

# LG

**THERMA V™**

Air-to-Water Heat Pump / Monobloc

R32 / 50Hz

5BPM5-01D(Replaces 5BPM5-01C)

# TOTAL HVAC

# SOLUTION

# PROVIDER

## ENGINEERING PRODUCT DATA BOOK

***THERMA V***<sup>TM</sup>  
Monobloc Type

**General Information**

**Product Data**

**Design and installation**

***THERMA V***<sup>TM</sup>  
Monobloc Type

**General Information**

- 1.Features**
- 2.Model Line Up**
- 3.Nomenclature**

## 1. Features

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- High energy efficiency
- Easy installation
- Total solution for cooling, heating & hot water
- No refrigerant piping work
- Low operating cost and CO<sub>2</sub> emission

## 2. Model line up

### ◆ Model line up

| Category                               | Capacity (kW) | Chassis | Model Name             |
|--|---------------|---------|------------------------|
| 1 Phase Model<br>1 Ø, 220-240 V, 50 Hz | 5.5           | UN4     | ZHBW056A0 [HM051M U43] |
|  | 7.0           |         | ZHBW076A0 [HM071M U43] |
|  | 9.0           |         | ZHBW096A0 [HM091M U43] |
|  | 12.0          | UN3     | ZHBW126A0 [HM121M U33] |
|  | 14.0          |         | ZHBW146A0 [HM141M U33] |
|  | 16.0          |         | ZHBW166A0 [HM161M U33] |
| 3 Phase Model<br>3 Ø, 380-415 V, 50 Hz | 12.0          | UN3     | ZHBW128A0 [HM123M U33] |
|  | 14.0          |         | ZHBW148A0 [HM143M U33] |
|  | 16.0          |         | ZHBW168A0 [HM163M U33] |

### ◆ External appearance

| UN4   | UN3   |
|---|---|
|  |  |

### 3. Nomenclature

#### ■ Global Name

| Model Name | ZH | B | W | 12 | 6 | A | 0 |
|------------|----|---|---|----|---|---|---|
| No.        | 1  | 2 | 3 | 4  | 5 | 6 | 7 |

| No. | Signification   |
|-----|---|
| 1   | <b>ZH : Air-to-Water Heat Pump for R32</b>  |
| 2   | <b>Classification</b><br>B : Monobloc   |
| 3   | <b>Model Type</b><br>W : Inverter Heat Pump   |
| 4   | <b>Heating Capacity (kW)</b><br>Ex) 5 kW : '05', 16 kW : '16'                       |
| 5   | <b>Electrical ratings</b><br>6 : 1 Ø, 220-240 V, 50 Hz<br>8 : 3 Ø, 380-415 V, 50 Hz |
| 6   | <b>Function</b><br>A : General Heating Heat pump                                    |
| 7   | <b>Series</b>   |

### 3. Nomenclature

■ **European Name**

|                   |          |          |           |          |          |           |          |
|-------------------|----------|----------|-----------|----------|----------|-----------|----------|
| <b>Model Name</b> | <b>H</b> | <b>M</b> | <b>12</b> | <b>1</b> | <b>M</b> | <b>U3</b> | <b>3</b> |
| No.               | 1        | 2        | 3         | 4        | 5        | 6         | 7        |

| No. | Signification   |
|-----|---|
| 1   | <b>H : Air-to-Water Heat Pump</b>   |
| 2   | <b>Classification</b><br>M : Monobloc type  |
| 3   | <b>Heating Capacity (kW)</b><br>Ex) 5 kW : '05', 16 kW : '16'                       |
| 4   | <b>Electrical ratings</b><br>1 : 1 Ø, 220-240 V, 50 Hz<br>3 : 3 Ø, 380-415 V, 50 Hz |
| 5   | <b>Leaving Water Combination</b><br>M : Mid Temperature                             |
| 6   | <b>Platform (Chassis code)</b><br>U3 : UN3 Chassis<br>U4 : UN4 Chassis              |
| 7   | <b>Type of refrigerant</b><br>2 : R410A<br>3 : R32                                  |

# ***THERMA V***<sup>TM</sup>

Monobloc Type

## **Product Data**

- 1. List of Functions**
- 2. Specification**
- 3. Dimensions**
- 4. Piping Diagrams**
- 5. Wiring Diagrams**
- 6. Performance Data**
- 7. Electric Characteristics**
- 8. Operation Range**
- 9. Sound levels**
- 10. Water Pump Capacity**



# 1. List of Functions

## ■ Basic functions of Unit

### ◆ Water Side

| Category                         | Functions  | ZHBW056A0 [HM051M U43]<br>ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43]<br>ZHBW126A0 [HM121M U33] / ZHBW128A0 [HM123M U33]<br>ZHBW146A0 [HM141M U33] / ZHBW148A0 [HM143M U33]<br>ZHBW166A0 [HM161M U33] / ZHBW168A0 [HM163M U33] |
|----------------------------------|--|--|
| Installation                     | Backup heater (Install kit)                              | O (Accessory)  |
| Reliability                      | Self diagnosis   | O  |
| Convenience                      | Auto Restart   | O  |
|                                  | Child lock   | O  |
|                                  | Sleep mode   | O  |
|                                  | Timer (on/off)   | O  |
|                                  | Timer (weekly)   | O  |
|                                  | Two thermistor control                                   | X  |
| Air to Water Heat Pump Functions | Anti-condensation on floor (cooling)                     | O  |
|                                  | Digital output for external pump                         | O  |
|                                  | Flow switch  | O  |
|                                  | Thermostat interface (230V AC)                           | O  |
|                                  | Thermostat interface (24V AC)                            | X  |
|                                  | DHW(Domestic Hot Water) tank kit                         | O (Accessory)  |
|                                  | Therma V solar kit                                       | O (Accessory)  |
|                                  | PHEX anti-freezing control                               | O  |
|                                  | Water pump anti-stuck function                           | O  |
|                                  | Weather compensation for heating and cooling (Auto mode) | O  |
|                                  | Silent operation   | O  |
|                                  | Anti-overheating of water pipe                           | O  |
|                                  | Emergency operation                                      | O  |
|                                  | Weather Dependent Operation with Thermostat              | O  |
|                                  | Scheduler (DHW Tank Heater)                              | O  |
|                                  | Timer (Domestic Hot Water Tank Heater)                   | O  |
|                                  | Quick Domestic Hot Water Tank Heating                    | O  |
|                                  | Screed Drying Mode                                       | O  |
|                                  | Sump Heater  | O  |
|                                  | Base Pan Heater  | O  |
| Integrated Dry Contact (CN-EXT)  | O  |  |

### ◆ Refrigerant Side

| Category         | Functions                               | ZHBW056A0 [HM051M U43]<br>ZHBW076A0 [HM071M U43]<br>ZHBW096A0 [HM091M U43]<br>ZHBW126A0 [HM121M U33]<br>ZHBW146A0 [HM141M U33]<br>ZHBW166A0 [HM161M U33] | ZHBW128A0 [HM123M U33]<br>ZHBW148A0 [HM143M U33]<br>ZHBW168A0 [HM163M U33] |
|------------------|---|--|--|
| Reliability      | Defrost / Deicing                       | O  | O  |
|                  | High pressure switch                    | O  | O  |
|                  | Low pressure switch                     | X  | X  |
|                  | Phase protection                        | X  | O  |
|                  | Restart delay (3-minutes)               | O  | O  |
|                  | Self diagnosis                          | O  | O  |
|                  | Soft start                              | X  | X  |
| Convenience      | Test function                           | X  | X  |
|                  | Wiring Error Check                      | X  | X  |
|                  | Peak Control                            | X  | X  |
|                  | Mode Lock                               | O  | O  |
| Network function | Forced Cooling Operation (Outdoor Unit) | X  | X  |
|                  | Network solution(LGAP)                  | O  | O  |

**Note**

1. O : Applied, X : Not applied

Accessory : Ordered and purchased separately the accessory package referring to the model name provided and install at field.

Accessory line-ups varies by region, so check your local catalogue or local sales material.

# 1. List of Functions

## ■ Accessory Compatibility List

| Category               |  | Product               | Remark                                | ZHBW056A0 [HM051M U43]<br>ZHBW076A0 [HM071M U43]<br>ZHBW096A0 [HM091M U43]<br>ZHBW126A0 [HM121M U33]<br>ZHBW146A0 [HM141M U33]<br>ZHBW166A0 [HM161M U33]<br>ZHBW128A0 [HM123M U33]<br>ZHBW148A0 [HM143M U33]<br>ZHBW168A0 [HM163M U33] |
|------------------------|--|-----------------------|---------------------------------------|--|
| Dry Contact            | Simple Contact                         | PDRYCB000             | Simple Dry Contact                    | O  |
|                        | Communication Type                     | PDRYCB400             | 2 Points Dry Contact (For Setback)    | X  |
|                        |  | PDRYCB300             | 8 Points Dry Contact (For Thermostat) | O  |
|                        |  | PDRYCB500             | Dry Contact for Modbus                | X  |
| ETC                    | Remote temperature sensor              | PQRSTA0               | -                                     | O  |
|                        | Zone Controller                        | ABZCA                 | -                                     | X  |
|                        | Electronic thermostat                  | AQETC                 | -                                     | X  |
|                        | CTI (Communication transfer interface) | PKEC0                 | -                                     | X  |
|                        | Group control wire                     | PZCWRCG3              | 0.25 m                                | X  |
|                        | 2-Remo Control Wire                    | PZCWRC2               | 0.25 m                                | X  |
|                        | Extension wire                         | PZCWRC1               | 10 m                                  | O  |
|                        | Wi-Fi controller *                     | PWFMDD200             | -                                     | O  |
|                        | Meter Interface Module                 | PENKTH000             | Interface between IDU and Meter       | O  |
| Accessory Kit for AWHP | DHW tank kit (Split)                   | PHLTA                 | For Split                             | X  |
|                        | DHW tank kit (Monobloc)                | PHLTB                 | For Monobloc                          | O  |
|                        | Solar thermal kit                      | PHLLA                 | -                                     | O  |
|                        | Backup heater                          | HA031M E1 / HA061M E1 | -                                     | O  |
|                        | Drain pan                              | PHDPB                 | -                                     | X  |
| Central Controller     | AC EZ                                  | PQCSZ250S0            | AC EZ                                 | X  |
|                        | AC Ez Touch                            | PACEZA000             | AC Ez Touch                           | O  |
|                        | AC Smart                               | PACS4B000             | AC Smart IV                           | O  |
|                        |  | PACS5A000             | AC Smart 5                            | O  |
|                        | ACP                                    | PACP4B000             | ACP IV                                | O  |
|                        |  | PACP5A000             | ACP 5                                 | O  |
|                        | AC Manager **                          | PACM4B000             | AC Manager IV                         | O  |
| PACM5A000              |  | AC Manager 5          | O                                     |  |
| Gateway                | IDU PI485                              | PHNFP14A0             | Connected with Indoor Units           | X  |
|                        |  | PSNFP14A0             | Connected with Indoor Units           | X  |
|                        | ODU PI485                              | PMNFP14A1             | PI 485 Gateway                        | O  |
|                        | BACnet                                 | PQNFB17C0             | ACP BACnet                            | O  |
| Lonworks               | PLNWKB000                              | ACP Lonworks          | O                                     |  |

**Note**

1. O: Possible, X: Impossible, - : Not applicable
2. \* : Some advanced functions controlled by individual controller cannot be operated.
3. \*\* : ACP, AC Smart, ACP BACnet or ACP Lonworks is needed.
4. If you need more detail, please refer to the manual of product.  
(<http://partner.lge.com/global> : Home> Download> Manuals)

## 2. Specification

### ■ 1 phase Inverter (5.5 ~ 9 kW)

| Nominal Capacity and Nominal Input   |         |                               |                          |     | ZHBW056A0<br>[HM051M U43] | ZHBW076A0<br>[HM071M U43] | ZHBW096A0<br>[HM091M U43] |
|--------------------------------------|---------|-------------------------------|--------------------------|-----|---------------------------|---------------------------|---------------------------|
| -                                    | -       | Outdoor Temp. (°C)<br>DB / WB | Leaving Water Temp. (°C) | -   |                           |                           |                           |
| Capacity                             | Cooling | 35 / 24                       | 18                       | kW  | 5.50                      | 7.00                      | 9.00                      |
|                                      |         |                               | 7                        | kW  | 5.50                      | 7.00                      | 9.00                      |
|                                      | Heating | 7 / 6                         | 35                       | kW  | 5.50                      | 7.00                      | 9.00                      |
|                                      |         |                               | 55                       | kW  | 5.50                      | 5.50                      | 5.50                      |
|                                      |         | 2 / 1                         | 35                       | kW  | 3.30                      | 4.20                      | 5.40                      |
| Power Input                          | Cooling | 35 / 24                       | 18                       | kW  | 1.20                      | 1.56                      | 2.14                      |
|                                      |         |                               | 7                        | kW  | 1.96                      | 2.59                      | 3.46                      |
|                                      | Heating | 7 / 6                         | 35                       | kW  | 1.22                      | 1.56                      | 2.15                      |
|                                      |         |                               | 55                       | kW  | 2.04                      | 2.04                      | 2.04                      |
|                                      |         | 2 / 1                         | 35                       | kW  | 0.94                      | 1.20                      | 1.54                      |
| EER                                  | Cooling | 35 / 24                       | 18                       | W/W | 4.60                      | 4.50                      | 4.20                      |
|                                      |         |                               | 7                        | W/W | 2.80                      | 2.70                      | 2.60                      |
| COP                                  | Heating | 7 / 6                         | 35                       | W/W | 4.50                      | 4.50                      | 4.18                      |
|                                      |         |                               | 55                       | W/W | 2.70                      | 2.70                      | 2.70                      |
|                                      |         |                               | 35                       | W/W | 3.52                      | 3.51                      | 3.50                      |
| SCOP (Low temp. Average)             |         |                               |                          |     | 4.45                      | 4.45                      | 4.45                      |
| SCOP (High temp. Average)            |         |                               |                          |     | 3.12                      | 3.12                      | 3.12                      |
| Rated Water Flow Rate (at LWT 35 °C) |         |                               |                          | LPM | 15.8                      | 20.1                      | 25.9                      |

| Electrical Specifications    |  |                      | ZHBW056A0<br>[HM051M U43] | ZHBW076A0<br>[HM071M U43] | ZHBW096A0<br>[HM091M U43] |
|------------------------------|--|----------------------|---------------------------|---------------------------|---------------------------|
| Power Supply                 | V, Ø, Hz                                     |                      | 220-240, 1, 50            | 220-240, 1, 50            | 220-240, 1, 50            |
| Maximum Running Current      | A  |                      | 21.0                      | 22.0                      | 23.0                      |
| Peak Control Running Current | A  |                      | 17.0                      | 17.0                      | 17.0                      |
| Rated Running Current        | Cooling                                      | A                    | 5.3                       | 6.9                       | 9.5                       |
|                              | Heating                                      | A                    | 5.4                       | 6.9                       | 9.6                       |
| Wiring Connections           | Power Supply Cable (included Earth, H07RN-F) | No × mm <sup>2</sup> | 3 × 4.0                   | 3 × 4.0                   | 3 × 4.0                   |

| Technical Specifications     |             |           |       | ZHBW056A0<br>[HM051M U43] | ZHBW076A0<br>[HM071M U43] | ZHBW096A0<br>[HM091M U43] |
|------------------------------|-------------|-----------|-------|---------------------------|---------------------------|---------------------------|
| Sound Power Level            | Heating     | Rated     | dB(A) | 60                        | 60                        | 60                        |
|                              |             | Silent    | dB(A) | 58                        | 58                        | 58                        |
| Sound Pressure Level (at 1m) | Heating     | Rated     | dB(A) | 50                        | 50                        | 50                        |
| Dimensions                   | Unit        | W × H × D | mm    | 1,239 × 834 × 330         | 1,239 × 834 × 330         | 1,239 × 834 × 330         |
|                              | Packed Unit | W × H × D | mm    | 1,364 × 985 × 461         | 1,364 × 985 × 461         | 1,364 × 985 × 461         |
| Weight                       | Unit        |           | kg    | 90.8                      | 90.8                      | 90.8                      |
|                              | Packed Unit |           | kg    | 102.5                     | 102.5                     | 102.5                     |

**Note**

- Due to our policy of innovation some specifications may be changed without notification.
- Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
- Sound pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard.  
Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard.  
Therefore, these values can be increased owing to ambient conditions during operation.
- Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation.  
For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35 °C
- This product contains Fluorinated greenhouse gases.
  - \* At least 25A circuit breaker can be used, but when using 3rd party product, connect external power.

