

# PWE Ka / PWE Kc

## WATER COOLED HEAT PUMPS WITH HOUSING AND SCROLL COMPRESSORS

COOLING CAPACITY FROM 5 to 78 kW 1 COOLING CIRCUIT

PWE 181 Ka + MV



Above picture is only indicative and is not binding.



The water cooled heat pumps of **PWE Ka / PWE Kc series** are designed for indoor installation and are particularly suitable for small and medium sized air conditioning systems, in residential and commercial applications. For this reason, they are made of a housing in painted steel plate. They are all available with 1 refrigerant circuit. Thanks to their compact dimensions and to the several options available, these units are particularly easy to install in small spaces. They are completely assembled and tested in the factory and supplied with refrigerant and non-freezing oil charge. Therefore, once on site, the units only need to be positioned and electrically and hydraulically connected.

**WARNING: units with inversion on water side (and not on refrigerant side) to be realized at customer's care during installation.**

The following versions are available:

- **PWE Ka** with R134a ecological refrigerant charge
- **PWE Kc** with R410A ecological refrigerant charge

**Water operation limits** (standard units):

EVAPORATOR (OUT): from 5 to 15°C.

CONDENSER (OUT): from 30 to 55°C.

### MAIN COMPONENTS

**Strong and compact frame**, with a housing made of galvanized and RAL 7035 painted steel plate. The front and the access panels to the electrical board are easy to be opened. The main components are installed inside the housing, which can be isolated with standard soundproofing material (option CL) or with bituminous rubber soundproofing material (option CM). When required, the hydraulic kit (buffer tank and hydraulic kit) is installed into an additional section at the bottom of the unit, so not change the overall dimensions.

**High-efficiency scroll compressor** (EER 3.37 under ARI conditions), with low sound level, internal heat protection, installed on rubber vibration dampers, supplied with crankcase heater when necessary. Higher capacity units are equipped with two scroll compressors in tandem.

Weld-brazed plate **evaporator and condenser** in AISI 316 stainless steel, with pipes and patented manifold so to reach a high heat exchange coefficient. Its design allows a uniform water distribution, compatibly with pressure drops. The exchanger is provided with close-cell insulating material.

**Cooling circuit** composed of thermostatic expansion valve, dehydrating filter, sight glass, safety device, antifreeze thermostat, high and low pressure switches.

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**Electric board** in compliance with CE norms, contained in a suitable partition protected by the hinged internal safety panel, provided with protection fuses and safety transformer. In case of hydraulic kit on board, the electrical control of the pump group is provided.

**Unit management microprocessor** installed on the external panel, easily accessible, complete with compressors hour counter.

### ACCESSORIES

- AE Electrical power supply different from standard:** Mainly, 230V three-phase, 460V three-phase. Frequency 50/60 Hz.
- CL Soundproofing insulation with standard material:** Insulation of the compressor housing by means of soundproofing material.
- CM Soundproofing insulation with bituminous rubber material:** Insulation of the compressor housing by means of bituminous rubber coated material.
- CS Compressors inrush counter:** Electromechanical device positioned inside the electrical board, recording the total inrush starts of compressors.
- HG Hot gas by-pass:** Mechanical device for modulating cooling capacity, preventing frequent compressor' tops.
- IH RS 485 serial interface:** Electronic card to be connected to microprocessor, to allow communication between the units and a Carel supervision system. It is possible to fully control the unit remotely. For connection to other supervision systems, the protocol of the controlled parameters is available on request.
- IM Seawood packing:** Fumigated seawood case and protection bag with hygroscopic salts, suitable for long sea transports.
- MF Phase monitor:** Electronic device controlling the correct sequence and/or the eventual lack of one of the 3 phases, switching off the unit if necessary.
- MT High and low pressure gauges** for measuring circuit pressure.
- MV Buffer tank** of suitable capacity complete with expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves.
- P1 Single pump group:** Chilled water pump group composed of single pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump. The pump is of 2 pole centrifugal packaged type.
- P1H Higher available pressure pump group:** Chilled water higher available pressure pump group composed of single pump, expansion vessel, safety valve, water gauge, water charge and discharge valves, air purging valves, electrical control of the pump. The pump is of 2 pole centrifugal packaged type.
- PA Rubber-type vibration dampers:** Bell-shaped vibration dampers supports for insulating the unit (supplied in kit), made of base and bell in galvanized steel and natural rubber mixture.
- PF Safety water flow switch:** Installed on evaporator, it switches off the unit in case of lack of water flow rate through the evaporator.
- PQ Remote display:** Remote terminal, allowing to display the temperature and humidity values detected by probes, the alarm digital inputs, the outputs and the remote ON/OFF of the unit, to change and program of the parameters, the sound signal and the display of the present alarms.
- RA Anti-freeze heater on evaporator:** Electrical heater installed on the evaporator, in order to prevent freezing and provided with thermostat.
- RL Compressors overload relays:** Electromechanical protection devices

