

WDH

Ground source heat pumps



R407C



C.O.P. ≥ 5,1



WDH heat pumps are particularly suitable for applications that utilise ground source probes. These units have been designed for use with radiant floor heating systems or those applications where it is necessary to have maximum efficiency when heating. They have been optimized on heating mode and are able to produce water up to 55°C.

WDH heat pumps are available in several versions. The most simple is a 2 pipe unit that can provide heating only. By fitting an external 3 port valve the unit can provide either heating or domestic hot water. There is also a 4 pipe unit that produces domestic hot water in a separate hydraulic circuit and can generate this irrespective of whether the unit is in heating or cooling mode. All the WDH units are also available in Free Cooling (FC) versions which provide low energy cooling by simply using the cool water that is available from either the ground source probes or the well water.

Differing versions and a wide range of accessories, enable the optimal solution to be selected.

OTHER VERSIONS

- WDH standard, heating only.
- WDH/SW5 heating only + domestic hot water circuit.
- WDH/RV reversible heating/cooling.
- WDH/RV/SW6 reversible version heating/cooling with independent DHW circuit.
- FC free cooling version (available in all versions)

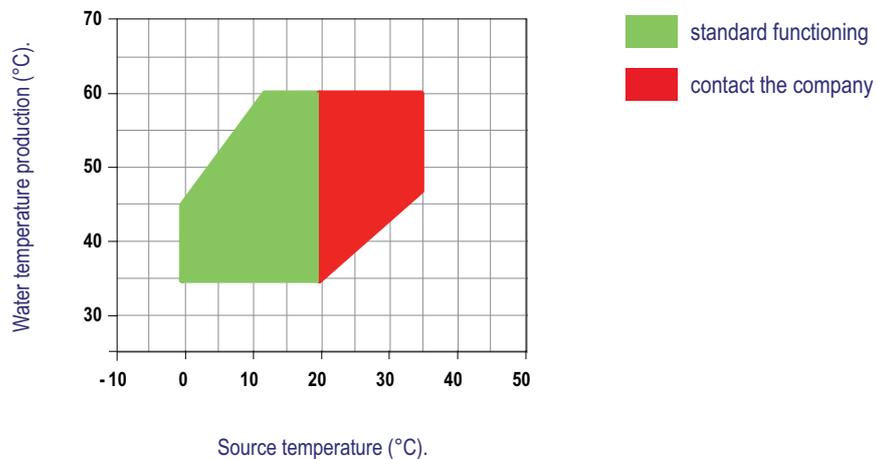
ACCESSORIES

- DSSE: Soft starter elettronico.
- INSE: Scheda interfaccia seriale RS485.
- KAVG: Rubber anti-vibration mountings.
- KAVM: Spring anti-vibration mountings.
- LS00: Low noise version.
- MAML: Refrigerant circuit pressure gauges.
- PCRL: Remote control panel.
- VM2D: 2 way modulating valve to reduce source water consumption (4-20 mA; 0-10 V).
- Pumps contacts (source, user, domestic hot water pump).

