

# Swimming Pool Heat Pump

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## Proteam i-Series Inverter Installation and Operation Manual





## Contents

- 1. Models .....2**
- 2. Product appearance .....2**
- 3. Specifications.....3**
- 4. Dimensions..... 15**
- 5. Wiring diagram..... 17**
- 6. Operation range ..... 19**
- 7. Refrigerant system diagram..... 19**
- 8. Accessories.....20**
- 9. Installation .....20**
- 10. Controller .....27**
- 11. Unit Functions .....32**
- 12. Maintenance .....34**
- 13. Trouble-shooting.....35**
- 14. Wifi function.....40**
- Appendix .....53**

## 1. Models

| Heating capacity | Cooling capacity | Model | Power supply   |
|------------------|------------------|-------|----------------|
| 1.60kW - 5.30kW  | 1.50kW - 2.80kW  | i5    | 230V~,1Ph,50Hz |
| 1.60kW - 7.20kW  | 1.70kW - 3.60kW  | i7    | 230V~,1Ph,50Hz |
| 1.90kW - 9.20kW  | 1.80kW - 4.60kW  | i9    | 230V~,1Ph,50Hz |
| 2.70kW - 10.90kW | 2.40kW - 6.00kW  | i11   | 230V~,1Ph,50Hz |
| 3.40kW - 14.30kW | 3.20kW - 7.87kW  | i14   | 230V~,1Ph,50Hz |
| 4.30kW - 17.40kW | 3.90kW - 9.60kW  | i17   | 230V~,1Ph,50Hz |
| 4.80kW - 21.20kW | 4.30kW - 11.50kW | i21   | 230V~,1Ph,50Hz |
| 6.20kW - 25.10kW | 5.80kW - 13.90kW | i25   | 230V~,1Ph,50Hz |
| 6.60kW - 29.00kW | 6.20kW - 16.00kW | i29   | 230V~,1Ph,50Hz |
| 7.70kW - 31.70kW | 7.20kW - 17.50kW | i32   | 230V~,1Ph,50Hz |

Notes:

Heating and cooling capacity based on the below conditions.

Heating: Outdoor ambient temperature = 26°C and RH70%; inlet/outlet water temperature = 26°C/28°C.

Cooling: Outdoor ambient temperature = 35°C; inlet/outlet water temperature = 28°C/26°C.

## 2. Product appearance

**PLEASE USE PICTURE OF A PROTEAM MODEL**

| Model      | Unit dimension | Packing dimension | Net / gross weight |
|------------|----------------|-------------------|--------------------|
| <b>i5</b>  | 860×330×668    | 950×410×800       | 35 / 42            |
| <b>i7</b>  | 860×330×668    | 950×410×800       | 38 / 45            |
| <b>i9</b>  | 860×330×668    | 950×410×800       | 40 / 48            |
| <b>i11</b> | 986×356×668    | 1,080×435×800     | 44 / 54            |
| <b>i14</b> | 986×356×668    | 1,080×435×800     | 46 / 56            |
| <b>i17</b> | 986×356×668    | 1,080×435×800     | 56 / 66            |
| <b>i21</b> | 1,076×426×720  | 1,161×490×855     | 67 / 80            |
| <b>i25</b> | 1,076×426×720  | 1,161×490×855     | 72 / 85            |
| <b>i29</b> | 1,176×451×822  | 1,261×515×957     | 90 / 108           |
| <b>i32</b> | 1,176×451×822  | 1,261×515×957     | 98 / 116           |

### 3. Specifications

| Model   |                  |                   | i5                                  | i7                                  |
|---|------------------|-------------------|-------------------------------------|-------------------------------------|
| Power supply  |                  |                   | 230V~, 1Ph, 50Hz                    | 230V~, 1Ph, 50Hz                    |
| Air temperature: 15°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                     |                                     |
| Heating capacity  |                  | kW                | 1.10 - 3.80                         | 1.30 - 5.10                         |
| Power input   |                  | kW                | 0.14 - 0.75                         | 0.17 - 1.06                         |
| COP   |                  |                   | 5.10 - 7.90                         | 4.80 - 7.80                         |
| Boost mode  | Heating capacity | kW                | 3.80                                | 5.10                                |
|   | COP              |                   | 5.10                                | 4.80                                |
| Smart mode  | Heating capacity | kW                | 3.04                                | 4.08                                |
|   | COP              |                   | 5.91                                | 5.90                                |
| Silent mode   | Heating capacity | kW                | 2.01                                | 2.55                                |
|   | COP              |                   | 6.82                                | 6.75                                |
| Air temperature: 26°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                     |                                     |
| Heating capacity  |                  | kW                | 1.60 - 5.30                         | 1.60 - 7.20                         |
| Power input   |                  | kW                | 0.13 - 0.88                         | 0.13 - 1.19                         |
| COP   |                  |                   | 6.25 - 14.50                        | 6.22 - 14.55                        |
| Boost mode  | Heating capacity | kW                | 5.30                                | 7.20                                |
|   | COP              |                   | 6.31                                | 6.26                                |
| Smart mode  | Heating capacity | kW                | 4.40                                | 5.92                                |
|   | COP              |                   | 7.70                                | 7.65                                |
| Silent mode   | Heating capacity | kW                | 2.80                                | 3.70                                |
|   | COP              |                   | 10.50                               | 10.42                               |
| Air temperature: 35°C, inlet/outlet water temperature: 28°C/26°C        |                  |                   |                                     |                                     |
| Cooling capacity  |                  | kW                | 1.50 - 2.80                         | 1.70 - 3.60                         |
| Power input   |                  | kW                | 0.20 - 0.62                         | 0.22 - 0.80                         |
| EER   |                  |                   | 4.51 - 7.55                         | 4.48 - 7.53                         |
| Boost mode  | Heating capacity | kW                | 2.80                                | 3.60                                |
|   | EER              |                   | 4.51                                | 4.48                                |
| Smart mode  | Heating capacity | kW                | 2.24                                | 2.88                                |
|   | EER              |                   | 5.62                                | 5.60                                |
| Silent mode   | Heating capacity | kW                | 1.70                                | 2.16                                |
|   | EER              |                   | 6.95                                | 6.92                                |
| Max. input  |                  | kW                | 1.23                                | 1.50                                |
| Max. current  |                  | A                 | 5.35                                | 6.53                                |
| Water flow  |                  | m <sup>3</sup> /h | 2 - 3                               | 3 - 4                               |
| Water pressure drop   |                  | kPa               | 16                                  | 16                                  |
| Running temperature range   |                  |                   | -15°C - 43°C                        | -15°C - 43°C                        |
| Advised swimming pool size  |                  |                   | 10m <sup>3</sup> - 20m <sup>3</sup> | 15m <sup>3</sup> - 30m <sup>3</sup> |
| Refrigerant system pressure (Max. / Min.)                               |                  |                   | 1.5MPa / 4.15MPa                    | 1.5MPa / 4.15MPa                    |

**Continued:**

| Model                      |                    |       | i5  | i7                     |
|----------------------------|--------------------|-------|---|------------------------|
| Refrigerant                | Type               |       | R32   | R32                    |
|                            | Charged            | kg    | 0.5   | 0.7                    |
| GWP value                  |                    |       | 675   | 675                    |
| Equivalent CO <sub>2</sub> |                    | Ton   | 0.3375  | 0.4725                 |
| Compressor                 | Brand              |       | GMCC  | GMCC                   |
|                            | Model              |       | KSK103D53UFZ                                    | KSK103D53UFZ           |
|                            | Type               |       | DC inverter, rotary                             | DC inverter, rotary    |
|                            | Quantity           |       | 1   | 1                      |
|                            | Capacity           | kW    | 3.220 (@60rps)                                  | 3.220 (@60rps)         |
|                            | Input              | kW    | 0.839 (@60rps)                                  | 0.839 (@60rps)         |
|                            | Current            | A     | 5.70 (@60rps)                                   | 5.70 (@60rps)          |
|                            | Oil type / charged |       | Estel oil VG74 / 320ml                          | Estel oil VG74 / 320ml |
| Air side heat-exchanger    | Material           |       | Hydrophilic aluminum & Inner groove copper tube |                        |
|                            | Rows               |       | 1   | 1                      |
|                            | Tube size          | mm    | Φ7  | Φ9.52                  |
| Fan motor                  | Fan type           |       | Axial   | Axial                  |
|                            | Fan size           | mm    | Φ429×119  | Φ429×119               |
|                            | Motor type         |       | BLDC  | BLDC                   |
|                            | Motor model        |       | RD34HA  | RD34HA                 |
|                            | Motor Brand        |       | LT  | LT                     |
|                            | Quantity           |       | 1   | 1                      |
|                            | Speed              | rpm   | 1,000   | 1,000                  |
| Throttling type            |                    |       | Electronic Expansion valve                      |                        |
| Water side heat-exchanger  |                    |       | Titanium heat-exchanger with PVC casing         |                        |
| Sound pressure level       | @1m                | dB(A) | 35.3 - 43.1                                     | 37.7 - 46.1            |
|                            | @4m                | dB(A) | 27.4 - 35.8                                     | 29.5 - 36.6            |
|                            | @10m               | dB(A) | 19.1 - 27.2                                     | 19.5 - 27.4            |
| Water pipe connection      | Inlet              |       | G1-1/2  | G1-1/2                 |
|                            | Outlet             |       | G1-1/2  | G1-1/2                 |
| Controller (Standard: LCD) |                    |       | LWC04-V01                                       | LWC04-V01              |
| Anti-UV cover              |                    |       | Yes   | Yes                    |
| Water resistance           |                    |       | IP×4  | IP×4                   |
| Dimension (L×W×H)          | Unit               | mm    | 860×330×668                                     | 860×330×668            |
|                            | Packing            | mm    | 950×410×800                                     | 950×410×800            |
| Weight                     | Net                | kg    | 35  | 38                     |
|                            | Gross              | kg    | 42  | 45                     |

## Notes:

1. Advised swimming pool size is the size of the pool with IOSthermal cover at night and when not in use.
2. The specification may be changed for product improvement, please refer to the nameplate of product.

| Model   |                  |                   | i9                                  | i11                                 |
|---|------------------|-------------------|-------------------------------------|-------------------------------------|
| Power supply  |                  |                   | 230V~, 1Ph, 50Hz                    | 230V~, 1Ph, 50Hz                    |
| Air temperature: 15°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                     |                                     |
| Heating capacity  |                  | kW                | 1.60 – 6.70                         | 2.18 - 8.13                         |
| Power input   |                  | kW                | 0.21 - 1.34                         | 0.28 - 1.59                         |
| COP   |                  |                   | 5.00 - 7.70                         | 4.9 - 7.8                           |
| Boost mode  | Heating capacity | kW                | 5.95                                | 8.13                                |
|   | COP              |                   | 5.00                                | 4.90                                |
| Smart mode  | Heating capacity | kW                | 4.76                                | 6.50                                |
|   | COP              |                   | 5.88                                | 5.76                                |
| Silent mode   | Heating capacity | kW                | 2.98                                | 4.07                                |
|   | COP              |                   | 6.67                                | 6.53                                |
| Air temperature: 26°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                     |                                     |
| Heating capacity  |                  | kW                | 1.90 - 9.20                         | 2.70 - 10.90                        |
| Power input   |                  | kW                | 0.13 - 1.28                         | 0.18 - 1.74                         |
| COP   |                  |                   | 6.24 - 14.71                        | 6.27 - 14.8                         |
| Boost mode  | Heating capacity | kW                | 9.20                                | 10.90                               |
|   | COP              |                   | 6.24                                | 6.27                                |
| Smart mode  | Heating capacity | kW                | 7.45                                | 8.94                                |
|   | COP              |                   | 7.80                                | 7.84                                |
| Silent mode   | Heating capacity | kW                | 4.60                                | 5.45                                |
|   | COP              |                   | 10.40                               | 10.45                               |
| Air temperature: 35°C, inlet/outlet water temperature: 28°C/26°C        |                  |                   |                                     |                                     |
| Cooling capacity  |                  | kW                | 1.80 - 4.60                         | 2.40 - 6.00                         |
| Power input   |                  | kW                | 0.28 - 1.20                         | 0.33 - 1.39                         |
| EER   |                  |                   | 4.47 - 7.46                         | 4.32 - 7.34                         |
| Boost mode  | Heating capacity | kW                | 4.60                                | 6.00                                |
|   | EER              |                   | 4.47                                | 4.32                                |
| Smart mode  | Heating capacity | kW                | 3.68                                | 4.80                                |
|   | EER              |                   | 5.59                                | 5.40                                |
| Silent mode   | Heating capacity | kW                | 2.30                                | 3.00                                |
|   | EER              |                   | 6.88                                | 6.65                                |
| Max. input  |                  | kW                | 1.66                                | 1.93                                |
| Max. current  |                  | A                 | 7.24                                | 8.4                                 |
| Water flow  |                  | m <sup>3</sup> /h | 3 - 5                               | 4 - 6                               |
| Water pressure drop   |                  | kPa               | 17                                  | 18                                  |
| Running temperature range   |                  |                   | -15°C - 43°C                        | -15°C - 43°C                        |
| Advised swimming pool size  |                  |                   | 20m <sup>3</sup> - 40m <sup>3</sup> | 25m <sup>3</sup> - 50m <sup>3</sup> |
| Refrigerant system pressure (Max. / Min.)                               |                  |                   | 1.5MPa / 4.15MPa                    | 1.5MPa / 4.15MPa                    |

**Continued:**

| Model                      |                    |       | i9  | i11                      |
|----------------------------|--------------------|-------|---|--------------------------|
| Refrigerant                | Type               |       | R32   | R32                      |
|                            | Charged            | kg    | 1.0   | 1.3                      |
| GWP value                  |                    |       | 675   | 675                      |
| Equivalent CO <sub>2</sub> |                    | Ton   | 0.6750  | 0.8775                   |
| Compressor                 | Brand              |       | GMCC  | GMCC                     |
|                            | Model              |       | KTN150D42UFZ                                    | KTN150D42UFZ             |
|                            | Type               |       | DC inverter, twin-rotary                        | DC inverter, twin-rotary |
|                            | Quantity           |       | 1   | 1                        |
|                            | Capacity           | kW    | 4.680 (@60rps)                                  | 4.680 (@60rps)           |
|                            | Input              | kW    | 1.185 (@60rps)                                  | 1.185 (@60rps)           |
|                            | Current            | A     | 7.70 (@60rps)                                   | 7.70 (@60rps)            |
|                            | Oil type / charged |       | Estel oil RB74AF / 670ml                        | Estel oil RB74AF / 670ml |
| Air side heat-exchanger    | Material           |       | Hydrophilic aluminum & Inner groove copper tube |                          |
|                            | Rows               |       | 1   | 1                        |
|                            | Tube size          | mm    | Φ9.52   | Φ9.52                    |
| Fan motor                  | Fan type           |       | Axial   | Axial                    |
|                            | Fan size           | mm    | Φ429×119  | Φ420×153                 |
|                            | Motor type         |       | BLDC  | BLDC                     |
|                            | Motor model        |       | RD34HA  | MWS100-8K-PD7            |
|                            | Motor Brand        |       | LT  | Match-well               |
|                            | Quantity           |       | 1   | 1                        |
|                            | Speed              | rpm   | 1,000   | 800                      |
| Throttling type            |                    |       | Electronic Expansion valve                      |                          |
| Water side heat-exchanger  |                    |       | Titanium heat-exchanger with PVC casing         |                          |
| Sound pressure level       | @1m                | dB(A) | 38.1 - 47.2                                     | 38.3 - 48.1              |
|                            | @4m                | dB(A) | 29.4 - 37.3                                     | 30.4 - 37.9              |
|                            | @10m               | dB(A) | 20.5 - 27.9                                     | 20.6 - 28.2              |
| Water pipe connection      | Inlet              |       | G1-1/2  | G1-1/2                   |
|                            | Outlet             |       | G1-1/2  | G1-1/2                   |
| Controller (Standard: LCD) |                    |       | LWC04-V01                                       | LWC04-V01                |
| Anti-UV cover              |                    |       | Yes   | Yes                      |
| Water resistance           |                    |       | IP×4  | IP×4                     |
| Dimension (L×W×H)          | Unit               | mm    | 860×330×668                                     | 986×356×668              |
|                            | Packing            | mm    | 950×410×800                                     | 1,080×435×800            |
| Weight                     | Net                | kg    | 40  | 44                       |
|                            | Gross              | kg    | 48  | 54                       |

## Notes:

1. Advised swimming pool size is the size of the pool with IOSthermal cover at night and when not in use.
2. The specification may be changed for product improvement, please refer to the nameplate of product.



