

# core & core max

## 5÷114 kW

High efficiency water/water and geothermal  
heat pumps





## TECHNICAL FEATURES

### CORE and CORE MAX

The CORE series has a unique design. Ideal for heating, cooling and production of domestic hot water with total or partial recovery, the CORE series has been designed to achieve the maximum from the available energy. The technical solutions and the implemented control logic make this innovative series reliable and of high performance. The energy efficiency values are among the highest on the market today. The series consists of 27 configurations, from 4 to 115 kW.

Ideal for using with:

- Vertical geothermal probes
- Horizontal geothermal probes
- Mixed geothermal probes
- Well water
- Tower water
- Combined with a remote condenser

### STRUCTURE

Structure in steel sheet coated with RAL 9003 epoxy-polyester powder paint, with removable panels on the three sides to facilitate the access for maintenance and installation operations.

The electrical and hydronic connections and the access to the temperature probe are in the upper part of the unit in order to allow installation on the wall. The units are designed to be installed from inside. The unit is always supplied with rubber antivibration mounts. Moreover, the unit base bears, via antivibration mounts, a structure that collects all moving components (pumps and compressors) and the compressors are also supported by antivibration mounts. This three-way absorbing system ensures complete obstruction of vibrations transmission to the floor.

### COMPRESSOR

The compressors are hermetically sealed scroll type, specially designed to be used in high efficiency heat pumps for the production of high temperature water.

Each compressor is equipped with thermal breaker, oil level gauge, crankcase heater and rubber antivibration mounts to reduce the vibration transmission to the unit.

### COOLING CIRCUIT

Comprises: scroll compressors, plate heat exchanger on the source side, loading plugs for maintenance, dehydrating filter, thermostatic expansion valve, high and low pressure switches. The unit can also comprise, depending on the outfit, a plate heat exchanger for domestic hot water production, a second thermostatic valve or a single electronic thermostatic valve and 4-way valve for cycle switching.

### PLATE HEAT EXCHANGER ON THE SOURCE AND USER SIDE

The brazed plate heat exchangers are made in stainless steel AISI 316 and insulated against condensate, ideal for reducing thermal losses. The heat exchangers are equipped with temperature probe for antifreeze protection. The accurate selection of the heat exchangers has allowed the enhancement of operation performance in heat pump mode and extremely reduced pressure drop even at high concentrations of glycol. This way the unit pumps operate with minimum power consumption.

### HYDRAULIC CIRCUIT

Depending on the outfit and accessories, the unit may be equipped with: flow switches installed inside the unit, already connected to the control device, source side connections, user and domestic water side (if fitted with the special heat exchanger) connected via flexible pipes (supplied with the unit). These type of connections allow the reduction of the vibration transmitted to the plant pipes.

## ELECTRICAL PANEL

The electric panel on the upper part of the unit has been designed to guarantee maximum accessibility and consists of:

- Main disconnect switch
- Automatic disconnect switch for the main and auxiliary power circuit protection
- Compressor remote disconnect switch
- Microprocessor control for full control of unit parameters

All wires are numbered to facilitate maintenance and the reading of the electric diagram.

The regulation systems depend on the unit outfit and comprise:

- Regulation of user temperature set-point in winter mode
- Circulation/pump control on source side
- Circulation/pump control on user side
- Set-point variation depending on the external temperature (accessory)
- Remote terminal or user interface display (accessory)
- Antifreeze protection for the heat exchanger on the source side
- Low water flow protection on the source side
- Compressor timing
- Alarm signalig
- ON/OFF digital input

The R basic outfit versions (reverse heat pump) are further fitted with:

- Regulation of user temperature set-point in summer mode
- Antifreeze protection for the heat exchanger on the plant side
- Low water flow protection for the heat exchanger on the plant side
- Control of the 4-way valve for cycle switching

The HWS (Hot Water Solution) versions, besides the R outfit, are equipped with:

- Regulation of domestic hot water temperature set-point
- Regulation of domestic hot water temperature set-point in total recovery mode
- Circulation/pump control on the source side in modulation mode (accessory)
- Circulation/pump control on domestic hot water side
- Circulation/pump control on the domestic hot water side in modulation mode (accessory)
- Automatic control of cycle switching for heat recovery or for prior production of domestic hot water
- Control of the last 100 alarm record entries

## CONTROL AND SAFETY DEVICES

All units are equipped with the following control and safety devices:

- Manual reset high pressure switch;
- Low pressure switch with manual reset at the third alarm;
- High pressure safety valve;
- Water temperature control probe on the plant side;
- Antifreeze probe on heat exchangers outlet (one or two, depending on the outfit);
- Vane mechanical flow switch fitted or connected (one or two, depending on the outfit);
- Compressor overtemperature protection.