WDH

Model WDH WDH/SW6		039	045	050	060	070	080	090	110	120	130
Heating capacity (EN14511) ⁽¹⁾	kW	48,2	58,7	67,9	75,8	83,7	101,7	118,4	135,2	152,3	169,5
Total input power (EN14511) ⁽¹⁾	kW	9,4	11,4	12,9	14,6	16,2	19,4	22,5	25,7	28,9	32,1
COP (EN14511) ⁽¹⁾	W/W	5,1	5,1	5,3	5,2	5,2	5,2	5,3	5,3	5,3	5,3
User water flow (EN14511) ⁽¹⁾	m ³ /h	11,2	13,6	15,8	17,6	19,4	23,6	27,5	31,4	35,4	39,4
Heating capacity (EN14511) ⁽²⁾	kW	37,0	45,0	52,4	58,1	64,2	77,9	90,6	103,3	115,3	128,3
Total input power (EN14511) ⁽²⁾	kW	9,2	11,1	12,7	14,3	15,7	18,7	21,6	24,5	27,5	30,5
COP (EN14511) ⁽²⁾	W/W	4,0	4,1	4,1	4,1	4,1	4,2	4,2	4,2	4,2	4,2
Cooling capacity (EN14511) ⁽³⁾	kW	56,2	70,2	82,8	86,9	101,8	123,1	143,4	157,0	185,6	207,3
Total input power (EN14511) ⁽³⁾	kW	9,9	12,1	13,7	15,8	17,9	21,3	24,5	27,8	31,7	35,6
EER (EN14511) ⁽³⁾	W/W	5,7	5,8	6,0	5,5	5,7	5,8	5,9	5,6	5,9	5,8
Cooling capacity (EN14511) ⁽⁴⁾	kW	41,0	50,8	60,5	62,8	73,8	90,1	104,9	114,6	135,0	150,3
Total input power (EN14511) ⁽⁴⁾	kW	9,7	11,8	13,3	15,1	16,9	20,2	23,4	26,7	30,2	36,6
EER (EN14511) ⁽⁴⁾	W/W	4,2	4,3	4,5	4,2	4,4	4,5	4,5	4,3	4,5	4,1
Free Cooling capacity ⁽⁵⁾	kW	24,0	28,0	33,0	37,0	41,0	50,0	58,0	66,0	74,0	83,0
Power supply		400V / 3Ph / 50 Hz									
Peak current	A	116,0	143,0	149,0	189,0	194,0	230,0	257,0	266,0	313,0	324,0
Maximum input current	A	34,0	40,0	44,0	49,0	54,0	64,0	73,0	82,0	93,0	104,0
Compressors type / n° / Circuits		Scroll / 2 / 1									
Capacity steps	n°	2	2	2	2	2	2	2	2	2	2
Water pump	kW	1,1	1,1	1,1	1,1	1,1	1,5	1,5	2,2	2,2	2,2
Pump available static pressure	kPa	155	130	100	80	60	105	65	80	60	50
Sound power ⁽⁶⁾	dB(A)	80	80	81	82	82	83	83	84	84	85
Sound pressure ⁽⁷⁾	dB(A)	52	52	53	54	54	55	55	56	56	57

OPERATION LIMITS



Performances refer to the following conditions:

⁽¹⁾ Heating: user water temperature 30/35°C, source water temperature 10/7°C.

⁽³⁾ Cooling: user water temperature 23/18°C, source water temperature 30/35°C.

⁽⁶⁾ Cooling: user water temperature 10°C, source water temperature 20°C.

⁽⁷⁾ Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, calculated in accordance with ISO 9614 (LS version).

⁽²⁾ Heating: user water temperature 30/35°C, source water temperature 0/-3°C con 10% glycol.

⁽⁴⁾ Cooling: user water temperature 12/7°C, source water temperature 30/35°C.

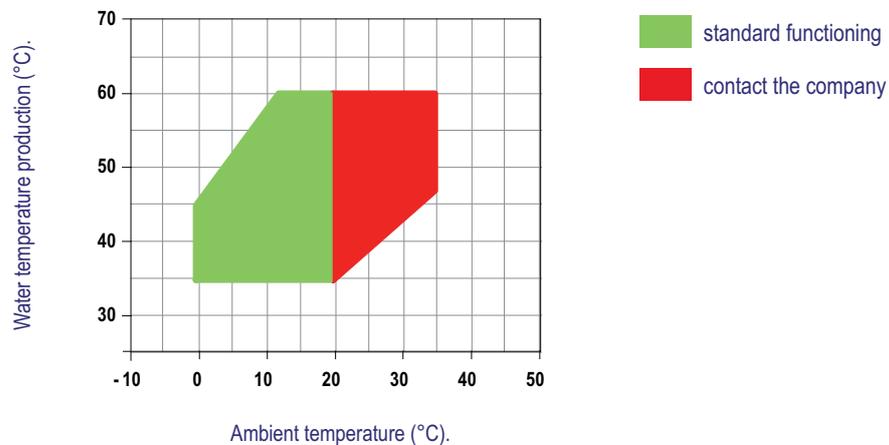
⁽⁶⁾ Sound power level in accordance with ISO 9614.