| Model   |                  |                   | i14                                 | i17                                 |
|---|------------------|-------------------|-------------------------------------|-------------------------------------|
| Power supply  |                  |                   | 230V~, 1Ph, 50Hz                    | 230V~, 1Ph, 50Hz                    |
| Air temperature: 15°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                     |                                     |
| Heating capacity  |                  | kW                | 2.86 - 10.65                        | 3.49 - 13.00                        |
| Power input   |                  | kW                | 0.38 - 2.17                         | 0.47 - 2.64                         |
| COP   |                  |                   | 4.9 - 7.6                           | 4.85 - 7.44                         |
| Boost mode  | Heating capacity | kW                | 10.65                               | 13.00                               |
|   | COP              |                   | 4.90                                | 4.85                                |
| Smart mode  | Heating capacity | kW                | 8.52                                | 10.40                               |
|   | COP              |                   | 5.76                                | 5.71                                |
| Silent mode   | Heating capacity | kW                | 5.33                                | 6.50                                |
|   | COP              |                   | 6.53                                | 6.47                                |
| Air temperature: 26°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                     |                                     |
| Heating capacity  |                  | kW                | 3.40 - 14.30                        | 4.30 - 17.40                        |
| Power input   |                  | kW                | 0.23 - 2.32                         | 0.29 - 2.85                         |
| COP   |                  |                   | 6.15 - 14.62                        | 6.00 - 14.50                        |
| Boost mode  | Heating capacity | kW                | 14.30                               | 17.40                               |
|   | COP              |                   | 6.15                                | 6.00                                |
| Smart mode  | Heating capacity | kW                | 11.44                               | 14.01                               |
|   | COP              |                   | 7.69                                | 7.50                                |
| Silent mode   | Heating capacity | kW                | 7.15                                | 8.70                                |
|   | COP              |                   | 10.25                               | 10.00                               |
| Air temperature: 35°C, inlet/outlet water temperature: 28°C/26°C        |                  |                   |                                     |                                     |
| Cooling capacity  |                  | kW                | 3.20 - 7.87                         | 3.90 - 9.60                         |
| Power input   |                  | kW                | 0.43 - 1.78                         | 0.51 - 2.30                         |
| EER   |                  |                   | 4.41 - 7.42                         | 4.24 - 7.40                         |
| Boost mode  | Heating capacity | kW                | 7.87                                | 9.60                                |
|   | EER              |                   | 4.41                                | 4.24                                |
| Smart mode  | Heating capacity | kW                | 6.30                                | 7.68                                |
|   | EER              |                   | 5.51                                | 5.30                                |
| Silent mode   | Heating capacity | kW                | 3.94                                | 4.80                                |
|   | EER              |                   | 6.78                                | 6.52                                |
| Max. input  |                  | kW                | 2.21                                | 3.17                                |
| Max. current  |                  | A                 | 9.6                                 | 13.77                               |
| Water flow  |                  | m <sup>3</sup> /h | 5 - 7                               | 6 - 8                               |
| Water pressure drop   |                  | kPa               | 18                                  | 19                                  |
| Running temperature range   |                  |                   | -15°C - 43°C                        | -15°C - 43°C                        |
| Advised swimming pool size  |                  |                   | 30m <sup>3</sup> - 60m <sup>3</sup> | 35m <sup>3</sup> - 70m <sup>3</sup> |
| Refrigerant system pressure (Max. / Min.)                               |                  |                   | 1.5MPa / 4.15MPa                    | 1.5MPa / 4.15MPa                    |

**Continued:**

| Model                      |                    |       | i14   | i17                      |
|----------------------------|--------------------|-------|---|--------------------------|
| Refrigerant                | Type               |       | R32   | R32                      |
|                            | Charged            | kg    | 1.5   | 1.58                     |
| GWP value                  |                    |       | 675   | 675                      |
| Equivalent CO <sub>2</sub> |                    | Ton   | 1.0125  | 1.2150                   |
| Compressor                 | Brand              |       | GMCC  | GMCC                     |
|                            | Model              |       | KTN150D42UFZ                                    | KTM240D57UMT             |
|                            | Type               |       | DC inverter, twin-rotary                        | DC inverter, twin-rotary |
|                            | Quantity           |       | 1   | 1                        |
|                            | Capacity           | kW    | 4.680 (@60rps)                                  | 7.715 (@60rps)           |
|                            | Input              | kW    | 1.185 (@60rps)                                  | 2.085 (@60rps)           |
|                            | Current            | A     | 7.70 (@60rps)                                   | 9.40 (@60rps)            |
|                            | Oil type / charged |       | Estel oil VG74 / 670ml                          | Estel oil VG74 / 670ml   |
| Air side heat-exchanger    | Material           |       | Hydrophilic aluminum & Inner groove copper tube |                          |
|                            | Rows               |       | 2   | 2                        |
|                            | Tube size          | mm    | Φ7  | Φ9.52                    |
| Fan motor                  | Fan type           |       | Axial   | Axial                    |
|                            | Fan size           | mm    | Φ420×153  | Φ420×153                 |
|                            | Motor type         |       | BLDC  | BLDC                     |
|                            | Motor model        |       | MWS100-8K-PD7                                   | MWS100-8K-PD7            |
|                            | Motor Brand        |       | Match-well                                      | Match-well               |
|                            | Quantity           |       | 1   | 1                        |
|                            | Speed              | rpm   | 800   | 800                      |
| Throttling type            |                    |       | Electronic Expansion valve                      |                          |
| Water side heat-exchanger  |                    |       | Titanium heat-exchanger with PVC casing         |                          |
| Sound pressure level       | @1m                | dB(A) | 38.5 - 48.6                                     | 41.5 - 52.5              |
|                            | @4m                | dB(A) | 30.6 - 38.2                                     | 32.8 - 40.5              |
|                            | @10m               | dB(A) | 20.8 - 28.6                                     | 23.0 - 31.8              |
| Water pipe connection      | Inlet              |       | G1-1/2  | G1-1/2                   |
|                            | Outlet             |       | G1-1/2  | G1-1/2                   |
| Controller (Standard: LCD) |                    |       | LWC04-V01                                       | LWC04-V01                |
| Anti-UV cover              |                    |       | Yes   | Yes                      |
| Water resistance           |                    |       | IP×4  | IP×4                     |
| Dimension (L×W×H)          | Unit               | mm    | 986×356×668                                     | 986×356×668              |
|                            | Packing            | mm    | 1,080×435×800                                   | 1,080×435×800            |
| Weight                     | Net                | kg    | 46  | 56                       |
|                            | Gross              | kg    | 56  | 66                       |

## Notes:

1. Advised swimming pool size is the size of the pool with IOSthermal cover at night and when not in use.
2. The specification may be changed for product improvement, please refer to the nameplate of product.

| Model   |                  | i21                                 |              |
|---|------------------|-------------------------------------|--------------|
| Power supply  |                  | 230V~, 1Ph, 50Hz                    |              |
| Air temperature: 15°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                                     |              |
| Heating capacity  |                  | kW                                  | 3.76 - 15.70 |
| Power input   |                  | kW                                  | 0.48 - 2.75  |
| COP   |                  | 5.10 - 7.52                         |              |
| Boost mode  | Heating capacity | kW                                  | 15.70        |
|   | COP              |                                     | 5.10         |
| Smart mode  | Heating capacity | kW                                  | 12.56        |
|   | COP              |                                     | 6.00         |
| Silent mode   | Heating capacity | kW                                  | 7.85         |
|   | COP              |                                     | 6.80         |
| Air temperature: 26°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                                     |              |
| Heating capacity  |                  | kW                                  | 4.80 - 21.20 |
| Power input   |                  | kW                                  | 0.33 - 3.38  |
| COP   |                  | 6.36 - 14.55                        |              |
| Boost mode  | Heating capacity | kW                                  | 21.20        |
|   | COP              |                                     | 6.36         |
| Smart mode  | Heating capacity | kW                                  | 17.17        |
|   | COP              |                                     | 7.95         |
| Silent mode   | Heating capacity | kW                                  | 10.60        |
|   | COP              |                                     | 10.60        |
| Air temperature: 35°C, inlet/outlet water temperature: 28°C/26°C        |                  |                                     |              |
| Cooling capacity  |                  | kW                                  | 4.30 - 11.50 |
| Power input   |                  | kW                                  | 0.57 - 2.62  |
| EER   |                  | 4.38 - 7.48                         |              |
| Boost mode  | Heating capacity | kW                                  | 11.50        |
|   | EER              |                                     | 4.38         |
| Smart mode  | Heating capacity | kW                                  | 9.20         |
|   | EER              |                                     | 5.48         |
| Silent mode   | Heating capacity | kW                                  | 5.75         |
|   | EER              |                                     | 6.74         |
| Max. input  |                  | kW                                  | 3.29         |
| Max. current  |                  | A                                   | 14.3         |
| Water flow  |                  | m <sup>3</sup> /h                   | 7 - 9        |
| Water pressure drop   |                  | kPa                                 | 20           |
| Running temperature range   |                  | -15°C - 43°C                        |              |
| Advised swimming pool size  |                  | 40m <sup>3</sup> - 80m <sup>3</sup> |              |
| Refrigerant system pressure (Max. / Min.)                               |                  | 1.5MPa / 4.15MPa                    |              |

**Continued:**

| Model                      |                    |       | i21   |
|----------------------------|--------------------|-------|---|
| Refrigerant                | Type               |       | R32   |
|                            | Charged            | kg    | 2.0   |
| GWP value                  |                    |       | 675   |
| Equivalent CO <sub>2</sub> |                    | Ton   | 1.3500  |
| Compressor                 | Brand              |       | GMCC  |
|                            | Model              |       | KTM240D57UMT                                    |
|                            | Type               |       | DC inverter, twin-rotary                        |
|                            | Quantity           |       | 1   |
|                            | Capacity           | kW    | 7.715 (@60rps)                                  |
|                            | Input              | kW    | 2.085 (@60rps)                                  |
|                            | Current            | A     | 9.40 (@60rps)                                   |
|                            | Oil type / charged |       | Estel oil VG74 / 670ml                          |
| Air side heat-exchanger    | Material           |       | Hydrophilic aluminum & Inner groove copper tube |
|                            | Rows               |       | 1.5   |
|                            | Tube size          | mm    | Φ9.52   |
| Fan motor                  | Fan type           |       | Axial   |
|                            | Fan size           | mm    | Φ458.5×152                                      |
|                            | Motor type         |       | BLDC  |
|                            | Motor model        |       | MWS100-8K-PD                                    |
|                            | Motor Brand        |       | Match-well                                      |
|                            | Quantity           |       | 1   |
|                            | Speed              | rpm   | 800   |
| Throttling type            |                    |       | Electronic Expansion valve                      |
| Water side heat-exchanger  |                    |       | Titanium heat-exchanger with PVC casing         |
| Sound pressure level       | @1m                | dB(A) | 42.3 - 53.1                                     |
|                            | @4m                | dB(A) | 33.2 - 40.9                                     |
|                            | @10m               | dB(A) | 23.6 - 32.2                                     |
| Water pipe connection      | Inlet              |       | G1-1/2  |
|                            | Outlet             |       | G1-1/2  |
| Controller (Standard: LCD) |                    |       | LWC04-V01                                       |
| Anti-UV cover              |                    |       | Yes   |
| Water resistance           |                    |       | IPx4  |
| Dimension (LxWxH)          | Unit               | mm    | 1,076×426×720                                   |
|                            | Packing            | mm    | 1,161×490×855                                   |
| Weight                     | Net                | kg    | 67  |
|                            | Gross              | kg    | 80  |

## Notes:

1. Advised swimming pool size is the size of the pool with IOSthermal cover at night and when not in use.
2. The specification may be changed for product improvement, please refer to the nameplate of product.

| Model   |                  |                   | i25                                  | i29                                  |
|---|------------------|-------------------|--------------------------------------|--------------------------------------|
| Power supply  |                  |                   | 230V~, 1Ph, 50Hz                     | 230V~, 1Ph, 50Hz                     |
| Air temperature: 15°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                      |                                      |
| Heating capacity  |                  | kW                | 5.15 - 18.52                         | 5.43 - 21.28                         |
| Power input   |                  | kW                | 0.68 - 3.77                          | 0.73 - 4.30                          |
| COP   |                  |                   | 4.91 - 7.53                          | 4.95 - 7.51                          |
| Boost mode  | Heating capacity | kW                | 18.52                                | 21.28                                |
|   | COP              |                   | 4.91                                 | 4.95                                 |
| Smart mode  | Heating capacity | kW                | 14.82                                | 17.02                                |
|   | COP              |                   | 5.74                                 | 5.82                                 |
| Silent mode   | Heating capacity | kW                | 9.26                                 | 10.54                                |
|   | COP              |                   | 6.51                                 | 6.60                                 |
| Air temperature: 26°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                   |                                      |                                      |
| Heating capacity  |                  | kW                | 6.20 - 25.10                         | 6.60 - 29.00                         |
| Power input   |                  | kW                | 0.43 - 4.05                          | 0.46 - 4.75                          |
| COP   |                  |                   | 6.20 - 14.52                         | 6.10 - 14.54                         |
| Boost mode  | Heating capacity | kW                | 25.10                                | 29.00                                |
|   | COP              |                   | 6.20                                 | 6.10                                 |
| Smart mode  | Heating capacity | kW                | 20.10                                | 23.20                                |
|   | COP              |                   | 7.60                                 | 7.63                                 |
| Silent mode   | Heating capacity | kW                | 12.52                                | 14.55                                |
|   | COP              |                   | 10.15                                | 10.17                                |
| Air temperature: 35°C, inlet/outlet water temperature: 28°C/26°C        |                  |                   |                                      |                                      |
| Cooling capacity  |                  | kW                | 5.80 - 13.90                         | 6.20 - 16.00                         |
| Power input   |                  | kW                | 0.80 - 3.35                          | 0.82 - 3.73                          |
| EER   |                  |                   | 4.15 - 7.22                          | 4.29 - 7.54                          |
| Boost mode  | Heating capacity | kW                | 13.90                                | 16.00                                |
|   | EER              |                   | 4.15                                 | 4.29                                 |
| Smart mode  | Heating capacity | kW                | 11.10                                | 12.80                                |
|   | EER              |                   | 5.18                                 | 5.36                                 |
| Silent mode   | Heating capacity | kW                | 6.95                                 | 8.00                                 |
|   | EER              |                   | 6.40                                 | 6.60                                 |
| Max. input  |                  | kW                | 4.49                                 | 4.91                                 |
| Max. current  |                  | A                 | 19.52                                | 21.35                                |
| Water flow  |                  | m <sup>3</sup> /h | 8 - 11                               | 9 - 12                               |
| Water pressure drop   |                  | kPa               | 23                                   | 25                                   |
| Running temperature range   |                  |                   | -15°C - 43°C                         | -15°C - 43°C                         |
| Advised swimming pool size  |                  |                   | 65m <sup>3</sup> - 110m <sup>3</sup> | 70m <sup>3</sup> - 130m <sup>3</sup> |
| Refrigerant system pressure (Max. / Min.)                               |                  |                   | 1.5MPa / 4.15MPa                     | 1.5MPa / 4.15MPa                     |

**Continued:**

| Model                      |                    |       | i25   | i29                      |
|----------------------------|--------------------|-------|---|--------------------------|
| Refrigerant                | Type               |       | R32   | R32                      |
|                            | Charged            | kg    | 2.6   | 3.0                      |
| GWP value                  |                    |       | 675   | 675                      |
| Equivalent CO <sub>2</sub> |                    | Ton   | 1.7550  | 2.0250                   |
| Compressor                 | Brand              |       | GMCC  | GMCC                     |
|                            | Model              |       | KTF310D43UMT                                    | KTQ420D1UMU              |
|                            | Type               |       | DC inverter, twin-rotary                        | DC inverter, twin-rotary |
|                            | Quantity           |       | 1   | 1                        |
|                            | Capacity           | kW    | 10.0010 (@60rps)                                | 13.700 (@60rps)          |
|                            | Input              | kW    | 2.765 (@60rps)                                  | 3.700 (@60rps)           |
|                            | Current            | A     | 5.38 (@60rps)                                   | 7.02 (@60rps)            |
|                            | Oil type / charged |       | Estel oil VG74 / 1,000ml                        | Estel oil VG74 / 1,400ml |
| Air side heat-exchanger    | Material           |       | Hydrophilic aluminum & Inner groove copper tube |                          |
|                            | Rows               |       | 2   | 2                        |
|                            | Tube size          | mm    | Φ9.52   | Φ7                       |
| Fan motor                  | Fan type           |       | Axial   | Axial                    |
|                            | Fan size           | mm    | Φ458.5×152                                      | Φ525×135                 |
|                            | Motor type         |       | BLDC  | BLDC                     |
|                            | Motor model        |       | MWS100-8K-PD                                    | MWS100-8K-PD4            |
|                            | Motor Brand        |       | Match-well                                      | Match-well               |
|                            | Quantity           |       | 1   | 1                        |
|                            | Speed              | rpm   | 800   | 800                      |
| Throttling type            |                    |       | Electronic Expansion valve                      |                          |
| Water side heat-exchanger  |                    |       | Titanium heat-exchanger with PVC casing         |                          |
| Sound pressure level       | @1m                | dB(A) | 44.7 - 54.9                                     | 45.6 - 57.1              |
|                            | @4m                | dB(A) | 35.6 - 41.8                                     | 36.4 - 44.7              |
|                            | @10m               | dB(A) | 24.6 - 33.7                                     | 26.6 - 36.5              |
| Water pipe connection      | Inlet              |       | G1-1/2  | G1-1/2                   |
|                            | Outlet             |       | G1-1/2  | G1-1/2                   |
| Controller (Standard: LCD) |                    |       | LWC04-V01                                       | LWC04-V01                |
| Anti-UV cover              |                    |       | Yes   | Yes                      |
| Water resistance           |                    |       | IP×4  | IP×4                     |
| Dimension (L×W×H)          | Unit               | mm    | 1,076×426×720                                   | 1,176×451×822            |
|                            | Packing            | mm    | 1,161×490×855                                   | 1,261×515×957            |
| Weight                     | Net                | kg    | 72  | 90                       |
|                            | Gross              | kg    | 85  | 108                      |

