Safe running

The unit is equipped with multiple protection functions to ensure the operating stability and reliability.

- High pressure protection
- Low pressure protection
- Refrigerant anti-leak protection
- Delayed compressor startup
- Compressor's frequent startup/ shutdown protection
- Anti-freezing protection
- Water outlet temperature protection
- Exhaust gas over-temperature protection
- Condensing water overflow protection
- Communication failure protection

3. Simple control

Advanced micro-computer control system and standard LCD wired controller allow for independent control of single units in different rooms, and guarantee room comfortableness by accurate control. Diversified running modes are available, such as cooling, heating, dehumidification, ventilation, and auto cooling & heating exchange. The unit can run quietly via a 4-way reversing valve. A remote control interface is reserved for better interconnecting with the building control system.

Integral Water Source Heat Pump Unit

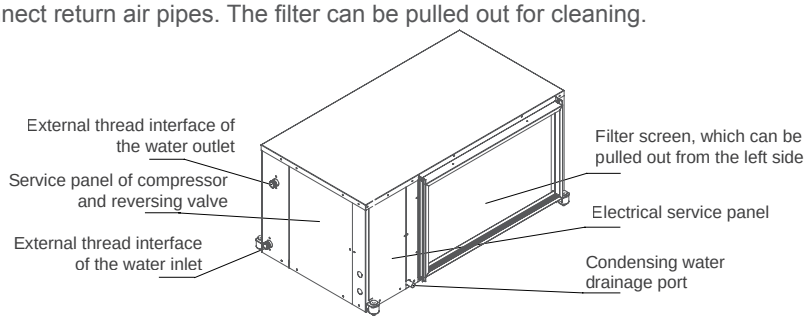
The integral unit is equipped with an independent cold and heat source, and housed in a case structure. The unit contains the compressor, double pipe heat exchanger, throttle, fin evaporator of the air handling part, air supply fan and motor, and control PC board. The integral unit is free from a refrigerant connecting pipe. Therefore, the installation and construction fees are less.

Easy measurement and maintenance

The integral water (ground) source heat pump units can be connected to the independent electricity meters of users, and users bear the air conditioning cost. The energy consumption fee of the public auxiliary device can be apportioned among all users.

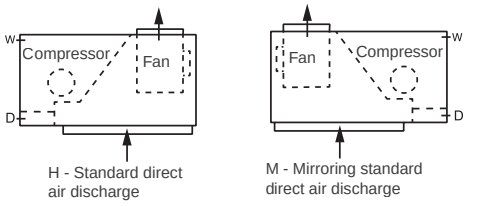
All internal parts in the unit can be accessed by removing the service panel. System devices are simple and easy to install. They can also be easily started and adjusted. The partitioning design enables flexibility and minimizes faults. A faulty unit will not affect other users, because units can be maintained separately.

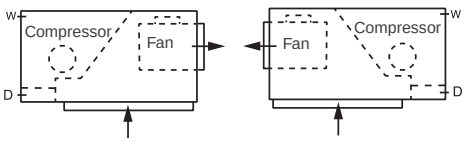
The nylon filter screen is supplied together with the filter guide bracket installed by the factory. This guide bracket is also used to connect return air pipes. The filter can be pulled out for cleaning.



Ease-to-install

All the horizontal type units support two air discharge manners: direct air discharge (standard manner) or side air discharge, which can be configured before delivery or on site. Mirroring units with opposite directions are provided. The fan section is comprised of fan blades/volute assembly parts, fan's motor, and drainage pan. Parts on the air side are separated from the compressor section to restrict noise transmission. A thermal insulation layer is deployed between the drainage pan and cabinet to avoid dew formation on the cabinet.





W = Water pipeline interface

D = Electrical wiring interface

Specifications

Specifications under Water Loop Condition

Model		TWWH	009ERR	013ERR	016ERR	019ERR	024ERR	030ERR	036ERR	043ERR	052ERR	062ERR
Nominal cooling capacity		kW	3.0	4.2	5.3	6.2	7.6	9.4	10.8	12.3	13.7	16.5
Nominal heating capacity		kW	4.0	5.4	6.7	7.8	9.0	11.8	13.3	14.8	17.4	19
Power input	Cooling	kW	0.67	1.00	1.26	1.48	1.79	2.19	2.49	3.08	3.75	4.5
	Heating	kW	0.73	1.18	1.30	1.68	1.80	2.30	2.51	3.15	3.90	4.54
Input current	Cooling	A	3.14	4.69	5.90	7.31	8.84	10.8	11.67	5.13	7.89	8.21
	Heating	A	3.40	5.53	6.09	8.3	8.89	11.36	11.78	5.6	8.20	8.28
Maximum operating current		A	4.2	6.9	7.6	8.1	9.7	12.6	14.7	7.1	10.0	9.8
Compressor type/ quantity		-	Rotor/1							Scroll/1		
Power supply		-	220~240V/50Hz							380~415/3N~50Hz		
Refrigerant		-	R410A									
ESP		Pa	20	50				100			150	
Circulating air flow		m^3/h	580	780	1170	1200	1500	1720	2200	2350	2850	3100
Water flow		m^3/h	0.65	0.90	1.15	1.3	1.57	1.98	2.31	2.7	2.95	3.85
Water pressure drop		kPa	31	32	42	43	40	44	43	32	40	37
Inlet/outlet pipe dimensions		-	RC1/2"				R3/4"				RC1"	
Dimensions of condensate pipe		-	φ3/4"									
Dimensions	Floor standing	mm^3	550*571*675		550*571*825		650*710*975				720*800*1145	
	Horizontal	mm^3	787*483*381		889*508*430		1067*559*483		1067*559*533		1321*686*533	
Weight		kg	58	62	71	72	90	100	120	135	144	148

Model		TWWH	072ERR	086ERR	100ERR	120ERR	142ERR	170ERR	210ERR	270ERR	310ERR	360ERR
Nominal cooling capacity		kW	18.8	22.0	27.0	31.0	37.0	44.5	58.0	73.0	85.0	98.0
Nominal heating capacity		kW	23.0	26.0	34.0	38.0	46.0	54.0	69.0	88.5	103.0	124.0
Power input	Cooling	kW	5.20	5.60	7.00	8.30	9.70	11.90	14.50	19.00	22.00	26.00
	Heating	kW	5.45	5.90	7.40	8.60	10.40	12.40	15.65	20.00	23.50	28.50
Input current	Cooling	A	10.94	11.78	14.72	17.45	20.40	25.03	30.50	39.96	46.27	54.68
	Heating	A	11.46	12.41	15.56	18.09	20.40	26.08	32.91	42.06	49.42	59.93
Maximum operating current		A	14.3	15.5	19.1	22.6	27.3	32.6	41.1	52.6	61.0	74.1
Compressor type/ quantity		-	Scroll/1		Scroll/2							
Power supply		-	380~415/3N~50Hz									
Refrigerant		-	R410A									
ESP		Pa	80	150				250		350		
Circulating air flow		m^3/h	3300	4500	5400	6400	7200	9000	10500	13500	15500	18500
Water flow		m^3/h	4.06	4.73	5.81	6.67	7.96	9.46	12.47	15.80	18.49	21.10
Water pressure drop		kPa	48	30	33	35	52	43	37	40	42	36
Inlet/outlet pipe dimensions		-	RC1"	NPT1-1/2'				NPT2'				NPT2-1/2'
Dimensions of condensate pipe		-	φ3/4"					φ1"				
Dimensions	Floor standing	mm^3	720*800 *1145	1305*775*1530				1810*1050*1700		2110*1050*1700		
	Horizontal	mm^3	1321*686 *533	2125*1080*715				1810*1080*1670		2110*1080*1670		
Weight		kg	154	315	370	390	415	570	640	780	860	920

★ **Remarks**

1. These specifications are calibrated according to the water loop condition in GB/T 19409-2013 standard. For the specifications in other conditions, see the variable condition table.
2. The cooling capacity is calibrated according to the air inlet dry/wet bulb temperature (27°C/19°C), water inlet temperature (30°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
3. The heating capacity is calibrated according to the air inlet dry/wet bulb temperature (20°C/15°C), water inlet temperature (20°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
4. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Specifications under Underground Water Condition

Model		TWWH	009ERR	013ERR	016ERR	019ERR	024ERR	030ERR	036ERR	043ERR	052ERR	062ERR
Nominal cooling capacity		kW	3.4	4.7	6.0	7.0	8.2	10.4	11.8	13.2	14.7	17.8
Nominal heating capacity		kW	3.6	5.0	6.2	7.4	8.5	10.8	12.2	13.7	16.5	18.0
Power input	Cooling	kW	0.60	0.92	1.18	1.38	1.60	2.00	2.18	2.75	3.40	3.85
	Heating	kW	0.70	1.15	1.28	1.60	1.72	2.15	2.38	3.07	3.68	4.20
Input current	Cooling	A	2.81	4.31	5.51	6.47	7.50	9.37	10.22	5.78	7.15	8.10
	Heating	A	3.28	5.39	6.00	7.50	8.06	10.07	11.15	6.46	7.74	8.83
Maximum operating current		A	4.1	6.7	7.5	9.4	10.1	12.6	13.9	8.1	9.7	11.0
Compressor type/ quantity		-	Rotor/1							Scroll/1		
Power supply		-	220~240V/50Hz							380~415/3N~50Hz		
Refrigerant		-	R410A									
ESP		Pa	20	30				50			80	
Circulating air flow		m^3/h	580	780	1170	1200	1500	1720	2200	2350	2850	3100
Water flow		m^3/h	0.35	0.48	0.62	0.72	0.84	1.07	1.22	1.36	1.51	1.83
Water pressure drop		kPa	10	10	12	16	14	15	16	12	16	15
Inlet/outlet pipe dimensions		-	RC1/2"				R3/4"				RC1"	
Dimensions of condensate pipe		-	φ3/4"									
Dimensions	Floor standing	mm^3	550*571*675		550*571*825		650*710*975				720*800*1145	
	Horizontal	mm^3	787*483*381		889*508*430		1067*559*483		1067*559*533		1321*686*533	
Weight		kg	58	62	71	72	90	100	120	135	144	148

Model		TWWH	072ERR	086ERR	100ERR	120ERR	142ERR	170ERR	210ERR	270ERR	310ERR	360ERR
Nominal cooling capacity		kW	20.5	23.5	28.5	33.0	38.6	46.5	62.5	76.0	89.0	103.0
Nominal heating capacity		kW	20.5	23.0	29.5	34.0	42.0	46.0	63.5	80.0	92.5	110.0
Power input	Cooling	kW	4.65	5.10	6.30	7.50	8.65	10.60	13.00	17.40	20.50	24.00
	Heating	kW	4.86	5.65	7.10	8.20	9.80	11.60	15.00	19.50	22.60	27.00
Input current	Cooling	A	9.46	10.73	12.83	15.77	18.19	22.29	27.34	36.59	43.10	50.47
	Heating	A	10.22	11.88	14.93	17.24	20.61	24.39	31.54	41.00	47.50	56.78
Maximum operating current		A	12.8	15.3	18.8	21.6	25.8	30.5	39.4	51.3	59.4	71.0
Compressor type/ quantity		-	Scroll/1		Scroll/2							
Power supply		-	380~415/3N~50Hz									
Refrigerant		-	R410A									
ESP		Pa	80	150				250		350		
Circulating air flow		m^3/h	3300	4500	5400	6400	7200	9000	10500	13500	15500	18500
Water flow		m^3/h	2.16	2.42	2.94	3.40	3.98	4.79	6.44	7.83	9.17	10.61
Water pressure drop		kPa	20	8	9	9	12	10	9	10	10	11
Inlet/outlet pipe dimensions		-	RC1"	NPT1-1/2'				NPT2'				NPT2-1/2'
Dimensions of condensate pipe		-	φ3/4"					φ1"				
Dimensions	Floor standing	mm^3	720*800 *1145	1305*775*1530				1810*1050*1700		2110*1050*1700		
	Horizontal	mm^3	1321*686 *533	2125*1080*715				1810*1080*1670		2110*1080*1670		
Weight		kg	154	315	370	390	415	570	640	780	860	920