## TESTING

All units are factory-tested and supplied complete with oil and refrigerant.

## OUTFITS

### Basic:

#### non reversible heat pump

#### /HP:

**reversible heat pump** The unit can operate as a heat pump or as a chiller and the cycle can be switched directly from the unit control.

Beside the basic version components, the unit comprises

- 4-way inversion valve
- flow switch for the heat exchanger on the plant side
- additional mechanical thermostatic valve

### /HWS:

#### multifunctional heat pump

This outfit comprises three heat exchangers: one on the source side, one on the plant side and one on domestic water side. On the plant side heat exchanger, the unit can produce both hot and cooled water, depending on the season, to meet the heating or cooling needs of the building. On the domestic water heat exchanger, the unit produces water of high temperature to be conveyed to a storage tank outside the unit. The unit operates differently, depending on the season: automatic switching from one operation mode to another (during the season) depending on the temperature probes and set-point reading. Timing and logic of switching are set to guarantee maximum efficiency and reliability of the system.

#### THERE ARE 3 SUMMER OPERATING MODES:

1. **Chiller mode:** the unit provides the production of cooled water for the system.
2. **Production of domestic hot water and chiller mode at the same time:** the unit produces cooled water for the system and domestic hot water at the same time. The capacity recovered for the production of domestic hot water can be total or partial, depending on the needs and storage tank.
3. **Production of domestic hot water only:** when there is no cooling load, the unit provides the heating of the water inside the storage tank for domestic use (outside the unit), using the finned coil as an evaporator. The use of external hot air as a heat source ensures reaching of extremely high COP.

#### THERE ARE 2 WINTER OPERATING MODES:

1. **Heat pump mode for heating:** the unit provides the heating of water in the plant until it reaches the set temperature
2. **Heat pump mode for the production of domestic hot water:** the unit provides the heating of the domestic hot water at high temperature. The switching from mode 1 to mode 2 is entirely automatic, following a logic of priority to produce domestic hot water.

Besides the R version components, the unit comprises:

- heat exchanger for the production of domestic hot water
- temperature probe to be installed on the domestic hot water storage tank
- double flow electronic thermostat valve (replacing the two mechanical thermostatic valves)
- programmable microprocessor control (replaces the parameters setting control)

### /LN:

#### low-noise outfit

Can be combined with any of the aforementioned versions, insulated inside by means of panels made of sound absorbing material and high impedance material for further lowering of noise emission. The material is made of two layers of sound absorbing material and one layer of high impedance material able to substantially obstruct the noise emissions of frequencies between 100 and 8000 Hz.

### /DS:

outfit with desuperheater Can be applied to R outfit units and consists of an additional heat exchanger for the recovery of the 20% of condensation heat. The heat exchanger must be disabled when the unit is operating in heat pump mode.

## HYDRAULIC SYSTEM OPTIONS

The basic version has no circulation device or pump fitted. Upon request, the unit can be combined with any of the following hydraulic modules:

### /ST 1P

#### pump on the plant side:

the unit is equipped with a circulation device or a pump (depending on the model) on the plant side hydraulic circuit, a discharge valve for hydraulic circuit water, a safety valve calibrated at 6 bar that corresponds to the maximum allowed operating pressure.

### /IS

#### pump on the source side:

the unit is equipped with a circulation device or a pump (depending on the model) on the source side hydraulic circuit, a discharge valve for hydraulic circuit water, a safety valve calibrated at 6 bar that corresponds to the maximum allowed operating pressure.