WDH

WDH

Model WDH WDH/SW6		152	162	144	164	190	210	240	260	300	320
Heating capacity (EN14511) ⁽¹⁾	kW	189,1	208,7	185,4	203,4	236,8	270,3	304,7	339,1	378,2	420,3
Total input power (EN14511) ⁽¹⁾	kW	35,2	38,3	35,6	38,7	45,1	51,4	57,8	64,2	70,3	76,5
COP (EN14511) ⁽¹⁾	W/W	5,4	5,4	5,2	5,3	5,3	5,3	5,3	5,3	5,4	5,5
User water flow (EN14511) ⁽¹⁾	m ³ /h	44,2	48,9	43,0	47,3	55,0	62,8	70,8	78,9	88,3	97,8
Heating capacity (EN14511) ⁽²⁾	kW	143,1	157,7	142,6	157,0	182,4	208,1	233,6	258,9	288,4	318,6
Total input power (EN14511) ⁽²⁾	kW	33,5	36,5	34,7	38,0	43,5	49,4	55,4	61,4	67,4	73,4
COP (EN14511) ⁽²⁾	W/W	4,3	4,3	4,1	4,1	4,2	4,2	4,2	4,2	4,3	4,3
Cooling capacity (EN14511) ⁽³⁾	kW	222,5	253,6	214,7	241,3	297,5	340,2	385,4	430,3	485,2	540,0
Total input power (EN14511) ⁽³⁾	kW	38,8	42,3	39,6	43,1	49,8	56,4	64,1	71,9	79,0	86,0
EER (EN14511) ⁽³⁾	W/W	5,7	6,0	5,4	5,6	6,0	6,0	6,0	6,0	6,1	6,3
Cooling capacity (EN14511) ⁽⁴⁾	kW	161,5	182,8	156,6	175,4	217,0	247,9	179,9	311,5	349,4	387,3
Total input power (EN14511) ⁽⁴⁾	kW	36,6	39,8	37,1	39,9	47,8	54,9	61,3	67,9	74,5	80,9
EER (EN14511) ⁽⁴⁾	W/W	4,4	4,6	4,2	4,4	4,5	4,5	2,9	4,6	4,7	4,8
Free Cooling capacity ⁽⁵⁾	kW	92,0	102,0	90,0	99,0	115,0	162,0	148,0	165,0	184,0	204,0
Power supply		400V / 3Ph / 50 Hz									
Peak current	A	362,0	372,5	279,8	294,0	330,0	348,0	406,0	428,0	476,5	497,5
Maximum input current	A	114,5	125,0	109,6	128,0	146,0	164,0	186,0	208,0	229,0	250,0
Compressors type / n° / Circuits		Scroll / 2 / 1					Scroll / 4 / 2				
Capacity steps	n°	2	2	4	4	4	4	4	4	4	4
Water pump	kW	3,0	3,0	3,0	3,0	3,0	4,0	4,0	4,0	5,5	5,5
Pump available static pressure	kPa	140	117	143	120	80	150	120	90	140	120
Sound power ⁽⁶⁾	dB(A)	85	85	85	85	86	88	88	88	90	90
Sound pressure ⁽⁷⁾	dB(A)	57	57	57	57	58	60	60	60	62	62

OPERATION LIMITS



⁽¹⁾ Heating: user water temperature 30/35°C, source water temperature 10/7°C.

⁽²⁾ Cooling: user water temperature 23/18°C, source water temperature 30/35°C.

⁽³⁾ Cooling: user water temperature 10°C, source water temperature 20°C.

⁽⁷⁾ Sound pressure level at 10 mt from the unit in free field conditions direction factor Q=2, in accordance with ISO 9614 (LS version).

⁽²⁾ Heating: user water temperature 30/35°C, source water temperature 0/-3°C con 10% glycol.

⁽⁴⁾ Cooling: user water temperature 12/7°C, source water temperature 30/35°C.