★ Remarks

1. These specifications are calibrated according to the water loop condition in GB/T 19409-2013 standard. For the specifications in other conditions, see the variable condition table.
2. The cooling capacity is calibrated according to the air inlet dry/wet bulb temperature (27°C/19°C), water inlet temperature (18°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
3. The heating capacity is calibrated according to the air inlet dry/wet bulb temperature (20°C/15°C), water inlet temperature (15°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
4. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Specifications under Underground Coil Condition

Model		TWWH	009ERR	013ERR	016ERR	019ERR	024ERR	030ERR	036ERR	043ERR	052ERR	062ERR
Nominal cooling capacity		kW	3.3	4.6	5.8	6.8	7.9	8.9	11.3	12.8	14.4	17.2
Nominal heating capacity		kW	3.2	4.5	5.4	6.6	7.5	9.7	11.0	12.2	14.6	16.2
Power input	Cooling	kW	0.62	0.95	1.20	1.40	1.64	2.03	2.25	2.82	3.49	3.95
	Heating	kW	0.68	1.12	1.24	1.58	1.68	2.10	2.34	3.00	3.60	4.18
Input current	Cooling	A	2.88	4.45	5.62	6.56	7.66	9.51	10.54	5.93	7.34	8.31
	Heating	A	3.19	5.25	5.81	7.40	7.87	9.84	10.97	6.31	7.57	8.79
Maximum operating current		A	4.0	6.6	7.3	9.3	9.8	12.3	13.7	7.9	9.5	11.0
Compressor Type /quantity		-	Rotor/1							Scroll/1		
Power supply		-	220~240V/50Hz							380~415/3N~50Hz		
Refrigerant		-	R410A									
ESP		Pa	20	30				50			80	
Circulating air flow		m^3/h	580	780	1170	1200	1500	1720	2200	2350	2850	3100
Water flow		m^3/h	0.72	0.99	1.25	1.45	1.69	2.14	2.42	2.75	3.10	3.70
Water pressure drop		kPa	31	32	42	43	41	45	44	33	41	38
Inlet/outlet pipe dimensions		-	RC1/2"				R3/4"				RC1"	
Dimensions of condensate pipe		-	φ3/4"									
Dimensions	Floor standing	mm^3	550*571*675		550*571*825		650*710*975				720*800*1145	
	Horizontal	mm^3	787*483*381		889*508*430		1067*559*483		1067*559*533		1321*686*533	
Weight		kg	58	62	71	72	90	100	120	135	144	148

Model		TWWH	072ERR	086ERR	100ERR	120ERR	142ERR	170ERR	210ERR	270ERR	310ERR	360ERR
Nominal cooling capacity		kW	19.6	23.2	28.0	32.5	38.0	45.5	61.5	75.0	88.0	102.0
Nominal heating capacity		kW	18.2	21.5	28.0	32.0	39.5	46.0	62.0	75.5	88.0	105.0
Power input	Cooling	kW	4.70	5.20	6.45	7.65	8.80	10.80	13.20	17.80	21.00	24.40
	Heating	kW	4.76	5.60	7.00	8.10	9.80	11.80	14.90	19.20	22.40	26.80
Input current	Cooling	A	9.88	10.94	13.56	16.09	18.51	22.71	27.76	37.43	44.16	51.31
	Heating	A	10.01	11.78	14.72	17.03	20.61	24.81	31.33	40.38	47.11	56.36
Maximum operating current		A	12.5	14.7	18.5	21.3	25.8	31.0	40.0	50.5	59.0	70.4
Compressor type/ quantity		-	Scroll/1		Scroll/2							
Power supply		-	380~415/3N~50Hz									
Refrigerant		-	R410A									
ESP		Pa	80	150				250		350		
Circulating air flow		m^3/h	3300	4500	5400	6400	7200	9000	10500	13500	15500	18500
Water flow		m^3/h	4.21	4.99	6.02	6.99	8.17	9.78	13.22	16.13	18.92	21.93
Water pressure drop		kPa	49	31	34	36	53	44	38	41	43	37
Inlet/outlet pipe dimensions		-	RC1"	NPT1-1/2'				NPT2'				NPT2-1/2'
Dimensions of condensate pipe		-	φ3/4"					φ1"				
Dimensions	Floor standing	mm^3	720*800 *1145	1305*775*1530				1810*1050*1700		2110*1050*1700		
	Horizontal	mm^3	1321*686 *533	2125*1080*715				1810*1080*1670		2110*1080*1670		
Weight		kg	154	315	370	390	415	570	640	780	860	920

★ **Remarks**

1. These specifications are calibrated according to the water loop condition in GB/T 19409-2013 standard. For the specifications in other conditions, see the variable condition table.
2. The cooling capacity is calibrated according to the air inlet dry/wet bulb temperature (27°C/19°C), water inlet temperature (25°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
3. The heating capacity is calibrated according to the air inlet dry/wet bulb temperature (20°C/15°C), water inlet temperature (10°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
4. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Specifications of Integral Fresh Air Handling Unit

Model		TWWH	036ERF	043ERF	052ERF	062ERF	072ERF	086ERF	100ERF
Nominal cooling capacity		kW	11.5	13.8	15.8	19.5	22.5	27.5	32.5
Nominal heating capacity		kW	12.0	14.2	16.5	20.5	23.2	28.5	34.5
Power input	Cooling	kW	2.54	3.05	3.50	4.32	5.00	5.75	6.80
	Heating	kW	2.48	2.95	3.45	4.30	4.90	5.65	6.85
Input current	Cooling	A	12.00	6.41	7.36	9.08	10.51	12.90	14.30
	Heating	A	11.70	6.20	7.26	9.04	10.30	11.88	14.41
Maximum operating current		A	15.0	7.8	9.1	11.3	12.9	14.9	18.0
Compressor type/ quantity		-	Rotor/1	Scroll/1					Scroll/2
Power supply		-	220~240V /50Hz	380~415/3N~50Hz					
Refrigerant		-	R410A						
ESP		Pa	80	120				150	
Circulating air flow		m^3/h	1300	1500	1800	2150	2500	3200	3800
Water flow		m^3/h	2.47	2.97	3.40	4.19	4.84	5.91	6.99
Water pressure drop		kPa	44	42	49	35	40	32	35
Inlet/outlet pipe dimensions		-	R3/4"			R1"		NPT1-1/2"	
Dimensions of condensate pipe		-	φ5/8"		φ3/4"				
Dimensions		mm^3	1096*604 *504		1347*790 *534			2125*1080 *715	
Weight		kg	104	105	142	144	145	315	370

Model		TWWH	120ERF	142ERF	170ERF	210ERF	270ERF	310ERF	360ERF
Nominal cooling capacity		kW	39.5	47.5	54.5	68.0	87.0	96.0	121.0
Nominal heating capacity		kW	42.0	52.0	60.0	73.0	95.0	85.0	130.0
Power input	Cooling	kW	8.30	10.00	11.60	14.50	18.80	24.00	26.80
	Heating	kW	8.35	10.50	12.00	14.80	19.50	25.00	27.50
Input current	Cooling	A	17.45	21.03	24.39	30.49	39.54	50.47	56.36
	Heating	A	17.56	22.08	25.24	31.12	41.01	52.57	57.83
Maximum operating current		A	21.9	27.6	31.5	38.9	51.3	65.7	72.3
Compressor type/ quantity		-	Scroll/2						
Power supply		-	380~415/3N~50Hz						
Refrigerant		-	R410A						
ESP		Pa	150		350				
Circulating air flow		m^3/h	4500	5400	6400	7600	9500	11500	13500
Water flow		m^3/h	8.49	10.21	11.72	14.62	18.71	20.64	26.02
Water pressure drop		kPa	37	52	45	37	40	42	36
Inlet/outlet pipe dimensions		-	NPT1-1/2"		NPT2"				NPT2-1/2'
Dimensions of condensate pipe		-	φ3/4"		φ1''				
Dimensions		mm^3	2125*1080 *715		1750*1080 *1670		2110*1080 *1670		
Weight		kg	390	415	570	620	780	860	920

★ **Remarks**

1. The cooling capacity is calibrated according to the air inlet dry/wet bulb temperature (35°C/28°C), water inlet temperature (30°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
2. The heating capacity is calibrated according to the air inlet dry bulb temperature (10°C), water inlet temperature (20°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
TWWH072ERHF and the following models adopt 3-speed motors, and the other models adopt single-speed belt-driven motors.
4. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Unit Application Scope

Operating conditions	Water Loop		Ground Loop	
Return air temperature range	Cooling	Heating	Cooling	Heating
	16~32°C	10~30°C	16~32°C	10~30°C
Source water inlet temperature scope	15~43°C	5~32°C	13~43°C	-5~32°C

★ **Remarks**

1. Under the water loop cooling conditions, it is not recommended that the water inlet temperature on the water source side should be within the range of 10°C to 15°C. When the water inlet temperature is less than 15°C, water flow must be reduced, and ensure that the water outlet temperature of the unit is above 25°C.
2. When the operating temperature on the water source side of the underground coil unit is too low, add anti-freezing solution to the water system to protect the unit system.

Cooling Capacity Correction Factor

Water inlet temperature (°C)	Return air dry/wet bulb temperature (°C)					
	30/21	29/20	27/19	25/18	23/17	21/16
40	1.01	0.96	0.93	0.89	0.85	0.82
35	1.05	1.01	0.97	0.94	0.90	0.85
30	1.08	1.04	1.00	0.97	0.93	0.88
25	1.11	1.06	1.03	0.99	0.96	0.92
20	1.14	1.10	1.06	1.03	0.99	0.95
15	1.16	1.14	1.10	1.06	1.04	0.99

Cooling Power Correction Factor

Water inlet temperature (°C)	Return air dry/wet bulb temperature (°C)					
	30/21	29/20	27/19	25/18	23/17	21/16
40	1.18	1.15	1.12	1.09	1.05	1.02
35	1.12	1.08	1.05	1.03	0.99	0.96
30	1.06	1.03	1.00	0.97	0.94	0.90
25	1.00	0.97	0.94	0.91	0.88	0.85
20	0.95	0.92	0.89	0.86	0.83	0.80
15	0.92	0.89	0.86	0.83	0.79	0.76

Heating Capacity Correction Factor

Water inlet temperature (°C)	Return air dry bulb temperature (°C)					
	12	14	16	18	20	22
30	1.25	1.21	1.18	1.15	1.12	1.08
25	1.18	1.14	1.11	1.08	1.05	1.01
20	1.13	1.09	1.06	1.03	1.00	0.96
15	1.03	0.99	0.96	0.92	0.89	0.86
10	0.98	0.94	0.90	0.86	0.82	0.79
5	0.90	0.86	0.82	0.79	0.76	0.72
0	0.84	0.80	0.76	0.72	0.69	0.66

Heating Power Correction Factor

Water inlet temperature (°C)	Return air dry/wet bulb temperature (°C)					
	12	14	16	18	20	22
30	1.04	1.05	1.07	1.09	1.10	1.12
25	0.99	1.01	1.02	1.04	1.05	1.07
20	0.94	0.96	0.97	0.99	1.00	1.02
15	0.89	0.91	0.92	0.94	0.95	0.97
10	0.86	0.88	0.90	0.91	0.92	0.94
5	0.83	0.85	0.87	0.88	0.89	0.91
0	0.80	0.82	0.84	0.85	0.86	0.88

Unit Application Scope (Fresh Air Handling Unit)

Air inlet temperature scope of IDU	Cooling °C	Heating °C
	16 to 38°C	-5 to 20°C
Source water inlet temperature scope	15 to 40°C	-5 to 30°C

Cooling Capacity Correction Factor (Fresh Air Handling Unit)

Water inlet temperature (°C)	Air inlet dry bulb temperature (°C)				
	38	35	30	27	24
40	0.96	0.92	0.91	0.80	0.68
35	0.99	0.96	0.95	0.84	0.72
30	1.04	1.00	0.99	0.88	0.76
25	1.07	1.04	1.03	0.92	0.79
20	1.11	1.06	1.05	0.96	0.83
15	1.15	1.10	1.09	1.01	0.99