## Notes:

1. Advised swimming pool size is the size of the pool with IOSthermal cover at night and when not in use.
2. The specification may be changed for product improvement, please refer to the nameplate of product.

| Model   |                  | i32                                  |              |
|---|------------------|--------------------------------------|--------------|
| Power supply  |                  | 230V~, 1Ph, 50Hz                     |              |
| Air temperature: 15°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                                      |              |
| Heating capacity  |                  | kW                                   | 6.34 - 23.68 |
| Power input   |                  | kW                                   | 0.87 - 4.80  |
| COP   |                  | 4.90 - 7.60                          |              |
| Boost mode  | Heating capacity | kW                                   | 23.68        |
|   | COP              |                                      | 4.90         |
| Smart mode  | Heating capacity | kW                                   | 18.94        |
|   | COP              |                                      | 5.76         |
| Silent mode   | Heating capacity | kW                                   | 11.84        |
|   | COP              |                                      | 6.53         |
| Air temperature: 26°C, RH70%, inlet/outlet water temperature: 26°C/28°C |                  |                                      |              |
| Heating capacity  |                  | kW                                   | 7.70 - 31.70 |
| Power input   |                  | kW                                   | 0.54 - 5.21  |
| COP   |                  | 6.11 - 14.60                         |              |
| Boost mode  | Heating capacity | kW                                   | 31.70        |
|   | COP              |                                      | 6.11         |
| Smart mode  | Heating capacity | kW                                   | 25.68        |
|   | COP              |                                      | 7.64         |
| Silent mode   | Heating capacity | kW                                   | 15.85        |
|   | COP              |                                      | 10.18        |
| Air temperature: 35°C, inlet/outlet water temperature: 28°C/26°C        |                  |                                      |              |
| Cooling capacity  |                  | kW                                   | 7.20 - 17.50 |
| Power input   |                  | kW                                   | 0.97 - 4.17  |
| EER   |                  | 4.21 - 7.44                          |              |
| Boost mode  | Heating capacity | kW                                   | 17.50        |
|   | EER              |                                      | 4.21         |
| Smart mode  | Heating capacity | kW                                   | 14.00        |
|   | EER              |                                      | 5.26         |
| Silent mode   | Heating capacity | kW                                   | 8.75         |
|   | EER              |                                      | 6.48         |
| Max. input  |                  | kW                                   | 5.80         |
| Max. current  |                  | A                                    | 25.2         |
| Water flow  |                  | m <sup>3</sup> /h                    | 12 - 15      |
| Water pressure drop   |                  | kPa                                  | 28           |
| Running temperature range   |                  | -15°C - 43°C                         |              |
| Advised swimming pool size  |                  | 80m <sup>3</sup> - 150m <sup>3</sup> |              |
| Refrigerant system pressure (Max. / Min.)                               |                  | 1.5MPa / 4.15MPa                     |              |

**Continued:**

| Model                      |                    |       | i32   |
|----------------------------|--------------------|-------|---|
| Refrigerant                | Type               |       | R22   |
|                            | Charged            | kg    | 3.3   |
| GWP value                  |                    |       | 675   |
| Equivalent CO <sub>2</sub> |                    | Ton   | 2.2275  |
| Compressor                 | Brand              |       | GMCC  |
|                            | Model              |       | KTQ420D1UMU                                     |
|                            | Type               |       | DC inverter, twin-rotary                        |
|                            | Quantity           |       | 1   |
|                            | Capacity           | kW    | 13.700 (@60rps)                                 |
|                            | Input              | kW    | 3.700 (@60rps)                                  |
|                            | Current            | A     | 7.02 (@60rps)                                   |
|                            | Oil type / charged |       | Estel oil VG74 / 1,400ml                        |
| Air side heat-exchanger    | Material           |       | Hydrophilic aluminum & Inner groove copper tube |
|                            | Rows               |       | 2   |
|                            | Tube size          | mm    | Φ9.52   |
| Fan motor                  | Fan type           |       | Axial   |
|                            | Fan size           | mm    | Φ522×140  |
|                            | Motor type         |       | BLDC  |
|                            | Motor model        |       | MWS100-8K-PD4                                   |
|                            | Motor Brand        |       | Match-well                                      |
|                            | Quantity           |       | 1   |
|                            | Speed              | rpm   | 800   |
| Throttling type            |                    |       | Electronic Expansion valve                      |
| Water side heat-exchanger  |                    |       | Titanium heat-exchanger with PVC casing         |
| Sound pressure level       | @1m                | dB(A) | 47.2 - 59.7                                     |
|                            | @4m                | dB(A) | 37.9 - 46.9                                     |
|                            | @10m               | dB(A) | 27.3 - 38.2                                     |
| Water pipe connection      | Inlet              |       | G1-1/2  |
|                            | Outlet             |       | G1-1/2  |
| Controller (Standard: LCD) |                    |       | LWC04-V01                                       |
| Anti-UV cover              |                    |       | Yes   |
| Water resistance           |                    |       | IP×4  |
| Dimension (L×W×H)          | Unit               | mm    | 1,176×451×822                                   |
|                            | Packing            | mm    | 1,261×515×957                                   |
| Weight                     | Net                | kg    | 98  |
|                            | Gross              | kg    | 116   |

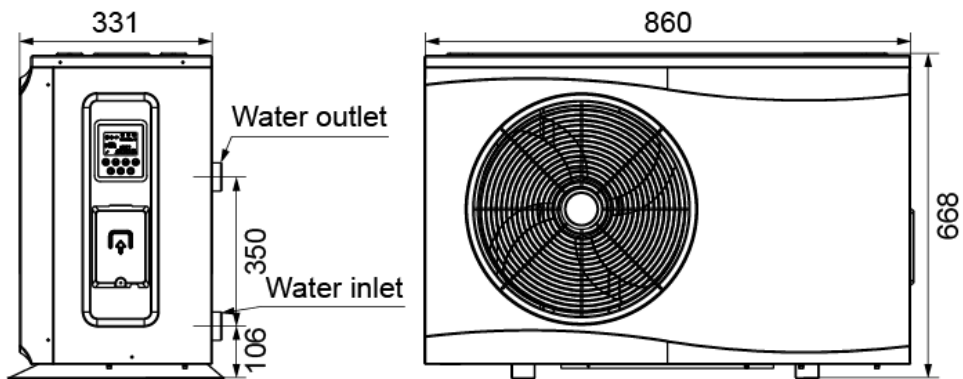
## Notes:

1. Advised swimming pool size is the size of the pool with IOSthermal cover at night and when not in use.
2. The specification may be changed for product improvement, please refer to the nameplate of product.

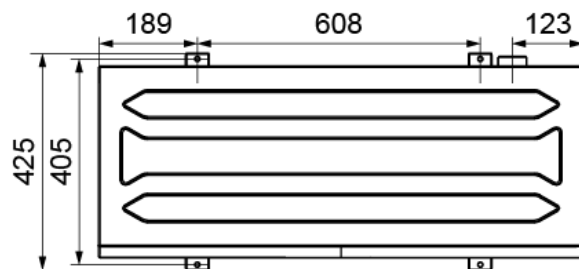
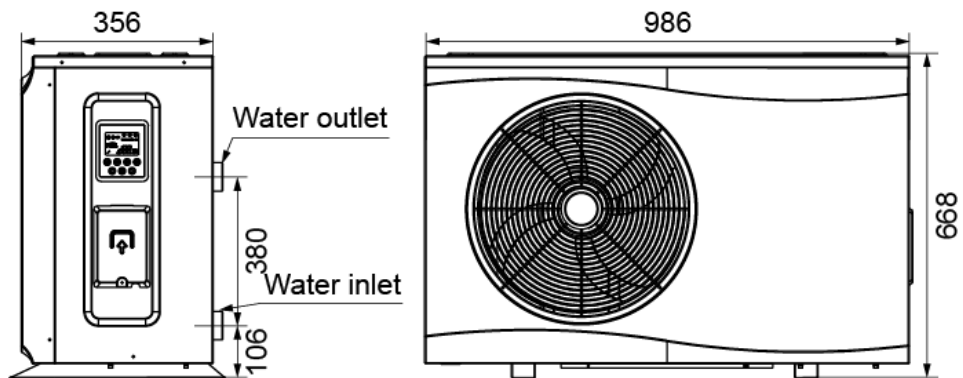


## 4. Dimensions

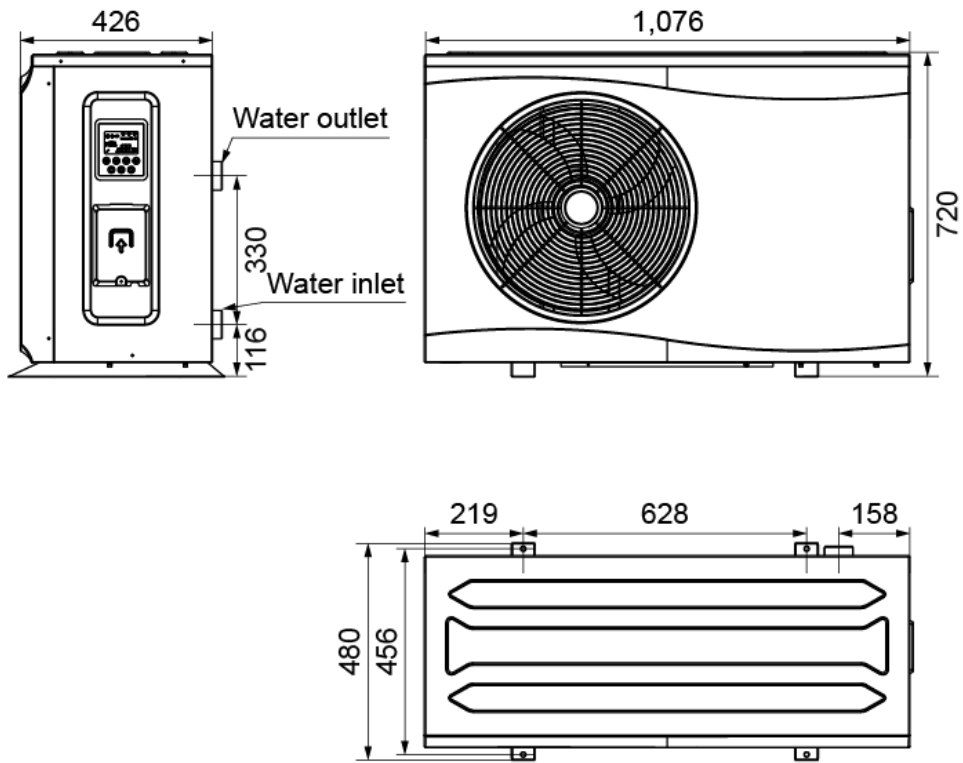
i5 / i7 / i9 (Unit: mm)



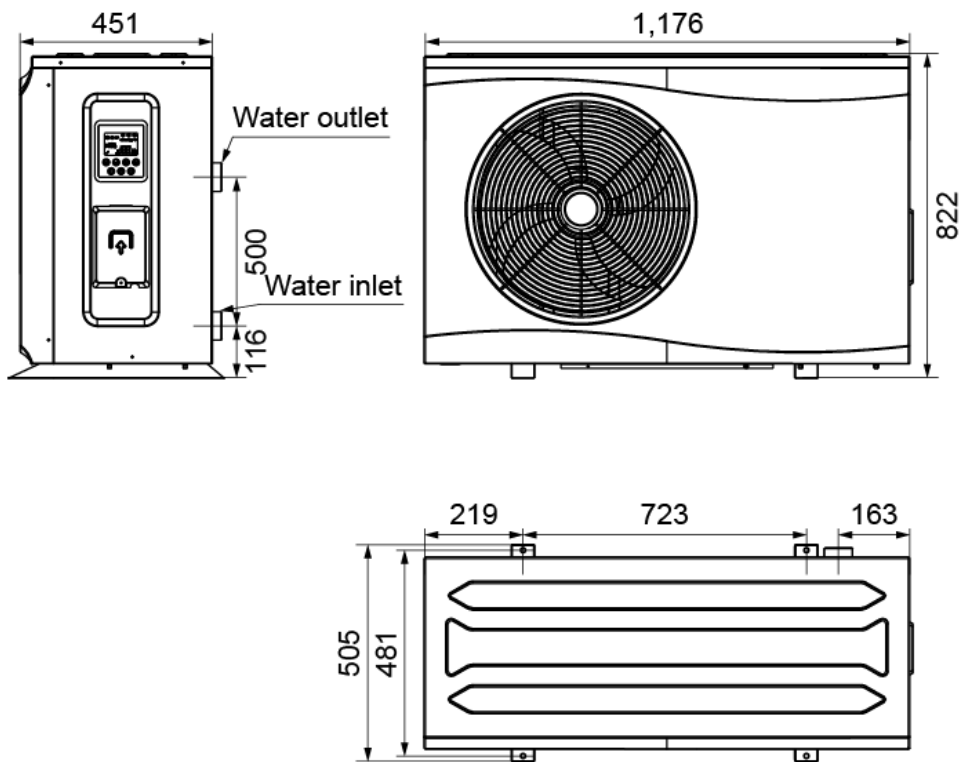
i11 / i14 / i17 (Unit: mm)