⁽⁶⁾ Sound power level in accordance with ISO 9614.

WDH

FRAME

All WDH units are made from hot-galvanized sheet steel, painted with polyurethane powder enamel and stoved at 180°C to provide maximum protection against corrosion. The frame is self-supporting with removable panels. All screws and rivets used are made from stainless steel. The standard colour of the units is RAL 7035.

REFRIGERANT CIRCUIT

The refrigerant utilised is R407C. The refrigerant circuit is assembled using internationally recognised brand name components with all brazing and welding being performed in accordance with ISO 97/23. Each refrigerant circuit is totally independent from the other with the result that any fault or alarm condition on one circuit does not influence the other. The refrigerant circuit includes: sight glass, filter drier, thermal expansion valve with external equalizer, Schrader valves for maintenance and control and pressure safety device (for compliance with PED regulations).

COMPRESSORS

The compressors used are a high performance scroll type that incorporates a special scroll design which enhances the efficiency of the refrigerant cycle when the source temperature is low. The compressors are all supplied with a crankcase heater and thermal overload protection by a klixon embedded in the motor winding. They are mounted in a separate enclosure thus enabling them to be maintained even if the unit is operating. Access to this enclosure is via the front panel of the unit. The crankcase heater is always powered when the compressor is in stand-by.

SOURCE HEAT EXCHANGERS

The source side heat exchanger is a braze welded, plate type heat exchanger, manufactured from AISI 316 stainless steel.

From size 039 to size 162 they have a single water side circuit, from size 144 they are double circuit, "cross flow" type. Utilisation of this type of exchanger results in a massive reduction of the refrigerant charge of the unit compared to a traditional shell-

in-tube type and increases the efficiency of the refrigerant cycle at part loads. The source heat exchangers are factory insulated with flexible close cell material and are provided with a temperature sensor as anti-freeze protection.

USER EXCHANGER

The user side heat exchanger is a braze welded, plate type heat exchanger, manufactured from AISI 316 stainless steel. From size 039 to size 162 they have a single water side circuit, from the size 144 they are double circuit, "cross flow" type. All units are supplied with a sub-cooler to enhance the performance of the refrigerant cycle. The user heat exchangers are factory insulated with flexible close cell material.

MICROPROCESSORS

All WDH units are supplied as standard with microprocessor controls. The microprocessor controls the following functions: control of the water temperature, antifreeze protection, compressor timing, compressor automatic starting sequence, alarm reset, volt free contact for remote general alarm, alarms and operation LED's. If required (available as an option), the microprocessor can be configured in order for it to connect to a site BMS system thus enabling remote control and management. The Hidros technical department can discuss and evaluate, in conjunction with the customer, solutions using MODBUS protocols.

ELECTRIC ENCLOSURE

The enclosure is manufactured in order to comply with the requirements of the electromagnetic compatibility standards CEE 73/23 and 89/336. Access to the enclosure is achieved by removing the front panel of the unit. The following components are supplied as standard on all units: main switch, thermal overloads (protection of pumps and fans), compressor fuses, control circuit automatic breakers, compressor contactors, fan contactors and pump contactors. The terminal board has volt free contacts for remote ON-OFF, Summer/Winter change over (reversible type only) and general alarm. For all three phase units, a sequen-

ce relay that disables the power supply in the event that the phase sequence is incorrect (scroll compressors can be damaged if they rotate in the wrong direction), is fitted as standard.

CONTROL AND PROTECTION DEVICES

All units are supplied with the following control and protection devices: Return and supply user heat exchanger sensors, return and supply source heat exchanger sensors, high pressure switch with manual reset, low pressure switch with automatic reset, high pressure safety valve, compressor thermal overload protection, pump thermal overload protection (when present), source heat exchanger flow switch.

OTHER VERSIONS

WDH/SW5 ONLY HEATING UNIT WITH DOMESTIC HOT WATER

This version is able to produce domestic hot water. It is supplied with an ON/OFF 3 way valve that diverts the water flow to a circuit for hot water production. These units are not available in the reversible version (RV) and cannot produce cold water.