### /IR

#### pump on the domestic water side:

the unit is equipped with a circulation device or a pump (depending on the model) on the domestic water side hydraulic circuit, a discharge valve for hydraulic circuit water, a safety valve calibrated at 6 bar that corresponds to the maximum allowed operating pressure. This hydraulic module can be fitted only on the HWS version units

## ACCESSORIES

The unit in basic version and of various outfits can also be fitted with extra accessories. For a complete list of accessories refer to the price list.

## Core - general technical data

UNIT SIZE		5M	7M	9M	10M	11M	14M	18M
<b>Heating</b>								
Heating capacity (B 0°C/W 35 )	(2) kW	4.0	5.9	7.2	7.9	9.0	10.8	13.5
Absorbed power	(1),(2) kW	1.0	1.4	1.6	1.8	2.1	2.4	3.0
COP	(2)	4.20	4.19	4.42	4.28	4.27	4.51	4.49
Heating capacity (B 0°C/W 45 )	(3) kW	3.9	5.6	7.1	7.7	8.8	10.5	13.0
Absorbed power	(1),(3) kW	1.2	1.8	2.1	2.4	2.7	3.1	3.8
COP	(3)	3.15	3.15	3.33	3.16	3.29	3.42	3.39
Heating capacity (W 10°C/W 35 )	(4) kW	5.2	7.5	8.8	10.0	11.5	13.5	17.1
Absorbed power	(1),(4) kW	1.0	1.4	1.6	1.8	2.1	2.4	3.0
COP	(4)	5.52	5.42	5.45	5.48	5.50	5.64	5.68
Heating capacity (W 10°C/W 45 )	(5) kW	5.0	7.2	8.6	9.6	10.9	12.9	16.3
Absorbed power	(1),(5) kW	1.2	1.8	2.1	2.4	2.6	3.0	3.8
COP	(5)	4.11	4.04	4.05	4.04	4.16	4.26	4.29
<b>Cooling</b>								
Nominal cooling capacity (B 30°C/W 18 )	(6) kW	5.8	8.6	9.7	11.1	12.8	14.7	18.9
Absorbed power	(1),(6) kW	1.0	1.4	1.6	1.8	2.1	2.4	3.0
EER	(6)	6.05	6.28	6.06	6.04	6.23	6.10	6.23
Nominal cooling capacity (B 30°C/W 7 )	(7) kW	3.9	6.0	7.0	7.9	9.1	10.7	13.5
Absorbed power	(1),(7) kW	1.0	1.4	1.6	1.8	2.1	2.4	3.0
EER	(7)	4.10	4.26	4.33	4.30	4.35	4.43	4.46
Nominal cooling capacity (W 15°C/W 18 )	(8) kW	6.2	9.2	10.3	11.8	13.7	15.7	20.2
Absorbed power	(1),(8) kW	0.8	1.1	1.3	1.5	1.7	2.0	2.6
EER	(8)	7.94	8.06	7.88	7.78	7.90	7.75	7.86
Nominal cooling capacity (W 15°C/W 7 )	(9) kW	4.3	6.5	7.5	8.5	9.8	11.4	14.5
Absorbed power	(1),(9) kW	0.8	1.2	1.3	1.5	1.8	2.0	2.6
EER	(9)	5.33	5.47	5.64	5.58	5.51	5.60	5.61
<b>Compressor</b>								
Quantity/Cooling circuits	n° / n°	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1	1 / 1
Capacity steps	n°	0-100	0-100	0-100	0-100	0-100	0-100	0-100
<b>Pump on the plant side</b>								
Pump head rating	(10) kPa	48	45	43	42	40	36	30
Heat exchanger pressure drop	(6) kPa	24	28	25	25	32	27	29
<b>Pump on the source side</b>								
Pump head rating	(10) kPa	38	35	33	32	30	59	54
Heat exchanger pressure drop	(6) kPa	39	44	40	38	50	41	42
<b>Noise levels</b>								
Noise power level	(11) dB(A)	49	49	50	50	50	53	53
Noise pressure level	(12) dB(A)	44	44	45	45	45	48	48

(1) The sum of the compressor absorbed power and the power required to overcome the pressure drop of the user heat exchanger (according to EN 14511)

(2) User side ingoing-outgoing water temperature 30/35 ; source side ingoing glycol solution temperature 0°C