**i21 / i25 (Unit: mm)**

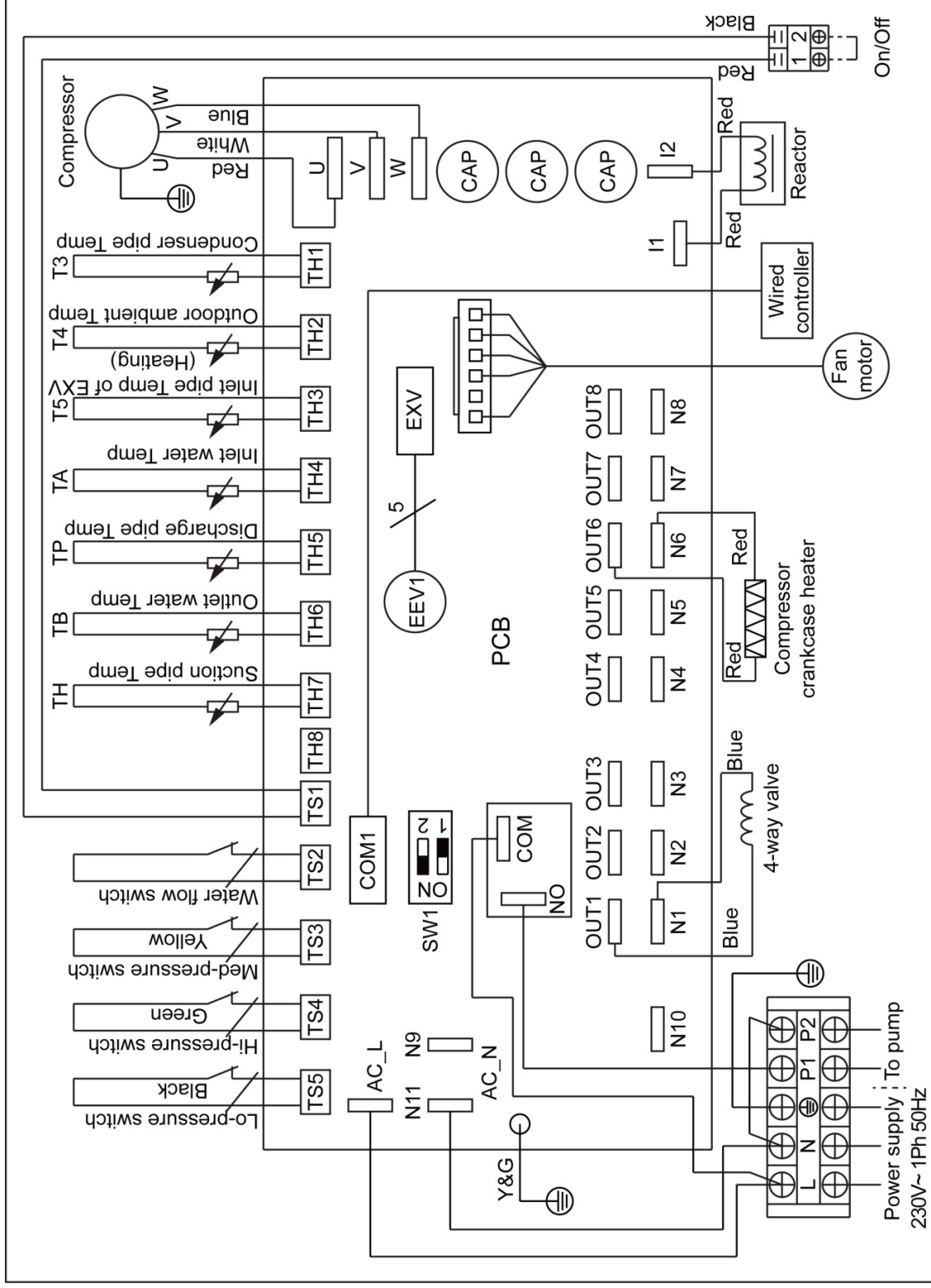


**i29 / i32 (Unit: mm)**

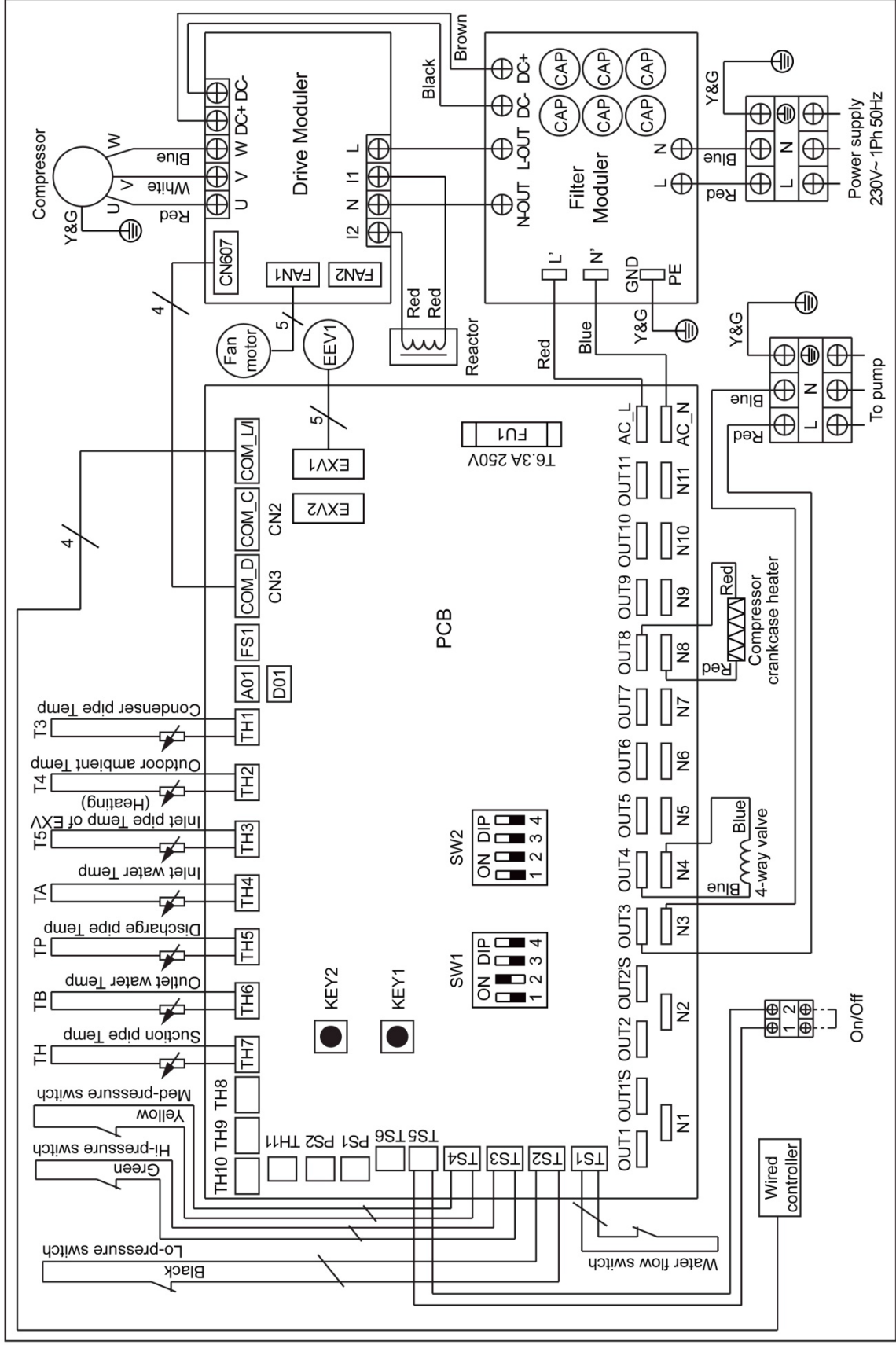


### 5. Wiring diagram

i5 / i7/ i9 / i11 / i14 / i17 / i21 / i25:



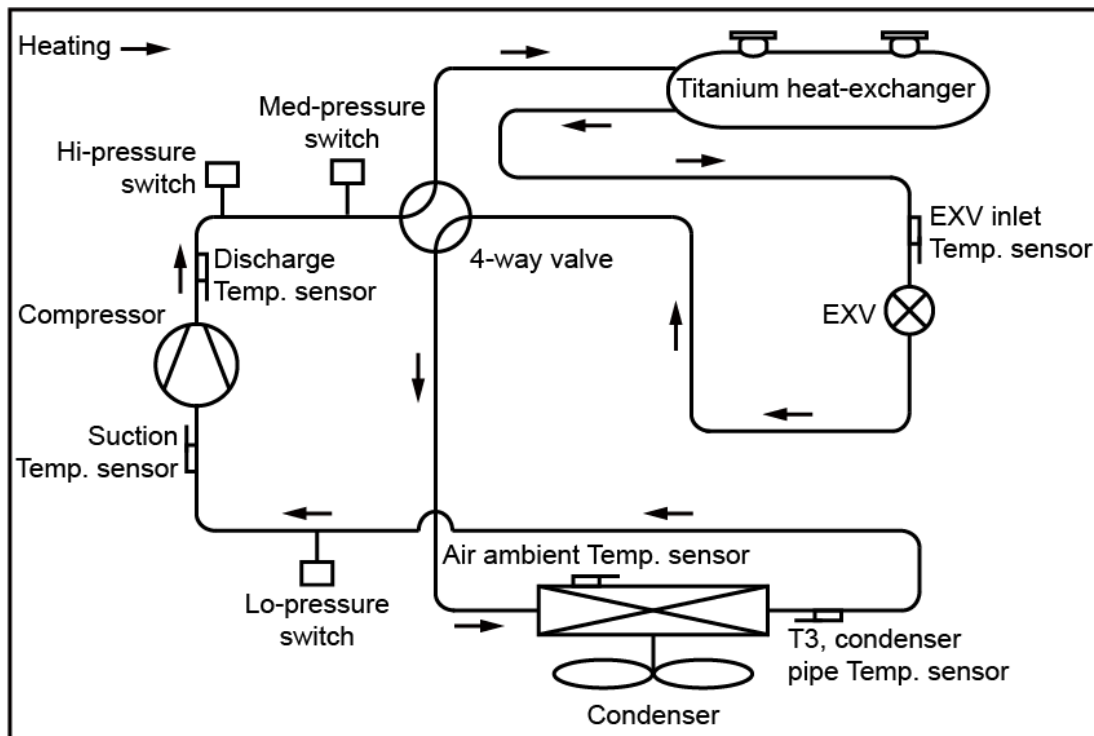
i29 / i32:



## 6. Operation range

| Air ambient temperature range | Setting temperature range                 |
|-------------------------------|---|
| -15°C - 43°C                  | Cooling: 8°C - 25°C; Heating: 15°C - 40°C |

## 7. Refrigerant system diagram








Notes:

**Hi-pressure switch:** When the refrigerant pressure in the system is higher than 4.5MPa, the hi-pressure switch will be triggered and the unit will shut down. When the refrigerant pressure in the system is lower than 3.5MPa, the pressure switch will be re-activated and the unit will start again.

**Lo-pressure switch:** When the refrigerant pressure in system is lower than 0.05MPa, the switch will be triggered and the signal of hi-pressure switch will be shutdown. When the refrigerant pressure in system is higher than 0.15MPa, the pressure switch will be recovered.

## 8. Accessories

| Items                             | Shapes   | Quantity | Remarks                                   |
|-----------------------------------|--|----------|---|
| Installation and operation manual |   | 1        | For guidance, installation and operation. |
| Water connectors                  |   | 2        | For water inlet/outlet connection.        |
| Winter cover                      |   | 1        | To protect the unit during winter.        |
| Rubber gasket                     |   | 4        | To reduce vibration.                      |
| Drainage joint and drainage pipe  |  | 1        | Condense water pipe                       |

## 9. Installation

To prevent injury to the installation engineer, users, or other people, or the damage of the unit, please follow the instructions:

- ✧ Install the unit only when it complies with local regulations, by-laws and standards.
- ✧ Check the main voltage and frequency. The unit is only suitable for earthed sockets and connection voltage 220V-240V~, 50Hz, 1Ph.
- ✧ Be sure to read the safety instructions below before installation.

### 9.1 Safety instructions

- ✓ Incorrect installation could cause an injury due to fire, electric shock, leakage of water and other potential issues.
- ✓ The unit must always have an earthed connection.
- ✓ The unit should be installed on a solid base, otherwise it may fall and cause injury to persons to damage to the unit itself. The fixing bolts should be secured properly and strong enough to support the unit.
- ✓ When installing the unit in a small space, please take measures to prevent possibility of asphyxia due to leakage of the refrigerant, and provide the enough space to carry out service and maintenance on the unit.
- ✓ Do not install the unit in a place where there is a risk of flammable gas leaks. If there is a

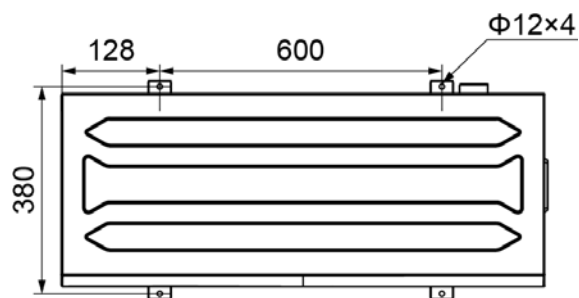
gas leakage and gas accumulation in the area surrounding the unit, it could cause explosions.

- ✓ Please use the specified electrical wires and attached shielded wires to connect the unit's terminal board. Incorrect connection may cause fire.
- ✓ Never use an extension cable to connect the unit to the power supply.
- ✓ Perform the drainage or piping works according to the installation instructions.
- ✓ Do not clean the unit before switching off the power supply. Failure to comply with these instructions could cause injury due to the high-speed running fan or electric shock.
- ✓ Do not continue to run the unit when there is something wrong or if there is a strange smell.
- ✓ Do not put fingers or other things into the fan grille or air side heat-exchanger.

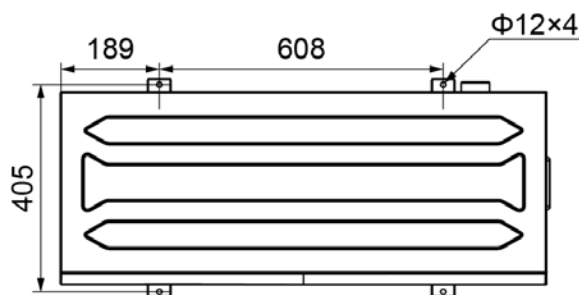
## 9.2 Unit fixing

- ✓ Install the swimming pool heat pump on a flat, horizontal, and stable surface. Make sure there is enough space to use the controller.
- ✓ Make sure that the discharged air will not be breathed in.
- ✓ Avoid directing the flow of the ventilated air towards a sensitive noise zone, such as room windows. Avoid positioning the heat pump on a surface that can transmit vibrations to the dwelling.
- ✓ Avoid placing the unit under a tree or exposed to water or mud, which could affect the operation of the unit and make maintenance and service more complicated.
- ✓ As following figures, please check the unit foot sizes:

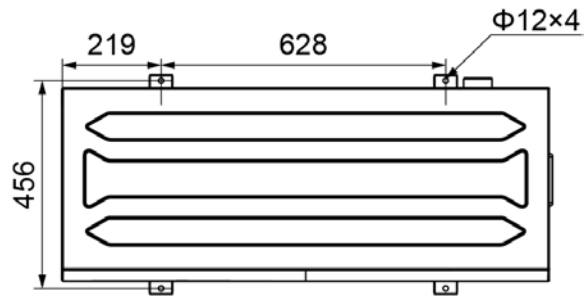
**i5 / i7 / i9:** (Unit: mm)



**i11 / i14 / i17:** (Unit: mm)



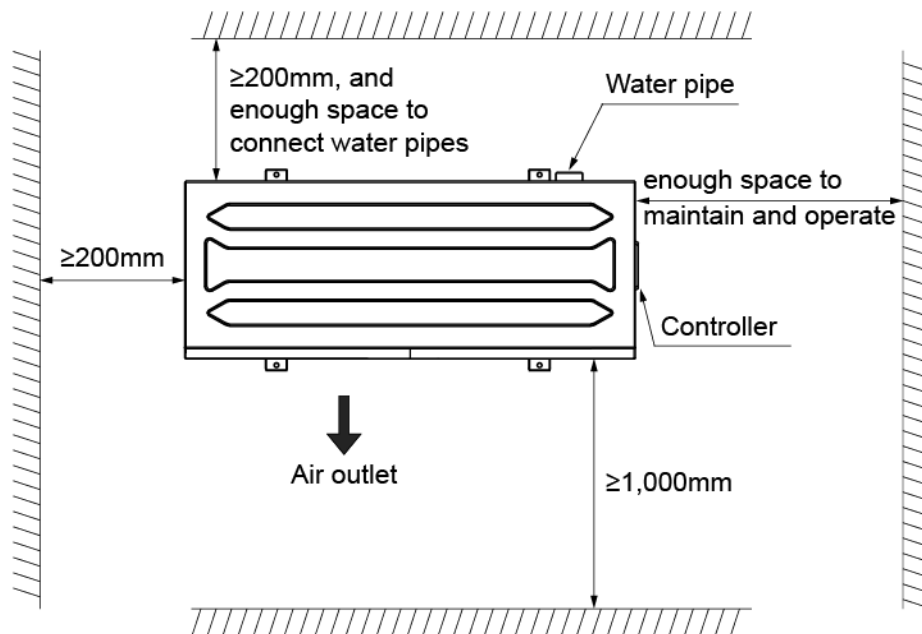
**i21 / i25:** (Unit: mm)



**i29 / i32:** (Unit: mm)



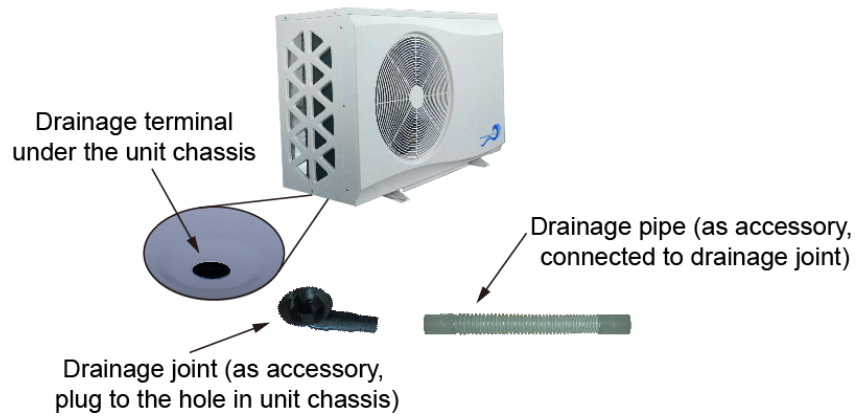
✓ The clearance of the unit (Unit: mm):



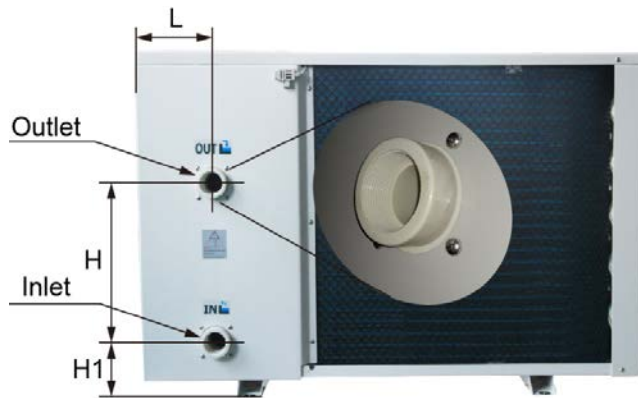


### 9.3 Water pipes connection

- ✓ Drainage pipe connection

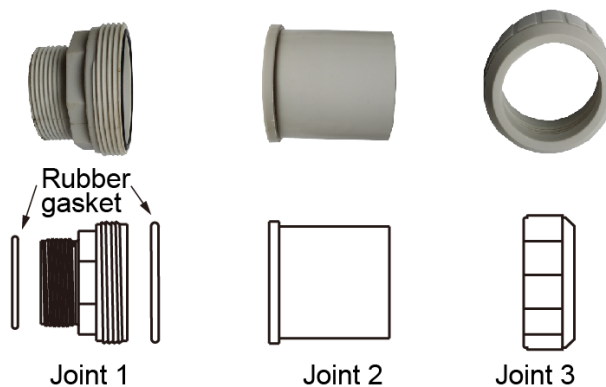


- ✓ Water connections/fittings on unit:

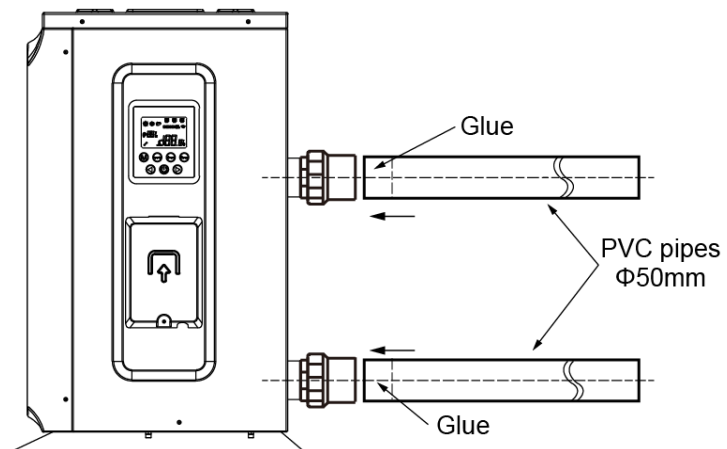
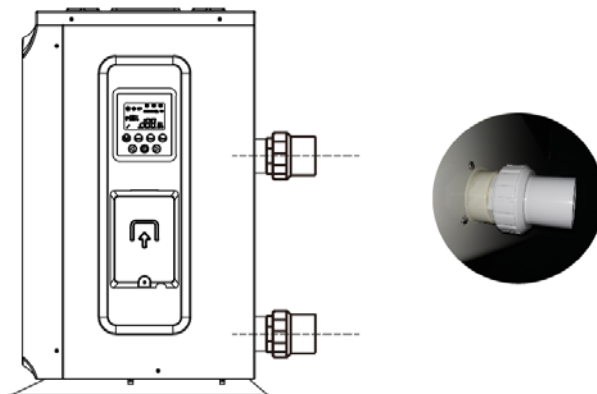
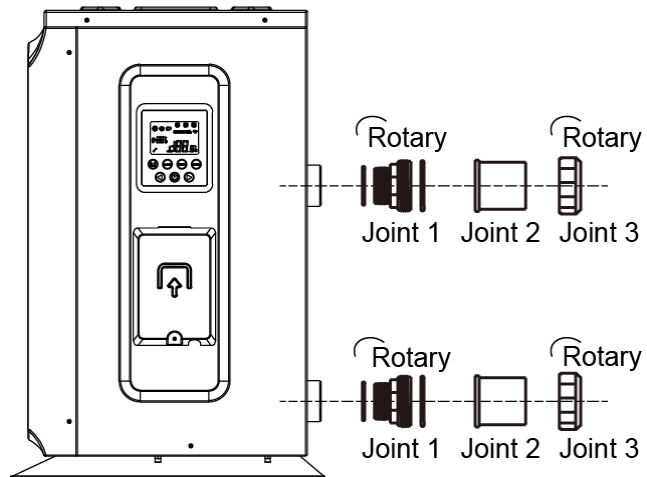


| Model           | L     | H     | H1    |
|-----------------|-------|-------|-------|
| i5 / i7 / i9    | 118mm | 350mm | 106mm |
| i11 / i14 / i17 | 123mm | 380mm | 106mm |
| i21 / i25       | 158mm | 330mm | 116mm |
| i29 / i32       | 163mm | 500mm | 116mm |

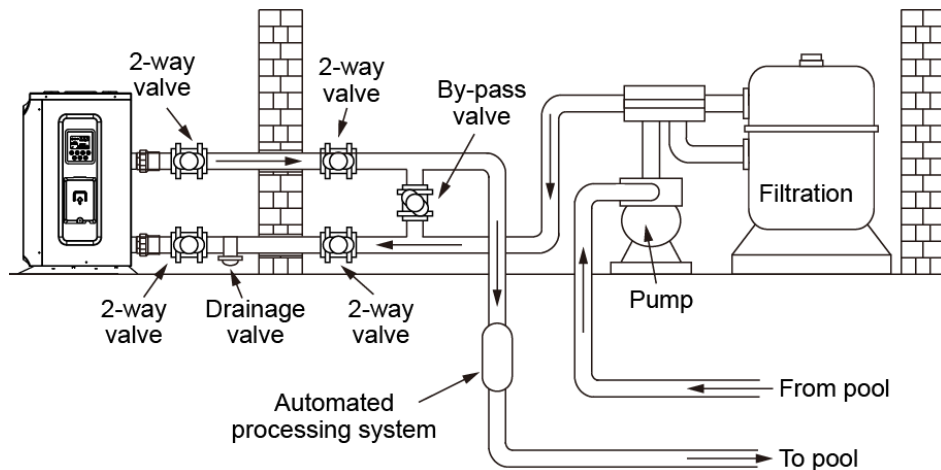
- ✓ Fittings in unit accessories:



✓ Connection between unit and water pipes



✓ Typical installation



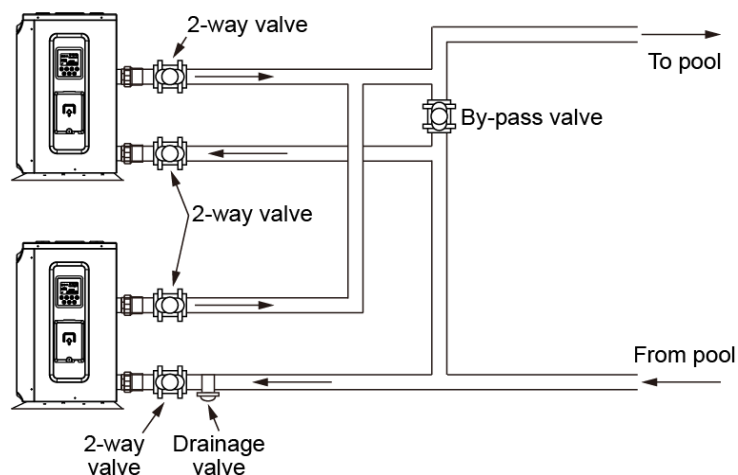
The heat pump is connected to a filtration circuit with a by-pass valve. The by-pass valve only should be half-open (throttled), while all the other valves should be completely open. We recommend to half-open the by-pass valve to avoid excessive pressure on the heat pump.

It is imperative that the by-pass is placed after the water pump and the filtration. The by-pass generally consists of 3 valves. This makes it possible to regulate the water flow which passes through the heat pump and to isolate the heat pump completely for any maintenance work, without affecting the flow of the filtration cycle.

The filter must be cleaned regularly to ensure that the water in the system is clean and to avoid any problems related to clogging of the filter.

It is necessary that the drainage valve is fixed on the lower water pipe. If the unit will not operate during the winter months, disconnect the power supply, and drain water out of the unit through the drainage valve. If using the unit at ambient temperatures below 0°C, please make sure that the water pump is always running.

✓ Parallel installation for 2 units

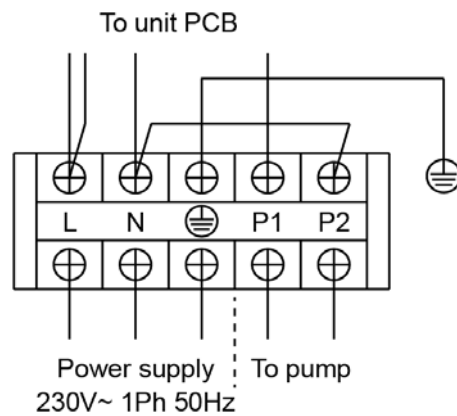


### 9.4 Electrical connection

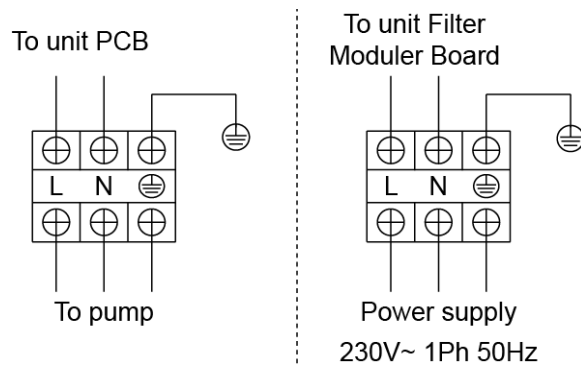
- ✓ Power supply wires size

| Model | Power supply wires   |        |
|-------|----------------------|--------|
| i5    | 3x2.5mm <sup>2</sup> | AWG 14 |
| i7    | 3x2.5mm <sup>2</sup> | AWG 14 |
| i9    | 3x2.5mm <sup>2</sup> | AWG 14 |
| i11   | 3x2.5mm <sup>2</sup> | AWG 14 |
| i14   | 3x2.5mm <sup>2</sup> | AWG 14 |
| i17   | 3x4.0mm <sup>2</sup> | AWG 12 |
| i21   | 3x4.0mm <sup>2</sup> | AWG 12 |
| i25   | 3x6.0mm <sup>2</sup> | AWG 10 |
| i29   | 3x10mm <sup>2</sup>  | AWG 8  |
| i32   | 3x10mm <sup>2</sup>  | AWG 8  |

- ✓ Electrical connection diagrams
- ✓ **i5 / i7/ i9 / i11 / i14 / i17 / i21 / i25:**



**i29 / i32:**



## 9.5 Trial running







- ✓ After water system and electrical wires have been connected, the unit should be ready for a trial run.
- ✓ Before starting the trial run, please double-check the following:
  - a. The unit is horizontal and on a firm base.
  - b. The water circuit is connected properly, without leakage and without any risk of injury due to badly-fitted hydraulic couplings.
  - c. The electrical circuit is connected properly. All cables are tightened correctly at the terminals and at the intermediate circuit breaker. All cables and connections have been insulated and earthed correctly.
  - d. The trial run can start, and the unit can be used, only when there is water flowing in the system.
- ✓ Trial run:
  - a. Open by-pass valve.
  - b. Start water pump in pool water system.
  - c. Turn on the unit.

## 10. Controller

### 10.1 Appearance



### 10.2 Icons

|   |              |
|---|--------------|
|  | Heating mode |
|  | Cooling mode |
|  | Auto mode    |
|  | Boost mode   |
|  | Smart mode   |
|  | Silent mode  |

|  |                              |
|--|------------------------------|
|  | Output rate                  |
|  | Wi-Fi signal                 |
|  | Inlet water / Outlet water   |
|  | Alarm for error              |
|  | Temperature or error display |

Notes:

If the unit power is off, there will be no temperature showing on the display, and the unit output rate will be 0%.

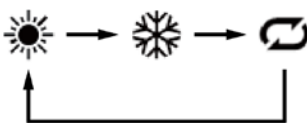
If there is a problem with the unit, the icon will flash, and the icon on the left of the icon will display P (Protection) or E (Error), and the icon on the left of the icon will display the number of the error

### 10.3 Buttons



**Mode button**

When the unit power is on, press this button to change operating mode.



Press this mode button for 3 to 5 seconds, the controller will enter query and configuration mode.



**Boost mode button**

When the unit is running, press this button to enter boost mode.



**Smart mode button**

When the unit is running, press this button to enter smart mode.



**Silent mode button**

When the unit is running, press this button to enter silent mode.



**Adjustment (arrow) buttons**

Press these two buttons to adjust the temperature or parameter settings.



**On/off button**

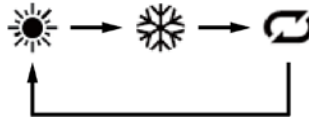
Press this button to power the unit on or switch it off. When in query or configuration mode,

press this to go back to the previous screen. When in query or configuration mode, press and hold this button for 3 to 5 seconds to quit this mode.

## 10.4 Functions

### Mode setting

When the unit is running, press the Mode button to change between the following icons (heating, cooling and auto mode).



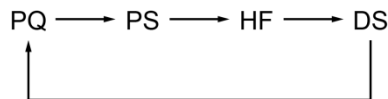
The Boost, Smart and Silent mode buttons can still be used with operation in all 3 modes.

### Setting the water temperature

When the unit is running, press the one of the adjustment/arrow buttons to enter the water temperature setting screen: the value of water temperature setting beside *inlet water icon* will flash. After using the adjustment/arrow buttons to set the desired temperature, press the On/off button to exit the setting interface. If no buttons are pressed for 30 seconds the setting screen will be exited automatically and the new set temperature will be saved.

### Query or configuration function

When the unit is running or on standby, press Mode button for 3 to 5 seconds to enter query or configuration status. At this point, the percent (%) of *output rate icon* will flash with the letters *PQ*. Press the arrow/adjustment button to change between the following letters on the display:



PQ: Parameter Query interface;

PS: Parameter Setting interface; (Only available for factory)

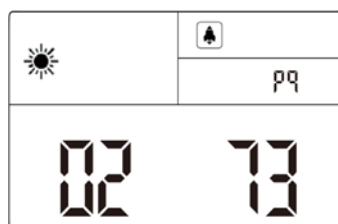
HF: History Fault interface;

DS: Debug Status interface. (Only available for factory)

After selecting one of the 4 interfaces mentioned above, press Mode button to confirm and enter the selected interface.

### In parameter Query interface:

The digits near the *inlet water icon* (left side of screen) will display the item code and the digits near the *outlet water icon* (right side of screen) will display the item value.



| Item code | Item value                                    |
|-----------|---|
| 01        | Running frequency of compressor (Hz)          |
| 02        | EEV Open degree (Displayed value/5)           |
| 03        | Ambient air temperature (°C)                  |
| 04        | Outlet water temperature (°C)                 |
| 05        | Discharge temperature of refrigerant (°C)     |
| 06        | Suction temperature of refrigerant (°C)       |
| 07        | Air side heat-exchanger pipe temperature (°C) |
| 08        | Outlet refrigerant temperature of EXV (°C)    |
| 09        | Water pump status (0=Off, 1=On)               |
| 10        | 4-way valve status (0=Off, 1=On)              |
| 11 - 15   | Reserved                                      |
| 16        | Current of compressor (Displayed value /10)   |
| 17        | Voltage (Displayed value ×10)                 |
| 18 - 20   | Reserved                                      |
| 21        | Fan speed (Displayed value ×15)               |
| 22        | DC link voltage (Displayed value ×5)          |
| 23        | DC link current (Compressor current display)  |
| 24        | PFC temperature (°C)                          |
| 25        | IPM temperature (°C)                          |
| 26        | Frequency target of compressor                |

**History Fault interface:**

The digits near the *inlet water icon (left side of screen)* will display the last 5 errors and protection codes that occurred. The digits near the *outlet water (right side of screen) icon* will display the error or protection code associated with the number sequence of these last 5 error codes. E or P will be displayed after the dot on the right side of the screen.





| Code      | Error or protection  |
|-----------|--|
| P01       | Water flow protection                                      |
| P02       | Refrigerant system high pressure protection                |
| P03       | Refrigerant system low pressure protection                 |
| P04       | Over-heating protection of air side heat-exchanger pipe    |
| P05       | Discharge temperature protection                           |
| P06       | Anti-freeze protection of outlet water                     |
| P07       | Low temperature protection of air side heat-exchanger pipe |
| P08       | Reserved   |
| P11       | DC motor fault   |
| E01       | Communication failure between controller and unit          |
| E02       | Discharge temperature sensor failure                       |
| E03       | Temperature sensor failure of air side heat-exchanger pipe |
| E04       | Air ambient temperature sensor failure                     |
| E05       | Temperature sensor failure of EXV's inlet pipe             |
| E06       | Suction temperature sensor failure                         |
| E07       | Reserved   |
| E08       | Inlet water temperature sensor failure                     |
| E09       | Outlet water temperature sensor failure                    |
| E10       | Communication failure between PCB and drive modular board  |
| E11 – E14 | Reserved   |
| E15       | Over-low of DC link voltage                                |
| E16       | Over-high of DC link voltage                               |
| E17       | Current protection of AC power supply                      |
| E18       | IPM failure  |
| E19       | PFC modular failure  |
| E20       | Compressor start failure                                   |
| E21       | Phase lack of compressor power supply                      |
| E22       | Drive modular reset  |
| E23       | Over-load current protection of compressor                 |
| E24       | Over-high temperature protection of PFC modular            |
| E25       | Electrical circuits failure                                |
| E26       | Out of control of compressor's motor speed                 |
| E27       | Temperature sensor failure of PFC modular                  |
| E28       | Communication failure                                      |
| E29       | Over-high temperature of IPM                               |

|           |  |
|-----------|--|
| E30       | Temperature sensor failure of IPM            |
| E31 – E36 | Reserved                                     |
| E37       | Limit frequency according to modular current |
| E38       | Limit frequency according to modular voltage |
| E51       | Communication failure of fan motor           |

## 11. Unit Functions

### Auto restart function

The unit restarts and resumes the set operating conditions in the event of a power supply shutdown without modification of the controller by hand. Operation will resume 3 minutes after the power supply is restored.