Cooling Power Correction Factor (Fresh Air Handling Unit)

Water inlet temperature (°C)	Air inlet dry bulb temperature (°C)				
	38	35	30	27	24
40	1.13	1.10	1.08	1.05	1.04
35	1.08	1.05	1.04	1.01	0.99
30	1.04	1.00	1.09	0.96	0.94
25	0.99	0.96	0.85	0.90	0.88
20	0.96	0.92	0.90	0.85	0.84
15	0.92	0.88	0.85	0.80	0.79

Heating Capacity Correction Factor (Fresh Air Handling Unit)

Water inlet temperature (°C)	Air inlet dry bulb temperature (°C)			
	-5	10	15	20
25	1.10	1.08	1.07	0.99
20	1.07	1.00	0.99	0.93
15	1.01	0.95	0.94	0.88
10	0.96	0.89	0.88	0.82
5	0.88	0.81	0.80	0.75
0	0.81	0.73	0.72	0.67
-5	0.72	0.66	0.65	0.59

Heating Power Correction Factor (Fresh Air Handling Unit)

Water inlet temperature (°C)	Air inlet dry bulb temperature (°C)			
	-5	10	15	20
25	0.92	1.05	1.06	1.11
20	0.86	1.00	1.01	1.06
15	0.81	0.95	0.96	1.03
10	0.78	0.92	0.93	1.00
5	0.76	0.90	0.91	0.97
0	0.74	0.87	0.88	0.94
-5	0.72	0.85	0.86	0.92

Split Type Water Source Heat Pump Unit

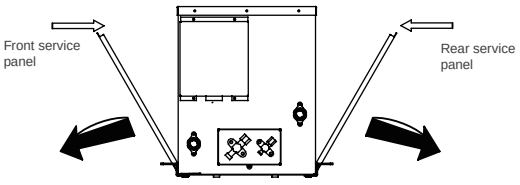
The split-type water source heat pump unit is located in an independent cabinet with external part separated from internal part. The ODU mainly contains a compressor, a double pipe heat exchanger, and throttle. The IDU is an air handling part, containing fin evaporator, air supply fan and motor, and control PC board. Generally, the split-type water source heat pump unit is installed in the places with limited space and height of the ceiling and high requirement for noise.

Quiet running

The compressor and air supply fan are separately deployed in two cabinets. The interior walls are made of high-efficiency, acoustic, and heat insulation materials, thus ensuring quiet running. The compressor is designed with double-layer shock absorption with optimized shock absorption pad structure, thus greatly reducing noise. The internal fluorine system structure is throughly separated from the external metal plate structure. The refrigeration and circulation pipes are concentric, which prevents vibration noise caused by the flowing refrigerant. In the IDU, the heat exchanger is moved to be close to the air vent so that air is supplied more evenly.

Easy measurement and maintenance

The split-type water source heat pump units can be connected to the independent electricity meters of users, and users bear the air conditioning cost. The energy consumption fee of the public auxiliary device can be allocated to each user.
System devices are simple and easily installed. They are also easily started and adjusted. The partitioning design enables flexibility. Failures will not affect other users. That is because units can be maintained separately without affecting operations of other units and normal use of other parts of the system. Remove a panel on the front or rear side to maintain any part inside the unit.



Optimized design

The optimized design of IDU features a compact structure. The IDU can be installed into the celling in a completely concealed manner. Therefore, pipelines can be easily deployed flexibly according to the room height. An installed unit can perfectly fit into the indoor decoration and has only the air vent exposed.

Specifications under Water Loop Condition

Model			TSR	009ERS	013ERS	016ERS	019ERS	024ERS	030ERS
			TSW	009ER	013ER	016ER	019ER	024ER	030ER
Nominal cooling capacity			kW	2.58	3.75	4.85	5.80	6.91	8.10
Nominal heating capacity			kW	3.40	4.85	5.77	6.90	8.75	9.80
Power input	Cooling		kW	0.60	0.98	1.11	1.40	1.66	1.97
	Heating		kW	0.66	1.00	1.17	1.48	1.81	1.98
Input current	Cooling		A	2.77	4.52	5.12	6.46	7.66	9.09
	Heating		A	3.05	4.61	5.40	6.83	8.35	9.14
Compressor type			-	Rotor					
Power supply			-	220 V~/50 Hz					
Refrigerant			-	R410A					
ODU	Water flow		m^3/h	0.55	0.81	1.04	1.25	1.49	1.74
	Water pressure drop		kPa	20	25	28	32	35	40
	Inlet/outlet pipe		-	R3/4" external thread pipe					
	Dimensions		mm^3	500*396*390			500*396*465		
	Weight		kg	31	33	37	39	41	45
	Operating weight		kg	34	37	41	44	46	50
IDU	ESP		Pa	12		30			
	Circulating air flow		m^3/h	530	700	800	1000	1250	1500
	Condensate water pipe (outer diameter)		-	3/4"					
	Dimensions	Length	mm	669	809	989	989	1089	1419
		Width	mm	465					
		Height	mm	231					
	Weight		kg	22	23	27	28	30	31
	Operating weight		kg	24	25	29	30	33	34
IDU-ODU connecting pipe	Liquid pipe		φmm	6.35					9.52
	Gas pipe		φmm	9.52	9.52	9.52	12.7	12.7	15.88

Model			TSR	036ERS	043ERS	052ERS	062ERS	072ERS	086ERS
			TSW	036ER	043ER	052ER	062ER	072ER	086ER
Nominal cooling capacity			kW	9.20	11.20	13.81	15.67	18.50	21.50
Nominal heating capacity			kW	11.86	13.50	15.88	19.07	22.50	26.00
Power input	Cooling		kW	2.33	2.89	3.26	3.96	4.79	5.75
	Heating		kW	2.35	2.98	3.32	4.24	5.08	5.92
Input current	Cooling		A	10.75	5.33	6.01	7.30	8.83	10.60
	Heating		A	10.84	5.49	6.12	7.81	9.36	10.91
Compressor type			-	Rotor	Scroll				
Power supply			-	220 V~/50 Hz	380 V/3N~50 Hz				
Refrigerant			-	R410A					
ODU	Water flow		m^3/h	1.98	2.41	2.97	3.37	3.98	4.62
	Water pressure drop		kPa	42	43	45	46	48	52
	Inlet/outlet pipe		-	R3/4" external thread pipe	R1" external thread pipe				
	Dimensions		mm^3	620*471*505				665*471*505	
	Weight		kg	62	71	81	90	103	106
	Operating weight		kg	69	79	91	111	115	118
IDU	ESP		Pa	50			80		100
	Circulating air flow		m^3/h	1800	2100	2600	2900	3300	4000
	Condensate water pipe (outer diameter)		-	3/4"					
	Dimensions	Length	mm	1519	1719	1719	1719	1575	1575
		Width	mm	465	465	490	520	870	870
		Height	mm	231	231	290	290	420	475
	Weight		kg	35	40	41	43	85	95
	Operating weight		kg	38	45	46	48	94	105
IDU-ODU connecting pipe	Liquid pipe		φmm	9.52					
	Gas pipe		φmm	15.88	19.05				

★ **Remarks**

1. These specifications are calibrated according to the water loop condition in GB/T 19409-2013 standard. For the specifications in other conditions, see the variable condition table.
2. The cooling capacity is calibrated according to the air inlet dry/wet bulb temperature (27°C/19°C), water inlet temperature (30°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
3. The heating capacity is calibrated according to the air inlet dry/wet bulb temperature (20°C/15°C), water inlet temperature (20°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
4. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Specifications under Underground Water Condition

Model			TSR	009ERS	013ERS	016ERS	019ERS	024ERS	030ERS
			TSW	009ER	013ER	016ER	019ER	024ER	030ER
Nominal cooling capacity			kW	2.98	4.33	5.25	6.29	7.52	8.90
Nominal heating capacity			kW	3.15	4.55	5.35	6.35	7.62	9.00
Power input	Cooling		kW	0.55	0.90	0.98	1.25	1.50	1.73
	Heating		kW	0.64	0.98	1.10	1.50	1.70	2.16
Input current	Cooling		A	2.54	4.15	4.52	5.77	6.82	7.98
	Heating		A	2.95	4.52	5.08	6.92	7.37	9.97
Compressor type			-	Rotor					
Power supply			-	220 V~/50 Hz					
Refrigerant			-	R410A					
ODU	Water flow		m^3/h	0.31	0.45	0.54	0.65	0.77	0.92
	Water pressure drop		kPa	10	12	13	16	17	18
	Inlet/outlet pipe		-	R3/4" external thread pipe					
	Dimensions		mm^3	500*396*390			500*396*465		
	Weight		kg	31	33	37	39	41	45
	Operating weight		kg	34	37	41	44	46	50
IDU	ESP		Pa	12		30			
	Circulating air flow		m^3/h	530	700	800	1000	1250	1500
	Condensate water pipe (outer diameter)		-	3/4"					
	Dimensions	Length	mm	669	809	989	989	1089	1419
		Width	mm	465					
		Height	mm	231					
	Weight		kg	22	23	27	28	30	31
	Operating weight		kg	24	25	29	30	33	34
IDU-ODU connecting pipe	Liquid pipe		φmm	6.35					9.52
	Gas pipe		φmm	9.52	9.52	9.52	12.7	12.7	15.88

Model			TSR	036ERS	043ERS	052ERS	062ERS	072ERS	086ERS
			TSW	036ER	043ER	052ER	062ER	072ER	086ER
Nominal cooling capacity			kW	9.90	11.85	14.53	16.69	19.60	22.60
Nominal heating capacity			kW	10.10	12.05	14.93	16.75	19.80	22.60
Power input	Cooling		kW	2.14	2.53	2.84	3.57	4.30	5.14
	Heating		kW	2.36	3.14	3.60	4.25	5.20	6.30
Input current	Cooling		A	9.88	4.66	5.23	6.58	7.92	9.47
	Heating		A	10.89	5.79	6.63	7.83	9.58	11.61
Compressor type			-	Rotor	Scroll				
Power supply			-	220 V~/50 Hz	380 V/3N~50 Hz				
Refrigerant			-	R410A					
ODU	Water flow		m^3/h	1.02	1.22	1.50	1.72	2.02	2.33
	Water pressure drop		kPa	19	20	22	23	24	25
	Inlet/outlet pipe		-	R3/4" external thread pipe	R1" external thread pipe				
	Dimensions		mm^3	620*471*505				665*471*505	
	Weight		kg	62	71	81	90	103	106
	Operating weight		kg	69	79	91	111	115	118
IDU	ESP		Pa	50			80		100
	Circulating air flow		m^3/h	1800	2100	2600	2900	3300	4000
	Condensate water pipe (outer diameter)		-	3/4"					
	Dimensions	Length	mm	1519	1719	1719	1719	1575	1575
		Width	mm	465	465	490	520	870	870
		Height	mm	231	231	290	290	420	475
	Weight		kg	35	40	41	43	85	95
	Operating weight		kg	38	45	46	48	94	105
IDU-ODU connecting pipe	Liquid pipe		φmm	9.52					
	Gas pipe		φmm	15.88	19.05				

★ Remarks

1. These specifications are calibrated according to the water loop condition in GB/T 19409-2013 standard. For the specifications in other conditions, see the variable condition table.
2. The cooling capacity is calibrated according to the air inlet dry/wet bulb temperature (27°C/19°C), water inlet temperature (18°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
3. The heating capacity is calibrated according to the air inlet dry/wet bulb temperature (20°C/15°C), water inlet temperature (15°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
4. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Specifications under Water Loop Condition