against compressor's overload with displayed alarm.

- RV Personalized frame painting in RAL color.**
- SN Main switch:** Manual switch of lock-door type, switching off the unit.
- VB Brine version:** Unit suitable for working with evaporator outlet water temperatures lower than 0°C. A 20 mm evaporator insulation will be provided.
- VP Pressostatic valve:** It is placed on condenser and controls the water flow rate according to the unit condensing pressure.
- VS Solenoid valve:** Electromagnetic solenoid valve on each cooling circuit to prevent refrigerant migrations and consequent flooding of compressors.

# HEAT PUMPS - WATER COOLED

## Technical data sheet - PWE 151-601 Ka

| PWE                            |                   | 151 Ka                       | 181 Ka | 211 Ka | 271 Ka | 311 Ka | 351 Ka | 421 Ka | 521 Ka | 601 Ka |
|--------------------------------|-------------------|------------------------------|--------|--------|--------|--------|--------|--------|--------|--------|
| <b>Cooling capacity</b>        |                   |                              |        |        |        |        |        |        |        |        |
| Cooling capacity 1)            | kW                | 12,3                         | 14,9   | 17,2   | 22,6   | 25,5   | 29,5   | 35,0   | 43,9   | 50,0   |
| Absorbed power                 | kW                | 4,0                          | 4,7    | 5,4    | 7,3    | 8,3    | 9,6    | 11,3   | 14,5   | 17,0   |
| EER                            |                   | 3,08                         | 3,17   | 3,19   | 3,10   | 3,07   | 3,07   | 3,10   | 3,03   | 2,94   |
| Heating capacity               | kW                | 16,3                         | 19,6   | 22,6   | 29,9   | 33,8   | 39,1   | 46,3   | 58,4   | 67,0   |
| COP                            |                   | 4,08                         | 4,17   | 4,19   | 4,10   | 4,07   | 4,07   | 4,10   | 4,03   | 3,94   |
| <b>Scroll compressors</b>      |                   |                              |        |        |        |        |        |        |        |        |
| Quantity                       | n                 | 1                            | 1      | 1      | 1      | 1      | 2      | 2      | 2      | 2      |
| Standard steps capacity        | n                 | 1                            | 1      | 1      | 1      | 1      | 2      | 2      | 2      | 2      |
| Nominal absorbed current       | A                 | 9,5                          | 10,7   | 12,3   | 15,1   | 17,2   | 21,4   | 24,6   | 30,1   | 34,4   |
| Maximum absorbed current       | A                 | 17,0                         | 20,0   | 22,0   | 27,0   | 32,0   | 40,0   | 44,0   | 54,0   | 64,0   |
| Inrush current                 | A                 | 99,0                         | 123,0  | 127,0  | 167,0  | 198,0  | 143,0  | 149,0  | 194,0  | 230,0  |
| <b>Brazed plate evaporator</b> |                   |                              |        |        |        |        |        |        |        |        |
| Quantity                       | n                 | 1                            | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| Circuits                       | n                 | 1                            | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| Water flow rate                | m <sup>3</sup> /h | 2,1                          | 2,6    | 3,0    | 3,9    | 4,4    | 5,1    | 6,0    | 7,5    | 8,6    |
| Water flow rate                | l/s               | 0,58                         | 0,72   | 0,83   | 1,08   | 1,22   | 1,42   | 1,67   | 2,08   | 2,39   |
| Pressure drop                  | kPa               | 18                           | 27     | 28     | 22     | 18     | 15     | 15     | 23     | 20     |
| <b>Brazed plate condenser</b>  |                   |                              |        |        |        |        |        |        |        |        |