WDH/RV REVERSIBLE VERSION HOT/COLD

This version can be used for cooling during summer operation by using a 4 way reversing valve in the refrigerant circuit. They are also fitted with a second thermostatic valve and a liquid receiver.

WDH/RV/SW6 REVERSIBLE HOT/COLD INDEPENDENT DOMESTIC HOT WATER CIRCUIT

This version has 4 pipes on the user side and is able to produce simultaneously, hot and cold water on 2 independent hydraulic circuits. The domestic hot water production is independent of the operation mode of the unit. This unit is supplied as standard with a reversing valve which enables the production of cold water in summer mode.

WDH

WDH/FC; WDH/FC/RV; WDH/FC/SW5; WDH/FC/RV/SW6 - FREE COOLING VERSIONS

These versions, in addition to the characteristics described above, can produce cold water during summer operation using the cold water available from the source ground probes. All free cooling versions are supplied with an intermediate heat exchanger and a 3 way valve which modulates the water flow to the user circuit depending on the required user cold water temperature. During free cooling mode the compressors may be off

or will operate partially to augment the free cooling available.

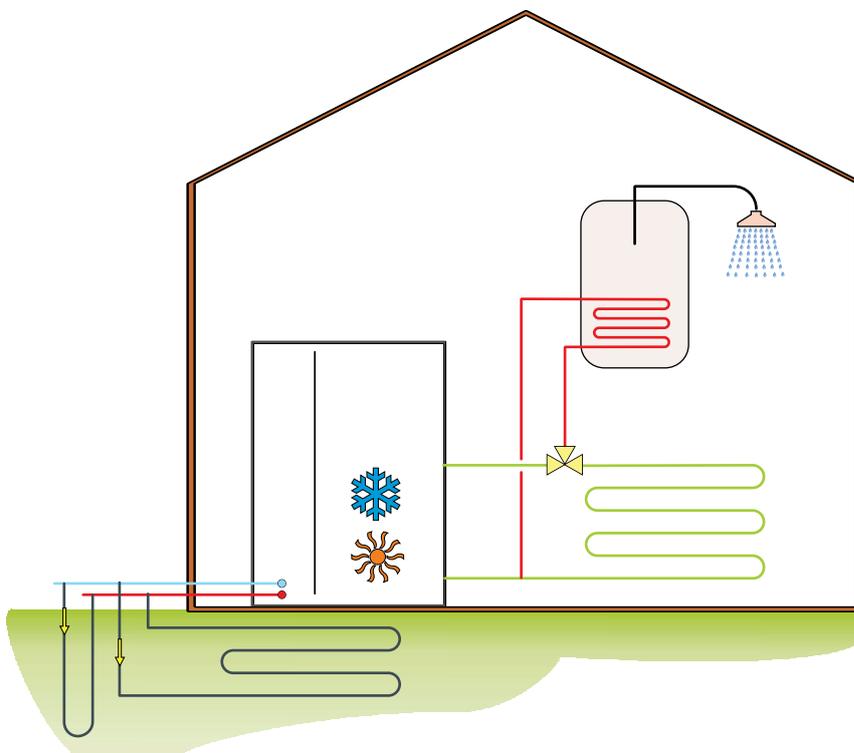
VERSIONS

WDH/A1NT UNIT WITH WATER PUMP

This version is supplied with a single, centrifugal type water pump with a high available pressure. The pump is connected as standard, to the user heat exchanger but upon request, can also be connected to the source heat exchanger.