Model			TSR	009ERS	013ERS	016ERS	019ERS	024ERS	030ERS
			TSW	009ER	013ER	016ER	019ER	024ER	030ER
Nominal cooling capacity			kW	2.93	4.23	5.15	6.19	7.42	8.80
Nominal heating capacity			kW	2.85	4.10	4.85	5.80	7.00	8.30
Power input	Cooling		kW	0.55	0.90	0.98	1.25	1.50	1.73
	Heating		kW	0.64	0.98	1.10	1.50	1.70	2.16
Input current	Cooling		A	2.54	4.15	4.52	5.77	6.82	7.98
	Heating		A	2.95	4.52	5.08	6.92	7.37	9.97
Compressor type			-	Rotor					
Power supply			-	220 V~/50 Hz					
Refrigerant			-	R410A					
ODU	Water flow		m^3/h	0.31	0.45	0.54	0.65	0.77	0.92
	Water pressure drop		kPa	10	12	13	16	17	18
	Inlet/outlet pipe		-	R3/4" external thread pipe					
	Dimensions		mm^3	500*396*390			500*396*465		
	Weight		kg	31	33	37	39	41	45
	Operating weight		kg	34	37	41	44	46	50
IDU	ESP		Pa	12		30			
	Circulating air flow		m^3/h	530	700	800	1000	1250	1500
	Condensate water pipe (outer diameter)		-	3/4"					
	Dimensions	Length	mm	669	809	989	989	1089	1419
		Width	mm	465					
		Height	mm	231					
	Weight		kg	22	23	27	28	30	31
	Operating weight		kg	24	25	29	30	33	34
IDU-ODU connecting pipe	Liquid pipe		φmm	6.35					9.52
	Gas pipe		φmm	9.52	9.52	9.52	12.7	12.7	15.88

Model			TSR	036ERS	043ERS	052ERS	062ERS	072ERS	086ERS
			TSW	036ER	043ER	052ER	062ER	072ER	086ER
Nominal cooling capacity			kW	9.79	11.65	14.23	16.29	19.20	22.20
Nominal heating capacity			kW	9.10	11.00	13.60	15.20	18.00	20.50
Power input	Cooling		kW	2.22	2.59	2.94	3.61	4.37	5.24
	Heating		kW	2.25	3.00	3.45	4.00	4.90	6.00
Input current	Cooling		A	10.24	4.77	5.42	6.65	8.50	9.66
	Heating		A	10.38	5.53	6.36	7.37	9.03	11.06
Compressor type			-	Rotor	Scroll				
Power supply			-	220 V~/50 Hz	380 V/3N~50 Hz				
Refrigerant			-	R410A					
ODU	Water flow		m^3/h	2.10	2.50	3.06	3.50	4.13	4.77
	Water pressure drop		kPa	43	44	46	47	49	53
	Inlet/outlet pipe		-	R3/4" external thread pipe	R1" external thread pipe				
	Dimensions		mm^3	620*471*505				665*471*505	
	Weight		kg	62	71	81	90	103	106
	Operating weight		kg	69	79	91	111	115	118
IDU	ESP		Pa	50			80		100
	Circulating air flow		m^3/h	1800	2100	2600	2900	3300	4000
	Condensate water pipe (outer diameter)		-	3/4"					
	Dimensions	Length	mm	1519	1719	1719	1719	1575	1575
		Width	mm	465	465	490	520	870	870
		Height	mm	231	231	290	290	420	475
	Weight		kg	35	40	41	43	85	95
	Operating weight		kg	38	45	46	48	94	105
IDU-ODU connecting pipe	Liquid pipe		φmm	9.52					
	Gas pipe		φmm	15.88	19.05				

★ Remarks

1. These specifications are calibrated according to the water loop condition in GB/T 19409-2013 standard. For the specifications in other conditions, see the variable condition table.
2. The cooling capacity is calibrated according to the air inlet dry/wet bulb temperature (27°C/19°C), water inlet temperature (25°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
3. The heating capacity is calibrated according to the air inlet dry/wet bulb temperature (20°C/15°C), water inlet temperature (10°C), and rated water flow. The input power has been counted into the fan power of the unit, excluding the water pump efficiency of the system.
4. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Unit Application Scope

Operating conditions	Water Loop		Ground Loop	
	Cooling	Heating	Cooling	Heating
Return air temperature range	16~32°C	10~30°C	16~32°C	10~30°C
Source water inlet temperature scope	15~43°C	5~32°C	13~43°C	-5~32°C

★ **Remarks**

1. Under the water loop cooling conditions, it is not recommended that the water inlet temperature on the water source side is within 10°C and 15°C. When the water inlet temperature is less than 15°C, water flow must be reduced, and ensure that the water outlet temperature of the unit is above 25°C.
2. When the operating temperature on the water source side of the underground coil unit is too low, add anti-freezing solution to the water system to protect the unit system against being frozen.
3. For the requirements beyond the application scope of the unit, contact TICA.

Cooling Capacity Correction Factor

Water inlet temperature (°C)	Return air temperature (°C)							
	31	29	27	25	23	21	19	17
40	1.03	0.98	0.93	0.88	0.84	0.78	0.74	0.70
35	1.06	1.02	0.96	0.92	0.87	0.82	0.78	0.74
30	1.08	1.05	1.00	0.95	0.90	0.85	0.81	0.77
25	1.15	1.11	1.06	1.01	0.96	0.91	0.87	0.83
20	1.19	1.15	1.10	1.06	1.01	0.96	0.92	0.87
15	1.21	1.17	1.12	1.07	1.02	0.97	0.94	0.89

Cooling Power Correction Factor

Water inlet temperature (°C)	Return air temperature (°C)							
	31	29	27	25	23	21	19	17
40	1.16	1.12	1.08	1.04	1.01	0.96	0.92	0.88
35	1.12	1.08	1.04	1.01	0.96	0.92	0.88	0.84
30	1.08	1.04	1.00	0.96	0.92	0.88	0.84	0.80
25	1.04	1.01	0.96	0.92	0.88	0.84	0.80	0.76
20	1.01	0.97	0.93	0.89	0.85	0.81	0.77	0.73
15	0.98	0.94	0.90	0.86	0.82	0.78	0.74	0.70

Heating Capacity Correction Factor

Water inlet temperature (°C)	Return air temperature (°C)			
	10	14	18	22
30	1.27	1.21	1.16	1.10
25	1.20	1.15	1.10	1.04
20	1.13	1.08	1.02	0.97
15	1.03	0.98	0.92	0.87
10	0.96	0.90	0.83	0.78
5	0.90	0.83	0.78	0.72
0	0.80	0.75	0.69	0.62
-5	0.72	0.68	0.61	0.56

Heating Power Correction Factor

Water inlet temperature (°C)	Return air temperature (°C)			
	10	14	18	22
30	1.03	1.06	1.08	1.11
25	0.98	1.00	1.04	1.06
20	0.93	0.96	0.98	1.01
15	0.88	0.90	0.94	0.96
10	0.83	0.86	0.88	0.91
5	0.79	0.82	0.84	0.87
0	0.75	0.77	0.80	0.83
-5	0.68	0.71	0.73	0.76

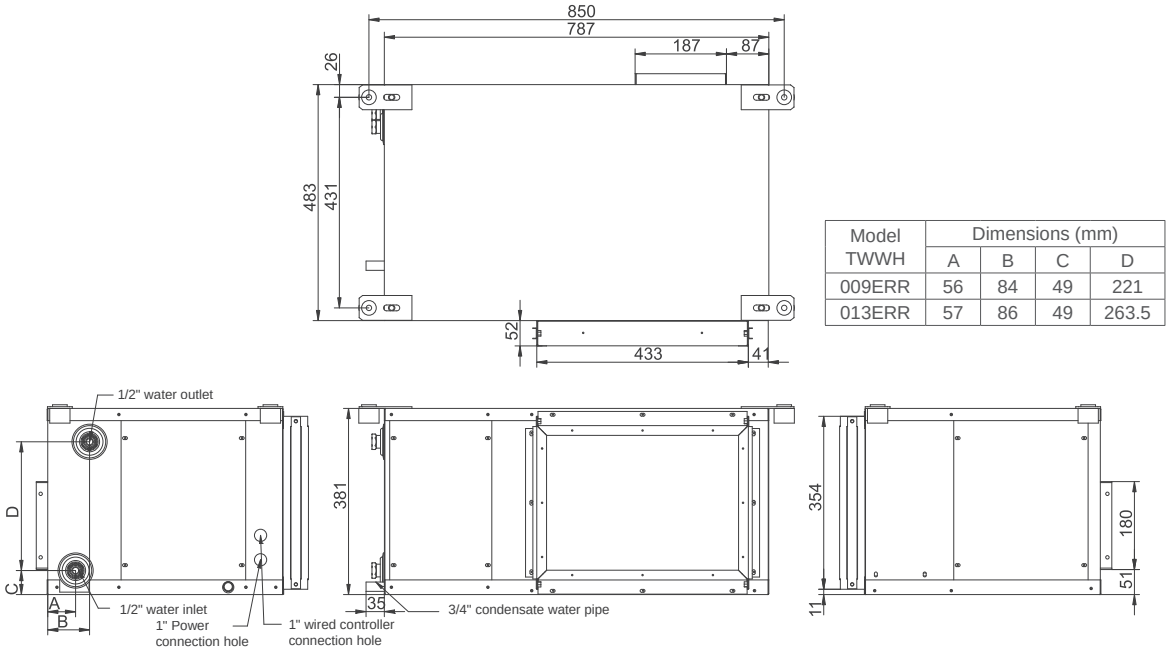
★ **Remarks**

1. The heating capacity is calibrated according to the air inlet dry bulb temperature (21°C),and water inlet temperature (60°C).
2. On the water side of the unit, the standard designed pressure is 1.0 MPa. To let the unit bear other pressure, contact TICA.
3. Parameters of the unit are subject to product improvement. The parameters on the nameplate of the unit shall prevail.