| Quantity                       | n                 | 1                            | 1      | 1      | 1      | 1      | 1      | 1      | 1      | 1      |
| Water flow rate                | m <sup>3</sup> /h | 2,8                          | 3,4    | 3,9    | 5,2    | 5,9    | 6,8    | 8,1    | 10,2   | 11,7   |
| Water flow rate                | l/s               | 0,78                         | 0,94   | 1,08   | 1,44   | 1,64   | 1,89   | 2,25   | 2,83   | 3,25   |
| Pressure drop                  | kPa               | 50                           | 45     | 47     | 60     | 51     | 24     | 19     | 19     | 24     |
| <b>Pumps</b>                   |                   |                              |        |        |        |        |        |        |        |        |
| Available pressure with P1     | kPa               | 72                           | 87     | 75     | 71     | 110    | 111    | 110    | 96     | 92     |
| Motor power with P1            | kW                | 0,55                         | 0,55   | 0,55   | 0,55   | 0,75   | 0,55   | 0,55   | 0,55   | 0,55   |
| Available pressure with P1H    | kPa               | 103                          | 118    | 107    | 104    | 152    | 164    | 165    | 152    | 150    |
| Motor power with P1H           | kW                | 0,75                         | 0,75   | 0,75   | 0,75   | 1,1    | 0,75   | 0,75   | 0,75   | 0,75   |
| Buffer tank water volume       | l                 | 80                           | 80     | 80     | 80     | 80     | 110    | 110    | 110    | 110    |
| <b>Sound pressure level</b>    |                   |                              |        |        |        |        |        |        |        |        |
| Sound pressure level 2)        | dB(A)             | 56                           | 57     | 57     | 58     | 58     | 59     | 59     | 60     | 60     |
| <b>Dimensions</b>              |                   |                              |        |        |        |        |        |        |        |        |
| Length                         | mm                | 800                          | 800    | 800    | 800    | 800    | 1.600  | 1.600  | 1.600  | 1.600  |
| Length with MV included        | mm                | 800                          | 800    | 800    | 800    | 800    | 1.600  | 1.600  | 1.600  | 1.600  |
| Width                          | mm                | 500                          | 500    | 500    | 500    | 500    | 750    | 750    | 750    | 750    |
| Width with MV included         | mm                | 500                          | 500    | 500    | 500    | 500    | 750    | 750    | 750    | 750    |
| Height                         | mm                | 960                          | 960    | 960    | 960    | 960    | 960    | 960    | 960    | 960    |
| Height with MV included        | mm                | 1.430                        | 1.430  | 1.430  | 1.430  | 1.430  | 1.340  | 1.340  | 1.340  | 1.340  |
| Transport weight 3)            | kg                | 175                          | 185    | 193    | 212    | 227    | 315    | 312    | 368    | 389    |
| Weight with empty MV included  | kg                | 225                          | 235    | 243    | 262    | 277    | 475    | 472    | 528    | 549    |
| Refrigerant charge             | kg                | 2                            | 2      | 2      | 2      | 2      | 3      | 3      | 4      | 4      |
| <b>Power supply</b>            |                   |                              |        |        |        |        |        |        |        |        |
| Power supply                   | V / ph / Hz       | 400 V / 50 Hz / 3 Ph + T + N |        |        |        |        |        |        |        |        |

### NOTES

- 1) Nominal conditions referred to: chilled water 7/12 °C - Condensing water 40/45 °C.
- 2) Measured at 1 m in open field (ISO 3746).
- 3) Oil and refrigerant charge included.