### Boost mode, Smart mode and Silent mode

|             |   |  |
|-------------|---|--|
| Boost mode  | 20% - 100% capacity output,<br>Fast heating | Late spring/early autumn in cooler climate |
| Smart mode  | 20% - 80% capacity output,<br>Standard      | Spring to autumn in warm climate           |
| Silent mode | 20% - 50% capacity output<br>Night use      | Middle of summer in hot climate            |

### Compressor start

When you press the On/off button, the unit will run automatically, and the compressor will operate after 3 minutes. Before the compressor starts, the fan of unit should keep running for 10 seconds.

### Compressor auto stopping

When in cooling mode, the PCB of the unit will automatically compare the temperature of the inlet water with the set temperature.

If  $T$  (the temperature of inlet water)  $<$   $T_s$  (set temperature)  $-2^{\circ}\text{C}$  and for approx. 2 minutes, the compressor will stop.

When in heating mode, the PCB will also automatically compare the inlet water temperature with the set temperature.

#### 1. In SILENT mode:

If  $T$  (inlet water temperature)  $<$   $T_s$  (set temperature)  $-1^{\circ}\text{C}$ , the unit will keep running at 50% frequency. If the inlet water temperature ( $T$ ) does not increase to achieve the set temperature ( $T_s$ ) in 60 minutes, the unit will automatically increase the frequency to 75% and run for another 60 minutes. If there is still no increase in the inlet water temperature ( $T$ ) while running at 75% during this time, the unit will automatically increase the frequency to 100%.

If  $T_s$  (set temperature)  $-1^{\circ}\text{C} < T$  (inlet water temperature)  $< T_s + 0.5^{\circ}\text{C}$ , the unit will keep running at 35% frequency.

If  $T_s$  (set temperature)  $+0.5^{\circ}\text{C} < T$  (inlet water temperature)  $< T_s + 1^{\circ}\text{C}$ , the unit will keep at 25% frequency.

If  $T_s$  (set temperature)  $+1^{\circ}\text{C} < T$  (inlet water temperature), the unit will go into standby mode.

When  $T$  (inlet water temperature)  $< T_s$  (set temperature)  $-1^{\circ}\text{C}$ , the unit will start to run again automatically.

When  $T$  (inlet water temperature) reaches the set temperature, then  $T$  (inlet water temperature) could be in the range between  $T_s$  (set temperature)  $-1^{\circ}\text{C}$  to  $T_s + 1^{\circ}\text{C}$  to save more energy.

## **2. In SMART mode:**

If  $T$  (inlet water temperature)  $< T_s$  (set temperature)  $-1^{\circ}\text{C}$ , the unit will run at 100% frequency.

If  $T_s$  (set temperature)  $-1^{\circ}\text{C} < T$  (inlet water temperature)  $< T_s$ , the unit will run at 50% frequency.

If the inlet water temperature ( $T$ ) does not increase to achieve the set temperature ( $T_s$ ) in 60 minutes, the unit will automatically increase the frequency to 75% and run for another 60 minutes. If there is still no increase in the inlet water temperature ( $T$ ) while running at 75% during this time, the unit will automatically increase the frequency to 100%.

If  $T_s$  (set temperature)  $< T$  (inlet water temperature)  $< T_s + 0.5^{\circ}\text{C}$ , the unit will run at 35% frequency.

If  $T_s$  (set temperature)  $+0.5^{\circ}\text{C} < T$  (inlet water temperature)  $< T_s + 1^{\circ}\text{C}$ , the unit will run at 25% frequency.

If  $T_s$  (set temperature)  $1^{\circ}\text{C} < T$  (inlet water temperature), the unit will go into standby mode.

When  $T$  (inlet water temperature)  $< T_s$  (set temperature)  $-1^{\circ}\text{C}$ , the unit will start to run again automatically.

## **3. In BOOST mode:**

If  $T$  (inlet water temperature)  $< T_s$  (set temperature)  $+0.5^{\circ}\text{C}$ , the unit will keep running at 100% frequency.

If  $T_s$  (set temperature)  $+0.5^{\circ}\text{C} < T$  (inlet water temperature)  $< T_s + 1^{\circ}\text{C}$ , the unit will keep running at 50% frequency.

If  $T_s$  (set temperature)  $+1^{\circ}\text{C} < T$  (inlet water temperature), the unit will go into standby mode.

When  $T$  (inlet water temperature)  $< T_s$  (set temperature)  $-1^{\circ}\text{C}$ , the unit will start to run again automatically.

### **Defrost function**

When the unit runs continuously in heating mode, it is inevitable that some ice will form on the surface of air side heat-exchanger / evaporator. To achieve high performance, the unit will enter defrost mode according to the way it has been programmed. In defrost mode, the speed of the compressor is reduced, the fan motor stops, and the unit operates in cooling mode.

### **Water flow protection**

When the water/filtration pump (installed at the site as part of the pool filtration system) is

started and runs for 30 seconds, the water flow switch circuit will be activated. If the circuit is broken (no flow), the heat pump will stop running, and P01 will be displayed.

After 3 minutes, the heat pump will begin running automatically. The unit will continue to detect the water flow. When the unit detects that water is flowing, it will start again. But, the unit detects that water flow has stopped for 3 times (flow switch circuit is broken 3 times), the unit will stop, and the controller will display P01.

#### **Lo-pressure protection**

When the compressor is running, if the PCB detects that the lo-pressure switch circuit is broken, the unit will stop and the controller will display P03. After 3 minutes, if it is detected that the lo-pressure switch is short, the unit will start to operate automatically.

If controller display error P03 occurs 3 times in 1 hour, the unit will stop running and the controller will display P03.

#### **Hi-pressure protection**

When the compressor is running, when it is detected that the high-pressure switch circuit is broken, the unit will stop immediately and protection code P02, will be displayed on the controller. The unit cannot restart automatically unless power is disconnected and restored.

When the compressor is running in cooling mode, if the temperature of the condenser pipe exceeds 65°C for 1 minute continuously, the compressor will stop and P04 will be displayed. At the same time, the fan will operate in high speed. When the temperature is lower than 52°C, the unit will restart, the P04 code will disappear, and the compressor will begin to operate after 3 minutes.

#### **Discharge temperature protection**

Once the discharge temperature sensor detects that the temperature of the discharge pipe exceeds 110°C, the compressor will stop and code P05 will be displayed. If the discharge temperature protection is triggered 3 times in 1 hour, the unit will stop, and P05 will be displayed.

## **12. Maintenance**

Maintenance should be carried out once a year by qualified professional technician. It is necessary to disconnect the power supply to the unit before doing any maintenance. Please do not touch any electronic components until all LED lights and the PCB are off.

The evaporator can be cleaned with household detergents or clean water: never use gasoline, thinners or any similar fuel.

- ✓ Check the water supply device and the release often.
- ✓ Check the power supply cable and cable connection.
- ✓ Avoid the condition of no water or air entering the water pipe system.
- ✓ Clear the air side heat-exchanger regularly to maintain good ventilation.
- ✓ The water pipe system and the titanium heat-exchanger must be cleaned by a qualified professional technician.

### 13. Trouble-shooting

| Code | Error or protection                         | Analysis                               | Diagnosis  | Solution  |
|------|---|--|--|---|
| P01  | Water flow protection                       | No water flow                          | Check if water in valve is closed or no water inlet.   | Open the valve.                                 |
|      |   | Flow switch failure                    | Check if flow switch is blocked or damaged.  | Replace the flow switch.                        |
|      |   | Water system block                     | Check if Y-shape filter is blocked.  | Clean or change filter.                         |
| P02  | Refrigerant system high pressure protection | Too little water flow                  | Check if water flow through the unit is not enough or if water pump flow is not enough.                | Replace with a new pump with larger water flow. |
|      |   | High pressure switch is damaged/faulty | Check if high pressure switch is short.  | Replace with a new high pressure switch.        |
|      |   | Refrigerant system blocked             | Check if refrigerant system is blocked.  | Change the filter.                              |
|      |   | EEV deadlock                           | When unit is off, turn on the unit and then turn it off to check if the EEV generates the reset sound. | Replace with a new EEV.                         |
|      |   | Lack of refrigerant                    | Check the pressure gauge   | Repair the leakage and charge refrigerant.      |
| P03  | Refrigerant system low pressure protection  | Refrigerant system blocked             | Check if filter is blocked.  | Replace filter                                  |
|      |   | Operating range of unit exceeded       | Check if ambient temp. and water temperature exceed operating range.                                   | \   |

**Continued:**

| Code | Error or protection  | Analysis  | Diagnosis                                  | Solution  |
|------|--|---|--|---|
| P04  | Over-heat protection of air side heat-exchanger pipe       | Fan blowing area is blocked.                    | Check if the area is open.                 | Clear the blowing area.   |
|      |  | Coil is blocked.                                | Check if the coil is too dirty.            | Clean the coil.   |
|      |  | Heat-exchanger sensor is damaged/faulty.        | Check if the sensor resistance is correct. | Replace with a new sensor.  |
| P05  | Discharge temperature protection                           | Lack of refrigerant                             | Check if there is a refrigerant leak.      | Repair the leak and charge refrigerant.   |
|      |  | Discharge temperature sensor is damaged/faulty. | Check if the sensor resistance is correct. | Replace with a new sensor.  |
|      |  | Water flow not enough                           | Check if there is air in water system.     | Remove air from water system.   |
| P06  | Anti-freeze protection of outlet water                     | Heat-exchanger blocked                          | Check if plate exchanger is blocked.       | Blow the plate heat-exchanger with water or high pressure air from the opposite direction of the normal flow. |
|      |  | Y-shape filter blocked                          | Check if Y-shape is blocked.               | Clean Y-shape filter.   |
|      |  | Water flow over-load                            | Check the design of the water system.      | Increase bypass in water system.  |
| P07  | Low temperature protection of air side heat-exchanger pipe | Lack of refrigerant                             | Check if there is a leak in the system.    | Repair the leak and charge refrigerant.   |
|      |  | Water system blocked                            | Check if Y-shape filter is blocked.        | Clean Y-shape filter.   |
|      |  | Refrigerant system blocked                      | Check if the refrigerant is blocked.       | Clean the filter.   |

**Continued:**

| Code | Error or protection  | Analysis                                  | Diagnosis                                   | Solution                                    |
|------|--|---|---|---|
| E01  | Communication failure between controller and unit          | Communication cable broken                | Check if the cable is broken.               | Connect again or replace with a new one.    |
| E02  | Discharge temperature sensor failure                       | The sensor is damaged/faulty.             | Check if the sensor resistance is correct.  | Connect again or replace with a new one.    |
| E03  | Temperature sensor failure of air side heat-exchanger pipe | The sensor is damaged/faulty.             | Check if the sensor resistance is correct.  | Connect again or replace with a new one.    |
| E04  | Air ambient temperature sensor failure                     | The sensor is damaged/faulty.             | Check if the sensor resistance is correct.  | Connect again or replace with a new one.    |
| E05  | Temperature sensor failure of EXV's inlet pipe             | The sensor is damaged/faulty.             | Check if the sensor resistance is correct.  | Connect again or replace with a new one.    |
| E06  | Suction temperature sensor failure                         | The sensor is damaged/faulty.             | Check if the sensor resistance is correct.  | Connect again or replace with a new one.    |
| E08  | Inlet water temperature sensor failure                     | The sensor is damaged/faulty.             | Check if the sensor resistance is correct.  | Connect again or replace with a new one.    |
| E09  | Outlet water temperature sensor failure                    | The sensor is damaged/faulty.             | Check if the sensor resistance is correct.  | Connect again or replace with a new one.    |
| E10  | Communication failure between PCB and drive modular board  | Communication cable broken                | Check if the cable is broken.               | Connect again or replace with a new one.    |
| E15  | Over-low of DC link voltage                                | Incorrect wire connection or IPM failure. | Check if the wires are connected correctly. | Connect again correctly, or change the IPM. |
| E16  | Over-high of DC link voltage                               |   |   |   |
| E17  | Current protection of AC power supply                      |   |   |   |
| E18  | IPM failure  |   |   |   |

**Continued:**

| Code | Error or protection                             | Analysis                                  | Diagnosis                                   | Solution                                    |
|------|---|---|---|---|
| E16  | Over-high of DC link voltage                    | Incorrect wire connection or IPM failure. | Check if the wires are connected correctly. | Connect again correctly, or change the IPM. |
| E17  | Current protection of AC power supply           |   |   |   |
| E18  | IPM failure                                     |   |   |   |
| E19  | PFC modular failure                             |   |   |   |
| E20  | Compressor start failure                        |   |   |   |
| E21  | Phase lack of compressor power supply           |   |   |   |
| E22  | Drive modular reset                             |   |   |   |
| E23  | Over-load current protection of compressor      |   |   |   |
| E24  | Over-high temperature protection of PFC modular |   |   |   |
| E25  | Electrical circuit failure                      |   |   |   |
| E26  | Compressor's motor speed out of control         |   |   |   |
| E27  | Temperature sensor failure of PFC module        |   |   |   |
| E28  | Communication failure                           |   |   |   |
| E29  | Over-high temperature of IPM                    |   |   |   |
| E30  | Temperature sensor failure of IPM               |   |   |   |



**Continued:**

| Code | Error or protection                          | Analysis                                  | Diagnosis                                   | Solution                                    |
|------|--|---|---|---|
| E30  | Temperature sensor failure of IPM            | Incorrect wire connection or IPM failure. | Check if the wires are connected correctly. | Connect again correctly, or change the IPM. |
| E37  | Limit frequency according to modular current |   |   |   |
| E38  | Limit frequency according to modular voltage |   |   |   |
| E51  | Communication failure of fan motor           |   |   |   |

## 14. Wifi function

### Method 1

Android system: Scan the QR code on an Android system browser. Download the APP and install it.

IOS (Apple): Scan the QR code to download the APP and install it.



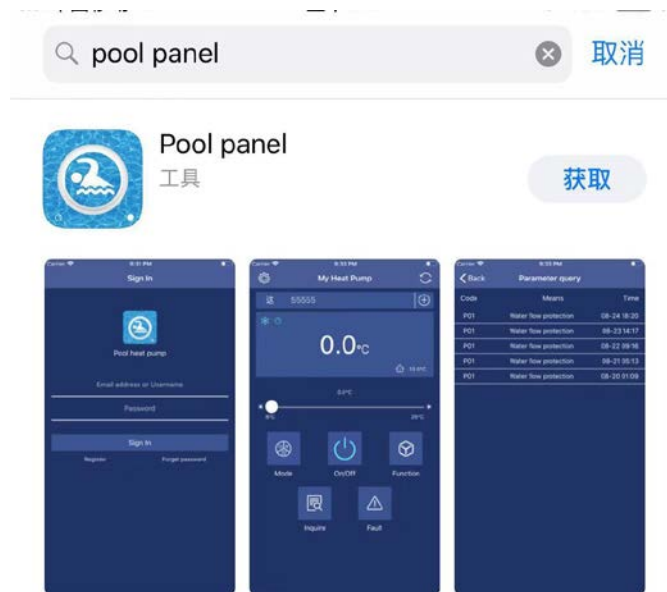
### Method 2

Android system: click on the following link

**<http://47.254.152.109:8080/scadaiot/downFile/execute.do>**

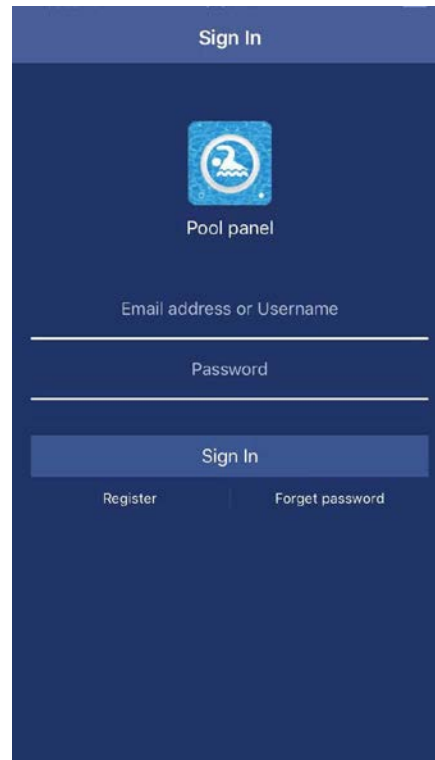
with an Android system browser to download the APP and install it.

IOS system: search for the 'Pool panel' APP in the APP store and install it.