WDH/LS LOW NOISE VERSION

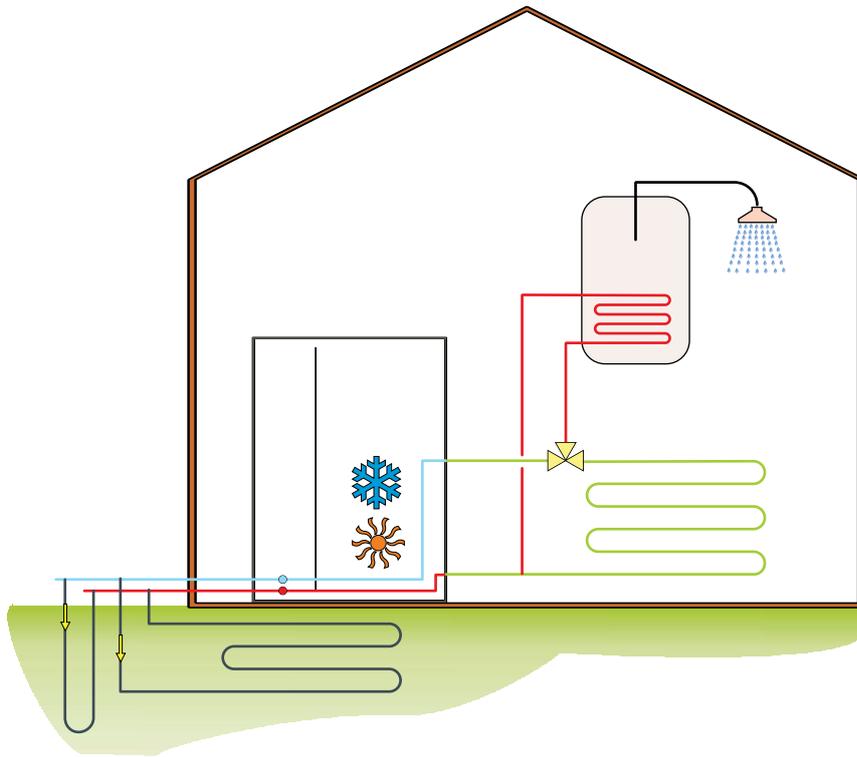
This version has acoustic insulation applied to the unit (both the compressor and its enclosure) in the form of compressor jackets and insulating material made with high density media coated with a heavy bitumen layer.



WDH/RV 2 PIPES VERSION.

This version is capable of cooling during summer operation by using a 4 way reversing valve in the refrigerant circuit.

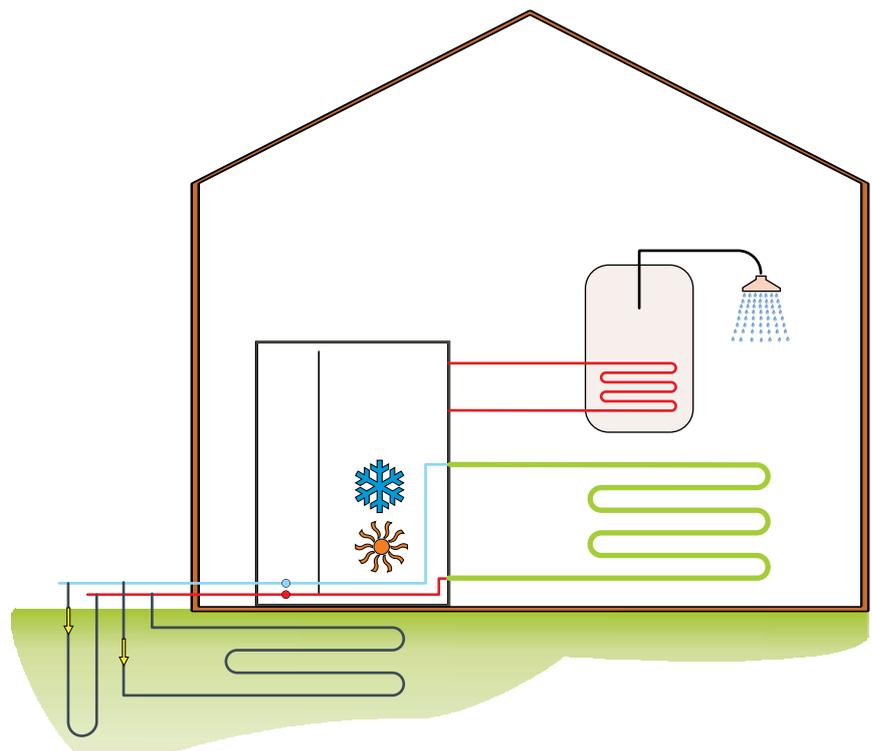
WDH



WDH/FC/RV 2 PIPES VERSION.