# HEAT PUMPS - WATER COOLED

## Technical data sheet - PWE 61-311 Kc

| PWE                            |                   | 61 Kc                | 111 Kc | 161 Kc | 191 Kc                       | 221 Kc | 271 Kc | 311 Kc |
|--------------------------------|-------------------|----------------------|--------|--------|------------------------------|--------|--------|--------|
| <b>Cooling capacity</b>        |                   |                      |        |        |                              |        |        |        |
| Cooling capacity 1)            | kW                | 5,1                  | 9,5    | 14,0   | 16,8                         | 21,6   | 24,1   | 27,6   |
| Absorbed power                 | kW                | 1,4                  | 2,5    | 3,8    | 4,6                          | 5,9    | 7,2    | 8,2    |
| EER                            |                   | 3,64                 | 3,80   | 3,68   | 3,65                         | 3,66   | 3,35   | 3,37   |
| <b>Heating capacity</b>        |                   |                      |        |        |                              |        |        |        |
| Heating capacity               | kW                | 6,5                  | 12,0   | 17,8   | 21,4                         | 27,5   | 31,3   | 35,8   |
| COP                            |                   | 4,64                 | 4,80   | 4,68   | 4,65                         | 4,66   | 4,35   | 4,37   |
| <b>Scroll compressors</b>      |                   |                      |        |        |                              |        |        |        |
| Quantity                       | n                 | 1                    | 1      | 1      | 1                            | 1      | 1      | 1      |
| Standard steps capacity        | n                 | 1                    | 1      | 1      | 1                            | 1      | 1      | 1      |
| Nominal absorbed current       | A                 | 8,8                  | 15,4   | 7,6    | 8,3                          | 11,7   | 13,2   | 15,2   |
| Maximum absorbed current       | A                 | 11,0                 | 23,0   | 11,0   | 13,0                         | 17,0   | 20,0   | 22,0   |
| Inrush current                 | A                 | 47,0                 | 100,0  | 66,0   | 72,0                         | 99,0   | 123,0  | 127,0  |
| <b>Brazed plate evaporator</b> |                   |                      |        |        |                              |        |        |        |
| Quantity                       | n                 | 1                    | 1      | 1      | 1                            | 1      | 1      | 1      |
| Circuits                       | n                 | 1                    | 1      | 1      | 1                            | 1      | 1      | 1      |
| Water flow rate                | m <sup>3</sup> /h | 0,9                  | 1,6    | 2,4    | 2,9                          | 3,7    | 4,1    | 4,7    |
| Water flow rate                | l/s               | 0,24                 | 0,45   | 0,67   | 0,80                         | 1,03   | 1,15   | 1,32   |
| Pressure drop                  | kPa               | 20                   | 25     | 21     | 31                           | 46     | 44     | 45     |
| <b>Brazed plate condenser</b>  |                   |                      |        |        |                              |        |        |        |
| Quantity                       | n                 | 1                    | 1      | 1      | 1                            | 1      | 1      | 1      |