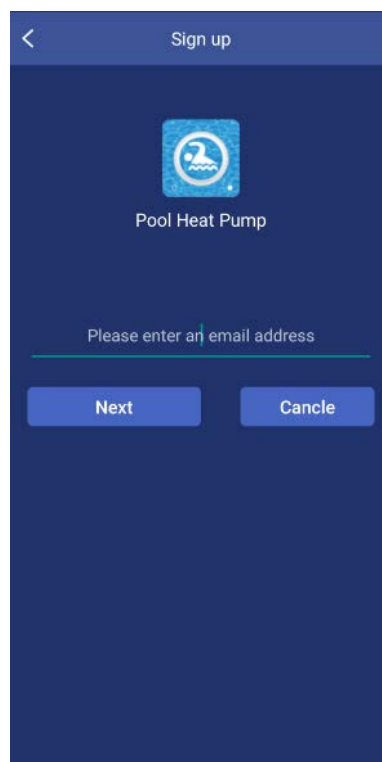


## Register

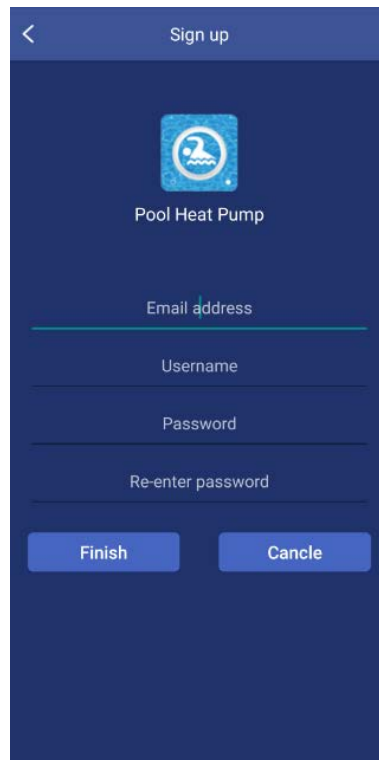
Please ensure that your mobile is already connected to a valid Wi-Fi.  
Open the APP.



Press Register to sign up for the first time.



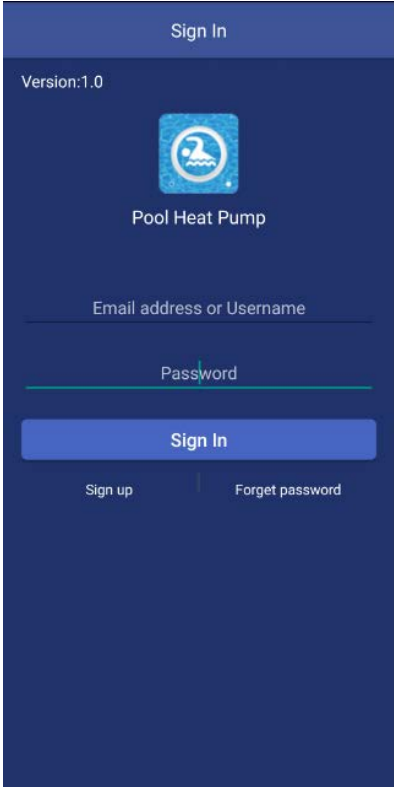
Type your email address and press Next.



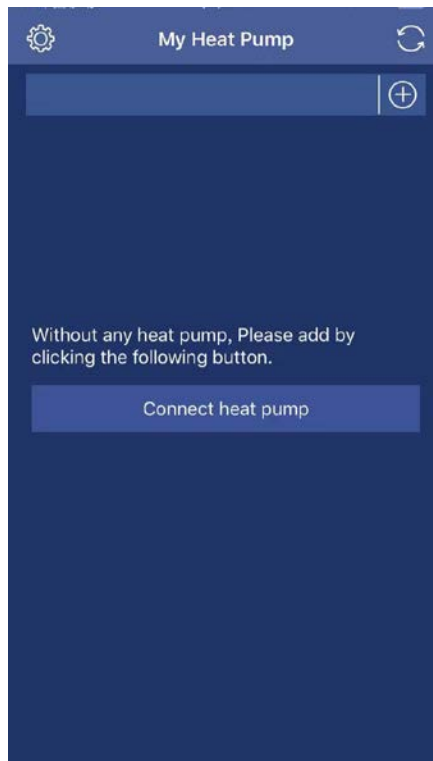
Please complete all fields requested, including Email address, Username, Password and Password confirmation, then press Finish to sign-up. After signing up successfully, the display will automatically change to the Log-in screen.

**Note: The password should be a combination of alphanumeric characters (letters and numbers) only.**

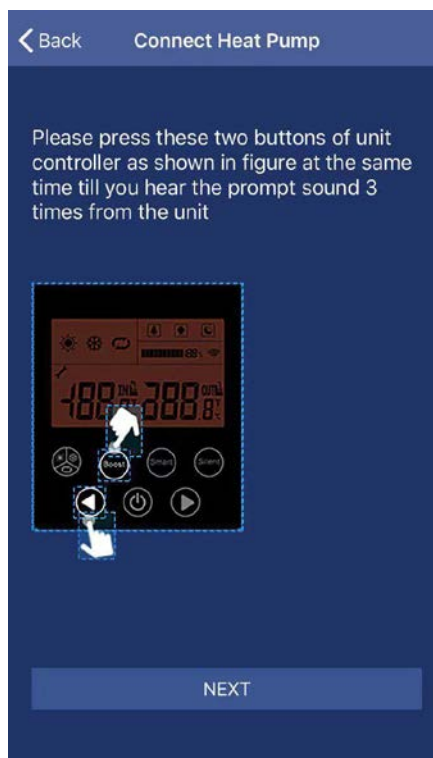
### Configuration of APP



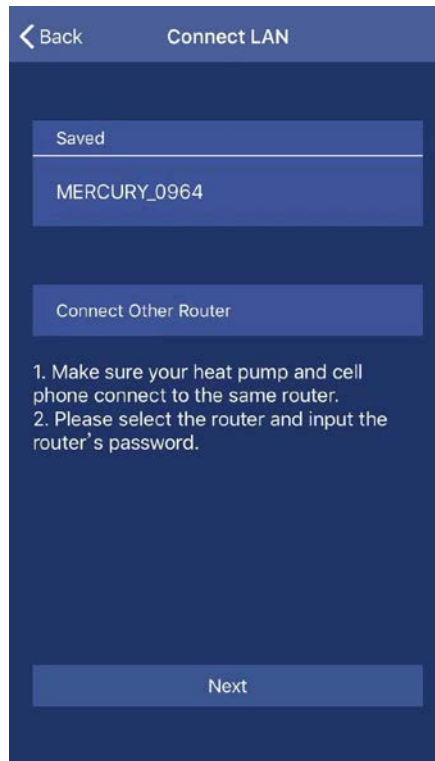
Enter Email address or Username, password and press Sign in button.



Press the button Connect heat pump, and the display will be change to next screen.



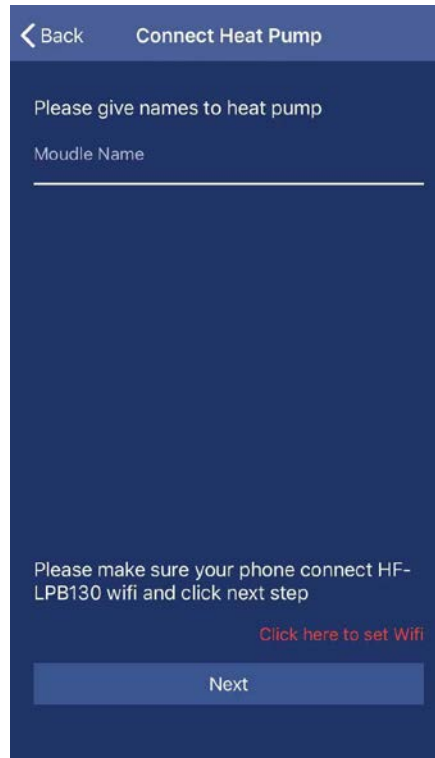
Follow the instructions on the screen to start operation. After setting up the unit, press Next.



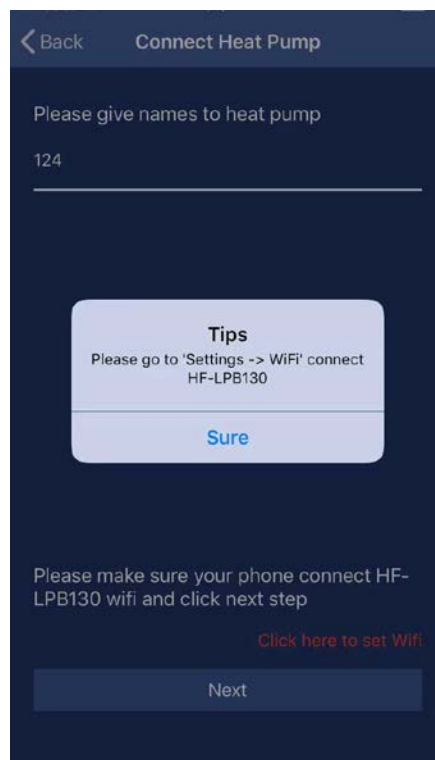
On this screen, select your router in your home LAN.



Enter your router's password, and click Binding and then Next.



On this screen, select a name for your heat pump. Press click here to set Wi-Fi.



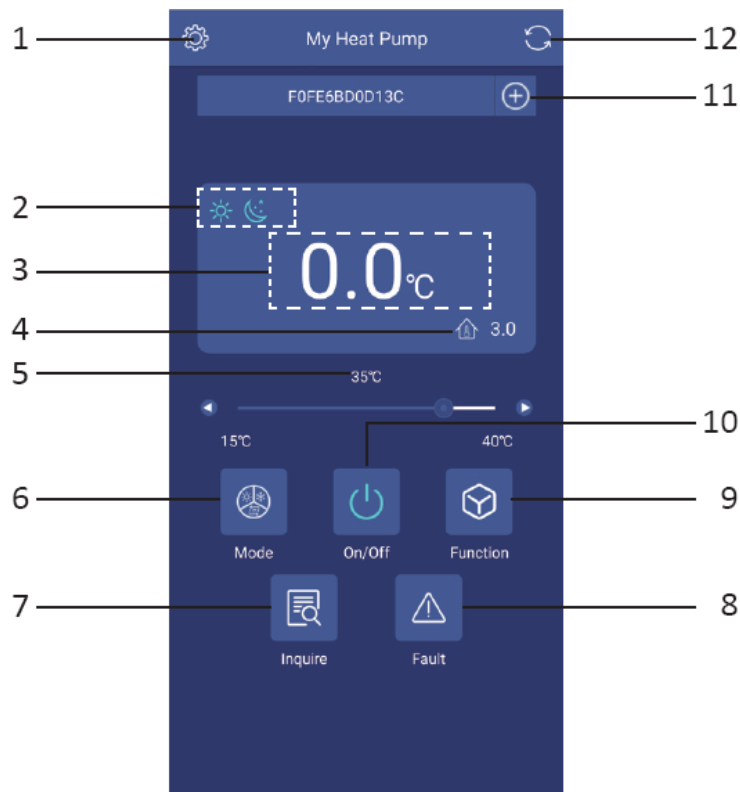


For Android systems, the screen will directly skip to the *settings* menu of your mobile to select HF-LPB130.

For IOS systems, you need to manually enter the settings menu of your mobile to select HF-LPB130. Your mobile and heat pump have now been successfully connected; the display will change to main user screen.

### Operation of APP

#### 1. Main icons and functions

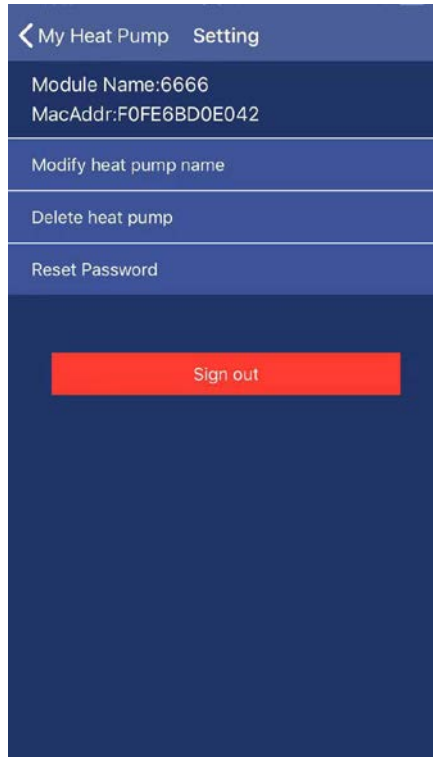


|    |                                  |
|----|----------------------------------|
| 1  | Setting icon                     |
| 2  | Operating mode and function icon |
| 3  | Temperature setting icon         |
| 4  | Ambient temperature              |
| 5  | Temperature setting bar          |
| 6  | Mode setting icon                |
| 7  | Inquiry icon                     |
| 8  | Fault icon                       |
| 9  | Function setting icon            |
| 10 | On/Off icon                      |
| 11 | Add heat pump icon               |
| 12 | Refresh icon                     |

## II. Icons

### 1. Setting

When you press the Setting icon, the display will be change to the setting screen as shown below.



On this screen:

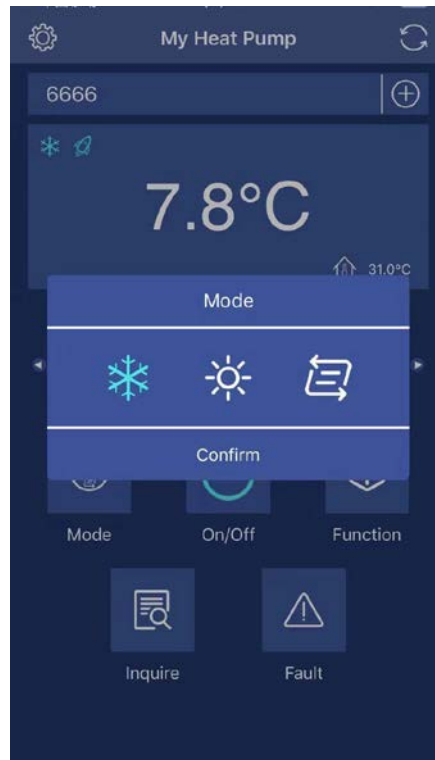
- The name of the heat pump connected to your mobile APP can be changed.
- You can delete heat pumps that have already been added previously.
- You can reset the APP password.
- You can sign out of the APP.

### 2. On/Off icon

If you press On/Off when the unit is in stand-by, it will start to run. If you press this when the unit is running, it will stop.

3.  Mode setting icon

This is used to select and switch between the operating modes: Auto, Cooling and Heating. When you press it, the display will enter the mode-selection screen, where you can set cooling mode, heating mode or auto mode. Once the desired mode has been selected, press Confirm to confirm the selection.

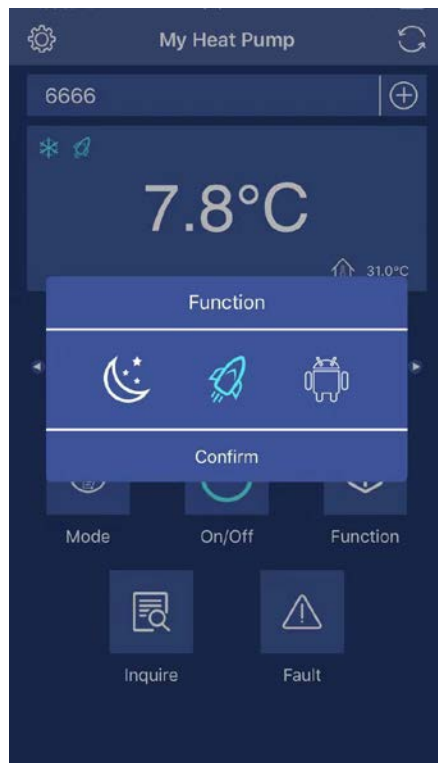


Once the operating mode has been set, the selected icon will be displayed on the left side of the screen.



4.  Function setting icon

This is used to select and switch between the operating functions: boost, smart and silent. When you press it, the display will enter the mode-selection screen, where you can set boost mode, smart mode or silent mode. Once the desired mode has been selected, press Confirm to confirm the selection.



Once the function has been set, the selected icon will be displayed on the left side of the screen.



Silent mode



Smart mode

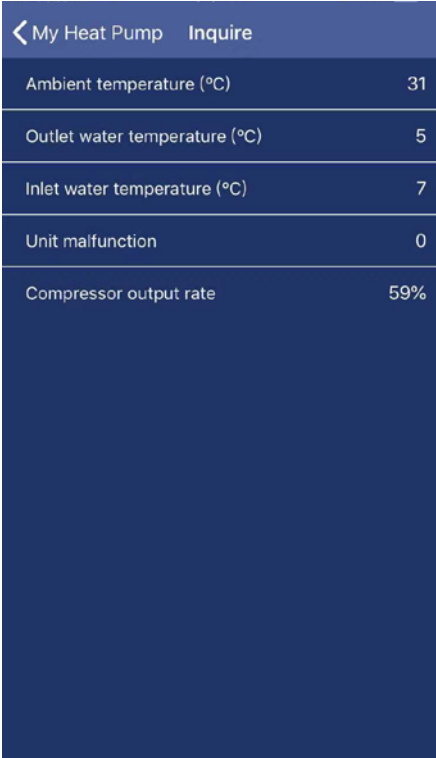


Boost mode

5.  Inquiry icon

When you press this, the inquiry screen will be displayed. From this screen, you can see the the following parameters of the heat pump.