These versions, in addition to the characteristics described above, can produce cold water during summer operation using the cold water available from the source ground probes. All free cooling versions are supplied with an intermediate heat exchanger and a 3 way valve which modulates the water flow to the user circuit depending on the required user cold water temperature. During free cooling mode the compressors may be off or will operate partially to augment the free cooling available.

WDH/FC/RV/SW6 2 PIPES VERSION.

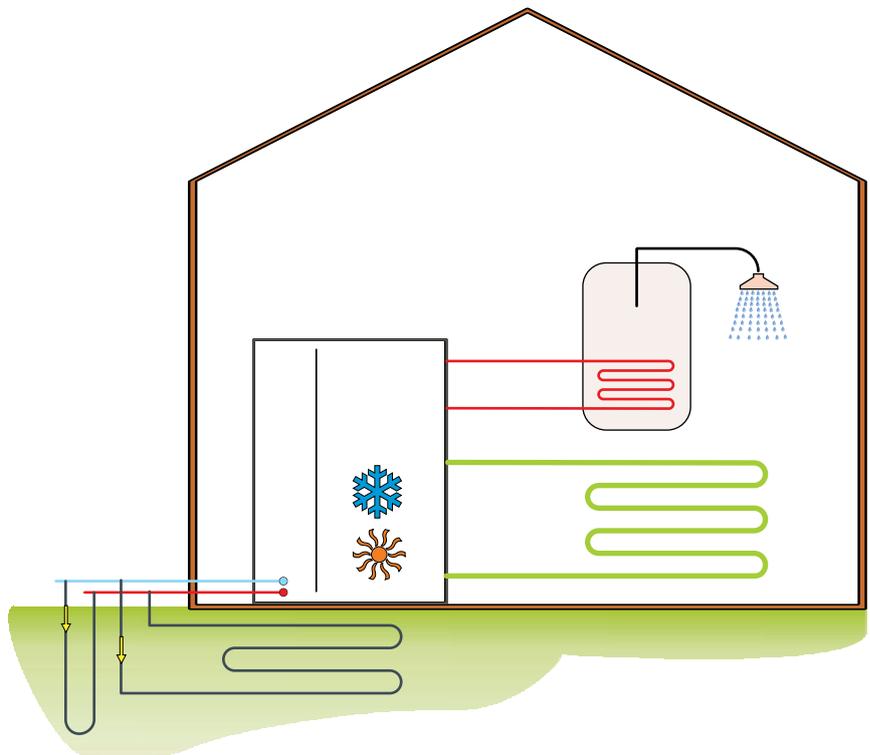


WDH

WDH

WDH/RV/SW6 4 PIPES VERSION.

This unit is supplied with 4 pipes on the user side and is able to produce hot and cold water at the same time on two independent hydraulic circuits. The unit is supplied with an additional heat exchanger that is used as condenser for the domestic hot water production of which is independent of the operational mode of the unit.