| Water flow rate                | m <sup>3</sup> /h | 1,1                  | 2,1    | 3,1    | 3,7                          | 4,7    | 5,4    | 6,2    |
| Water flow rate                | l/s               | 0,31                 | 0,57   | 0,85   | 1,02                         | 1,31   | 1,50   | 1,71   |
| Pressure drop                  | kPa               | 21                   | 64     | 54     | 75                           | 65     | 38     | 18     |
| <b>Pumps</b>                   |                   |                      |        |        |                              |        |        |        |
| Available pressure with P1     | kPa               | 66                   | 44     | 64     | 80                           | 64     | 70     | 93     |
| Motor power with P1            | kW                | 0,18                 | 0,18   | 0,55   | 0,55                         | 0,55   | 0,55   | 0,75   |
| Available pressure with P1H    | kPa               | 86                   | 71     | 99     | 114                          | 96     | 99     | 134    |
| Motor power with P1H           | kW                | 0,18                 | 0,18   | 0,75   | 0,75                         | 0,75   | 0,75   | 1,1    |
| Buffer tank water volume       | l                 | 80                   | 80     | 80     | 80                           | 80     | 80     | 80     |
| <b>Sound pressure level</b>    |                   |                      |        |        |                              |        |        |        |
| Sound pressure level 2)        | dB(A)             | 57                   | 58     | 58     | 59                           | 59     | 60     | 60     |
| <b>Dimensions</b>              |                   |                      |        |        |                              |        |        |        |
| Length                         | mm                | 800                  | 800    | 800    | 800                          | 800    | 800    | 800    |
| Length with MV included        | mm                | 800                  | 800    | 800    | 800                          | 800    | 800    | 800    |
| Width                          | mm                | 500                  | 500    | 500    | 500                          | 500    | 500    | 500    |
| Width with MV included         | mm                | 500                  | 500    | 500    | 500                          | 500    | 500    | 500    |
| Height                         | mm                | 960                  | 960    | 960    | 960                          | 960    | 960    | 960    |
| Height with MV included        | mm                | 1430                 | 1430   | 1430   | 1430                         | 1430   | 1430   | 1430   |
| Transport weight 3)            | kg                | 117                  | 126    | 139    | 143                          | 185    | 199    | 202    |
| Weight with empty MV included  | kg                | 167                  | 176    | 189    | 193                          | 235    | 249    | 252    |
| Refrigerant charge             | kg                | 2                    | 3      | 3      | 3                            | 5      | 5      | 6      |
| <b>Power supply</b>            |                   |                      |        |        |                              |        |        |        |
| Power supply                   | V / ph / Hz       | 230 V/50 Hz /1Ph+N+T |        |        | 400 V / 50 Hz / 3 Ph + T + N |        |        |        |