## 2. Specification

| Technical Specifications (Water side)    |                              |                                       |       | ZHBW056A0<br>[HM051M U43]      | ZHBW076A0<br>[HM071M U43]  | ZHBW096A0<br>[HM091M U43] |
|--|------------------------------|---------------------------------------|-------|--------------------------------|----------------------------|---------------------------|
| Operation Range<br>(Leaving Water Temp.) | Cooling                      | Min. ~ Max.                           | °C    | 5 ~ 27                         | 5 ~ 27                     | 5 ~ 27                    |
|  | Heating                      | Min. ~ Max.                           | °C    | 15 ~ 65                        | 15 ~ 65                    | 15 ~ 65                   |
|  | DHW *                        | Min. ~ Max.                           | °C    | 15 ~ 80                        | 15 ~ 80                    | 15 ~ 80                   |
| Water Pump                               | Type                         | Canned type for hot water circulation |       |                                |                            |                           |
|  | Model                        | GRUNDFOS UPM3K 20-75 CHBL             |       |                                |                            |                           |
|  | Motor Type                   | BLDC                                  |       |                                |                            |                           |
|  | Steps of Pumping Performance | Variable speed 10% to 100%            |       |                                |                            |                           |
|  | Power input                  | Min. / Rated                          | W     | 6 / 60                         | 6 / 60                     | 6 / 60                    |
|  | Water Flow Rate              | Min. / Rated                          | ℓ/min | 2.3 / 25.9                     | 2.3 / 25.9                 | 2.3 / 25.9                |
| Heat Exchanger                           | Type                         | Braze Plate HEX                       |       |                                |                            |                           |
|  | Quantity                     | 1                                     |       |                                |                            |                           |
|  | Number of Plate              | EA                                    | 54    | 54                             | 54                         |                           |
|  | Water Volume                 | ℓ                                     | 0.7   | 0.7                            | 0.7                        |                           |
| Expansion Vessel                         | Volume                       | Max.                                  | ℓ     | 8                              | 8                          | 8                         |
|  | Water pressure               | Max.                                  | bar   | 3                              | 3                          | 3                         |
|  |                              | Pre-charged                           | bar   | 1                              | 1                          | 1                         |
| Piping Connections                       | Inlet                        | mm(inch) Male PT 25(1)                |       |                                |                            |                           |
|  | Outlet                       | mm(inch) Male PT 25(1)                |       |                                |                            |                           |
| Strainer                                 | Mesh size                    | -                                     |       |                                |                            |                           |
|  | Material                     | -                                     |       |                                |                            |                           |
| Relief Valve                             | Pressure Limit               | Upper Limit                           | bar   | 3.0                            | 3.0                        | 3.0                       |
|  | Devices for Water Circuit    |                                       |       | -                              | Relief valve / Flow Switch |                           |
|  |                              |                                       | -     | Drain hose                     |                            |                           |
|  |                              |                                       | -     | Pressure gage / Air vent valve |                            |                           |

| Technical Specifications (Refrigerant side) |                                   |                       |                           | ZHBW056A0<br>[HM051M U43] | ZHBW076A0<br>[HM071M U43] | ZHBW096A0<br>[HM091M U43] |
|---|-----------------------------------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Operation Range<br>(Outdoor Temp.)          | Cooling                           | Min. ~ Max.           | °C DB                     | 5 ~ 48                    | 5 ~ 48                    | 5 ~ 48                    |
|   | Heating                           | Min. ~ Max.           | °C DB                     | -25 ~ 35                  | -25 ~ 35                  | -25 ~ 35                  |
| Compressor                                  | Type                              | -                     |                           |                           |                           |                           |
|   | Model                             | Model × No.           |                           |                           |                           |                           |
|   | Motor Type                        | -                     |                           |                           |                           |                           |
|   | Displacement                      | cm <sup>3</sup> /Rev. | 31.6                      | 31.6                      | 31.6                      |                           |
| Refrigerant                                 | Type                              | -                     |                           |                           |                           |                           |
|   | GWP<br>(Global Warming Potential) | -                     |                           |                           |                           |                           |
|   | Precharged Amount                 | g                     | 1,400                     | 1,400                     | 1,400                     |                           |
|   | t-CO2 eq.                         | -                     | 0.945                     | 0.945                     | 0.945                     |                           |
|   | Control                           | -                     |                           |                           |                           |                           |
| Refrigerant Oil                             | Type                              | -                     |                           |                           |                           |                           |
|   | Charged Volume                    | cc × No.              | 1,000                     | 1,000                     | 1,000                     |                           |
| Fan   | Type                              | -                     |                           |                           |                           |                           |
|   | Air Flow Rate                     | Rated                 | m <sup>3</sup> /min × No. | 60.0 × 1                  | 60.0 × 1                  | 60.0 × 1                  |
| Fan Motor                                   | Type                              | -                     |                           |                           |                           |                           |
|   | Output                            | W × No.               | 124 × 1                   | 124 × 1                   | 124 × 1                   |                           |

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- Sound pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard.  
Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard.  
Therefore, these values can be increased owing to ambient conditions during operation.
- Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation.  
For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35°C
- This product contains Fluorinated greenhouse gases.
  - \* DHW 55~80°C Operating is available only when the booster heater is operating.

## 2. Specification

### ■ 1 phase Inverter (12 ~ 16 kW)

| Nominal Capacity and Nominal Input   |         |                               |                          |     | ZHBW126A0<br>[HM121M U33] | ZHBW146A0<br>[HM141M U33] | ZHBW166A0<br>[HM161M U33] |      |
|--------------------------------------|---------|-------------------------------|--------------------------|-----|---------------------------|---------------------------|---------------------------|------|
| -                                    | -       | Outdoor Temp. (°C)<br>DB / WB | Leaving Water Temp. (°C) | -   |                           |                           |                           |      |
| Capacity                             | Cooling | 35 / 24                       | 18                       | kW  | 12.00                     | 14.00                     | 16.00                     |      |
|                                      |         |                               | 7                        | kW  | 12.00                     | 14.00                     | 16.00                     |      |
|                                      | Heating | 7 / 6                         | 35                       | kW  | 12.00                     | 14.00                     | 16.00                     |      |
|                                      |         |                               | 55                       | kW  | 12.00                     | 12.00                     | 12.00                     |      |
|                                      |         | 2 / 1                         | 35                       | kW  | 11.00                     | 12.00                     | 13.80                     |      |
| Power Input                          | Cooling | 35 / 24                       | 18                       | kW  | 2.61                      | 3.26                      | 4.00                      |      |
|                                      |         |                               | 7                        | kW  | 4.44                      | 5.38                      | 6.40                      |      |
|                                      | Heating | 7 / 6                         | 35                       | kW  | 2.61                      | 3.11                      | 3.64                      |      |
|                                      |         |                               | 55                       | kW  | 4.29                      | 4.29                      | 4.29                      |      |
|                                      |         |                               | 2 / 1                    | 35  | kW                        | 3.13                      | 3.42                      | 3.94 |
|                                      | EER     | Cooling                       | 35 / 24                  | 18  | W/W                       | 4.60                      | 4.30                      | 4.00 |
| 7                                    |         |                               |                          | W/W | 2.70                      | 2.60                      | 2.50                      |      |
| COP                                  | Heating | 7 / 6                         | 35                       | W/W | 4.60                      | 4.50                      | 4.40                      |      |
|                                      |         |                               | 55                       | W/W | 2.80                      | 2.80                      | 2.80                      |      |
|                                      |         | 2 / 1                         | 35                       | W/W | 3.52                      | 3.51                      | 3.50                      |      |
| SCOP (Low temp. Average)             |         |                               |                          |     | 4.45                      | 4.45                      | 4.45                      |      |
| SCOP (High temp. Average)            |         |                               |                          |     | 3.18                      | 3.18                      | 3.18                      |      |
| Rated Water Flow Rate (at LWT 35 °C) |         |                               |                          | LPM | 34.5                      | 40.3                      | 46.0                      |      |

| Electrical Specifications    |  |                      | ZHBW126A0<br>[HM121M U33] | ZHBW146A0<br>[HM141M U33] | ZHBW166A0<br>[HM161M U33] |
|------------------------------|--|----------------------|---------------------------|---------------------------|---------------------------|
| Power Supply                 | V, Ø, Hz                                     |                      | 220-240, 1, 50            | 220-240, 1, 50            | 220-240, 1, 50            |
| Maximum Running Current      | A  |                      | 33.0                      | 34.0                      | 35.0                      |
| Peak Control Running Current | A  |                      | 25.0                      | 25.0                      | 25.0                      |
| Rated Running Current        | Cooling                                      | A                    | 11.6                      | 14.4                      | 17.7                      |
|                              | Heating                                      | A                    | 11.6                      | 13.8                      | 16.1                      |
| Wiring Connections           | Power Supply Cable (included Earth, H07RN-F) | No × mm <sup>2</sup> | 3 × 6.0                   | 3 × 6.0                   | 3 × 6.0                   |

| Technical Specifications     |             |           |       | ZHBW126A0<br>[HM121M U33] | ZHBW146A0<br>[HM141M U33] | ZHBW166A0<br>[HM161M U33] |
|------------------------------|-------------|-----------|-------|---------------------------|---------------------------|---------------------------|
| Sound Power Level            | Heating     | Rated     | dB(A) | 63                        | 63                        | 63                        |
|                              |             | Silent    | dB(A) | 61                        | 61                        | 61                        |
| Sound Pressure Level (at 1m) | Heating     | Rated     | dB(A) | 52                        | 52                        | 52                        |
| Dimensions                   | Unit        | W × H × D | mm    | 1,239 × 1,380 × 330       | 1,239 × 1,380 × 330       | 1,239 × 1,380 × 330       |
|                              | Packed Unit | W × H × D | mm    | 1,364 × 1,532 × 461       | 1,364 × 1,532 × 461       | 1,364 × 1,532 × 461       |
| Weight                       | Unit        |           | kg    | 124.8                     | 124.8                     | 124.8                     |
|                              | Packed Unit |           | kg    | 138.5                     | 138.5                     | 138.5                     |

**Note**

1. Due to our policy of innovation some specifications may be changed without notification.
2. Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
3. Sound pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard.  
Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard.  
Therefore, these values can be increased owing to ambient conditions during operation.
4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation.  
For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35 °C
5. This product contains Fluorinated greenhouse gases.
  - \* At least 40A circuit breaker can be used, but when using 3rd party product, connect external power.

## 2. Specification

| Technical Specifications (Water side)    |                              |                                       |       | ZHBW126A0<br>[HM121M U33]      | ZHBW146A0<br>[HM141M U33]  | ZHBW166A0<br>[HM161M U33] |
|--|------------------------------|---------------------------------------|-------|--------------------------------|----------------------------|---------------------------|
| Operation Range<br>(Leaving Water Temp.) | Cooling                      | Min. ~ Max.                           | °C    | 5 ~ 27                         | 5 ~ 27                     | 5 ~ 27                    |
|  | Heating                      | Min. ~ Max.                           | °C    | 15 ~ 65                        | 15 ~ 65                    | 15 ~ 65                   |
|  | DHW *                        | Min. ~ Max.                           | °C    | 15 ~ 80                        | 15 ~ 80                    | 15 ~ 80                   |
| Water Pump                               | Type                         | Canned type for hot water circulation |       |                                |                            |                           |
|  | Model                        | GRUNDFOS UPML GEO 20-105 CHBL         |       |                                |                            |                           |
|  | Motor Type                   | BLDC                                  |       |                                |                            |                           |
|  | Steps of Pumping Performance | Variable speed 10% to 100%            |       |                                |                            |                           |
|  | Power input                  | Min. / Rated                          | W     | 14 / 140                       | 14 / 140                   | 14 / 140                  |
|  | Water Flow Rate              | Min. / Rated                          | ℓ/min | 5.0 / 46.0                     | 5.0 / 46.0                 | 5.0 / 46.0                |
| Heat Exchanger                           | Type                         | Braze Plate HEX                       |       |                                |                            |                           |
|  | Quantity                     | 1                                     |       |                                |                            |                           |
|  | Number of Plate              | EA                                    | 76    | 76                             | 76                         |                           |
|  | Water Volume                 | ℓ                                     |       |                                |                            |                           |
| Expansion Vessel                         | Volume                       | Max.                                  | ℓ     | 8                              | 8                          | 8                         |
|  |                              | Water pressure                        | Max.  | bar                            | 3                          | 3                         |
|  |                              | Pre-charged                           | bar   | 1                              | 1                          | 1                         |
| Piping Connections                       | Inlet                        | mm(inch)                              |       |                                |                            |                           |
|  | Outlet                       | mm(inch)                              |       |                                |                            |                           |
| Strainer                                 | Mesh size                    | -                                     |       |                                |                            |                           |
|  | Material                     | -                                     |       |                                |                            |                           |
| Relief Valve                             | Pressure Limit               | Upper Limit                           | bar   | 3.0                            | 3.0                        | 3.0                       |
|  | Devices for Water Circuit    |                                       |       | -                              | Relief valve / Flow Switch |                           |
|  |                              |                                       | -     | Drain hose                     |                            |                           |
|  |                              |                                       | -     | Pressure gage / Air vent valve |                            |                           |

| Technical Specifications (Refrigerant side) |                                   |                       |                           | ZHBW126A0<br>[HM121M U33] | ZHBW146A0<br>[HM141M U33] | ZHBW166A0<br>[HM161M U33] |
|---|-----------------------------------|-----------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Operation Range<br>(Outdoor Temp.)          | Cooling                           | Min. ~ Max.           | °C DB                     | 5 ~ 48                    | 5 ~ 48                    | 5 ~ 48                    |
|   | Heating                           | Min. ~ Max.           | °C DB                     | -25 ~ 35                  | -25 ~ 35                  | -25 ~ 35                  |
| Compressor                                  | Type                              | -                     |                           |                           |                           |                           |
|   | Model                             | Model × No.           |                           |                           |                           |                           |
|   | Motor Type                        | -                     |                           |                           |                           |                           |
|   | Displacement                      | cm <sup>3</sup> /Rev. |                           |                           |                           |                           |
| Refrigerant                                 | Type                              | -                     |                           |                           |                           |                           |
|   | GWP<br>(Global Warming Potential) | -                     |                           |                           |                           |                           |
|   | Precharged Amount                 | g                     |                           |                           |                           |                           |
|   | t-CO2 eq.                         | -                     |                           |                           |                           |                           |
|   | Control                           | -                     |                           |                           |                           |                           |
| Refrigerant Oil                             | Type                              | -                     |                           |                           |                           |                           |
|   | Charged Volume                    | cc × No.              |                           |                           |                           |                           |
| Fan   | Type                              | -                     |                           |                           |                           |                           |
|   | Air Flow Rate                     | Rated                 | m <sup>3</sup> /min × No. | 60.0 × 2                  | 60.0 × 2                  | 60.0 × 2                  |
| Fan Motor                                   | Type                              | -                     |                           |                           |                           |                           |
|   | Output                            | W × No.               |                           |                           |                           |                           |

**Note**

- Due to our policy of innovation some specifications may be changed without notification.
- Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
- Sound pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard.  
Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard.  
Therefore, these values can be increased owing to ambient conditions during operation.
- Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation.  
For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35°C
- This product contains Fluorinated greenhouse gases.
  - \* DHW 55~80°C Operating is available only when the booster heater is operating.