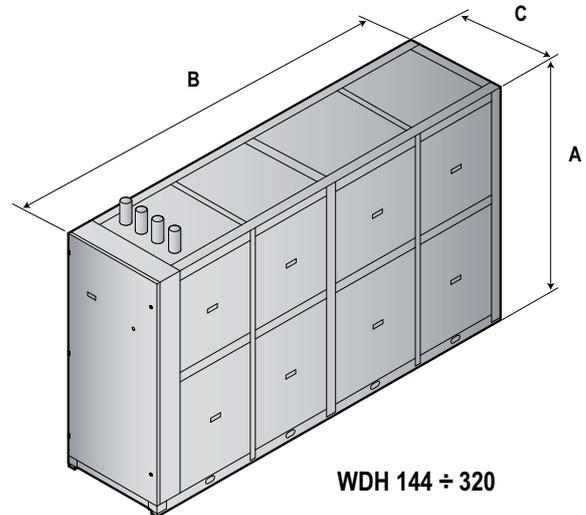
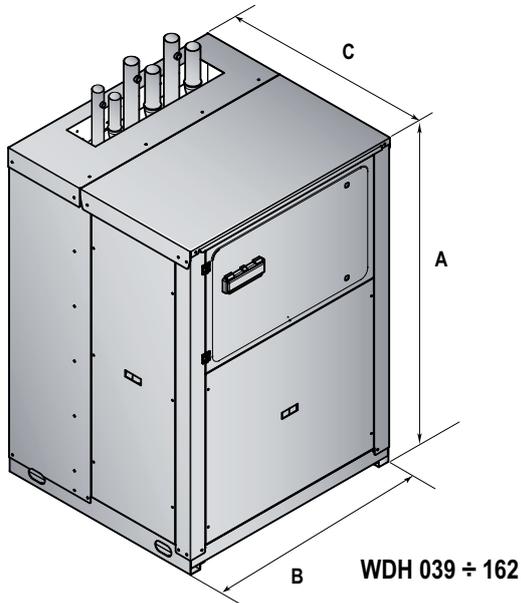
Model WDH	Code	039-045	050-060	070-080	090-110	120-130
Main switch		●	●	●	●	●
Microprocessor control		●	●	●	●	●
Remote ON/OFF digital input		●	●	●	●	●
Summer/Winter digital input		●	●	●	●	●
LS low noise version	LS00	○	○	○	○	○
Partial heat recovery 20%	RP00	○	○	○	○	○
(A1NT) version - one pump without water tank	A1NT	○	○	○	○	○
Electronic soft starter	DSSE	○	○	○	○	○
Rubber anti-vibration mountings	KAVG	○	○	○	○	○
Spring anti-vibration mountings	KAVM	○	○	○	○	○
Refrigerant circuit pressure gauges	MAML	○	○	○	○	○
Liquid line solenoid valve	VSLI	○	○	○	○	○
Remote control panel	PCRL	○	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○	○
2 way modulating to control source water consumption	VM2D	○	○	○	○	○

● Standard, ○ Optional, – Not Available.

WDH

Model WDH	Code	152-162	144-164	190-210	240-260	300-320
Main switch		●	●	●	●	●
Microprocessor control		●	●	●	●	●
Remote ON/OFF digital input		●	●	●	●	●
Summer/Winter digital input		●	●	●	●	●
LS low noise version	LS00	○	○	○	○	○
Partial heat recovery 20%	RP00	○	○	○	○	○
(A1NT) version - one pump without water tank	A1NT	○	○	○	○	○
Electronic soft starter	DSSE	○	○	○	○	○
Rubber anti-vibration mountings	KAVG	○	○	○	○	○
Spring anti-vibration mountings	KAVM	○	○	○	○	○
Refrigerant circuit pressure gauges	MAML	○	○	○	○	○
Liquid line solenoid valve	VSLI	○	○	○	○	○
Remote control panel	PCRL	○	○	○	○	○
Serial interface card RS485	INSE	○	○	○	○	○
2 way modulating to control source water consumption	VM2D	○	○	○	○	○

● Standard, ○ Optional, – Not Available.



Mod.	A (mm)	B (mm)	C (mm)	Kg
039	1566	1101	1005	430
045	1566	1101	1005	440
050	1566	1101	1005	460
060	1566	1101	1005	470
070	1566	1101	1005	480
080	1566	1101	1005	490
090	1986	1101	1255	580
110	1986	1101	1255	600
120	1986	1101	1255	630
130	1986	1101	1255	650
152	1986	1101	1255	730
162	1986	1101	1255	760

Mod.	A (mm)	B (mm)	C (mm)	Kg
144	1855	2480	800	1020
164	1855	2480	800	1090
190	1855	2480	800	1170
210	1855	2480	800	1210
240	1855	2480	800	1270
260	1855	2480	800	1320
300	1855	2480	800	1390
320	1855	2480	800	1430