### NOTES

- 1) Nominal conditions referred to: chilled water 7/12 °C - Condensing water 40/45 °C.
- 2) Measured at 1 m in open field (ISO 3746).
- 3) Oil and refrigerant charge included.

# HEAT PUMPS - WATER COOLED

## Technical data sheet - PWE 391-901 Kc

| PWE                            |                   | 391 Kc                       | 461 Kc | 521 Kc | 601 Kc | 771 Kc | 901 Kc |
|--------------------------------|-------------------|------------------------------|--------|--------|--------|--------|--------|
| <b>Cooling capacity</b>        |                   |                              |        |        |        |        |        |
| Cooling capacity 1)            | kW                | 35,0                         | 41,1   | 46,8   | 53,3   | 69,6   | 81,4   |
| Absorbed power                 | kW                | 10,7                         | 12,6   | 14,5   | 17,3   | 21,8   | 25,1   |
| EER                            |                   | 3,27                         | 3,26   | 3,23   | 3,08   | 3,19   | 3,24   |
| Heating capacity               | kW                | 45,7                         | 53,7   | 61,3   | 70,6   | 91,4   | 106,5  |
| COP                            |                   | 4,27                         | 4,26   | 4,23   | 4,08   | 4,19   | 4,24   |
| <b>Scroll compressors</b>      |                   |                              |        |        |        |        |        |
| Quantity                       | n                 | 1                            | 1      | 2      | 2      | 2      | 2      |
| Standard steps capacity        | n                 | 1                            | 1      | 2      | 2      | 2      | 2      |
| Nominal absorbed current       | A                 | 17,7                         | 21,7   | 26,5   | 30,5   | 35,4   | 43,3   |
| Maximum absorbed current       | A                 | 27,0                         | 32,0   | 40,0   | 44,0   | 54,0   | 64,0   |
| Inrush current                 | A                 | 167,0                        | 198,0  | 143,0  | 149,0  | 194,0  | 230,0  |
| <b>Brazed plate evaporator</b> |                   |                              |        |        |        |        |        |
| Quantity                       | n                 | 1                            | 1      | 1      | 1      | 1      | 1      |
| Circuits                       | n                 | 1                            | 1      | 1      | 1      | 1      | 1      |
| Water flow rate                | m <sup>3</sup> /h | 6,0                          | 7,1    | 8,0    | 9,2    | 12,0   | 14,0   |
| Water flow rate                | l/s               | 1,67                         | 1,96   | 2,24   | 2,55   | 3,33   | 3,89   |
| Pressure drop                  | kPa               | 46                           | 63     | 20     | 23     | 21     | 21     |
| <b>Brazed plate condenser</b>  |                   |                              |        |        |        |        |        |
| Quantity                       | n                 | 1                            | 1      | 1      | 1      | 1      | 1      |
| Water flow rate                | m <sup>3</sup> /h | 7,9                          | 9,2    | 10,5   | 12,1   | 15,7   | 18,3   |
| Water flow rate                | l/s               | 2,18                         | 2,57   | 2,93   | 3,37   | 4,37   | 5,09   |
| Pressure drop                  | kPa               | 43                           | 40     | 22     | 21     | 26     | 27     |
| <b>Pumps</b>                   |                   |                              |        |        |        |        |        |
| Available pressure with P1     | kPa               | 83                           | 85     | 104    | 98     | 74     | 57     |
| Motor power with P1            | kW                | 0,75                         | 0,75   | 0,55   | 0,55   | 0,55   | 0,55   |
| Available pressure with P1H    | kPa               | 123                          | 130    | 159    | 156    | 139    | 120    |
| Motor power with P1H           | kW                | 1,1                          | 1,1    | 0,75   | 0,75   | 0,75   | 0,75   |
| Buffer tank water volume       | l                 | 80                           | 80     | 110    | 110    | 110    | 110    |
| <b>Sound pressure level</b>    |                   |                              |        |        |        |        |        |
| Sound pressure level 2)        | dB(A)             | 61                           | 61     | 62     | 62     | 63     | 63     |
| <b>Dimensions</b>              |                   |                              |        |        |        |        |        |
| Length                         | mm                | 800                          | 800    | 1600   | 1600   | 1600   | 1600   |
| Length with MV included        | mm                | 800                          | 800    | 1600   | 1600   | 1600   | 1600   |
| Width                          | mm                | 500                          | 500    | 750    | 750    | 750    | 750    |
| Width with MV included         | mm                | 500                          | 500    | 750    | 750    | 750    | 750    |
| Height                         | mm                | 960                          | 960    | 960    | 960    | 960    | 960    |
| Height with MV included        | mm                | 1430                         | 1430   | 1340   | 1340   | 1340   | 1340   |
| Transport weight 3)            | kg                | 219                          | 237    | 336    | 342    | 399    | 425    |
| Weight with empty MV included  | kg                | 269                          | 287    | 496    | 502    | 559    | 585    |
| Refrigerant charge             | kg                | 6                            | 8      | 12     | 13     | 17     | 20     |
| <b>Power supply</b>            |                   |                              |        |        |        |        |        |
| Power supply                   | V / ph / Hz       | 400 V / 50 Hz / 3 Ph + T + N |        |        |        |        |        |

### NOTES

- 1) Nominal conditions referred to: chilled water 7/12 °C - Condensing water 40/45 °C.
- 2) Measured at 1 m in open field (ISO 3746).
- 3) Oil and refrigerant charge included.