## 2. Specification

### ■ 3 phase Inverter (12 ~ 16 kW)

| Nominal Capacity and Nominal Input   |         |                              |                        |     | ZHBW128A0<br>[HM123M U33] | ZHBW148A0<br>[HM143M U33] | ZHBW168A0<br>[HM163M U33] |      |
|--------------------------------------|---------|------------------------------|------------------------|-----|---------------------------|---------------------------|---------------------------|------|
| -                                    | -       | Outdoor Temp (°C)<br>DB / WB | Leaving Waer Temp (°C) | -   |                           |                           |                           |      |
| Capacity                             | Cooling | 35 / 24                      | 18                     | kW  | 12.00                     | 14.00                     | 16.00                     |      |
|                                      |         |                              | 7                      | kW  | 12.00                     | 14.00                     | 16.00                     |      |
|                                      | Heating | 7 / 6                        | 35                     | kW  | 12.00                     | 14.00                     | 16.00                     |      |
|                                      |         |                              | 55                     | kW  | 12.00                     | 12.00                     | 12.00                     |      |
|                                      |         | 2 / 1                        | 35                     | kW  | 11.00                     | 12.00                     | 13.80                     |      |
| Power Input                          | Cooling | 35 / 24                      | 18                     | kW  | 2.61                      | 3.26                      | 4.00                      |      |
|                                      |         |                              | 7                      | kW  | 4.44                      | 5.38                      | 6.40                      |      |
|                                      | Heating | 7 / 6                        | 35                     | kW  | 2.61                      | 3.11                      | 3.64                      |      |
|                                      |         |                              | 55                     | kW  | 4.29                      | 4.29                      | 4.29                      |      |
|                                      |         |                              | 2 / 1                  | 35  | kW                        | 3.13                      | 3.42                      | 3.94 |
|                                      | EER     | Cooling                      | 35 / 24                | 18  | W/W                       | 4.60                      | 4.30                      | 4.00 |
| 7                                    |         |                              |                        | W/W | 2.70                      | 2.60                      | 2.50                      |      |
| COP                                  | Heating | 7 / 6                        | 35                     | W/W | 4.60                      | 4.50                      | 4.40                      |      |
|                                      |         |                              | 55                     | W/W | 2.80                      | 2.80                      | 2.80                      |      |
|                                      |         | 2 / 1                        | 35                     | W/W | 3.52                      | 3.51                      | 3.50                      |      |
| SCOP (Low temp. Average)             |         |                              |                        |     | 4.45                      | 4.45                      | 4.45                      |      |
| SCOP (High temp. Average)            |         |                              |                        |     | 3.18                      | 3.18                      | 3.18                      |      |
| Rated Water Flow Rate (at LWT 35 °C) |         |                              |                        | LPM | 34.5                      | 40.3                      | 46.0                      |      |

| Electrical Specifications    |  |                      | ZHBW128A0<br>[HM123M U33] | ZHBW148A0<br>[HM143M U33] | ZHBW168A0<br>[HM163M U33] |
|------------------------------|--|----------------------|---------------------------|---------------------------|---------------------------|
| Power Supply                 | V, Ø, Hz                                     |                      | 380-415, 3, 50            | 380-415, 3, 50            | 380-415, 3, 50            |
| Maximum Running Current      | A  |                      | 14.0                      | 14.5                      | 15.0                      |
| Peak Control Running Current | A  |                      | 10.0                      | 10.0                      | 10.0                      |
| Rated Running Current        | Cooling                                      | A                    | 3.8                       | 4.8                       | 5.9                       |
|                              | Heating                                      | A                    | 3.8                       | 4.6                       | 5.4                       |
| Wiring Connections           | Power Supply Cable (included Earth, H07RN-F) | No × mm <sup>2</sup> | 5 × 4.0                   | 5 × 4.0                   | 5 × 4.0                   |

| Technical Specifications     |             |           |       | ZHBW128A0<br>[HM123M U33] | ZHBW148A0<br>[HM143M U33] | ZHBW168A0<br>[HM163M U33] |
|------------------------------|-------------|-----------|-------|---------------------------|---------------------------|---------------------------|
| Sound Power Level            | Heating     | Rated     | dB(A) | 63                        | 63                        | 63                        |
|                              |             | Silent    | dB(A) | 61                        | 61                        | 61                        |
| Sound Pressure Level (at 1m) | Heating     | Rated     | dB(A) | 52                        | 52                        | 52                        |
| Dimensions                   | Unit        | W × H × D | mm    | 1,239 × 1,380 × 330       | 1,239 × 1,380 × 330       | 1,239 × 1,380 × 330       |
|                              | Packed Unit | W × H × D | mm    | 1,364 × 1,532 × 461       | 1,364 × 1,532 × 461       | 1,364 × 1,532 × 461       |
| Weight                       | Unit        |           | kg    | 124.8                     | 124.8                     | 124.8                     |
|                              | Packed Unit |           | kg    | 138.5                     | 138.5                     | 138.5                     |

**Note**

1. Due to our policy of innovation some specifications may be changed without notification.
2. Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.
3. Sound pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard.  
Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard.  
Therefore, these values can be increased owing to ambient conditions during operation.
4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation.  
For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35 °C
5. This product contains Fluorinated greenhouse gases.
  - \* At least 20A circuit breaker can be used, but when using 3rd party product, connect external power.

## 2. Specification

| Technical Specifications (Water side)    |                              |                                       |       | ZHBW128A0<br>[HM123M U33]        | ZHBW148A0<br>[HM143M U33] | ZHBW168A0<br>[HM163M U33] |
|--|------------------------------|---------------------------------------|-------|----------------------------------|---------------------------|---------------------------|
| Operation Range<br>(Leaving Water Temp.) | Cooling                      | Min. ~ Max.                           | °C    | 5 ~ 27                           | 5 ~ 27                    | 5 ~ 27                    |
|  | Heating                      | Min. ~ Max.                           | °C    | 15 ~ 65                          | 15 ~ 65                   | 15 ~ 65                   |
|  | DHW *                        | Min. ~ Max.                           | °C    | 15 ~ 80                          | 15 ~ 80                   | 15 ~ 80                   |
| Water Pump                               | Type                         | Canned type for hot water circulation |       |                                  |                           |                           |
|  | Model                        | GRUNDFOS UPML GEO 20-105 CHBL         |       |                                  |                           |                           |
|  | Motor Type                   | BLDC                                  |       |                                  |                           |                           |
|  | Steps of Pumping Performance | Variable speed 10% to 100%            |       |                                  |                           |                           |
|  | Power input                  | Min. / Rated                          | W     | 14 / 140                         | 14 / 140                  | 14 / 140                  |
|  | Water Flow Rate              | Min. / Rated                          | ℓ/min | 5.0 / 46.0                       | 5.0 / 46.0                | 5.0 / 46.0                |
| Heat Exchanger                           | Type                         | Braze Plate HEX                       |       |                                  |                           |                           |
|  | Quantity                     | 1                                     |       |                                  |                           |                           |
|  | Number of Plate              | EA                                    | 76    | 76                               | 76                        |                           |
|  | Water Volume                 | ℓ                                     | 1.0   | 1.0                              | 1.0                       |                           |
| Expansion Vessel                         | Volume                       | Max.                                  | ℓ     | 8                                | 8                         | 8                         |
|  | Water pressure               | Max.                                  | bar   | 3                                | 3                         | 3                         |
|  |                              | Pre-charged                           | bar   | 1                                | 1                         | 1                         |
| Piping Connections                       | Inlet                        | mm(inch) Male PT 25(1)                |       |                                  |                           |                           |
|  | Outlet                       | mm(inch) Male PT 25(1)                |       |                                  |                           |                           |
| Strainer                                 | Mesh size                    | - 28 mesh 28 mesh 28 mesh             |       |                                  |                           |                           |
|  | Material                     | - Stainless Steel                     |       |                                  |                           |                           |
| Relief Valve                             | Pressure Limit               | Upper Limit                           | bar   | 3.0                              | 3.0                       | 3.0                       |
| Devices for Water Circuit                |                              |                                       |       | - Relief valve / Flow Switch     |                           |                           |
|  |                              |                                       |       | - Drain hose                     |                           |                           |
|  |                              |                                       |       | - Pressure gage / Air vent valve |                           |                           |

| Technical Specifications (Refrigerant side) |                                   |                              |                           | ZHBW128A0<br>[HM123M U33] | ZHBW148A0<br>[HM143M U33] | ZHBW168A0<br>[HM163M U33] |
|---|-----------------------------------|------------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| Operation Range<br>(Outdoor Temp.)          | Cooling                           | Min. ~ Max.                  | °C DB                     | 5 ~ 48                    | 5 ~ 48                    | 5 ~ 48                    |
|   | Heating                           | Min. ~ Max.                  | °C DB                     | -25 ~ 35                  | -25 ~ 35                  | -25 ~ 35                  |
| Compressor                                  | Type                              | - Hermetic Sealed Scroll     |                           |                           |                           |                           |
|   | Model                             | Model × No. RJB036MAA × 1    |                           |                           |                           |                           |
|   | Motor Type                        | - BLDC                       |                           |                           |                           |                           |
|   | Displacement                      | cm <sup>3</sup> /Rev.        | 31.6                      | 31.6                      | 31.6                      |                           |
| Refrigerant                                 | Type                              | - R32                        |                           |                           |                           |                           |
|   | GWP<br>(Global Warming Potential) | -                            | 675.0                     | 675.0                     | 675.0                     |                           |
|   | Precharged Amount                 | g                            | 2,400                     | 2,400                     | 2,400                     |                           |
|   | t-CO2 eq.                         | -                            | 1.620                     | 1.620                     | 1.620                     |                           |
|   | Control                           | - Electronic Expansion Valve |                           |                           |                           |                           |
| Refrigerant Oil                             | Type                              | - FW68D                      |                           |                           |                           |                           |
|   | Charged Volume                    | cc × No.                     | 1,000                     | 1,000                     | 1,000                     |                           |
| Fan   | Type                              | - Propeller                  |                           |                           |                           |                           |
|   | Air Flow Rate                     | Rated                        | m <sup>3</sup> /min × No. | 60.0 × 2                  | 60.0 × 2                  | 60.0 × 2                  |
| Fan Motor                                   | Type                              | - BLDC                       |                           |                           |                           |                           |
|   | Output                            | W × No.                      | 124 × 2                   | 124 × 2                   | 124 × 2                   |                           |

**Note**

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3. Sound pressure level is measured on the rated condition in the anechoic rooms by ISO 3745 standard.  
Sound power level is measured on the rated condition in the reverberation rooms by ISO 3741 standard.  
Therefore, these values can be increased owing to ambient conditions during operation.
4. Performances are accordance with EN14511 and reflect ErP testing conditions. Above gives the declared values at rated conditions acc. ErP regulation.  
For max. capacities, refer to Performance Data.
  - Rated running current : Outdoor Temp. 7°CDB / 6°CWB, LWT 35°C
5. This product contains Fluorinated greenhouse gases.
  - \* DHW 55~80°C Operating is available only when the booster heater is operating.



## 2. Specification

### ■ Backup Heater

| Electrical Specification |                                       |                       | AHEH036A<br>[HA031M E1] | AHEH066A<br>[HA061M E1] |
|--------------------------|---------------------------------------|-----------------------|-------------------------|-------------------------|
| Backup Heater            | Type                                  | -                     | Sheath                  | Sheath                  |
|                          | Number of Heating Coil                | EA                    | 1                       | 2                       |
|                          | Max. Power consumption                | kW                    | 3.0                     | 3.0 + 3.0               |
|                          | Operation                             | -                     | Automatic               | Automatic               |
|                          | Heating Steps                         | Step                  | 1                       | 2                       |
|                          | Power Supply                          | V, Ø, Hz              | 220-240, 1, 50          | 220-240, 1, 50          |
| Wiring Connections       | Power Cable (Included Earth, H07RN-F) | No. × mm <sup>2</sup> | 3 × 1.5                 | 3 × 4.0                 |
|                          | Communication Cable (H07RN-F)         | No. × mm <sup>2</sup> | 4 × 0.75                | 4 × 0.75                |

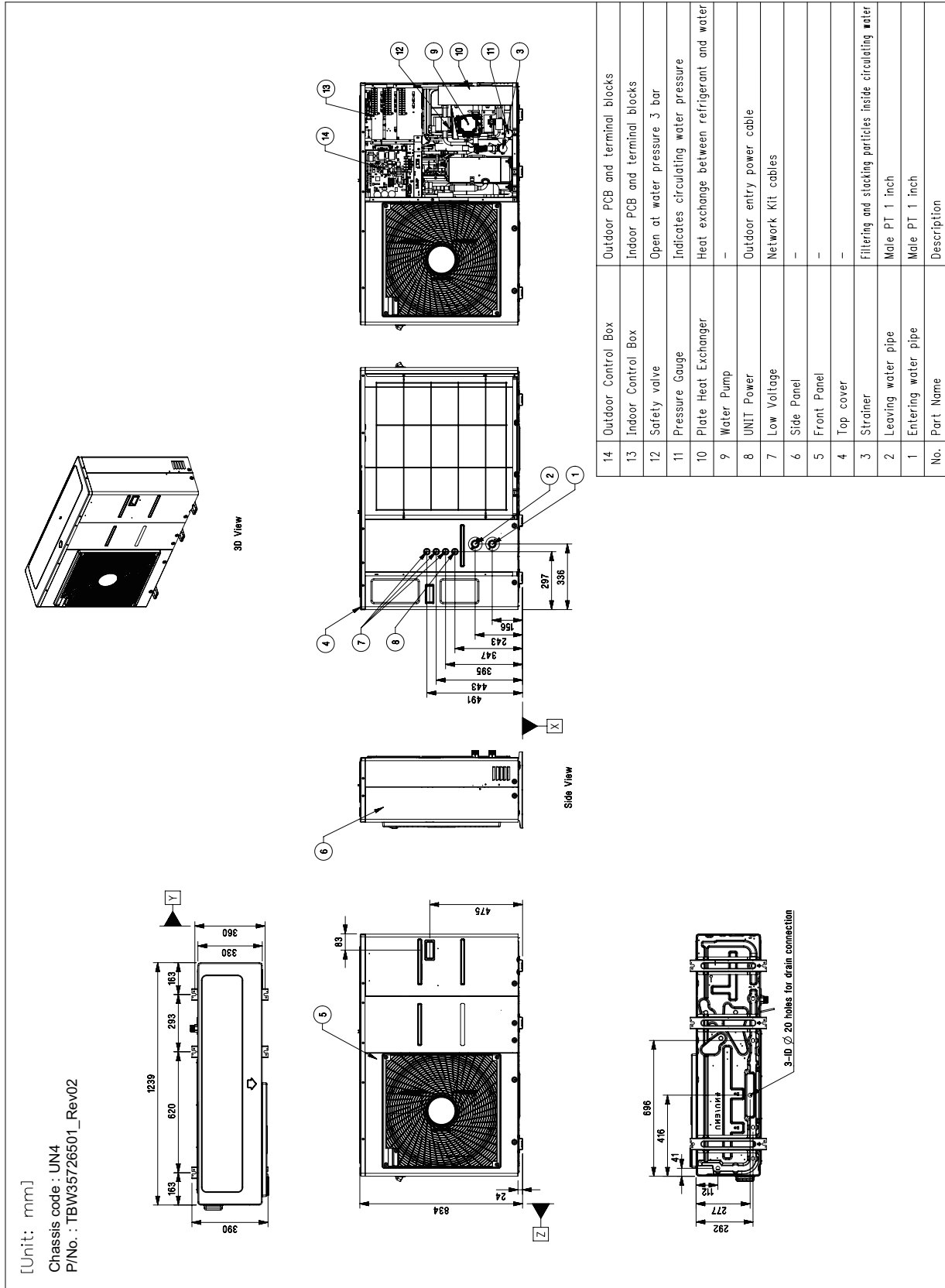
#### Note

1. Due to our policy of innovation some specifications may be changed without notification.
2. Wiring cable size must comply with the applicable local and national codes. And "Electric characteristics" chapter should be considered for electrical work and design. Especially the power cable and circuit breaker should be selected in accordance with that.

# 3. Dimensions

## Product

◆ ZHBW056A0 [HM051M U43] / ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43]



### 3. Dimensions

- ◆ ZHBW126A0 [HM121M U33] / ZHBW146A0 [HM141M U33] / ZHBW166A0 [HM161M U33]  
 ZHBW128A0 [HM123M U33] / ZHBW148A0 [HM143M U33] / ZHBW168A0 [HM163M U33]

[Unit: mm]  
 Chassis code : UN3  
 P/No. : TBW35686501\_Rev02

3D View

Front View

Side View

3 - ID  $\varnothing$  20 holes for drain connection

|     |                      |   |
|-----|----------------------|---|
| 14  | Outdoor Control Box  | Outdoor PCB and terminal blocks                           |
| 13  | Indoor Control Box   | Indoor PCB and terminal blocks                            |
| 12  | Safety valve         | Open at water pressure 3 bar                              |
| 11  | Pressure Gauge       | Indicates circulating water pressure                      |
| 10  | Plate Heat Exchanger | Heat exchange between refrigerant and water               |
| 9   | Water Pump           | -   |
| 8   | UNIT Power           | Outdoor entry power cable                                 |
| 7   | Low Voltage          | Accessory Kit cables                                      |
| 6   | Side Panel           | -   |
| 5   | Front Panel          | -   |
| 4   | Top cover            | -   |
| 3   | Strainer             | Filtering and stacking particles inside circulating water |
| 2   | Leaving water pipe   | Male PT 1 inch  |
| 1   | Entering water pipe  | Male PT 1 inch  |
| No. | Part Name            | Description   |

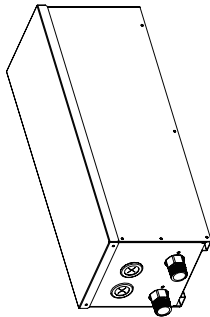
# 3. Dimensions

## Backup Heater

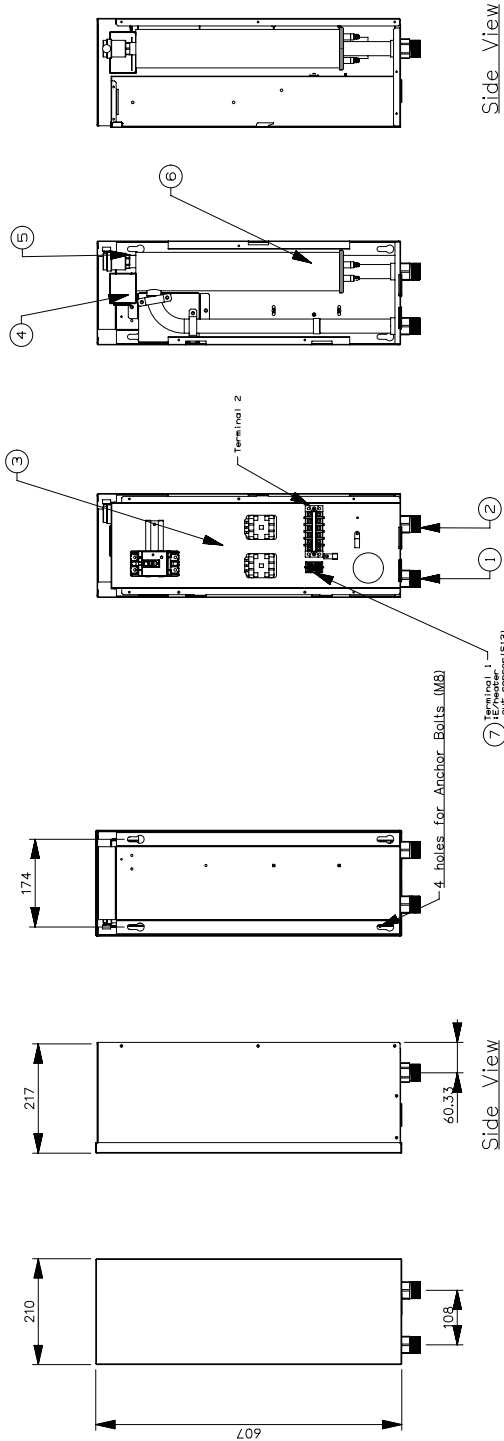
Accessory(Backup Heater)

**Note**

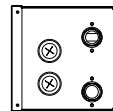
- Unit should be installed in compliance with the installation manual in the product box.
- Unit should be grounded in accordance with the local regulations or applicable national codes.
- All electrical components and materials to be supplied from the site must comply with the local regulations or international codes.