- a. Ambient temperature;
- b. Outlet water temperature;
- c. Inlet water temperature;
- d. Unit malfunction state;
- e. Compressor output rate.




| My Heat Pump Inquire          |     |
|-------------------------------|-----|
| Ambient temperature (°C)      | 31  |
| Outlet water temperature (°C) | 5   |
| Inlet water temperature (°C)  | 7   |
| Unit malfunction              | 0   |
| Compressor output rate        | 59% |

6.  Fault icon

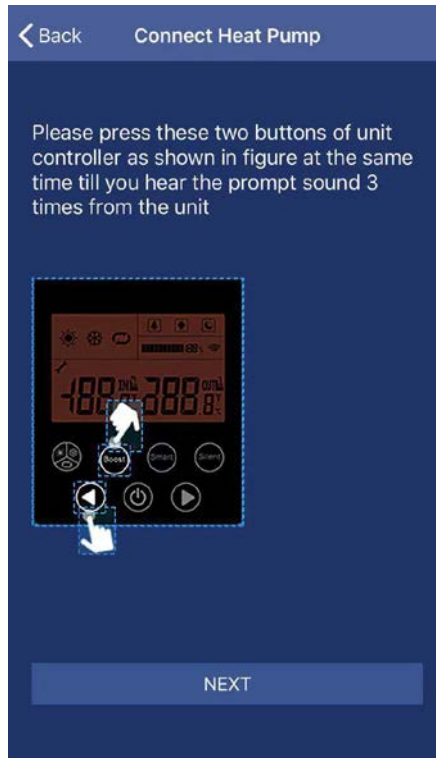
Press Fault to show the history of error codes, as well as current errors or protection codes.



| Fault |       |      |
|-------|-------|------|
| Code  | Means | Time |

7.  Add heat pump icon

Press this to add another heat pump as shown below.



Repeat steps mentioned previously to add another unit.

8.  Refresh icon

Press this to refresh the current set temperature and ambient temperature on the screen.

9.  Temperature setting bar

Slide your finger along the temperature bar to set the desired temperature. The temperature value above the temperature bar will change according to the movement along the slider bar.

**Tips:**

1. If the heat pump has already been set-up on an Android or IOS system, and you want to change to a different operating system (mobile phone), please follow these steps:
  - a. Press and hold the adjustment/arrows buttons (◀and▶) on the heat pump controller simultaneously until you hear the prompt sound.
  - b. Set up the APP and heat pump again according to the steps mentioned above.

**Appendix**

**R-T table (Discharge temperature sensor, B25/50 = 3,950 ± 3%, R90°C =5kΩ ± 3%)**

| Temperature (°C) | Resistance (kΩ) | Temperature (°C) | Resistance (kΩ) |
|------------------|-----------------|------------------|-----------------|
| 8.0              | 122.343         | 42.0             | 27.373          |
| 9.0              | 116.582         | 43.0             | 26.306          |
| 10.0             | 111.120         | 44.0             | 25.286          |
| 11.0             | 105.942         | 45.0             | 24.311          |
| 12.0             | 101.031         | 46.0             | 23.378          |
| 13.0             | 96.372          | 47.0             | 22.487          |
| 14.0             | 91.952          | 48.0             | 21.633          |
| 15.0             | 87.758          | 49.0             | 20.817          |
| 16.0             | 83.776          | 50.0             | 20.036          |
| 17.0             | 79.996          | 51.0             | 19.288          |
| 18.0             | 76.406          | 52.0             | 18.571          |
| 19.0             | 72.996          | 53.0             | 17.885          |
| 20.0             | 69.756          | 54.0             | 17.227          |
| 21.0             | 66.677          | 55.0             | 16.597          |
| 22.0             | 63.750          | 56.0             | 15.993          |
| 23.0             | 60.967          | 57.0             | 15.414          |
| 24.0             | 58.321          | 58.0             | 14.859          |
| 25.0             | 55.803          | 59.0             | 14.326          |
| 26.0             | 53.408          | 60.0             | 13.815          |
| 27.0             | 51.129          | 61.0             | 13.324          |
| 28.0             | 48.959          | 62.0             | 12.854          |
| 29.0             | 46.893          | 63.0             | 12.401          |
| 30.0             | 44.926          | 64.0             | 11.967          |
| 31.0             | 43.051          | 65.0             | 11.550          |
| 32.0             | 41.265          | 66.0             | 11.150          |
| 33.0             | 39.563          | 67.0             | 10.765          |
| 34.0             | 37.941          | 68.0             | 10.395          |
| 35.0             | 36.393          | 69.0             | 10.039          |
| 36.0             | 34.918          | 70.0             | 9.697           |
| 37.0             | 33.510          | 71.0             | 9.368           |
| 38.0             | 32.166          | 72.0             | 9.052           |
| 39.0             | 30.884          | 73.0             | 8.748           |
| 40.0             | 29.659          | 74.0             | 8.455           |
| 41.0             | 28.490          | 75.0             | 8.173           |

Continued:

| Temperature (°C) | Resistance (kΩ) | Temperature (°C) | Resistance (kΩ) |
|------------------|-----------------|------------------|-----------------|
| 76.0             | 7.902           | 111.0            | 2.649           |
| 77.0             | 7.641           | 112.0            | 2.574           |
| 78.0             | 7.389           | 113.0            | 2.502           |
| 79.0             | 7.147           | 119.0            | 2.115           |
| 80.0             | 6.914           | 120.0            | 2.058           |
| 81.0             | 6.689           | 121.0            | 2.002           |
| 82.0             | 6.473           | 122.0            | 1.949           |
| 83.0             | 6.264           | 123.0            | 1.897           |
| 84.0             | 6.063           | 124.0            | 1.846           |
| 85.0             | 5.869           | 125.0            | 1.797           |
| 86.0             | 5.683           | 126.0            | 1.750           |
| 87.0             | 5.503           | 127.0            | 1.704           |
| 88.0             | 5.329           | 128.0            | 1.660           |
| 89.0             | 5.162           | 129.0            | 1.617           |
| 90.0             | 5.000           | 130.0            | 1.575           |
| 91.0             | 4.844           | 131.0            | 1.535           |
| 92.0             | 4.694           | 132.0            | 1.496           |
| 93.0             | 4.549           | 133.0            | 1.458           |
| 94.0             | 4.409           | 134.0            | 1.421           |
| 95.0             | 4.274           | 135.0            | 1.385           |
| 96.0             | 4.144           | 136.0            | 1.350           |
| 97.0             | 4.018           | 137.0            | 1.316           |
| 98.0             | 3.896           | 138.0            | 1.283           |
| 99.0             | 3.779           | 139.0            | 1.251           |
| 100.0            | 3.666           | 140.0            | 1.220           |
| 101.0            | 3.557           | 141.0            | 1.190           |
| 102.0            | 3.451           | 142.0            | 1.160           |
| 103.0            | 3.349           | 143.0            | 1.131           |
| 104.0            | 3.251           | 144.0            | 1.103           |
| 105.0            | 3.156           | 145.0            | 1.076           |
| 106.0            | 3.064           | 146.0            | 1.049           |
| 107.0            | 2.975           | 147.0            | 1.023           |
| 108.0            | 2.889           | 148.0            | 0.997           |
| 109.0            | 2.806           | 149.0            | 0.972           |
| 110.0            | 2.726           | 150.0            | 0.948           |

**R-T table (Other temperature sensors, B25/50 = 4,100 ± 3%, R25°C =10kΩ ± 3%)**



| Temperature<br>(°C) | Resistance (kΩ) |        |        | Resistance TOL. |         | Temp. TOL. (°C) |         |
|---------------------|-----------------|--------|--------|-----------------|---------|-----------------|---------|
|                     | Rmax            | R      | Rmin   | Max (+)         | Min (-) | Max (+)         | Min (-) |
| -12.0               | 72.632          | 66.943 | 61.574 | 8.500           | 8.020   | 1.450           | 1.450   |
| -11.0               | 68.523          | 63.252 | 58.274 | 8.330           | 7.870   | 1.440           | 1.430   |
| -10.0               | 64.668          | 59.784 | 55.169 | 8.170           | 7.720   | 1.420           | 1.410   |
| -9.0                | 61.048          | 56.524 | 52.246 | 8.000           | 7.570   | 1.400           | 1.390   |
| -8.0                | 57.649          | 53.458 | 49.492 | 7.840           | 7.420   | 1.380           | 1.370   |
| -7.0                | 54.456          | 50.575 | 46.899 | 7.670           | 7.270   | 1.350           | 1.350   |
| -6.0                | 51.456          | 47.862 | 44.455 | 7.510           | 7.120   | 1.330           | 1.320   |
| -5.0                | 48.636          | 45.308 | 42.150 | 7.350           | 6.970   | 1.310           | 1.300   |
| -4.0                | 45.984          | 42.903 | 39.977 | 7.180           | 6.820   | 1.290           | 1.280   |
| -3.0                | 43.490          | 40.638 | 37.927 | 7.020           | 6.670   | 1.270           | 1.260   |
| -2.0                | 41.144          | 38.504 | 35.992 | 6.860           | 6.520   | 1.250           | 1.240   |
| -1.0                | 38.935          | 36.492 | 34.165 | 6.700           | 6.380   | 1.230           | 1.210   |
| 0.0                 | 36.857          | 34.596 | 32.440 | 6.530           | 6.230   | 1.210           | 1.190   |
| 1.0                 | 34.898          | 32.807 | 30.810 | 6.380           | 6.090   | 1.180           | 1.170   |
| 2.0                 | 33.055          | 31.120 | 29.271 | 6.220           | 5.940   | 1.160           | 1.150   |
| 3.0                 | 31.317          | 29.528 | 27.815 | 6.060           | 5.800   | 1.140           | 1.120   |
| 4.0                 | 29.681          | 28.026 | 26.440 | 5.900           | 5.660   | 1.120           | 1.100   |
| 5.0                 | 28.138          | 26.608 | 25.140 | 5.750           | 5.520   | 1.100           | 1.080   |
| 6.0                 | 26.682          | 25.268 | 23.909 | 5.600           | 5.380   | 1.070           | 1.060   |
| 7.0                 | 25.310          | 24.003 | 22.745 | 5.450           | 5.240   | 1.050           | 1.030   |
| 8.0                 | 24.016          | 22.808 | 21.644 | 5.300           | 5.100   | 1.030           | 1.010   |
| 9.0                 | 22.794          | 21.678 | 20.601 | 5.150           | 4.970   | 1.010           | 0.990   |
| 10.0                | 21.641          | 20.610 | 19.614 | 5.000           | 4.830   | 0.990           | 0.970   |
| 11.0                | 20.553          | 19.601 | 18.680 | 4.860           | 4.700   | 0.960           | 0.940   |
| 12.0                | 19.525          | 18.646 | 17.794 | 4.710           | 4.570   | 0.940           | 0.920   |
| 13.0                | 18.554          | 17.743 | 16.955 | 4.570           | 4.440   | 0.920           | 0.900   |
| 14.0                | 17.636          | 16.888 | 16.160 | 4.430           | 4.310   | 0.900           | 0.880   |
| 15.0                | 16.769          | 16.079 | 15.406 | 4.290           | 4.190   | 0.880           | 0.850   |
| 16.0                | 15.949          | 15.313 | 14.691 | 4.150           | 4.060   | 0.860           | 0.830   |
| 17.0                | 15.174          | 14.588 | 14.014 | 4.020           | 3.940   | 0.840           | 0.810   |
| 18.0                | 14.442          | 13.902 | 13.372 | 3.890           | 3.810   | 0.810           | 0.790   |
| 19.0                | 13.748          | 13.251 | 12.762 | 3.750           | 3.690   | 0.790           | 0.760   |
| 20.0                | 13.093          | 12.635 | 12.183 | 3.620           | 3.570   | 0.770           | 0.740   |
| 21.0                | 12.471          | 12.050 | 11.634 | 3.500           | 3.460   | 0.750           | 0.720   |

Continued:

| Temperature<br>(°C) | Resistance (kΩ) |        |        | Resistance TOL. |         | Temp. TOL. (°C) |         |
|---------------------|-----------------|--------|--------|-----------------|---------|-----------------|---------|
|                     | Rmax            | R      | Rmin   | Max (+)         | Min (-) | Max (+)         | Min (-) |
| 22.0                | 11.883          | 11.496 | 11.112 | 3.370           | 3.340   | 0.730           | 0.700   |
| 23.0                | 11.327          | 10.971 | 10.617 | 3.250           | 3.230   | 0.710           | 0.680   |
| 24.0                | 10.800          | 10.473 | 10.147 | 3.120           | 3.110   | 0.690           | 0.660   |
| 25.0                | 10.300          | 10.000 | 9.700  | 3.000           | 3.000   | 0.670           | 0.630   |
| 26.0                | 9.848           | 9.551  | 9.255  | 3.110           | 3.100   | 0.690           | 0.660   |
| 27.0                | 9.418           | 9.125  | 8.834  | 3.210           | 3.190   | 0.720           | 0.690   |
| 28.0                | 9.010           | 8.721  | 8.434  | 3.310           | 3.290   | 0.750           | 0.710   |
| 29.0                | 8.621           | 8.337  | 8.055  | 3.410           | 3.380   | 0.770           | 0.740   |
| 30.0                | 8.252           | 7.972  | 7.695  | 3.510           | 3.470   | 0.800           | 0.770   |
| 31.0                | 7.900           | 7.625  | 7.353  | 3.610           | 3.570   | 0.830           | 0.790   |
| 32.0                | 7.566           | 7.296  | 7.029  | 3.700           | 3.660   | 0.850           | 0.820   |
| 33.0                | 7.247           | 6.982  | 6.721  | 3.800           | 3.740   | 0.880           | 0.840   |
| 34.0                | 6.944           | 6.684  | 6.428  | 3.890           | 3.830   | 0.910           | 0.870   |
| 35.0                | 6.656           | 6.401  | 6.150  | 3.980           | 3.920   | 0.930           | 0.900   |
| 36.0                | 6.381           | 6.131  | 5.886  | 4.080           | 4.000   | 0.960           | 0.930   |
| 37.0                | 6.119           | 5.874  | 5.634  | 4.170           | 4.090   | 0.980           | 0.950   |
| 38.0                | 5.870           | 5.630  | 5.395  | 4.260           | 4.170   | 1.010           | 0.980   |
| 39.0                | 5.631           | 5.397  | 5.167  | 4.340           | 4.260   | 1.030           | 1.010   |
| 40.0                | 5.404           | 5.175  | 4.951  | 4.430           | 4.340   | 1.060           | 1.030   |
| 41.0                | 5.188           | 4.964  | 4.745  | 4.520           | 4.420   | 1.090           | 1.060   |
| 42.0                | 4.982           | 4.763  | 4.549  | 4.600           | 4.500   | 1.120           | 1.090   |
| 43.0                | 4.785           | 4.571  | 4.362  | 4.690           | 4.580   | 1.140           | 1.120   |
| 44.0                | 4.596           | 4.387  | 4.183  | 4.770           | 4.660   | 1.170           | 1.140   |
| 45.0                | 4.417           | 4.213  | 4.014  | 4.850           | 4.740   | 1.190           | 1.170   |
| 46.0                | 4.246           | 4.046  | 3.851  | 4.930           | 4.810   | 1.220           | 1.200   |
| 47.0                | 4.082           | 3.887  | 3.697  | 5.020           | 4.890   | 1.250           | 1.230   |
| 48.0                | 3.925           | 3.735  | 3.550  | 5.100           | 4.970   | 1.280           | 1.250   |
| 49.0                | 3.776           | 3.590  | 3.409  | 5.180           | 5.040   | 1.300           | 1.280   |
| 50.0                | 3.632           | 3.451  | 3.274  | 5.250           | 5.120   | 1.330           | 1.300   |
| 51.0                | 3.495           | 3.318  | 3.146  | 5.330           | 5.190   | 1.350           | 1.330   |
| 52.0                | 3.363           | 3.191  | 3.023  | 5.410           | 5.260   | 1.410           | 1.360   |
| 53.0                | 3.237           | 3.069  | 2.905  | 5.490           | 5.340   | 1.430           | 1.380   |
| 54.0                | 3.116           | 2.952  | 2.793  | 5.560           | 5.410   | 1.460           | 1.410   |
| 55.0                | 3.001           | 2.841  | 2.685  | 5.640           | 5.480   | 1.480           | 1.440   |