Dimensions

Integral Water Source Heat Pump Unit

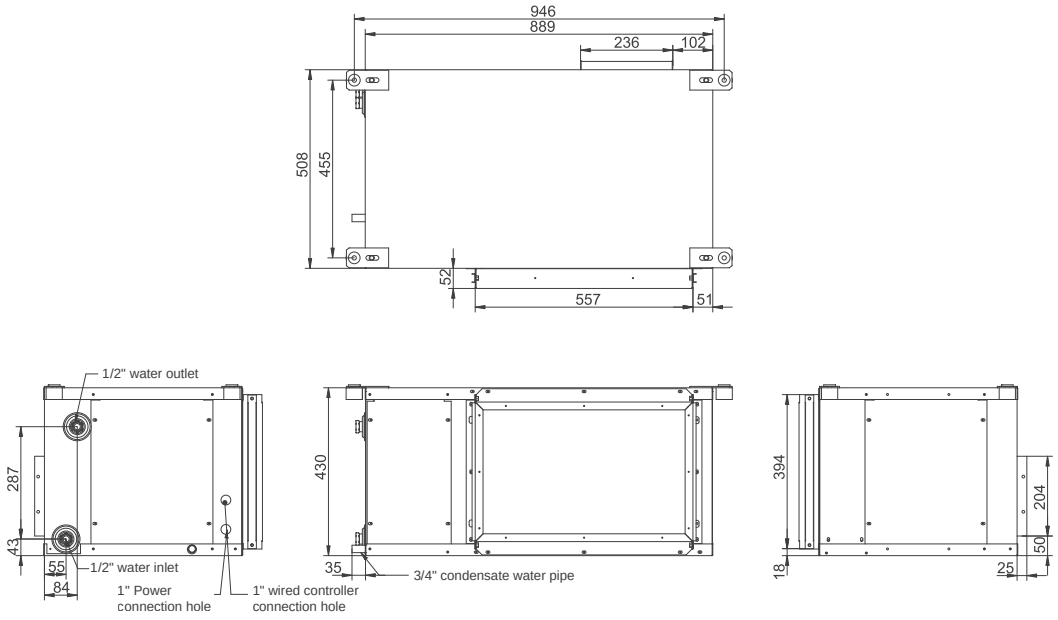
TWWH009~013ERR



Model TWWH	Dimensions (mm)			
	A	B	C	D
009ERR	56	84	49	221
013ERR	57	86	49	263.5

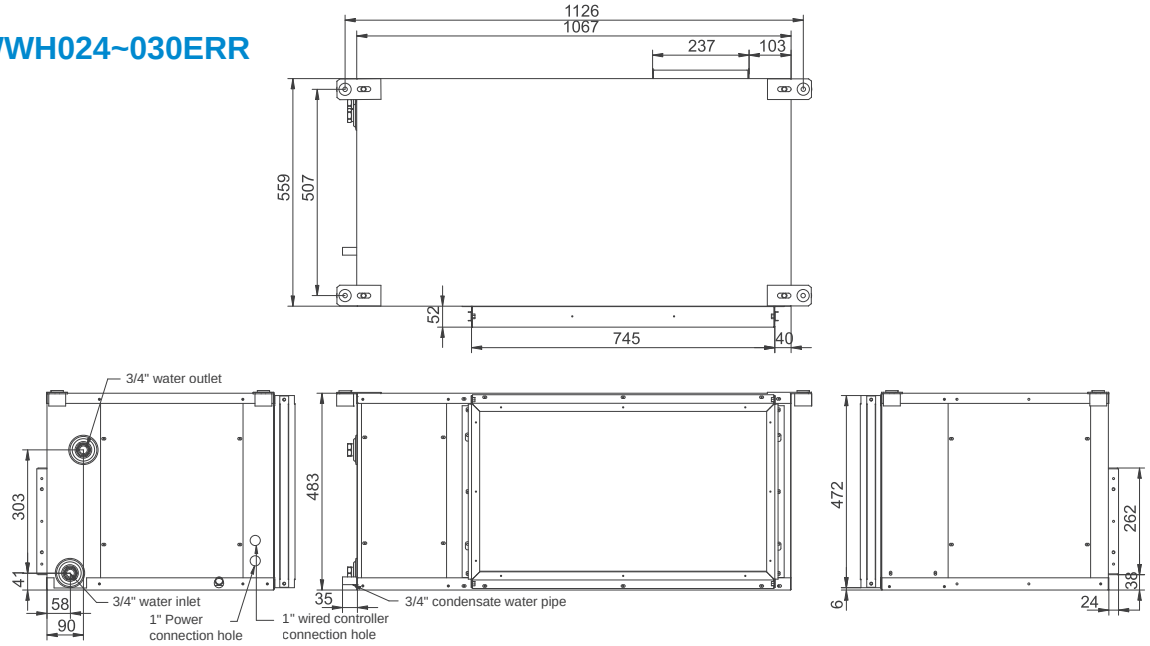
Unless otherwise specified, units of all the unit specifications are mm.

TWWH016~019ERR



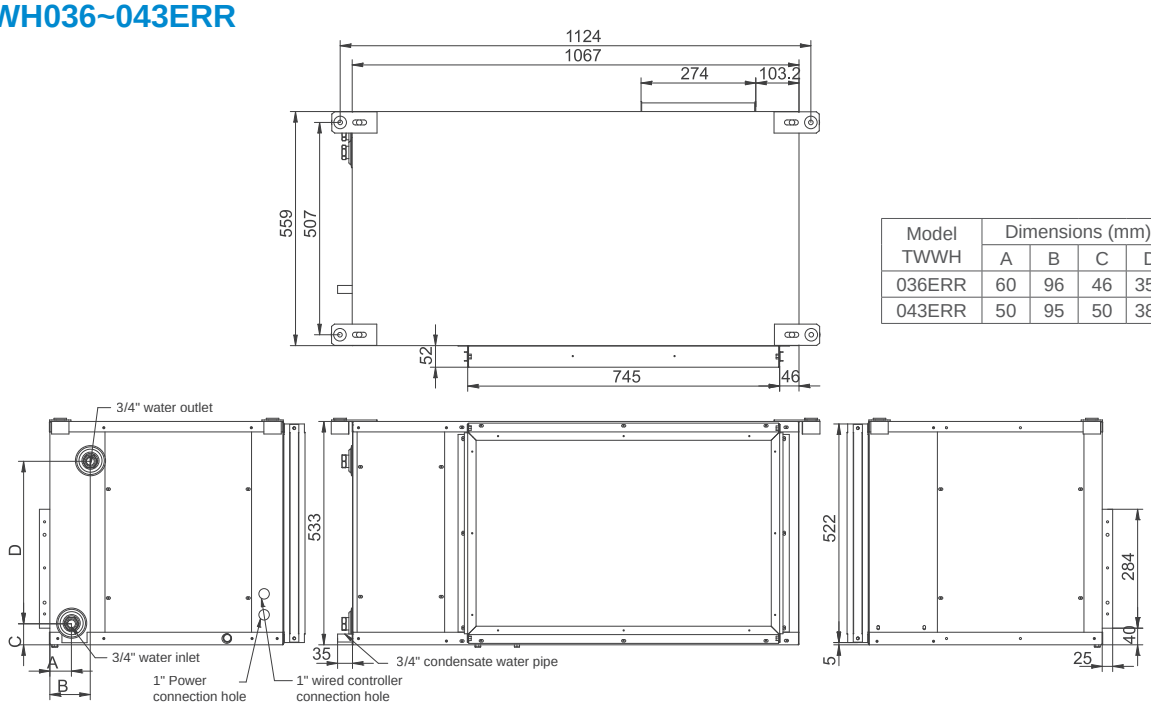
Unless otherwise specified, units of all the unit specifications are mm.

TWWH024~030ERR



Unless otherwise specified, units of all the unit specifications are mm.

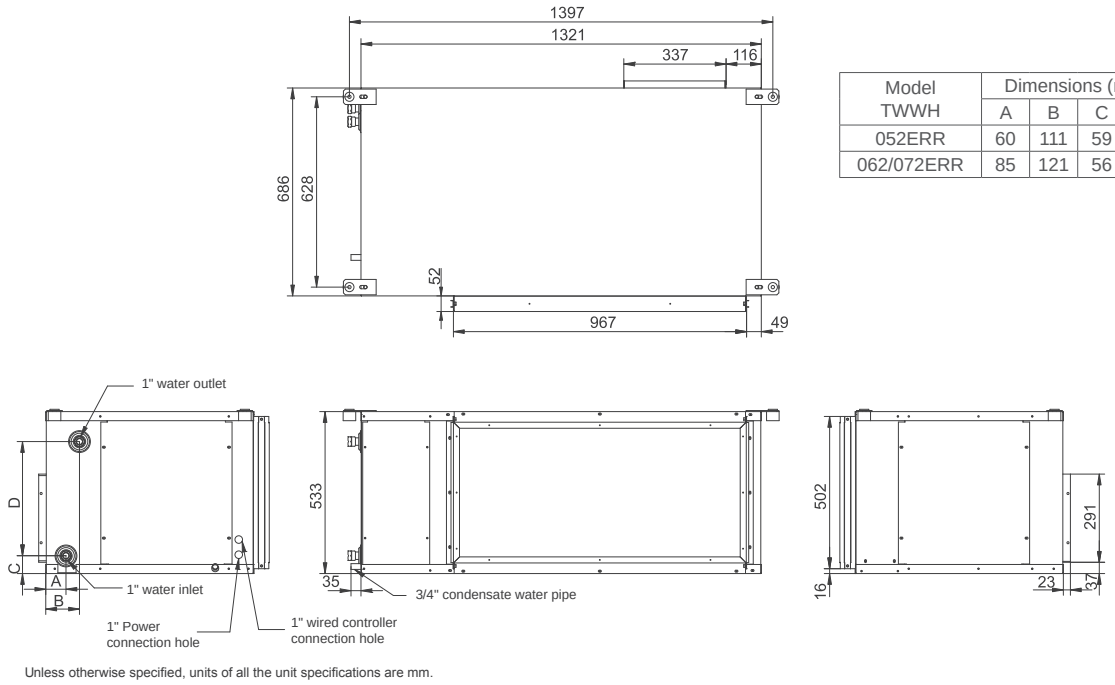
TWWH036~043ERR



Model TWWH	Dimensions (mm)			
	A	B	C	D
036ERR	60	96	46	352
043ERR	50	95	50	388

Unless otherwise specified, units of all the unit specifications are mm.

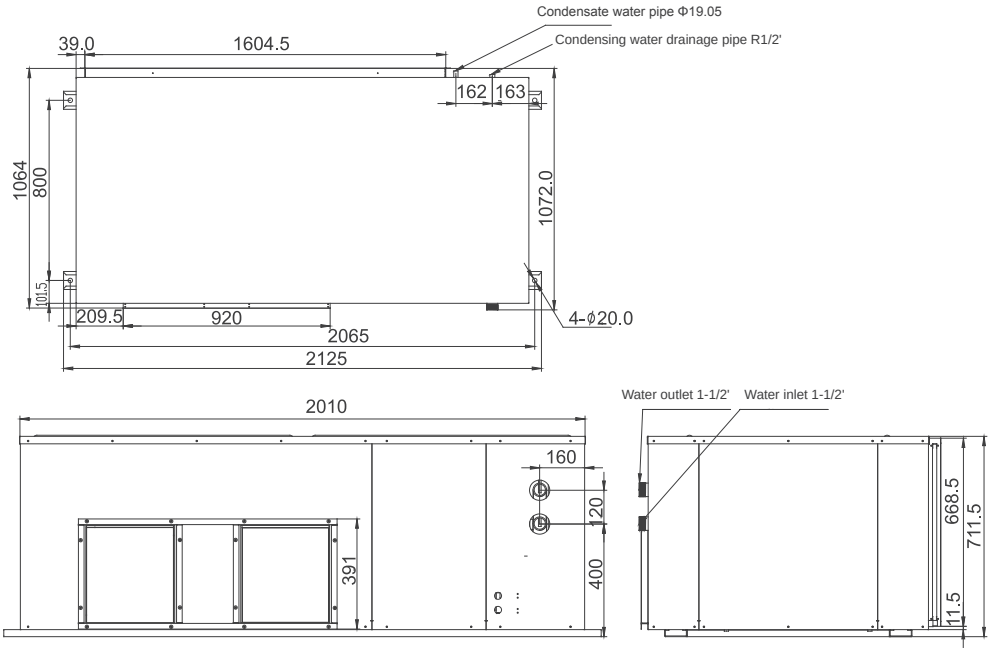
TWWH052~072ERR



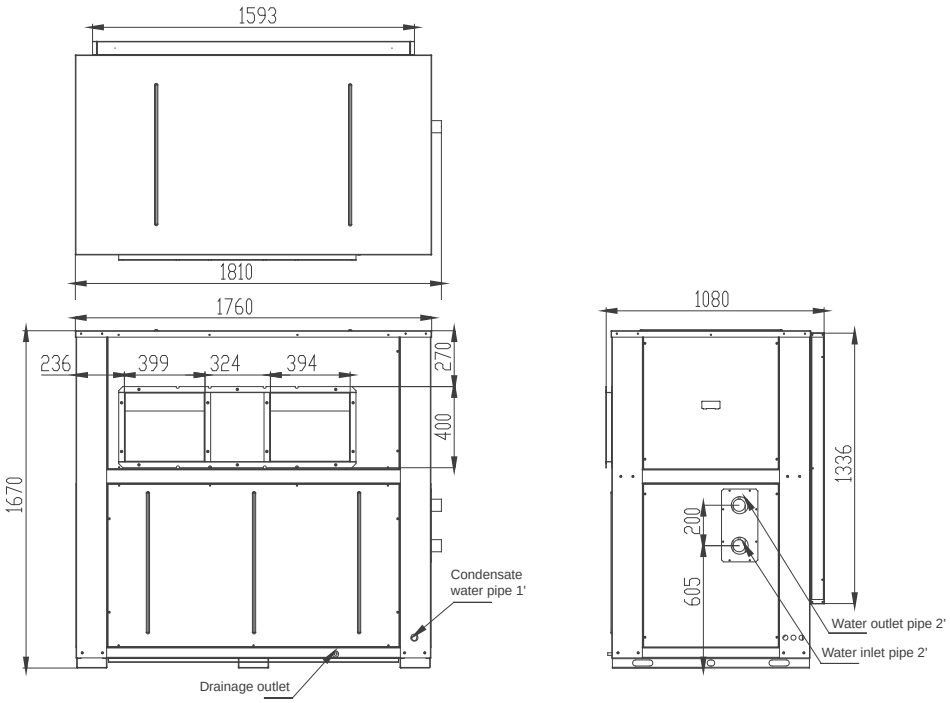
Model TWWH	Dimensions (mm)			
	A	B	C	D
052ERR	60	111	59	377
062/072ERR	85	121	56	325

Unless otherwise specified, units of all the unit specifications are mm.