Side View



Side View



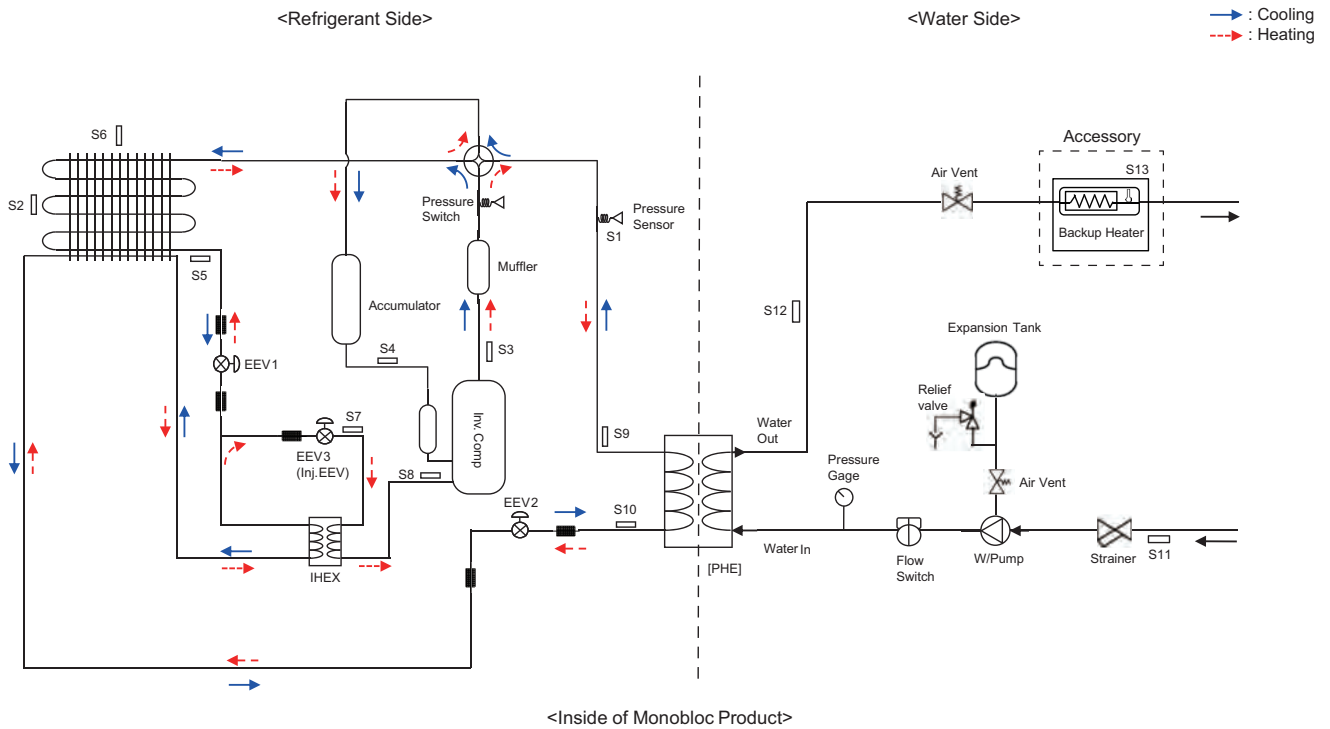
| No. | Part Name                        | Description                                       |
|-----|----------------------------------|---|
| 7   | Backup heater outlet sensor(S13) | Connect to unit heat pump                         |
| 6   | Electric Heater                  | Refer the related information                     |
| 5   | Air vent                         | Air purging when charging water                   |
| 4   | Thermal switch                   | Cut-off power input to E/Heater at 90℃            |
| 3   | Control Box                      | Circuit Breaker, Magnetic Switch, Terminal Blocks |
| 2   | Entering Water Pipe              | Male PT 1 inch                                    |
| 1   | Leaving Water Pipe               | Male PT 1 inch                                    |
|     |                                  |   |

[Unit: mm]

P/No.: TAY37568301

# 4. Piping Diagram

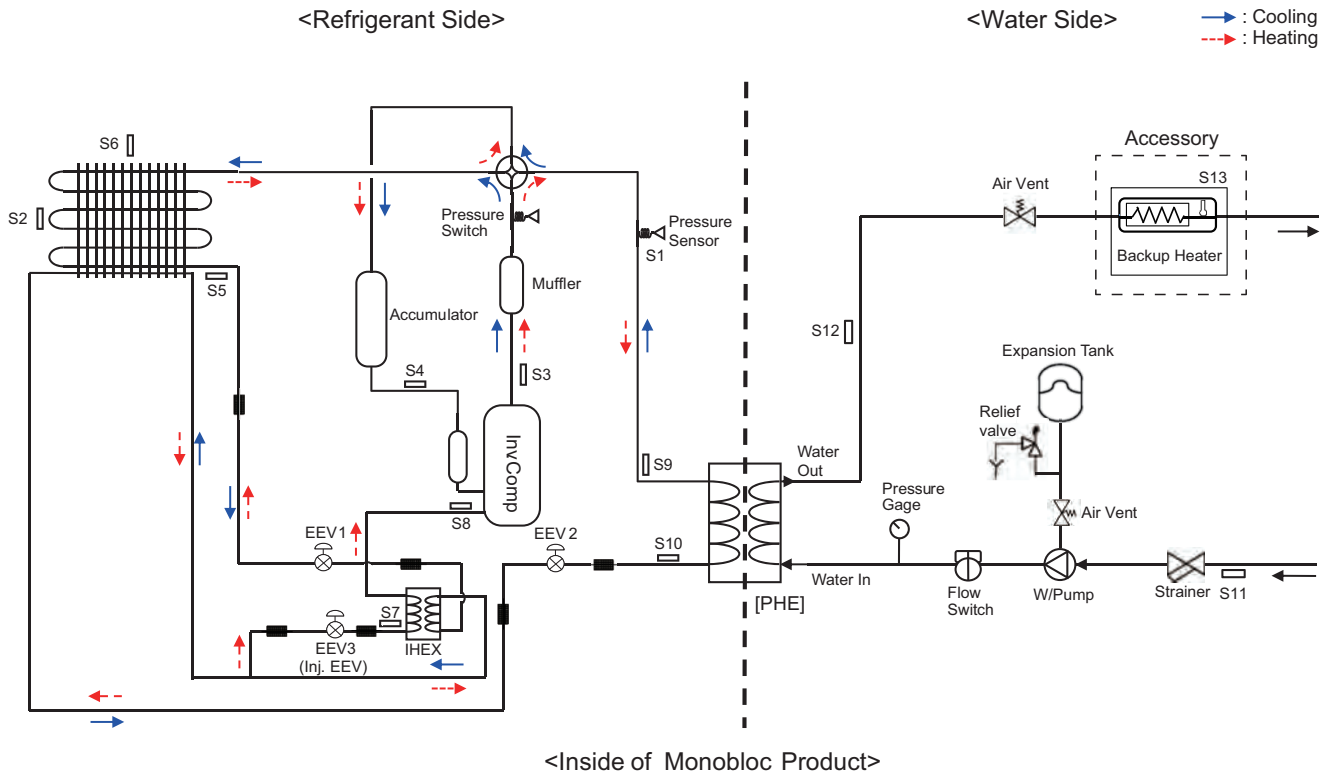
◆ ZHBW056A0 [HM051M U43] / ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43]



| Category         | Symbol | Meaning                                       | PCB Connector |
|------------------|--------|---|---------------|
| Refrigerant side | S9     | PHEX gas temp. sensor                         | CN_PIPE/OUT   |
|                  | S10    | PHEX liquid temp. sensor                      | CN_PIPE/IN    |
|                  | S7     | Inlet IHEX temperature sensor                 | CN_VI_IN      |
|                  | S8     | Outlet IHEX temperature sensor                | CN_VI_OUT     |
|                  | S3     | Compressor-discharge pipe temperature sensor  | CN_DISCHA     |
|                  | S4     | Compressor-suction pipe temperature sensor    | CN_SUCTION    |
|                  | S2     | Outdoor-HEX middle temp. sensor               | CN_MID        |
|                  | S5     | Outdoor-HEX temp. sensor                      | CN_C_PIPE     |
|                  | S6     | Outdoor air temperature sensor                | CN_AIR        |
|                  | EEV1   | Electronic Expansion Valve (Heating)          | CN_EEV1(WH)   |
|                  | EEV2   | Electronic Expansion Valve (Cooling)          | CN_EEV2(BL)   |
| Water Side       | S11    | Inlet water temperature sensor                | CN_TH3        |
|                  | S12    | Outlet water temperature sensor               |               |
|                  | S13    | Electric backup heater outlet (Accessory kit) |               |

# 4. Piping Diagram

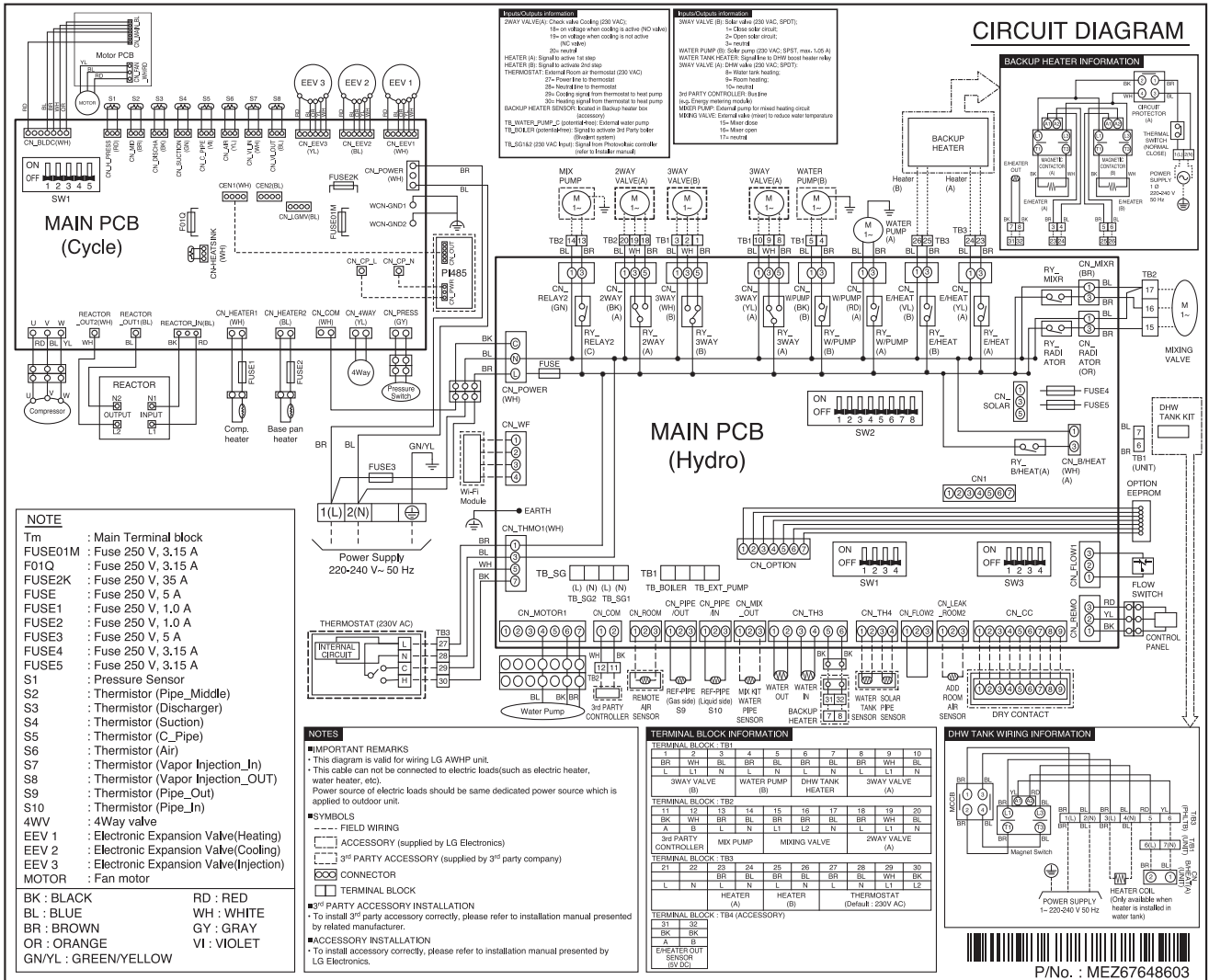
- ◆ ZHBW126A0 [HM121M U33] / ZHBW146A0 [HM141M U33] / ZHBW166A0 [HM161M U33]  
 ZHBW128A0 [HM123M U33] / ZHBW148A0 [HM143M U33] / ZHBW168A0 [HM163M U33]



| Category         | Symbol                                 | Meaning                                       | PCB Connector |
|------------------|--|---|---------------|
| Refrigerant side | S9                                     | PHEX gas temp. sensor                         | CN_PIPE/OUT   |
|                  | S10                                    | PHEX liquid temp. sensor                      | CN_PIPE/IN    |
|                  | S7                                     | Inlet IHEX temperature sensor                 | CN_VI_IN      |
|                  | S8                                     | Outlet IHEX temperature sensor                | CN_VI_OUT     |
|                  | S3                                     | Compressor-discharge pipe temperature sensor  | CN_DISCHA     |
|                  | S4                                     | Compressor-suction pipe temperature sensor    | CN_SUCTION    |
|                  | S2                                     | Outdoor-HEX middle temp. sensor               | CN_MID        |
|                  | S5                                     | Outdoor-HEX temp. sensor                      | CN_C_PIPE     |
|                  | S6                                     | Outdoor air temperature sensor                | CN_AIR        |
|                  | EEV1                                   | Electronic Expansion Valve (Heating)          | CN_EEV1_WH    |
| EEV2             | Electronic Expansion Valve (Cooling)   | CN_EEV2_BL                                    |               |
| EEV3             | Electronic Expansion Valve (Injection) | CN_EEV_MAIN_VI                                |               |
| Water Side       | S11                                    | Inlet water temperature sensor                | CN_TH3        |
|                  | S12                                    | Outlet water temperature sensor               |               |
|                  | S13                                    | Electric backup heater outlet (Accessory kit) |               |