(3) User side ingoing-outgoing water temperature 40/45 ; source side ingoing glycol solution temperature 0°C

(4) User side ingoing-outgoing water temperature 30/35 ; source side ingoing water temperature 10°C

(5) User side ingoing-outgoing water temperature 40/45 ; source side ingoing water temperature 10°C

(6) User side ingoing-outgoing water temperature 23/18 ; source side ingoing glycol solution temperature 30°C

(7) User side ingoing-outgoing water temperature 12/7 ; source side ingoing glycol solution temperature 30°C

(8) User side ingoing-outgoing water temperature 23/18 ; source side ingoing water temperature 15°C

(9) User side ingoing-outgoing water temperature 12/7 ; source side ingoing water temperature 15°C

(10) If provided by the configuration

(11) Noise power levels calculated according to ISO 3744

(12) Noise pressure levels measured at 1 meter from the unit in free field, with a directivity factor Q=4

This data sheet gives the characteristic data of the basic and standard versions of the range; for more details please refer to the specific documentation. The values and images inside the document are indicative and can be modified by the manufacturer without prior notification. For further information refer to the specific documentation. The reproduction of this material, even partial, is prohibited.

## Core - general technical data

UNIT SIZE		7	9	10	11	14	18	19	22	25	27	32	37
<b>Heating</b>													
Heating capacity (B 0°C/W 35 )	(2) kW	6.0	7.1	7.8	9.0	10.5	13.5	15.3	17.6	20.1	22.7	26.1	29.6
Absorbed power	(1),(2) kW	1.4	1.7	1.8	2.1	2.3	3.0	3.5	3.9	4.4	4.8	5.5	6.2
COP	(2)	4.25	4.19	4.31	4.37	4.51	4.57	4.36	4.50	4.59	4.74	4.78	4.78
Heating capacity (B 0°C/W 45 )	(3) kW	5.8	6.9	7.5	8.7	10.1	13.1	14.7	17.1	19.5	21.9	25.1	28.4
Absorbed power	(1),(3) kW	1.8	2.2	2.3	2.6	3.0	3.8	4.4	4.9	5.6	6.0	6.8	7.9
COP	(3)	3.23	3.19	3.26	3.33	3.38	3.45	3.36	3.48	3.50	3.68	3.68	3.61
Heating capacity (W 10°C/W 35 )	(4) kW	7.5	9.0	9.8	11.3	13.3	17.0	19.3	22.2	25.4	28.7	32.9	37.4
Absorbed power	(1),(4) kW	1.4	1.7	1.8	2.1	2.3	2.9	3.4	4.0	4.5	4.9	5.5	6.2
COP	(4)	5.46	5.40	5.54	5.51	5.72	5.79	5.60	5.54	5.63	5.88	5.96	6.00
Heating capacity (W 10°C/W 45 )	(5) kW	7.2	8.6	9.4	10.8	12.7	16.3	18.4	21.2	24.3	27.4	31.4	37.0
Absorbed power	(1),(5) kW	1.8	2.1	2.3	2.6	3.0	3.8	4.3	5.0	5.7	6.0	6.8	7.9
COP	(5)	4.06	4.03	4.14	4.19	4.29	4.33	4.30	4.25	4.29	4.56	4.60	4.70
<b>Cooling</b>													
Nominal cooling capacity (B 30°C/W 18 )	(6) kW	8.4	10.3	11.2	12.7	14.8	18.8	21.2	23.8	27.0	30.5	34.7	41.2
Absorbed power	(1),(6) kW	1.4	1.7	1.8	2.1	2.4	2.9	3.4	4.1	4.7	5.1	5.7	6.5
EER	(6)	6.06	6.21	6.41	6.11	6.31	6.44	6.28	5.77	5.72	5.93	6.08	6.36
Nominal cooling capacity (B 30°C/W 7 )	(7) kW	6.0	7.2	8.0	9.0	10.6	13.5	15.1	17.2	19.5	22.0	25.1	30.0
Absorbed power	(1),(7) kW	1.4	1.7	1.8	2.1	2.4	3.0	3.5	4.0	4.5	4.9	5.6	6.3
EER	(7)	4.29	4.28	4.44	4.38	4.50	4.56	4.36	4.29	4.32	4.47	4.49	4.74
Nominal cooling capacity (W 15°C/W 18 )	(8) kW	9.0	11.0	12.0	13.6	15.8	20.1	22.4	25.4	28.6	32.4	36.7	43.5
Absorbed power	(1),(8) kW	1.2	1.4	1.5	1.8	2.0	2.5	2.9	3.6	4.1	4.5	4.9	5.6
EER	(8)	7.85	7.94	8.21	7.76	8.02	8.20	7.72	7.13	7.04	7.26	7.46	7.77
Nominal cooling capacity (W 15°C/W 7 )	(9) kW	6.5	7.8	8.5	9.6	11.3	14.5	16.1	18.4	20.9	23.5	26.7	31.9
Absorbed power	(1),(9) kW	1.2	1.4	1.5	1.8	2.0	2.5	3.0	3.5	3.9	4.3	4.8	5.4
EER	(9)	5.52	5.47	5.68	5.49	5.70	5.81	5.42	5.34	5.42	5.49	5.53	5.92
<b>Compressor</b>													
Quantity/Cooling circuits	n°/n°	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
Capacity steps	n°	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100	0-100
<b>Pump on the plant side</b>													
Pump head rating	(10) kPa	45	43	43	40	37	30	26	56	50	46	37	76
Heat exchanger pressure drop	(6) kPa	27	28	25	31	27	28	27	34	34	23	30	27
<b>Pump on the source side</b>													
Pump head rating	(10) kPa	35	33	33	30	59	54	51	46	40	112	93	66
Heat exchanger pressure drop	(6) kPa	43	44	39	49	41	41	38	49	48	35	45	35
<b>Noise levels</b>													
Noise power level	(11) dB(A)	49	50	50	50	53	53	54	56	58	58	60	60
Noise pressure level	(12) dB(A)	44	45	45	45	48	48	49	51	53	53	55	55