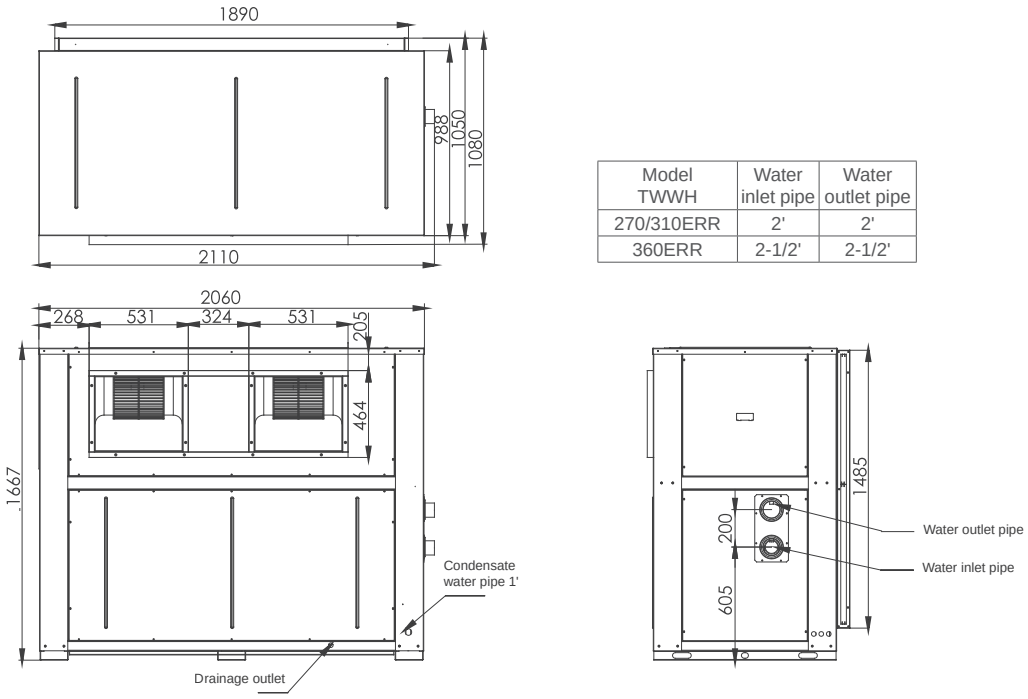
TWWH086~142ERR



TWWH170~210ERR



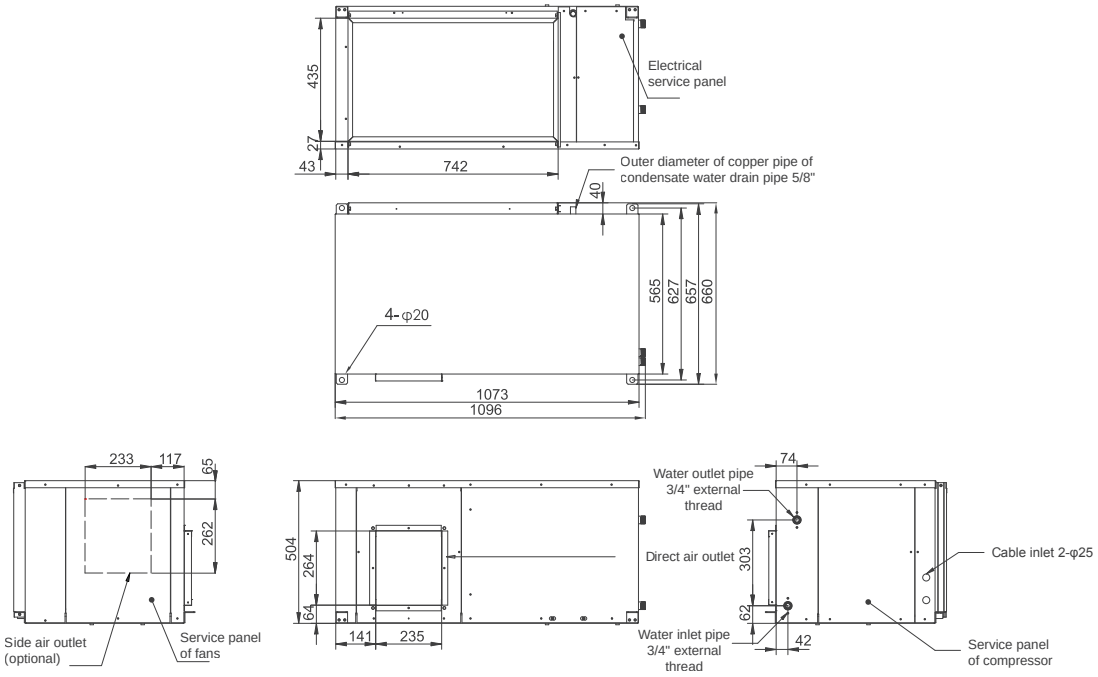
TWWH270~360ERR



Model TWWH	Water inlet pipe	Water outlet pipe
270/310ERR	2'	2'
360ERR	2-1/2'	2-1/2'

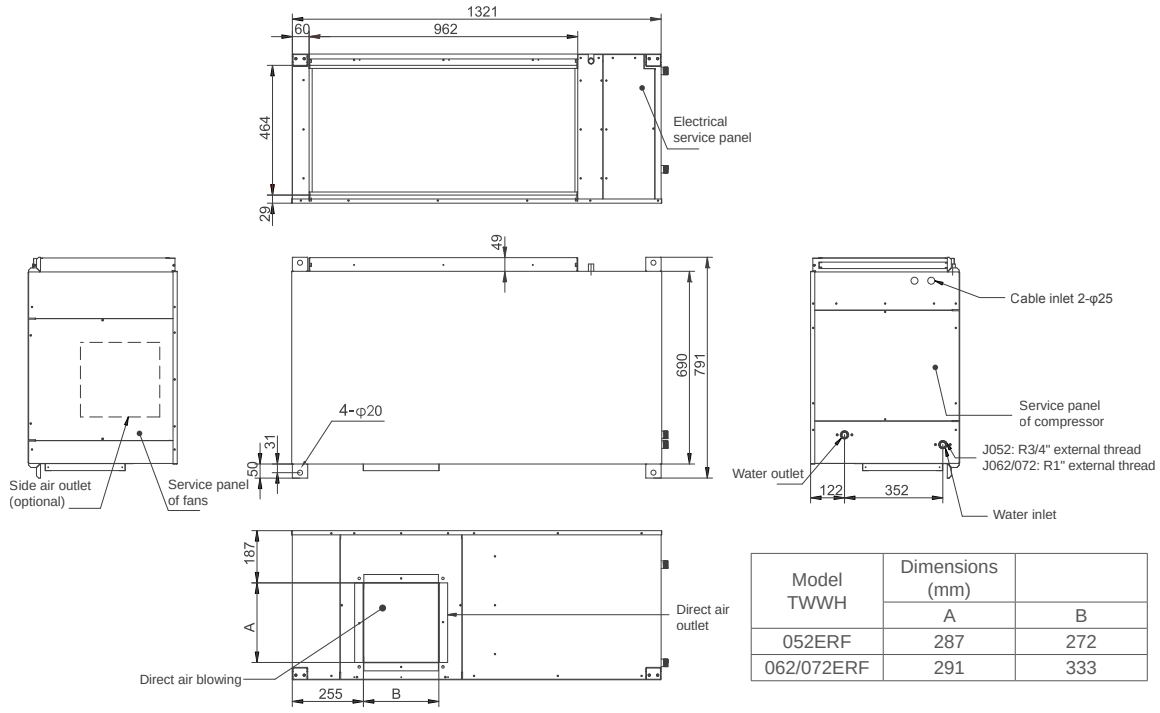
Integral Fresh Air Water Source Heat Pump Unit

TWWH036~043ERF



Unless otherwise specified, units of all the unit specifications are mm.

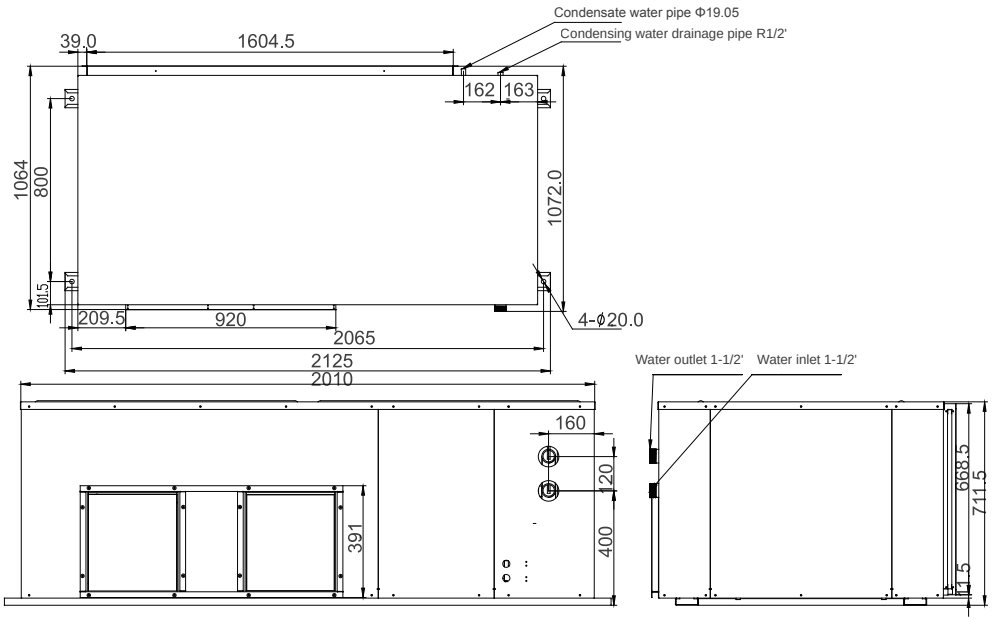
TWWH052~072ERF



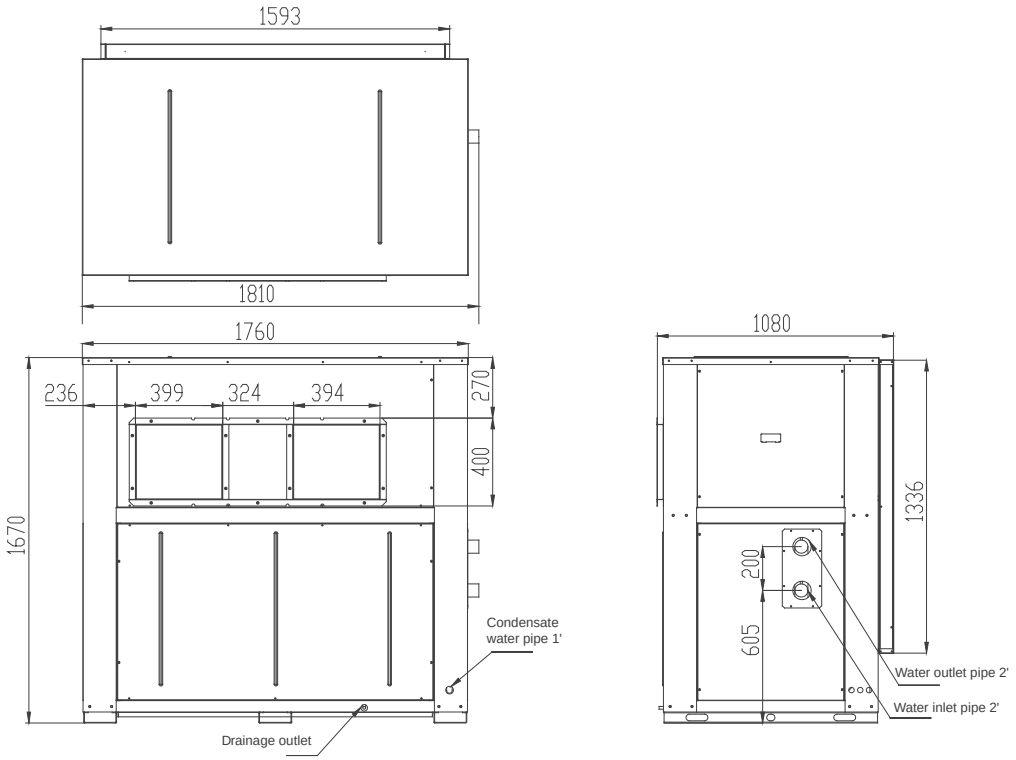
Model TWWH	Dimensions (mm)	
	A	B
052ERF	287	272
062/072ERF	291	333

Unless otherwise specified, units of all the unit specifications are mm.