# 5. Wiring Diagram

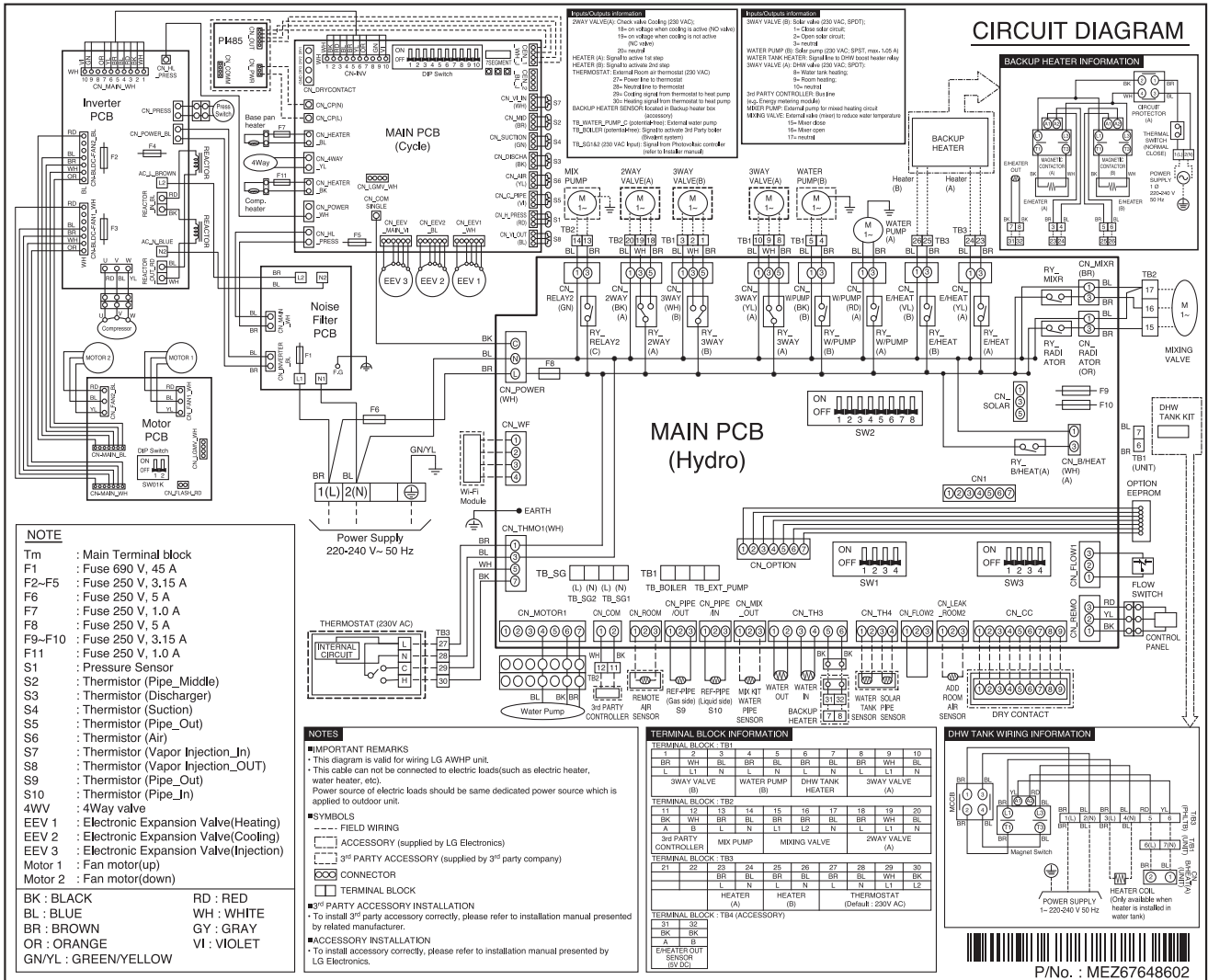
## ◆ ZHBW056A0 [HM051M U43] / ZHBW076A0 [HM071M U43] / ZHBW096A0 [HM091M U43]



P/No. : MEZ67648603

# 5. Wiring Diagram

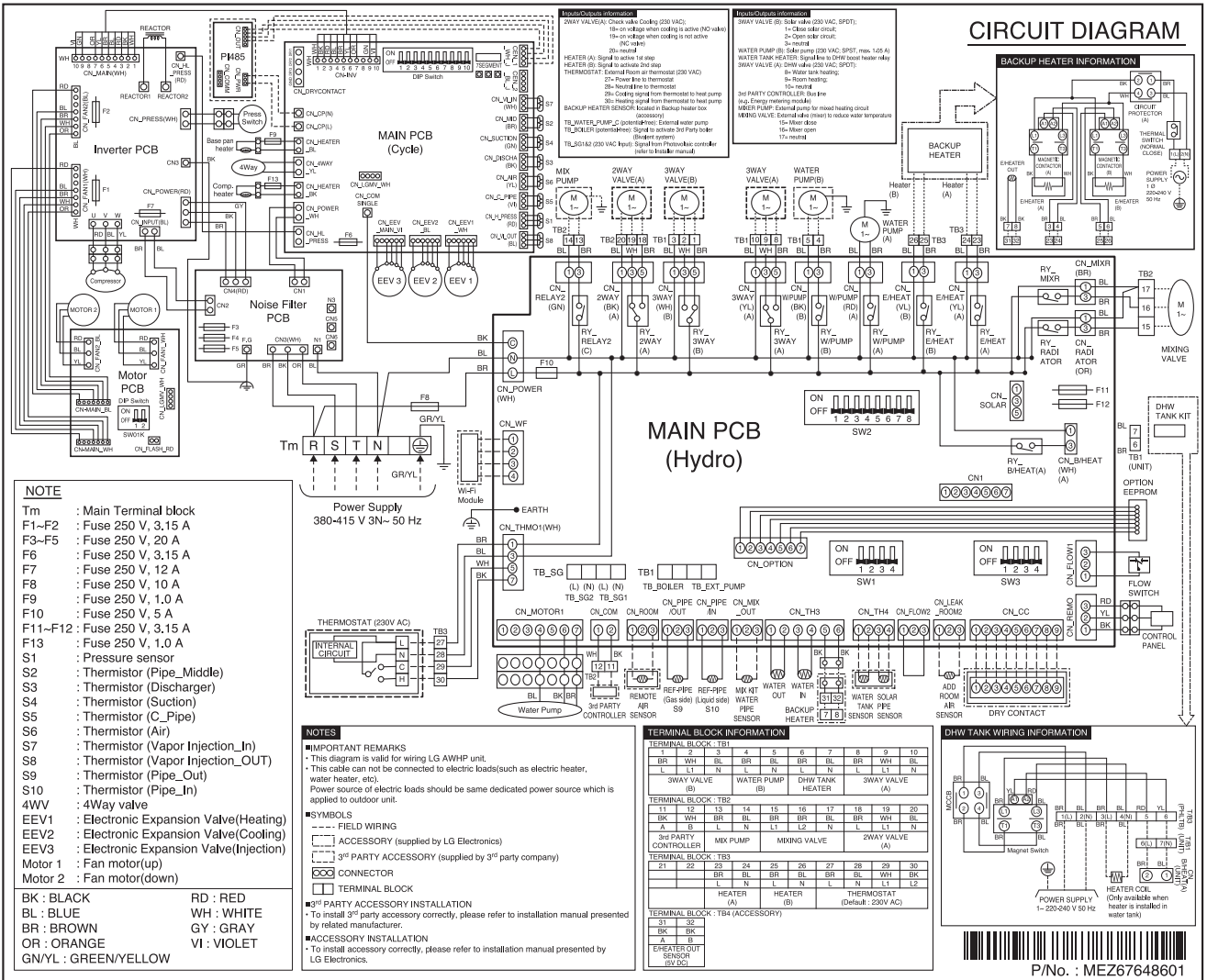
## ◆ ZHBW126A0 [HM121M U33] / ZHBW146A0 [HM141M U33] / ZHBW166A0 [HM161M U33]





# 5. Wiring Diagram

## ◆ ZHBW128A0 [HM123M U33] / ZHBW148A0 [HM143M U33] / ZHBW168A0 [HM163M U33]



P/No. : MEZ67648601

## 6. Performance Data

### 6.1 Cooling Operation

#### ■ Maximum Cooling Capacity

##### ◆ ZHBW056A0 [HM051M U43]

| Outdoor Temperature<br>[°C DB] | Water flow rate 15.8 LPM |      |           |      |           |      |           |      |           |      |           |      |           |      |
|--------------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|                                | LWT 7 °C                 |      | LWT 10 °C |      | LWT 13 °C |      | LWT 15 °C |      | LWT 18 °C |      | LWT 20 °C |      | LWT 22 °C |      |
|                                | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  |
| 10                             | 5.16                     | 4.43 | 5.65      | 4.86 | 6.14      | 5.29 | 6.47      | 5.58 | 6.96      | 6.01 | 7.29      | 6.30 | 7.62      | 6.59 |
| 20                             | 5.29                     | 3.78 | 5.59      | 4.23 | 5.89      | 4.69 | 6.08      | 4.99 | 6.38      | 5.45 | 6.58      | 5.75 | 6.77      | 6.05 |
| 30                             | 5.43                     | 3.13 | 5.53      | 3.60 | 5.63      | 4.08 | 5.69      | 4.40 | 5.79      | 4.88 | 5.86      | 5.20 | 5.92      | 5.52 |
| 35                             | 5.50                     | 2.80 | 5.50      | 3.29 | 5.50      | 3.78 | 5.50      | 4.11 | 5.50      | 4.60 | 5.50      | 4.93 | 5.50      | 5.25 |
| 40                             | 5.57                     | 2.47 | 5.50      | 2.95 | 5.43      | 3.42 | 5.38      | 3.74 | 5.31      | 4.21 | 5.27      | 4.52 | 5.22      | 4.84 |
| 45                             | 5.64                     | 2.15 | 5.50      | 2.60 | 5.36      | 3.06 | 5.27      | 3.36 | 5.13      | 3.82 | 5.04      | 4.12 | 4.94      | 4.42 |

##### ◆ ZHBW076A0 [HM071M U43]

| Outdoor Temperature<br>[°C DB] | Water flow rate 20.1 LPM |      |           |      |           |      |           |      |           |      |           |      |           |      |
|--------------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|                                | LWT 7 °C                 |      | LWT 10 °C |      | LWT 13 °C |      | LWT 15 °C |      | LWT 18 °C |      | LWT 20 °C |      | LWT 22 °C |      |
|                                | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  |
| 10                             | 6.56                     | 4.33 | 7.19      | 4.75 | 7.82      | 5.18 | 8.24      | 5.46 | 8.86      | 5.88 | 9.28      | 6.16 | 9.70      | 6.44 |
| 20                             | 6.74                     | 3.68 | 7.11      | 4.13 | 7.49      | 4.58 | 7.74      | 4.88 | 8.12      | 5.33 | 8.37      | 5.63 | 8.62      | 5.93 |
| 30                             | 6.91                     | 3.03 | 7.04      | 3.50 | 7.16      | 3.98 | 7.25      | 4.30 | 7.37      | 4.78 | 7.46      | 5.09 | 7.54      | 5.41 |
| 35                             | 7.00                     | 2.70 | 7.00      | 3.19 | 7.00      | 3.68 | 7.00      | 4.01 | 7.00      | 4.50 | 7.00      | 4.83 | 7.00      | 5.15 |
| 40                             | 7.09                     | 2.37 | 7.00      | 2.85 | 6.91      | 3.32 | 6.85      | 3.63 | 6.76      | 4.10 | 6.70      | 4.42 | 6.65      | 4.73 |
| 45                             | 7.18                     | 2.05 | 7.00      | 2.50 | 6.82      | 2.95 | 6.70      | 3.25 | 6.53      | 3.70 | 6.41      | 4.01 | 6.29      | 4.31 |

##### ◆ ZHBW096A0 [HM091M U43]

| Outdoor Temperature<br>[°C DB] | Water flow rate 25.9 LPM |      |           |      |           |      |           |      |           |      |           |      |           |      |
|--------------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|                                | LWT 7 °C                 |      | LWT 10 °C |      | LWT 13 °C |      | LWT 15 °C |      | LWT 18 °C |      | LWT 20 °C |      | LWT 22 °C |      |
|                                | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  |
| 10                             | 8.44                     | 4.04 | 9.24      | 4.44 | 10.05     | 4.83 | 10.59     | 5.09 | 11.40     | 5.49 | 11.93     | 5.75 | 12.47     | 6.01 |
| 20                             | 8.66                     | 3.47 | 9.15      | 3.88 | 9.63      | 4.29 | 9.95      | 4.56 | 10.44     | 4.97 | 10.76     | 5.25 | 11.08     | 5.52 |
| 30                             | 8.89                     | 2.89 | 9.05      | 3.32 | 9.21      | 3.74 | 9.32      | 4.03 | 9.48      | 4.46 | 9.59      | 4.74 | 9.69      | 5.03 |
| 35                             | 9.00                     | 2.60 | 9.00      | 3.04 | 9.00      | 3.47 | 9.00      | 3.76 | 9.00      | 4.20 | 9.00      | 4.49 | 9.00      | 4.78 |
| 40                             | 9.11                     | 2.31 | 9.00      | 2.73 | 8.89      | 3.16 | 8.81      | 3.44 | 8.70      | 3.86 | 8.62      | 4.14 | 8.54      | 4.42 |
| 45                             | 9.23                     | 2.02 | 9.00      | 2.43 | 8.77      | 2.84 | 8.62      | 3.11 | 8.39      | 3.52 | 8.24      | 3.79 | 8.09      | 4.06 |

#### Note

1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liters per minute (ℓ/min)
2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
3. Direct interpolation is permissible. Do not extrapolate.
4. Measuring procedure follows EN-14511.
  - Rated values are based on standard conditions, and it can be found on specifications.
  - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
  - In accordance with the test standard(or nations), the results may vary.

## 6. Performance Data

### ◆ ZHBW126A0 [HM121M U33] / ZHBW128A0 [HM123M U33]

| Outdoor Temperature [°C DB] | Water flow rate 34.5 LPM |      |           |      |           |      |           |      |           |      |           |      |           |      |
|-----------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|                             | LWT 7 °C                 |      | LWT 10 °C |      | LWT 13 °C |      | LWT 15 °C |      | LWT 18 °C |      | LWT 20 °C |      | LWT 22 °C |      |
|                             | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  |
| 10                          | 11.25                    | 4.43 | 12.33     | 4.86 | 13.40     | 5.29 | 14.12     | 5.58 | 15.20     | 6.01 | 15.91     | 6.30 | 16.63     | 6.59 |
| 20                          | 11.55                    | 3.74 | 12.20     | 4.20 | 12.84     | 4.67 | 13.27     | 4.98 | 13.92     | 5.45 | 14.35     | 5.76 | 14.78     | 6.07 |
| 30                          | 11.85                    | 3.05 | 12.07     | 3.55 | 12.28     | 4.05 | 12.42     | 4.38 | 12.64     | 4.88 | 12.78     | 5.22 | 12.93     | 5.55 |
| 35                          | 12.00                    | 2.70 | 12.00     | 3.22 | 12.00     | 3.74 | 12.00     | 4.08 | 12.00     | 4.60 | 12.00     | 4.95 | 12.00     | 5.29 |
| 40                          | 12.15                    | 2.35 | 12.00     | 2.85 | 11.85     | 3.35 | 11.75     | 3.68 | 11.59     | 4.17 | 11.49     | 4.50 | 11.39     | 4.83 |
| 45                          | 12.30                    | 2.01 | 12.00     | 2.48 | 11.69     | 2.95 | 11.49     | 3.27 | 11.19     | 3.74 | 10.99     | 4.06 | 10.78     | 4.37 |

### ◆ ZHBW146A0 [HM141M U33] / ZHBW148A0 [HM143M U33]

| Outdoor Temperature [°C DB] | Water flow rate 40.3 LPM |      |           |      |           |      |           |      |           |      |           |      |           |      |
|-----------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|                             | LWT 7 °C                 |      | LWT 10 °C |      | LWT 13 °C |      | LWT 15 °C |      | LWT 18 °C |      | LWT 20 °C |      | LWT 22 °C |      |
|                             | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  |
| 10                          | 13.13                    | 4.14 | 14.38     | 4.54 | 15.64     | 4.95 | 16.47     | 5.22 | 17.73     | 5.62 | 18.57     | 5.89 | 19.40     | 6.16 |
| 20                          | 13.48                    | 3.52 | 14.23     | 3.95 | 14.98     | 4.38 | 15.48     | 4.66 | 16.24     | 5.09 | 16.74     | 5.38 | 17.24     | 5.66 |
| 30                          | 13.83                    | 2.91 | 14.08     | 3.36 | 14.33     | 3.81 | 14.49     | 4.11 | 14.75     | 4.56 | 14.91     | 4.87 | 15.08     | 5.17 |
| 35                          | 14.00                    | 2.60 | 14.00     | 3.06 | 14.00     | 3.53 | 14.00     | 3.84 | 14.00     | 4.30 | 14.00     | 4.61 | 14.00     | 4.92 |
| 40                          | 14.18                    | 2.29 | 14.00     | 2.74 | 13.82     | 3.18 | 13.70     | 3.48 | 13.53     | 3.93 | 13.41     | 4.22 | 13.29     | 4.52 |
| 45                          | 14.35                    | 1.98 | 14.00     | 2.41 | 13.64     | 2.84 | 13.41     | 3.13 | 13.05     | 3.55 | 12.82     | 3.84 | 12.58     | 4.13 |

### ◆ ZHBW166A0 [HM161M U33] / ZHBW168A0 [HM163M U33]

| Outdoor Temperature [°C DB] | Water flow rate 46.0 LPM |      |           |      |           |      |           |      |           |      |           |      |           |      |
|-----------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|-----------|------|
|                             | LWT 7 °C                 |      | LWT 10 °C |      | LWT 13 °C |      | LWT 15 °C |      | LWT 18 °C |      | LWT 20 °C |      | LWT 22 °C |      |
|                             | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC        | COP  |
| 10                          | 15.00                    | 3.85 | 16.43     | 4.23 | 17.87     | 4.60 | 18.83     | 4.85 | 20.26     | 5.23 | 21.22     | 5.48 | 22.17     | 5.73 |
| 20                          | 15.40                    | 3.31 | 16.26     | 3.70 | 17.12     | 4.09 | 17.70     | 4.35 | 18.56     | 4.74 | 19.13     | 5.00 | 19.70     | 5.26 |
| 30                          | 15.80                    | 2.77 | 16.09     | 3.17 | 16.37     | 3.57 | 16.57     | 3.84 | 16.85     | 4.25 | 17.04     | 4.51 | 17.23     | 4.78 |
| 35                          | 16.00                    | 2.50 | 16.00     | 2.91 | 16.00     | 3.32 | 16.00     | 3.59 | 16.00     | 4.00 | 16.00     | 4.27 | 16.00     | 4.55 |
| 40                          | 16.20                    | 2.23 | 16.00     | 2.63 | 15.80     | 3.02 | 15.66     | 3.29 | 15.46     | 3.68 | 15.32     | 3.95 | 15.19     | 4.21 |
| 45                          | 16.40                    | 1.96 | 16.00     | 2.34 | 15.59     | 2.73 | 15.32     | 2.98 | 14.92     | 3.37 | 14.65     | 3.62 | 14.38     | 3.88 |

**Note**

1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liters per minute (ℓ/min)
2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
3. Direct interpolation is permissible. Do not extrapolate.
4. Measuring procedure follows EN-14511.
  - Rated values are based on standard conditions, and it can be found on specifications.
  - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
  - In accordance with the test standard(or nations), the results may vary.