(1) The sum of the compressor absorbed power and the power required to overcome the pressure drop of the user heat exchanger (according to EN 14511)

(2) User side ingoing-outgoing water temperature 30/35 ; source side ingoing glycol solution temperature 0°C

(3) User side ingoing-outgoing water temperature 40/45 ; source side ingoing glycol solution temperature 0°C

(4) User side ingoing-outgoing water temperature 30/35 ; source side ingoing water temperature 10°C

(5) User side ingoing-outgoing water temperature 40/45 ; source side ingoing water temperature 10°C

(6) User side ingoing-outgoing water temperature 23/18 ; source side ingoing glycol solution temperature 30°C

(7) User side ingoing-outgoing water temperature 12/7 ; source side ingoing glycol solution temperature 30°C

(8) User side ingoing-outgoing water temperature 23/18 ; source side ingoing water temperature 15°C

(9) User side ingoing-outgoing water temperature 12/7 ; source side ingoing water temperature 15°C

(10) If provided by the configuration

(11) Noise power levels calculated according to ISO 3744

(12) Noise pressure levels measured at 1 meter from the unit in free field, with a directivity factor Q=4

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## Core Max - general technical data

UNIT SIZE		43	50	55	63	74	84	95	111
<b>Heating</b>									
Heating capacity (B 0°C/W 35 )	(2) kW	35.2	40.5	44.7	51.8	60.8	66.7	75.8	90.7
Absorbed power	(1),(2) kW	7.8	8.7	9.7	11.0	12.6	14.3	15.8	19.0
COP	(2)	4.51	4.64	4.63	4.72	4.82	4.68	4.79	4.76
Heating capacity (B 0°C/W 45 )	(3) kW	34.1	39.1	43.3	49.8	58.3	63.7	72.8	87.1
Absorbed power	(1),(3) kW	9.8	11.1	12.0	13.7	16.0	18.0	19.8	23.2
COP	(3)	3.48	3.53	3.59	3.63	3.64	3.54	3.68	3.75
Heating capacity (W 10°C/W 35 )	(4) kW	44.4	51.3	56.6	65.5	76.8	84.3	96.0	114.7
Absorbed power	(1),(4) kW	8.0	9.0	9.9	11.2	13.0	14.4	16.2	19.7
COP	(4)	5.58	5.72	5.73	5.86	5.92	5.85	5.91	5.82
Heating capacity (W 10°C/W 45 )	(5) kW	42.5	49.1	54.1	62.5	73.0	80.0	91.2	109.2
Absorbed power	(1),(5) kW	10.0	11.3	12.2	13.8	16.3	18.1	20.1	24.0
COP	(5)	4.27	4.36	4.44	4.52	4.48	4.42	4.54	4.55
<b>Cooling</b>									
Nominal cooling capacity (B 30°C/W 18 )	(6) kW	44.8	51.8	57.4	66.4	78.3	89.7	100.1	115.7
Absorbed power	(1),(6) kW	8.3	9.4	10.4	11.5	13.2	14.9	17.0	20.4
EER	(6)	5.43	5.50	5.54	5.77	5.92	6.00	5.88	5.66
Nominal cooling capacity (B 30°C/W 7 )	(7) kW	32.6	37.6	41.8	48.4	57.1	65.4	72.8	84.5
Absorbed power	(1),(7) kW	8.0	9.0	9.9	11.3	12.9	14.6	16.3	19.8
EER	(7)	4.06	4.16	4.20	4.29	4.42	4.48	4.46	4.27