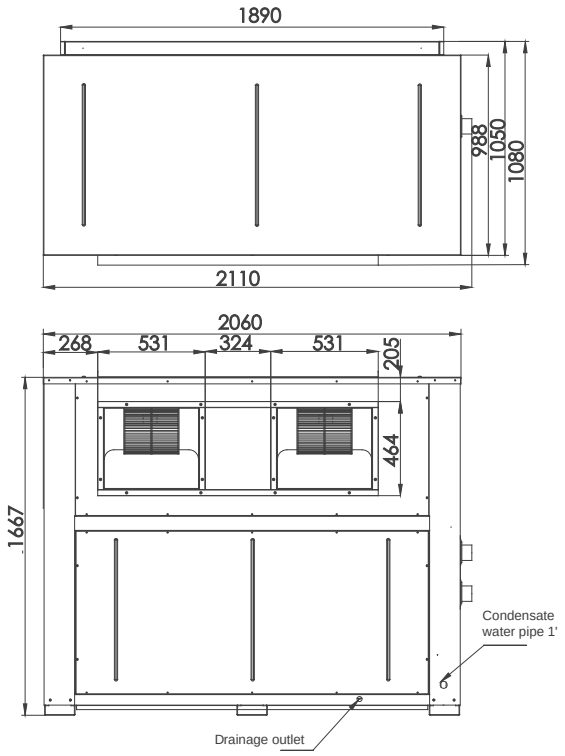
TWWH086~142ERF



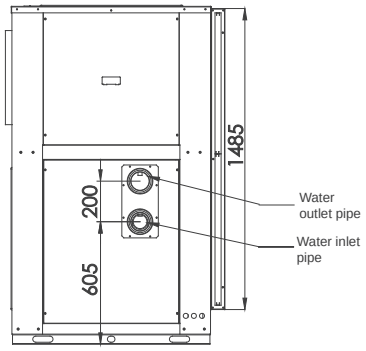
TWWH170~210ERF



TWWH270~360ERF

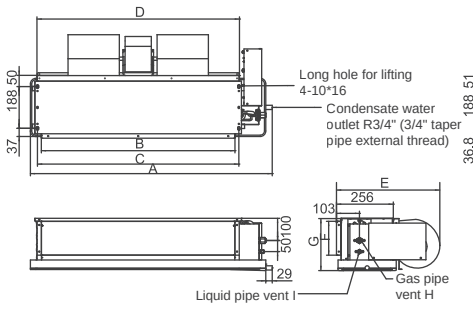


Model TWWH	Water inlet pipe	Water outlet pipe
270/310ERF	2'	2'
360ERF	2-1/2'	2-1/2'

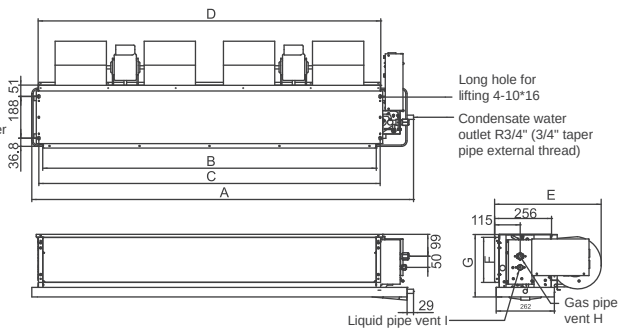


Split-type Water Source Heat Pump IDU

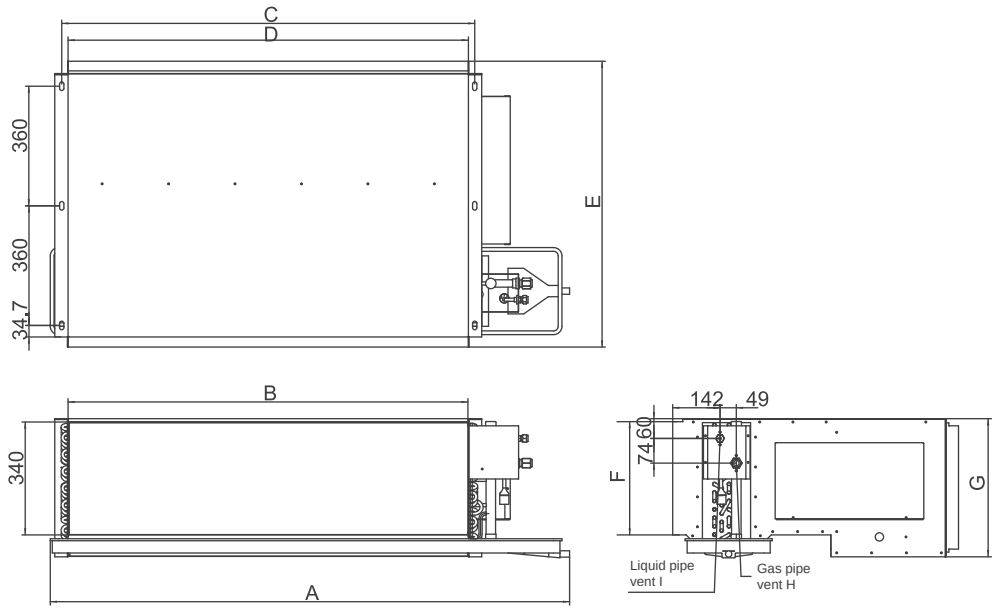
TSR009~043ERS



TSR052~062ERS



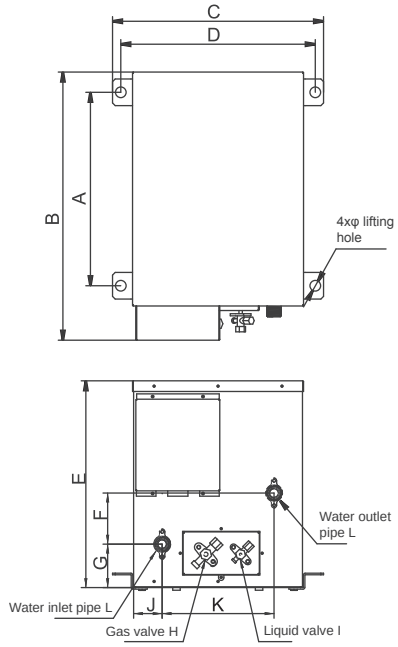
TSR072~086ERS



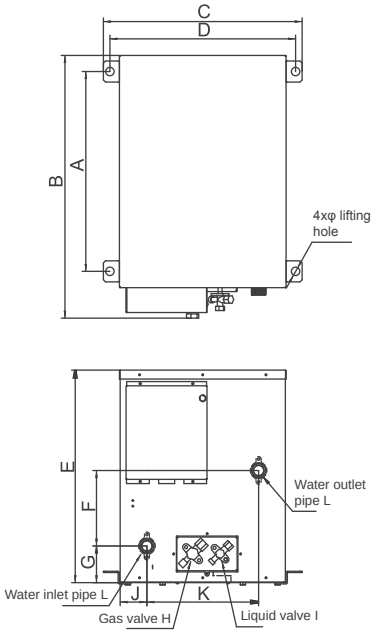
Model TSR	A	B	C	D	E	F	G	H	I	Number of fans
009ERS	669	450	487	492	465	152	231	φ9.52	φ6.35	1
013ERS	809	590	627	632	465	152	231	φ9.52	φ6.35	2
016ERS	989	770	807	812	465	152	231	φ9.52	φ6.35	2
019ERS	989	770	807	812	465	152	231	φ12.7	φ6.35	2
024ERS	1089	870	907	912	465	152	231	φ12.7	φ6.35	2
030ERS	1419	1200	1237	1242	465	152	231	φ15.88	φ9.52	3
036ERS	1519	1300	1337	1342	465	152	231	φ15.88	φ9.52	4
043ERS	1719	1500	1537	1542	465	152	231	φ19.05	φ9.52	4
052ERS	1719	1500	1537	1542	490	202	290	φ19.05	φ9.52	4
062ERS	1719	1500	1537	1542	520	202	290	φ19.05	φ9.52	4
072ERS	1575	1205	1243	1205	870	338	420	φ19.05	φ9.52	2
086ERS	1575	1205	1243	1205	870	385	475	φ19.05	φ9.52	2

Split-type Water Source Heat Pump ODU

TSW009~030ER



TSW036~086ER



Model TSW	A	B	C	D	E	F	G	H	I	J	K	L
009ER	363	503	396	365	388	68.5	70	φ9.52	φ6.35	36	245	R3/4"
013ER	363	503	396	365	388	68.5	70	φ9.52	φ6.35	36	245	R3/4"
016ER	363	503	396	365	388	68.5	70	φ9.52	φ6.35	36	245	R3/4"
019ER	363	503	396	365	463	96	70	φ12.7	φ6.35	54	210	R3/4"
024ER	363	503	396	365	463	107	80	φ12.7	φ6.35	42	234	R3/4"
030ER	363	503	396	365	463	107	80	φ15.88	φ9.52	42	234	R3/4"
036ER	474	623	472	440	504	118	90	φ15.88	φ9.52	78	235	R3/4"
043ER	474	623	472	440	504	137	85	φ19.05	φ9.52	48	295	R1"
052ER	474	623	472	440	504	179	85	φ19.05	φ9.52	64	265	R1"
062ER	474	623	472	440	504	198	77	φ19.05	φ9.52	46	300	R1"
072ER	519	665	472	440	504	198	82	φ19.05	φ9.52	48	295	R1"
086ER	519	665	472	440	504	198	82	φ19.05	φ9.52	48	295	R1"

Installation Instructions

Electrical Data

Integral Water Source Heat Pump Unit

Model TWWH	Power supply	Compressor		Fan	Total current (A)	Voltage		Max. circuit breaker specifications (A)	Power cable inlet	
		RLA(A)	LRA(A)	RLA(A)		Minimum	Maximum		Cable diameter (mm^2)	Qty
009E	220 V/1N~50 Hz	3.6	17.8	0.39	3.99	198	264	10	1.5	3
013E	220 V/1N~50 Hz	5.4	26.1	0.52	5.92	198	264	15	1.5	3
016E	220 V/1N~50 Hz	6.25	27.44	0.85	7.1	198	264	15	1.5	3
019E	220 V/1N~50 Hz	7.75	31.83	0.94	8.69	198	264	25	2.5	3
024E	220 V/1N~50 Hz	9.3	36.8	1.11	10.41	198	264	25	2.5	3
030E	220 V/1N~50 Hz	11.9	61	1.4	13.3	198	264	32	2.5	3
036E	220 V/1N~50 Hz	13.1	68.2	2.07	15.17	198	264	32	4	3
043E	380V/3N~50 Hz	6.3	44	2	8.3	342	418	20	2.5	5
052E	380V/3N~50 Hz	7.2	50	3.82	11.02	342	418	20	2.5	5
062E	380V/3N~50 Hz	8.2	57	4.06	12.26	342	418	20	2.5	5
072E	380V/3N~50 Hz	10.1	73	5.82	15.96	342	418	20	4	5
086E	380V/3N~50 Hz	11.6	77.7	1.3	12.9	342	418	20	4	5
100E	380V/3N~50 Hz	14.4	57.3	1.7	16.1	342	418	32	4	5
120E	380V/3N~50 Hz	16.4	63.2	2.2	18.6	342	418	32	4	5
142E	380V/3N~50 Hz	20.6	79.3	3	23.6	342	418	40	6	5
170E	380V/3N~50 Hz	23.2	89.3	4	27.2	342	418	50	6	5
210E	380V/3N~50 Hz	30	115.5	5	35	342	418	50	10	5
270E	380V/3N~50 Hz	37	142.5	7	44	342	418	63	10	5
310E	380V/3N~50 Hz	42	161.7	8.1	50.1	342	418	100	10	5
360E	380V/3N~50 Hz	48	184.8	12	60	342	418	100	16	5