## 6. Performance Data

### 6.2 Heating Operation

#### ■ Maximum Heating Capacity (Include defrost effect)

##### ◆ ZHBW056A0 [HM051M U43]

| Outdoor Temperature<br>[°C DB] | Water flow rate 15.8 LPM |      |           |      |           |      |           |      | Water flow rate 9.9 LPM |      |           |      | Water flow rate 7.9 LPM |      |           |      |
|--------------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|-------------------------|------|-----------|------|-------------------------|------|-----------|------|
|                                | LWT 30 °C                |      | LWT 35 °C |      | LWT 40 °C |      | LWT 45 °C |      | LWT 50 °C               |      | LWT 55 °C |      | LWT 60 °C               |      | LWT 65 °C |      |
|                                | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC                      | COP  | TC        | COP  | TC                      | COP  | TC        | COP  |
| -25                            | 3.79                     | 1.88 | 3.67      | 1.75 | 3.54      | 1.63 | 3.42      | 1.50 | -                       | -    | -         | -    | -                       | -    | -         | -    |
| -20                            | 4.22                     | 2.51 | 4.09      | 2.01 | 3.96      | 1.86 | 3.83      | 1.72 | 3.70                    | 1.57 | -         | -    | -                       | -    | -         | -    |
| -15                            | 4.66                     | 2.42 | 4.52      | 2.27 | 4.38      | 2.10 | 4.25      | 1.93 | 4.11                    | 1.77 | 3.97      | 1.60 | -                       | -    | -         | -    |
| -7                             | 5.50                     | 3.18 | 5.50      | 2.99 | 5.50      | 2.79 | 5.50      | 2.60 | 5.50                    | 2.41 | 5.50      | 2.21 | 5.50                    | 2.02 | -         | -    |
| -4                             | 5.50                     | 3.36 | 5.50      | 3.14 | 5.50      | 2.93 | 5.50      | 2.71 | 5.50                    | 2.49 | 5.50      | 2.28 | 5.50                    | 2.06 | 5.50      | 1.91 |
| -2                             | 5.50                     | 3.51 | 5.50      | 3.25 | 5.50      | 3.04 | 5.50      | 2.83 | 5.50                    | 2.63 | 5.50      | 2.42 | 5.50                    | 2.21 | 5.50      | 2.01 |
| 2                              | 5.50                     | 3.52 | 5.50      | 3.45 | 5.50      | 3.25 | 5.50      | 3.04 | 5.50                    | 2.83 | 5.50      | 2.63 | 5.50                    | 2.42 | 5.50      | 2.21 |
| 7                              | 5.50                     | 4.84 | 5.50      | 4.50 | 5.50      | 4.16 | 5.50      | 3.82 | 5.50                    | 3.49 | 5.50      | 2.70 | 5.50                    | 2.59 | 5.50      | 2.47 |
| 10                             | 5.50                     | 5.14 | 5.50      | 4.78 | 5.50      | 4.42 | 5.50      | 4.06 | 5.50                    | 3.70 | 5.50      | 3.35 | 5.50                    | 2.99 | 5.50      | 2.63 |
| 15                             | 5.50                     | 6.12 | 5.50      | 5.66 | 5.50      | 5.20 | 5.50      | 4.73 | 5.50                    | 4.27 | 5.50      | 3.81 | 5.50                    | 3.35 | 5.50      | 2.88 |
| 18                             | 5.50                     | 6.45 | 5.50      | 5.96 | 5.50      | 5.48 | 5.50      | 4.99 | 5.50                    | 4.50 | 5.50      | 4.01 | 5.50                    | 3.53 | 5.50      | 3.04 |
| 20                             | 5.50                     | 6.67 | 5.50      | 6.17 | 5.50      | 5.66 | 5.50      | 5.16 | 5.50                    | 4.65 | 5.50      | 4.15 | 5.50                    | 3.65 | 5.50      | 3.14 |
| 35                             | 5.50                     | 8.31 | 5.50      | 7.68 | 5.50      | 7.05 | 5.50      | 6.43 | 5.50                    | 5.80 | 5.50      | 5.17 | 5.50                    | 4.54 | 5.50      | 3.91 |

##### ◆ ZHBW076A0 [HM071M U43]

| Outdoor Temperature<br>[°C DB] | Water flow rate 20.1 LPM |      |           |      |           |      |           |      | Water flow rate 12.6 LPM |      |           |      | Water flow rate 10.0 LPM |      |           |      |
|--------------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|--------------------------|------|-----------|------|--------------------------|------|-----------|------|
|                                | LWT 30 °C                |      | LWT 35 °C |      | LWT 40 °C |      | LWT 45 °C |      | LWT 50 °C                |      | LWT 55 °C |      | LWT 60 °C                |      | LWT 65 °C |      |
|                                | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC                       | COP  | TC        | COP  | TC                       | COP  | TC        | COP  |
| -25                            | 4.82                     | 1.99 | 4.67      | 1.73 | 4.51      | 1.48 | 4.36      | 1.22 | -                        | -    | -         | -    | -                        | -    | -         | -    |
| -20                            | 5.38                     | 2.47 | 5.21      | 1.98 | 5.05      | 1.77 | 4.88      | 1.56 | 4.72                     | 1.35 | -         | -    | -                        | -    | -         | -    |
| -15                            | 5.93                     | 2.38 | 5.76      | 2.22 | 5.58      | 2.06 | 5.41      | 1.90 | 5.23                     | 1.74 | 5.06      | 1.58 | -                        | -    | -         | -    |
| -7                             | 7.00                     | 3.15 | 7.00      | 2.96 | 7.00      | 2.77 | 7.00      | 2.58 | 7.00                     | 2.38 | 7.00      | 2.19 | 7.00                     | 2.00 | -         | -    |
| -4                             | 7.00                     | 3.33 | 7.00      | 3.11 | 7.00      | 2.90 | 7.00      | 2.68 | 7.00                     | 2.47 | 7.00      | 2.25 | 7.00                     | 2.04 | 7.00      | 1.89 |
| -2                             | 7.00                     | 3.51 | 7.00      | 3.21 | 7.00      | 3.01 | 7.00      | 2.81 | 7.00                     | 2.60 | 7.00      | 2.40 | 7.00                     | 2.19 | 7.00      | 1.99 |
| 2                              | 7.00                     | 3.52 | 7.00      | 3.42 | 7.00      | 3.21 | 7.00      | 3.01 | 7.00                     | 2.81 | 7.00      | 2.60 | 7.00                     | 2.40 | 7.00      | 2.19 |
| 7                              | 7.00                     | 4.69 | 7.00      | 4.50 | 7.00      | 4.16 | 7.00      | 3.82 | 7.00                     | 3.47 | 7.00      | 2.68 | 7.00                     | 2.57 | 7.00      | 2.45 |
| 10                             | 7.00                     | 5.14 | 7.00      | 4.78 | 7.00      | 4.42 | 7.00      | 4.05 | 7.00                     | 3.69 | 7.00      | 3.33 | 7.00                     | 2.96 | 7.00      | 2.60 |
| 15                             | 7.00                     | 6.02 | 7.00      | 5.57 | 7.00      | 5.12 | 7.00      | 4.67 | 7.00                     | 4.21 | 7.00      | 3.76 | 7.00                     | 3.31 | 7.00      | 2.86 |
| 18                             | 7.00                     | 6.34 | 7.00      | 5.87 | 7.00      | 5.39 | 7.00      | 4.92 | 7.00                     | 4.44 | 7.00      | 3.96 | 7.00                     | 3.49 | 7.00      | 3.01 |
| 20                             | 7.00                     | 6.56 | 7.00      | 6.07 | 7.00      | 5.57 | 7.00      | 5.08 | 7.00                     | 4.59 | 7.00      | 4.10 | 7.00                     | 3.60 | 7.00      | 3.11 |
| 35                             | 7.00                     | 8.17 | 7.00      | 7.56 | 7.00      | 6.95 | 7.00      | 6.33 | 7.00                     | 5.72 | 7.00      | 5.10 | 7.00                     | 4.49 | 7.00      | 3.88 |

##### ◆ ZHBW096A0 [HM091M U43]

| Outdoor Temperature<br>[°C DB] | Water flow rate 25.9 LPM |      |           |      |           |      |           |      | Water flow rate 16.2 LPM |      |           |      | Water flow rate 12.9 LPM |      |           |      |
|--------------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|--------------------------|------|-----------|------|--------------------------|------|-----------|------|
|                                | LWT 30 °C                |      | LWT 35 °C |      | LWT 40 °C |      | LWT 45 °C |      | LWT 50 °C                |      | LWT 55 °C |      | LWT 60 °C                |      | LWT 65 °C |      |
|                                | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC                       | COP  | TC        | COP  | TC                       | COP  | TC        | COP  |
| -25                            | 6.20                     | 1.95 | 6.00      | 1.70 | 5.80      | 1.45 | 5.60      | 1.20 | -                        | -    | -         | -    | -                        | -    | -         | -    |
| -20                            | 6.91                     | 2.45 | 6.70      | 1.96 | 6.49      | 1.75 | 6.28      | 1.54 | 6.06                     | 1.33 | -         | -    | -                        | -    | -         | -    |
| -15                            | 7.63                     | 2.39 | 7.40      | 2.22 | 7.18      | 2.05 | 6.95      | 1.89 | 6.73                     | 1.72 | 6.50      | 1.55 | -                        | -    | -         | -    |
| -7                             | 9.00                     | 3.09 | 9.00      | 2.90 | 9.00      | 2.71 | 9.00      | 2.53 | 9.00                     | 2.34 | 9.00      | 2.15 | 9.00                     | 1.96 | -         | -    |
| -4                             | 9.00                     | 3.26 | 9.00      | 3.05 | 9.00      | 2.84 | 9.00      | 2.63 | 9.00                     | 2.42 | 9.00      | 2.21 | 9.00                     | 2.00 | 9.00      | 1.85 |
| -2                             | 9.00                     | 3.51 | 9.00      | 3.15 | 9.00      | 2.95 | 9.00      | 2.75 | 9.00                     | 2.55 | 9.00      | 2.35 | 9.00                     | 2.15 | 9.00      | 1.95 |
| 2                              | 9.00                     | 3.52 | 9.00      | 3.35 | 9.00      | 3.15 | 9.00      | 2.95 | 9.00                     | 2.75 | 9.00      | 2.55 | 9.00                     | 2.35 | 9.00      | 2.15 |
| 7                              | 9.00                     | 4.70 | 9.00      | 4.18 | 9.00      | 3.88 | 9.00      | 3.59 | 9.00                     | 3.29 | 9.00      | 2.66 | 9.00                     | 2.53 | 9.00      | 2.40 |
| 10                             | 9.00                     | 4.76 | 9.00      | 4.44 | 9.00      | 4.13 | 9.00      | 3.81 | 9.00                     | 3.50 | 9.00      | 3.18 | 9.00                     | 2.87 | 9.00      | 2.55 |
| 15                             | 9.00                     | 6.07 | 9.00      | 5.60 | 9.00      | 5.13 | 9.00      | 4.67 | 9.00                     | 4.20 | 9.00      | 3.73 | 9.00                     | 3.27 | 9.00      | 2.80 |
| 18                             | 9.00                     | 6.39 | 9.00      | 5.90 | 9.00      | 5.41 | 9.00      | 4.92 | 9.00                     | 4.43 | 9.00      | 3.93 | 9.00                     | 3.44 | 9.00      | 2.95 |
| 20                             | 9.00                     | 6.61 | 9.00      | 6.10 | 9.00      | 5.59 | 9.00      | 5.08 | 9.00                     | 4.58 | 9.00      | 4.07 | 9.00                     | 3.56 | 9.00      | 3.05 |
| 35                             | 9.00                     | 8.23 | 9.00      | 7.60 | 9.00      | 6.97 | 9.00      | 6.33 | 9.00                     | 5.70 | 9.00      | 5.07 | 9.00                     | 4.43 | 9.00      | 3.80 |

**Note**

1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liters per minute (ℓ/min)
2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
3. Direct interpolation is permissible. Do not extrapolate.
4. Measuring procedure follows EN-14511.
  - Rated values are based on standard conditions, and it can be found on specifications.
  - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
  - In accordance with the test standard(or nations), the results may vary.
5. The shaded areas are not guaranteed continuous operation.

# 6. Performance Data

## ◆ ZHBW126A0 [HM121M U33] / ZHBW128A0 [HM123M U33]

| Outdoor Temperature [°C DB] | Water flow rate 34.5 LPM |      |           |      |           |      |           |      | Water flow rate 21.6 LPM |      |           |      | Water flow rate 17.3 LPM |      |           |      |
|-----------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|--------------------------|------|-----------|------|--------------------------|------|-----------|------|
|                             | LWT 30 °C                |      | LWT 35 °C |      | LWT 40 °C |      | LWT 45 °C |      | LWT 50 °C                |      | LWT 55 °C |      | LWT 60 °C                |      | LWT 65 °C |      |
|                             | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC                       | COP  | TC        | COP  | TC                       | COP  | TC        | COP  |
| -25                         | 8.75                     | 2.13 | 8.50      | 1.85 | 8.25      | 1.58 | 8.00      | 1.30 | -                        | -    | -         | -    | -                        | -    | -         | -    |
| -20                         | 10.13                    | 2.34 | 10.00     | 2.13 | 9.88      | 1.91 | 9.75      | 1.70 | 9.63                     | 1.49 | -         | -    | -                        | -    | -         | -    |
| -15                         | 11.50                    | 2.55 | 11.50     | 2.40 | 11.50     | 2.25 | 11.50     | 2.10 | 11.50                    | 1.95 | 11.50     | 1.80 | -                        | -    | -         | -    |
| -7                          | 12.00                    | 3.15 | 12.00     | 3.00 | 12.00     | 2.85 | 12.00     | 2.70 | 12.00                    | 2.55 | 12.00     | 2.40 | 12.00                    | 2.25 | -         | -    |
| -4                          | 12.00                    | 3.36 | 12.00     | 3.17 | 12.00     | 2.97 | 12.00     | 2.78 | 12.00                    | 2.59 | 12.00     | 2.39 | 12.00                    | 2.20 | 12.00     | 2.05 |
| -2                          | 12.00                    | 3.47 | 12.00     | 3.28 | 12.00     | 3.09 | 12.00     | 2.90 | 12.00                    | 2.71 | 12.00     | 2.53 | 12.00                    | 2.34 | 12.00     | 2.15 |
| 2                           | 12.00                    | 3.69 | 12.00     | 3.50 | 12.00     | 3.31 | 12.00     | 3.12 | 12.00                    | 2.93 | 12.00     | 2.73 | 12.00                    | 2.54 | 12.00     | 2.35 |
| 7                           | 12.00                    | 4.93 | 12.00     | 4.60 | 12.00     | 4.27 | 12.00     | 3.93 | 12.00                    | 3.60 | 12.00     | 2.80 | 12.00                    | 2.60 | 12.00     | 2.60 |
| 10                          | 12.00                    | 5.22 | 12.00     | 4.87 | 12.00     | 4.51 | 12.00     | 4.16 | 12.00                    | 3.81 | 12.00     | 3.46 | 12.00                    | 3.10 | 12.00     | 2.75 |
| 15                          | 12.00                    | 5.99 | 12.00     | 5.56 | 12.00     | 5.13 | 12.00     | 4.71 | 12.00                    | 4.28 | 12.00     | 3.85 | 12.00                    | 3.43 | 12.00     | 3.00 |
| 18                          | 12.00                    | 6.29 | 12.00     | 5.84 | 12.00     | 5.39 | 12.00     | 4.94 | 12.00                    | 4.49 | 12.00     | 4.05 | 12.00                    | 3.60 | 12.00     | 3.15 |
| 20                          | 12.00                    | 6.49 | 12.00     | 6.02 | 12.00     | 5.56 | 12.00     | 5.10 | 12.00                    | 4.64 | 12.00     | 4.17 | 12.00                    | 3.71 | 12.00     | 3.25 |
| 35                          | 12.00                    | 7.98 | 12.00     | 7.41 | 12.00     | 6.84 | 12.00     | 6.28 | 12.00                    | 5.71 | 12.00     | 5.14 | 12.00                    | 4.57 | 12.00     | 4.00 |