Nominal cooling capacity (W 15°C/W 18 )	(8) kW	47.7	55.0	61.1	70.3	82.8	95.3	105.9	122.6
Absorbed power	(1),(8) kW	7.1	8.1	9.0	9.9	11.4	13.0	15.1	17.2
EER	(8)	6.74	6.82	6.79	7.08	7.29	7.34	7.03	7.14
Nominal cooling capacity (W 15°C/W 7 )	(9) kW	34.8	40.2	44.5	51.4	61.0	69.8	77.3	89.8
Absorbed power	(1),(9) kW	6.9	7.7	8.6	9.7	11.0	12.5	14.1	17.1
EER	(9)	5.07	5.25	5.17	5.30	5.57	5.58	5.48	5.24
<b>Compressor</b>									
Quantity/Cooling circuits	n° / n°	2/1	2/1	2/1	2/1	2/1	2/1	2/1	2/1
Capacity steps	n°	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100	0-50-100
<b>Pump on the plant side</b>									
Pump head rating	(10) kPa	43	91	76	160	152	144	133	110
Heat exchanger pressure drop	(6) kPa	23	24	21	23	24	22	22	24
<b>Pump on the source side</b>									
Pump head rating	(10) kPa	33	81	66	110	142	134	123	100
Heat exchanger pressure drop	(6) kPa	40	40	35	38	38	33	33	34
<b>Noise levels</b>									
Noise power level	(11) dB(A)	63	63	64	64	64	65	65	65
Noise pressure level	(12) dB(A)	58	58	59	59	59	60	60	60

(1) The sum of the compressor absorbed power and the power required to overcome the pressure drop of the user heat exchanger (according to EN 14511)

(2) User side ingoing-outgoing water temperature 30/35 ; source side ingoing glycol solution temperature 0°C

(3) User side ingoing-outgoing water temperature 40/45 ; source side ingoing glycol solution temperature 0°C

(4) User side ingoing-outgoing water temperature 30/35 ; source side ingoing water temperature 10°C

(5) User side ingoing-outgoing water temperature 40/45 ; source side ingoing water temperature 10°C

(6) User side ingoing-outgoing water temperature 23/18 ; source side ingoing glycol solution temperature 30°C

(7) User side ingoing-outgoing water temperature 12/7 ; source side ingoing glycol solution temperature 30°C

(8) User side ingoing-outgoing water temperature 23/18 ; source side ingoing water temperature 15°C

(9) User side ingoing-outgoing water temperature 12/7 ; source side ingoing water temperature 15°C

(10) If provided by the configuration

(11) Noise power levels calculated according to ISO 3744

(12) Noise pressure levels measured at 1 meter from the unit in free field, with a directivity factor Q=4

This data sheet gives the characteristic data of the basic and standard versions of the range; for more details please refer to the specific documentation. The values and images inside the document are indicative and can be modified by the manufacturer without prior notification. For further information refer to the specific documentation. The reproduction of this material, even partial, is prohibited.