★ **Remarks**

The power cable is multi-strand copper wire. The above table shows the type recommended for each model (when the optional electric heater is provided, the increased power should be added to the diameter of the power cable)

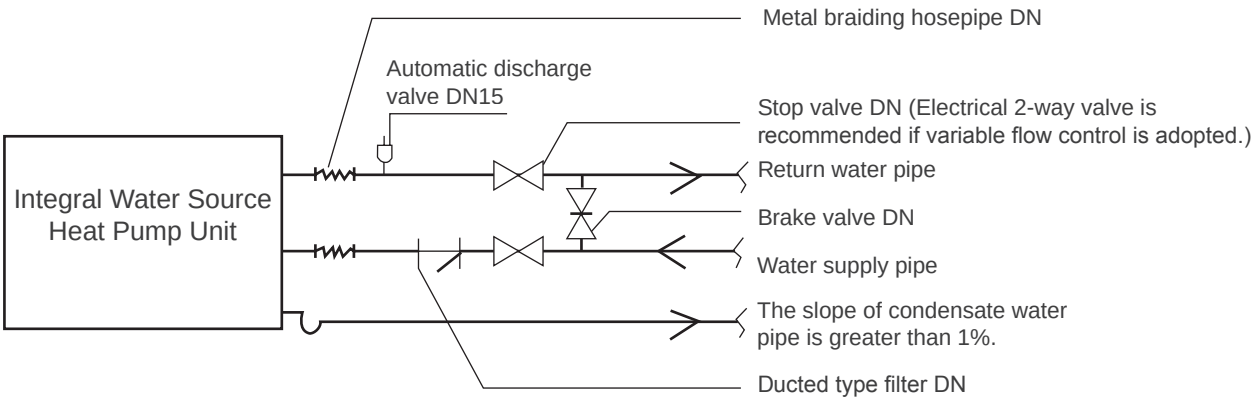
Split-type Water Source Heat Pump Unit

Model	Maximum operating current (A)	Power cable inlet		Connecting cable between master unit and IDU			
TSW/TSR		Cable diameter (mm^2)	Qty	Power cable diameter (mm^2)	Qty	Control cable diameter (mm^2)	Qty
009	4.6	1.5	3	1.5	3	1.0	4
013	6.7	1.5	3	1.5	3	1.0	4
016	8.2	1.5	3	1.5	3	1.0	4
019	10.8	2.5	3	2.5	3	1.0	4
024	12.4	2.5	3	2.5	3	1.0	4
030	15.5	4.0	3	4.0	3	1.0	4
036	18.3	4.0	3	4.0	3	1.0	4
043	9.0	2.5	5	2.5	5	1.0	4
052	10.7	2.5	5	2.5	5	1.0	4
062	12.8	2.5	5	2.5	5	1.0	4
072	15.3	4.0	5	4.0	5	1.0	4
086	17.8	4.0	5	4.0	5	1.0	4

★ **Remarks**

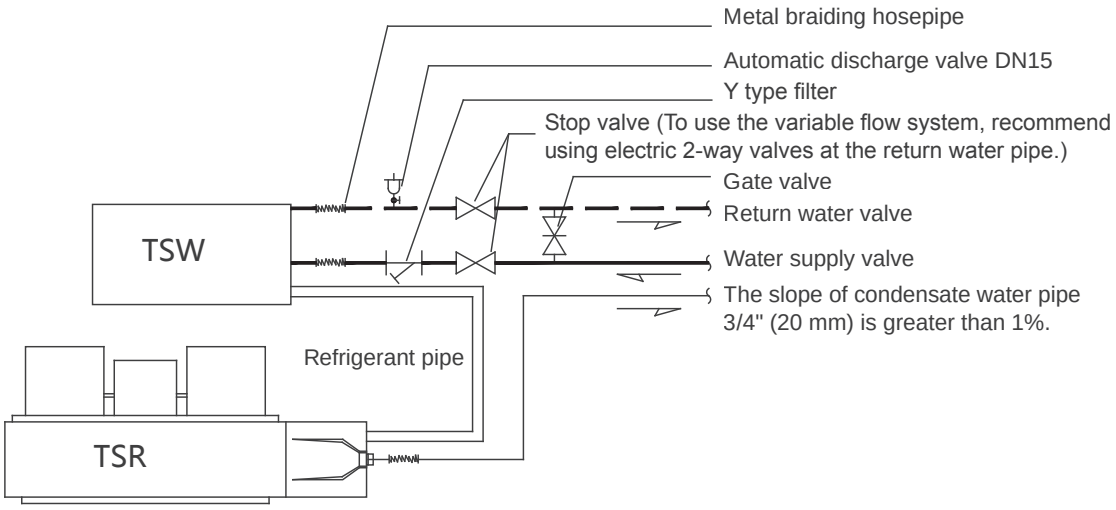
The power cable is multi-strand copper wire. The above table shows the type recommended for each model (when the optional electric heater is provided, the increased power should be added to the diameter of the power cable)

Pipe Connection Diagrams



Note: Deploy a discharge valve at the highest point of the closed water loop pipeline.

Pipe connection diagram of integral water source heat pump unit



Pipe connection diagram of split-type water source heat pump unit

Design of Indoor Part

- Select the working mode of water source according to the surrounding of buildings. The operating conditions of ground source heat pump units are underground coil and underground water conditions. The operating conditions of water loop heat pump units are as follows: in summer, dissipate heat by cooling tower; in winter, provide heat by boiler or TICA air source heat pump. Specifications of units in different operating conditions differ.
- Calculate cooling and heating load according to thermotechnical characteristics of maintenance structure of buildings, orientation, functions, area size, and fresh air volume.
- Look up the actual cooling capacity and heating capacity at different water inlet temperature and flows according to the specifications list of variable conditions.
- Select the unit model and quantity by using the building cooling/heating load calculation method and based on the actual cooling capacity and heating capacity of the unit.
- Determine the installation manner and air flow organization form. To lift a unit, install a shock absorbing spring or shock insulation rubber. The air outlet and return air vent are soft connection interfaces. Generally, air flow is 130 to 180 m^3/h and fan speed is 3 to 5 m/s.
- Reasonably configure water pipeline system and each part according to different water source modes. Try to decrease water system resistance and guarantee hydraulic balance between branches. Generally, water flow speed is 1 m/s to 2 m/s, and water flow at every kW is 0.19 m^3/h. Recommend using the reversed return system of water supply and return water pipelines.
- Deploy discharge valves at the highest place (point) and locally raised place (point) of the water supply and return water pipeline system, while deploy a water leakage valve at the lowest place (point). Deploy a stop valve at the inlet and outlet of the master unit. Install a water filter before the water inlet pipe of the master unit.
- Condensate water of the unit shall be discharged nearby. Try to reduce convergence points.
- For other requirements, observe the related national provisions about design, construction, and acceptance scope of heating and ventilation engineering.

Water Source Selection

The water source heat pump unit can operate in five different water source modes:

1. Using circulating water

On the water system, connect the cooling tower and auxiliary heating device. In summer, the unit discharges indoor heating load to the air via the cooling tower of the water system pipeline. In winter, the unit provides heat via the auxiliary heating device of the water system pipeline, generally, the boiler. Then, the unit "increases" the heat and transfers it to rooms.

2. Using surface water

The unit draws water from rivers, lakes and seas. After filtering, sand removal, and algae removal, water is transferred to the heat exchanger in the unit. The heat exchanger extracts and "increases" cooling/heating capacity from water, and transfers it to rooms. After passing the heat exchanger, the water is transferred to rivers, lakes and seas without changing water quality or affecting the ecological environment.

3. Using underground water

Because underground water features appropriate temperature and small fluctuation, the unit can enable cooling and heating by utilizing energy of underground water. In summer, underground water is led to the heat exchanger of the unit. The unit converts indoor heating load, and then transfers it to the underground water and absorbs indoor heating capacity to decrease room temperature. In winter, the unit absorbs heating capacity from underground water, and "increases" and transfers the heating capacity to the room, thus increasing room temperature. In this manner, energy efficiency ratio is extremely high. In other words, more cooling/heating capacity can be generated with less electric energy consumed. It is also the most energy-saving manner. However, the underground water well and the water system that contains devices for sand removal and filtering shall ensure that the unit can run efficiently and stably.

4. Using water in underground coil

Because temperature of the soil 2 meters below the earth's surface is basically constant. Water system pipelines are buried in the soil. Therefore, water in pipelines exchanges heat with soil. In summer, indoor heating load is discharged to the soil by the water pipelines buried in the soil. In winter, the unit absorbs heat from the soil, and increases and transfers it to rooms.

5. Using industrial tail water and terrestrial heat tail water

The water system connects the filtering device, sand removal device, and algae removal device, as well as industrial tail water and terrestrial heat tail water. In summer, the unit discharges indoor heating load to industrial tail water and terrestrial heat tail water via water system pipelines. In winter, the unit absorbs heat from industrial tail water and terrestrial heat tail water, and increases and transfers it to rooms.

Comparison Between Water Loop Heat Pump System and Traditional Central Air Conditioner

Item	Water Loop Heat Pump System	Traditional Central Air Conditioning System
System design	Simple system design and short design period	Complicated system design and long design period
System cost	Initial investment cost is more than 20% cheaper than that of 4-pipe fan coil system.	Initial investment cost of the 4-pipe system is high.
Staged investment	When necessary, choose staged investment.	Staged investment is not allowed.
Space usage	Small heat pump unit is installed into the ceiling or a small equipment room. No cooling water unit. Large equipment room is not required.	Apart from the cooling tower, boiler, and water pump, a big equipment room is required for housing the cooling unit.
Commissioning	Each heat pump unit can be powered on only after common air conditioner technicians check and ensure that it is installed properly. It takes a short time to complete commissioning.	The water chiller should be installed and commissioned by professional workers. Due to a long supply period, the installation cannot be completed fast.
System installation	The system can be installed by common air conditioner installation workers. Installation and commissioning are simple. The supply period of heat pumps is short, so the installation can be completed fast.	The water chiller should be installed and commissioned by professional workers. Due to a long supply period, the installation cannot be completed fast.
Maintenance	Each heat pump unit uses hermetic compressors without the need of maintenance. There is only a need to clean filter screens by common technicians. A failed heat pump unit can be quickly replaced by the standby heat pump unit without affecting running of other units. The loss is slight.	Filter screens of fan coils should be cleaned. Water chillers should be regularly maintained by professional technicians. Therefore, maintenance cost is high. When a water chiller fails, the entire system will stop running, thus imposing a great influence. Loss is also great.
Temperature control	Each heat pump unit can run in cooling or heating mode at any time by settings. Temperature is comfortable.	The mode (cooling/heating) is configurable only when the 4-pipe fan coil is supplied with both cold and hot water at the same time.
Independent calculation	Power consumption of each heat pump unit can be calculated independently.	The master unit calculates power consumption independently. A tedious control system needs to be configured at air side.
System thermal insulation	Water temperature in pipes slightly differs from ambient temperature, and heat loss of pipes is small. Less space is occupied and the construction is easy. The water circulating pipes of air conditioners are free from dew formation and dew dripping.	The water circulating system of air conditioners requires thermal insulation, which occupies large space and requires much construction work. In summer, dew is easily formed on the pipes for transferring 7°C to 12°C water and drips from them. Any carelessness may result in dew dripping accidents. Moreover, heat loss is great.

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