## ◆ ZHBW146A0 [HM141M U33] / ZHBW148A0 [HM143M U33]

| Outdoor Temperature [°C DB] | Water flow rate 40.3 LPM |      |           |      |           |      |           |      | Water flow rate 25.2 LPM |      |           |      | Water flow rate 20.1 LPM |      |           |      |
|-----------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|--------------------------|------|-----------|------|--------------------------|------|-----------|------|
|                             | LWT 30 °C                |      | LWT 35 °C |      | LWT 40 °C |      | LWT 45 °C |      | LWT 50 °C                |      | LWT 55 °C |      | LWT 60 °C                |      | LWT 65 °C |      |
|                             | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC                       | COP  | TC        | COP  | TC                       | COP  | TC        | COP  |
| -25                         | 9.25                     | 2.08 | 9.00      | 1.80 | 8.75      | 1.53 | 8.50      | 1.25 | -                        | -    | -         | -    | -                        | -    | -         | -    |
| -20                         | 10.63                    | 2.26 | 10.50     | 2.05 | 10.38     | 1.84 | 10.25     | 1.63 | 10.13                    | 1.41 | -         | -    | -                        | -    | -         | -    |
| -15                         | 12.00                    | 2.45 | 12.00     | 2.30 | 12.00     | 2.15 | 12.00     | 2.00 | 12.00                    | 1.85 | 12.00     | 1.70 | -                        | -    | -         | -    |
| -7                          | 14.00                    | 3.12 | 14.00     | 2.95 | 14.00     | 2.79 | 14.00     | 2.63 | 14.00                    | 2.46 | 14.00     | 2.30 | 14.00                    | 2.14 | -         | -    |
| -4                          | 14.00                    | 3.30 | 14.00     | 3.10 | 14.00     | 2.90 | 14.00     | 2.70 | 14.00                    | 2.50 | 14.00     | 2.30 | 14.00                    | 2.10 | 14.00     | 1.95 |
| -2                          | 14.00                    | 3.39 | 14.00     | 3.20 | 14.00     | 3.01 | 14.00     | 2.82 | 14.00                    | 2.63 | 14.00     | 2.43 | 14.00                    | 2.24 | 14.00     | 2.05 |
| 2                           | 14.00                    | 3.65 | 14.00     | 3.40 | 14.00     | 3.21 | 14.00     | 3.02 | 14.00                    | 2.83 | 14.00     | 2.63 | 14.00                    | 2.44 | 14.00     | 2.25 |
| 7                           | 14.00                    | 4.83 | 14.00     | 4.50 | 14.00     | 4.17 | 14.00     | 3.83 | 14.00                    | 3.50 | 14.00     | 2.78 | 14.00                    | 2.50 | 14.00     | 2.50 |
| 10                          | 14.00                    | 5.12 | 14.00     | 4.77 | 14.00     | 4.42 | 14.00     | 4.06 | 14.00                    | 3.71 | 14.00     | 3.36 | 14.00                    | 3.00 | 14.00     | 2.65 |
| 15                          | 14.00                    | 6.02 | 14.00     | 5.57 | 14.00     | 5.13 | 14.00     | 4.68 | 14.00                    | 4.24 | 14.00     | 3.79 | 14.00                    | 3.35 | 14.00     | 2.90 |
| 18                          | 14.00                    | 6.33 | 14.00     | 5.86 | 14.00     | 5.39 | 14.00     | 4.92 | 14.00                    | 4.45 | 14.00     | 3.99 | 14.00                    | 3.52 | 14.00     | 3.05 |
| 20                          | 14.00                    | 6.53 | 14.00     | 6.05 | 14.00     | 5.57 | 14.00     | 5.08 | 14.00                    | 4.60 | 14.00     | 4.12 | 14.00                    | 3.63 | 14.00     | 3.15 |
| 35                          | 14.00                    | 8.09 | 14.00     | 7.49 | 14.00     | 6.89 | 14.00     | 6.29 | 14.00                    | 5.70 | 14.00     | 5.10 | 14.00                    | 4.50 | 14.00     | 3.90 |

## ◆ ZHBW166A0 [HM161M U33] / ZHBW168A0 [HM163M U33]

| Outdoor Temperature [°C DB] | Water flow rate 46.0 LPM |      |           |      |           |      |           |      | Water flow rate 28.8 LPM |      |           |      | Water flow rate 23.0 LPM |      |           |      |
|-----------------------------|--------------------------|------|-----------|------|-----------|------|-----------|------|--------------------------|------|-----------|------|--------------------------|------|-----------|------|
|                             | LWT 30 °C                |      | LWT 35 °C |      | LWT 40 °C |      | LWT 45 °C |      | LWT 50 °C                |      | LWT 55 °C |      | LWT 60 °C                |      | LWT 65 °C |      |
|                             | TC                       | COP  | TC        | COP  | TC        | COP  | TC        | COP  | TC                       | COP  | TC        | COP  | TC                       | COP  | TC        | COP  |
| -25                         | 10.50                    | 1.96 | 10.00     | 1.70 | 9.50      | 1.44 | 9.00      | 1.18 | -                        | -    | -         | -    | -                        | -    | -         | -    |
| -20                         | 12.30                    | 2.33 | 11.75     | 1.94 | 11.44     | 1.74 | 11.13     | 1.55 | 10.75                    | 1.34 | -         | -    | -                        | -    | -         | -    |
| -15                         | 14.10                    | 2.70 | 13.50     | 2.18 | 13.38     | 2.05 | 13.25     | 1.92 | 13.13                    | 1.78 | 13.00     | 1.65 | -                        | -    | -         | -    |
| -7                          | 16.00                    | 2.96 | 16.00     | 2.80 | 16.00     | 2.64 | 16.00     | 2.48 | 16.00                    | 2.31 | 16.00     | 2.15 | 16.00                    | 1.99 | -         | -    |
| -4                          | 16.00                    | 3.18 | 16.00     | 2.98 | 16.00     | 2.79 | 16.00     | 2.59 | 16.00                    | 2.40 | 16.00     | 2.20 | 16.00                    | 2.01 | 16.00     | 1.79 |
| -2                          | 16.00                    | 3.51 | 16.00     | 3.11 | 16.00     | 2.90 | 16.00     | 2.70 | 16.00                    | 2.50 | 16.00     | 2.30 | 16.00                    | 2.10 | 16.00     | 1.90 |
| 2                           | 16.00                    | 3.52 | 16.00     | 3.35 | 16.00     | 3.14 | 16.00     | 2.93 | 16.00                    | 2.73 | 16.00     | 2.52 | 16.00                    | 2.31 | 16.00     | 2.10 |
| 7                           | 16.00                    | 4.74 | 16.00     | 4.40 | 16.00     | 4.06 | 16.00     | 3.72 | 16.00                    | 3.38 | 16.00     | 2.75 | 16.00                    | 2.40 | 16.00     | 2.36 |
| 10                          | 16.00                    | 5.05 | 16.00     | 4.69 | 16.00     | 4.33 | 16.00     | 3.96 | 16.00                    | 3.60 | 16.00     | 3.24 | 16.00                    | 2.88 | 16.00     | 2.51 |
| 15                          | 16.00                    | 5.67 | 16.00     | 5.54 | 16.00     | 5.08 | 16.00     | 4.62 | 16.00                    | 4.16 | 16.00     | 3.69 | 16.00                    | 3.23 | 16.00     | 2.77 |
| 18                          | 16.00                    | 6.34 | 16.00     | 5.85 | 16.00     | 5.36 | 16.00     | 4.87 | 16.00                    | 4.39 | 16.00     | 3.90 | 16.00                    | 3.41 | 16.00     | 2.93 |
| 20                          | 16.00                    | 6.56 | 16.00     | 6.05 | 16.00     | 5.55 | 16.00     | 5.05 | 16.00                    | 4.54 | 16.00     | 4.04 | 16.00                    | 3.53 | 16.00     | 3.03 |
| 35                          | 16.00                    | 8.23 | 16.00     | 7.60 | 16.00     | 6.96 | 16.00     | 6.33 | 16.00                    | 5.70 | 16.00     | 5.07 | 16.00                    | 4.43 | 16.00     | 3.80 |

**Note**

1. DB : Dry bulb temperature(°C), LWT : Leaving water temperature(°C), LPM : Liters per minute (l/min)
2. TC : Total capacity(kW), COP : Coefficient of performance (kW/kW)
3. Direct interpolation is permissible. Do not extrapolate.
4. Measuring procedure follows EN-14511.
  - Rated values are based on standard conditions, and it can be found on specifications.
  - Above table values may not be matched according to installation condition. Except for rated value, the performance is not guaranteed.
  - In accordance with the test standard(or nations), the results may vary.
5. The shaded areas are not guaranteed continuous operation.

## 7. Electric Characteristics

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### ■ Wiring of Main Power Supply and Equipment Capacity

1. Bear in mind ambient conditions (ambient temperature, direct sunlight, rain liquid, etc.) when proceeding with the wiring and connections
  2. The wire size is the minimum value for metal conduit wiring. The power cord size should be 1 rank thicker taking into account the line voltage drops. Make sure the power-supply voltage does not drop more than 10%.
  3. Specific wiring requirements should adhere to the wiring regulations of the region.
  4. Power supply cords of parts of appliances for outdoor use should not be lighter than polychloroprene sheathed flexible cord.
  5. Don't install an individual switch or electrical outlet to disconnect each of indoor unit separately from the power supply.
- 

### WARNING

- Follow ordinance of your governmental organization for technical standard related to electrical equipment, wiring regulations and guidance of each electric power company.
  - Make sure to use specified wires for connections so that no external force is imparted to terminal connections. If connections are not fixed firmly, it may cause heating or fire.
  - Make sure to use the appropriate type of overcurrent protection switch. Note that generated overcurrent may include some amount of direct current.
- 

### CAUTION

- Some installation site may require attachment of an earth leakage breaker. If no earth leakage breaker is installed, it may cause an electric shock.
  - Do not use anything other than breaker and fuse with correct capacity. Using fuse and wire or copper wire with too large capacity may cause a malfunction of unit or fire.
-

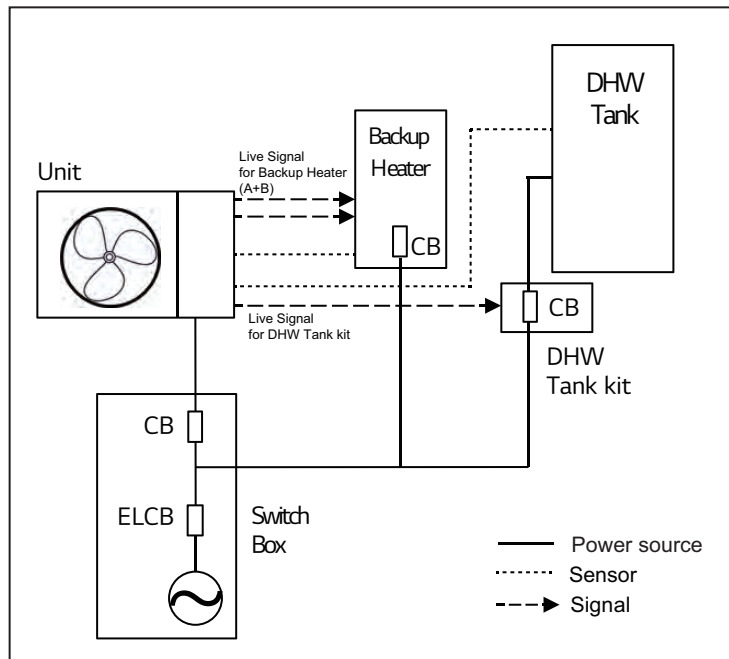
# 7. Electric Characteristics

| Outdoor Unit           | Phase / Volts / Hz      | Voltage range            |
|------------------------|-------------------------|--------------------------|
| ZHBW056A0 [HM051M U43] | 1 Ø / 220-240 V / 50 Hz | Min. : 198<br>Max. : 264 |
| ZHBW076A0 [HM071M U43] |                         |                          |
| ZHBW096A0 [HM091M U43] |                         |                          |
| ZHBW126A0 [HM121M U33] |                         |                          |
| ZHBW146A0 [HM141M U33] |                         |                          |
| ZHBW166A0 [HM161M U33] | 3 Ø / 380-415 V / 50 Hz | Min. : 342<br>Max. : 457 |
| ZHBW128A0 [HM123M U33] |                         |                          |
| ZHBW148A0 [HM143M U33] |                         |                          |
| ZHBW168A0 [HM163M U33] |                         |                          |

| Backup Heater       | Power Supply for Heater |               |
|---------------------|-------------------------|---------------|
|                     | Phase / Volts / Hz      | Capacity (kW) |
| AEH036A [HA031M E1] | 1 Ø / 220-240 V / 50 Hz | 3             |
| AEH066A [HA061M E1] |                         | 3+3           |

| DHW Boost Heater                          | Power Supply for DHW Boost Heater |               |
|---|-----------------------------------|---------------|
|   | Phase / Volts / Hz                | Capacity (kW) |
| Integral part of DHW tanks [OSHW-x00F(D)] | 1 Ø / 220-240 V / 50 Hz           | 2.4           |

**[Power Supply for Heat pump, Backup heater and DHW boost heater]**



**Note**

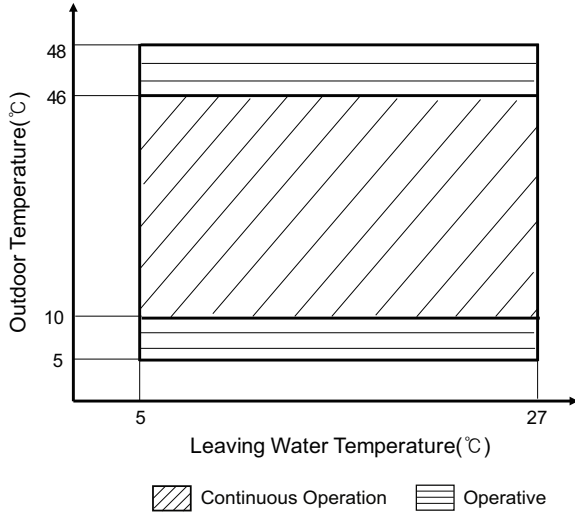
1. Voltage supplied to the unit terminals should be within the minimum and maximum range.
2. Maximum allowable voltage unbalance between phase is 2%.

# 8. Operation Range

## ■ Cooling

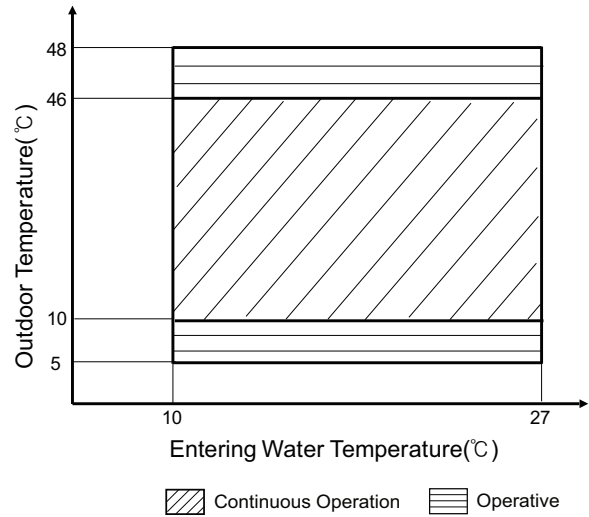
### Cooling

(Settings : Outlet temp. control / Fan coil unit used)



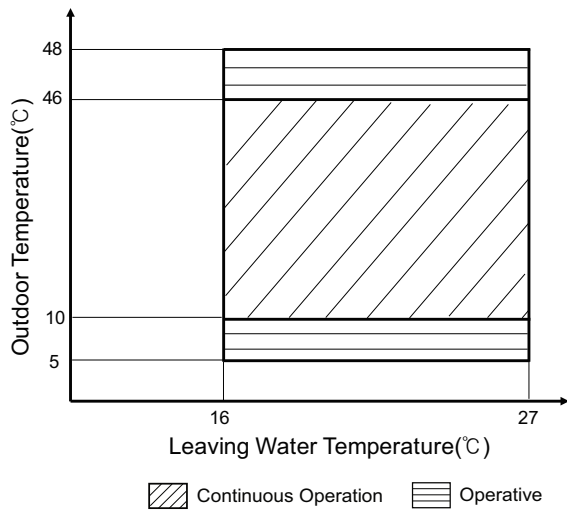
### Cooling

(Settings : Inlet temp. control / Fan coil unit used)



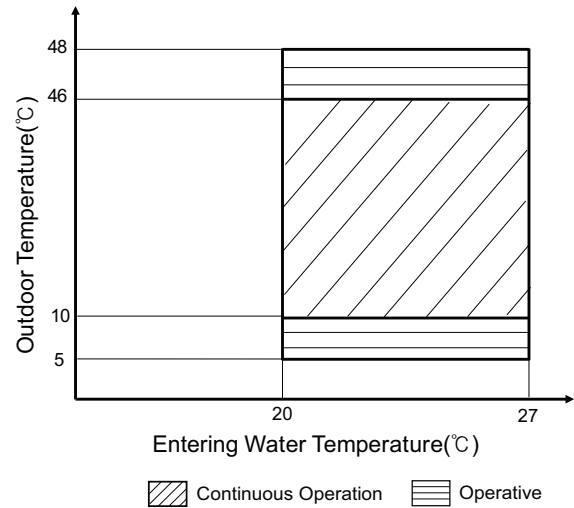
### Cooling

(Settings : Outlet temp. control / Fan coil unit not used)



### Cooling

(Settings : Inlet temp. control / Fan coil unit not used)



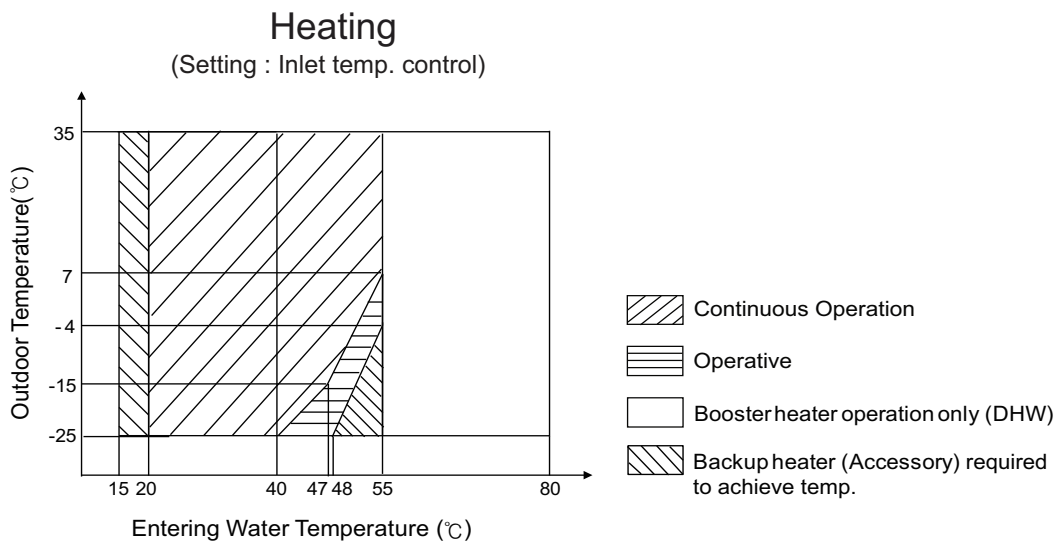
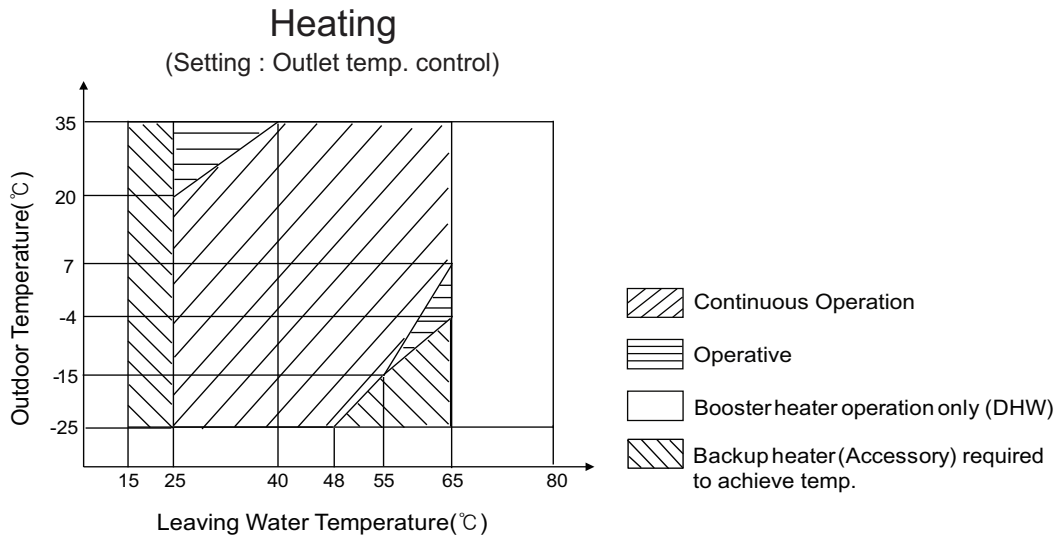
#### Note

- Continuous Operation : It is possible to operate continuously, but capacity is not guaranteed.
- Operative : It is not guaranteed continuous operation.



# 8. Operation Range

## ■ Heating



**Note**

- Continuous Operation : It is possible to operate continuously, but capacity is not guaranteed.
- Operative : It is not guaranteed continuous operation.
- DHW Heat pump operation : max. 55 °C
- DHW operation with electric heater : max. 80 °C

# 9. Sound levels

## 9.1 Sound power level

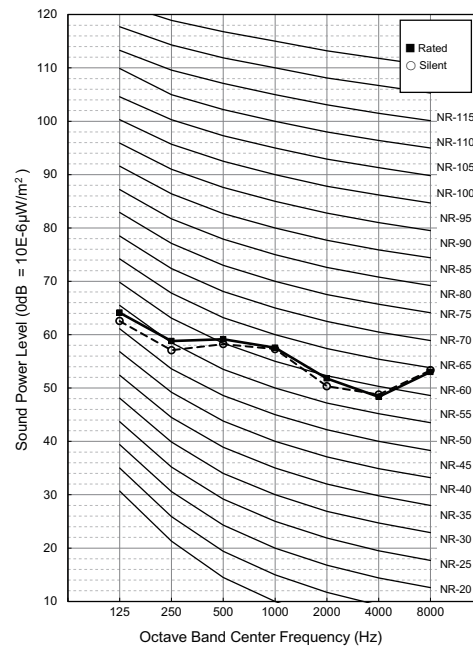
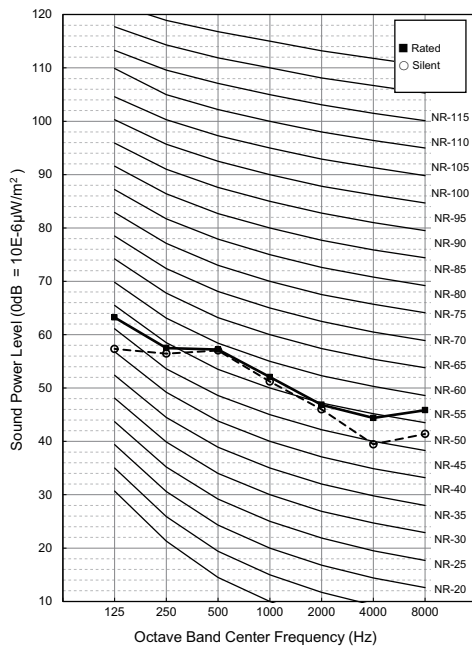
**Note**

1. Data is valid at diffuse field condition.
2. Reference acoustic intensity 0dB = 10E-6μW/m<sup>2</sup>
3. Sound power level is measured on the rated condition in the reverberation rooms. Refer to the Model Specifications for nominal conditions(Power source and Ambient temperature, etc)
4. Sound levels can be increased in accordance with installation and operating conditions.
5. Sound level will vary depending on a range of factors such as the construction (acoustic absorption coefficient) of particular installed place in which the equipment in installed.

| Model                  | Sound Power Level [dB(A)] |        |
|------------------------|---------------------------|--------|
|                        | Heating                   |        |
|                        | Rated                     | Silent |
| ZHBW056A0 [HM051M U43] | 60                        | 58     |
| ZHBW076A0 [HM071M U43] | 60                        | 58     |
| ZHBW096A0 [HM091M U43] | 60                        | 58     |
| ZHBW126A0 [HM121M U33] | 63                        | 61     |
| ZHBW146A0 [HM141M U33] | 63                        | 61     |
| ZHBW166A0 [HM161M U33] | 63                        | 61     |
| ZHBW128A0 [HM123M U33] | 63                        | 61     |
| ZHBW148A0 [HM143M U33] | 63                        | 61     |
| ZHBW168A0 [HM163M U33] | 63                        | 61     |

ZHBW056A0 [HM051M U43]  
 ZHBW076A0 [HM071M U43]  
 ZHBW096A0 [HM091M U43]

ZHBW126A0 [HM121M U33], ZHBW128A0 [HM123M U33]  
 ZHBW146A0 [HM141M U33], ZHBW148A0 [HM143M U33]  
 ZHBW166A0 [HM161M U33], ZHBW168A0 [HM163M U33]



## 10. Water pump Capacity

The water pump is variable type which is capable to change flow rate, so it may be required to change default water pump capacity in case of noise by water flow. In most case, however, it is strongly recommended to set capacity as Maximum.

### ■ Pressure Drop

| Capacity [kW] | Rated flow-rate [LPM] | Pump Head [m] (at rated flow-rate) | Product pressure drop [m] (Plate heat exchanger) | Serviceable Head [m] | Min. flow-rate [LPM] (Recommend) |
|---------------|-----------------------|------------------------------------|--|----------------------|----------------------------------|
| 5             | 14.37                 | 7.5                                | 0.2  | 7.3                  | 15                               |
| 7             | 20.12                 | 7.3                                | 0.3  | 7.0                  |                                  |
| 9             | 25.87                 | 6.1                                | 0.4  | 5.7                  |                                  |
| 12            | 34.50                 | 9.8                                | 0.8  | 9.0                  | 20                               |
| 14            | 40.25                 | 9.3                                | 1.1  | 8.2                  |                                  |
| 16            | 46.00                 | 9.0                                | 1.4  | 7.6                  |                                  |

### Note

- To secure enough water flow rate, do not set water pump capacity as Minimum. It can lead unexpected flow rate error CH14.
- When installing the product, install additional pump in consideration of the pressure loss and pump performance.
- If flow-rate is low, overloading of product can occur.

# ***THERMA V***<sup>TM</sup>

Monobloc Type

## **Design and installation**

- 1. Alternative Refrigerant R32**
- 2. Select the Best Location**
- 3. Installation Space**
- 4. Water Control**
- 5. Lifting Method**
- 6. Installation**
- 7. Electrical Wiring**
- 8. Starting Operation**

## 1. Alternative Refrigerant R32

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The refrigerant R32 has the higher efficiency and more friendly for environment in comparison with R410A. It has a lower GWP (Global Warming Potential) value, and higher efficiency than R410A. The Ozone Depletion Potential (ODP) of R32 is 0, and Global Warming Potential(GWP) is 675.

Refrigerant piping consists of copper/steel pipes, joints, and other fittings. All components must be selected and installed in conformity with the standards pertaining to the Refrigeration Safety Regulation. Same piping as for R410A can be used.

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### **WARNING**

- This product contains fluorinated greenhouse gases (Refrigerant type : R32). Do NOT emit refrigerant gases into the atmosphere.
  - The refrigerant R32 is Slightly Flammable gas. But it does not leak normally. If the refrigerant leaks in the installed place and contact with burning energy, it may cause fire, or a harmful gas.
  - If there are some leak, turn off any combustible devices, ventilate the installed place, and contact the dealer from which you purchased the unit. Do not use the unit until the refrigerant leaked is repaired.
  - Only use R32 as refrigerant. Other substances may cause explosions and accidents.
- 

### **CAUTION**

- The wall thickness of the piping should comply with the relevant local and national regulations for the designed pressure.
  - For high-pressure refrigerant, any unapproved pipe must not be used.
  - Do not heat pipes more than necessary to prevent them from softening.
-

## 2. Select the Best Location

---

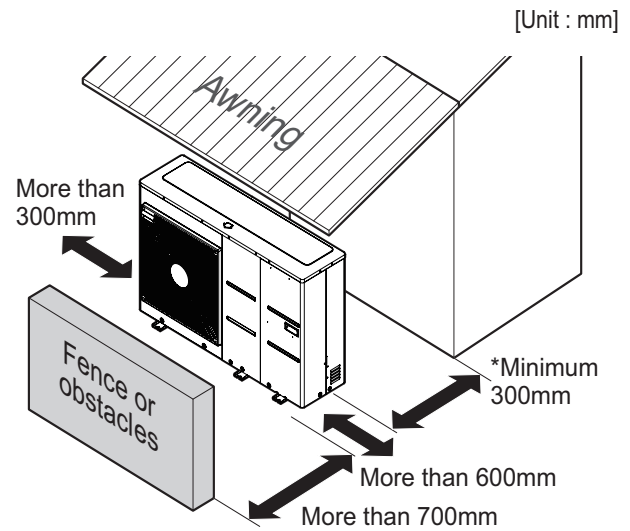
Select space for installing unit, which will meet the following conditions:

- No direct thermal radiation from other heat sources
- No possibility of annoying neighbors by noise from unit
- No exposition to strong wind
- With strength which bears weight of unit
- With space for air passage and service work shown next
- Because of the possibility of fire, do not install unit to the space where generation, inflow, stagnation, and leakage of combustible gas is expected.
- Avoid unit installation in a place where acidic solution and spray (sulfur) are often used.
- Do not use unit under any special environment where oil, steam and sulfuric gas exist.
- It is recommended to fence round the unit in order to prevent any person or animal from accessing the unit.
- If installation site is area of heavy snowfall, then the following directions should be observed.
  - Make the foundation as high as possible.
  - Fit a snow protection hood.
- Select installation location considering following conditions to avoid bad condition when additionally performing defrost operation.
  1. Install the unit at a place well ventilated and having a lot of sunshine in case of installing the product at a place with a high humidity in winter (near beach, coast, lake, etc).
  2. Performance of heating will be reduced and pre-heat time of the unit may be lengthened in case of installing the unit in winter at following location:
    - 1) Shade position with a narrow space
    - 2) Location with much humidity around.
    - 3) Location where liquid gathers since the floor is not even.
- When installing the unit in a place that is constantly exposed to a strong wind like a coast or on a high story of a building, secure a normal fan operation by using a duct or a wind shield.
  1. Install the unit so that its discharge port faces to the wall of the building. Keep a distance 300 mm or more between the unit and the wall surface.
  2. Supposing the wind direction during the operation season of the unit, install the unit so that the discharge port is set at right angle to the wind direction.

## 3. Installation Space

### 3.1 General considerations

- If an awning is built over the unit to prevent direct sunlight or rain exposure, make sure that heat radiation from the condenser is not restricted.
- Ensure that the spaces indicated by arrows around front, back and side of the unit.
- Do not place animals and plants in the path of the warm or cold air.
- Take the unit weight into account and select a place where noise and vibration are minimum.
- Select a place so that the air flow and noise from the unit do not disturb neighbors.
- Place that can sufficiently endure the weight and vibration of the outdoor unit and where even installation is possible.
- Place that has no direct influence of snow or rain.
- Place with no danger of extreme snowfall or icicle drop.
- Place without weak floor or base such as decrepit part of the building or with a lot of snow accumulation.



\* Please secure the space to install the shut-off valve and strainer.

## 4. Water Control

### 4.1 Water quality

Water quality should be complied with EN 98/83 EC Directives.

Detailed water quality condition can be found in EN 98/83 EC Directives.

#### CAUTION

- If the product is installed at existing hydraulic water loop, it is important to clean hydraulic pipes to remove sludge and scale.
- Installing sludge strainer in the water loop is very important to prevent performance degrade.
- Chemical treatment to prevent rust should be performed by installer.
- It is strongly recommended to install an additional filter on the heating water circuit. Especially to remove metallic particles from the heating piping, it is advised to use a magnetic or cyclone filter, which can remove small particles. Small particles may damage the unit and will NOT be removed by the standard filter of the heat pump system.

### 4.2 Frost protection

In areas of the country where entering water temperatures drop below 0 °C, the water pipe must be protected by using an approved antifreeze solution. Consult your heat pump unit supplier for locally approved solutions in your area.

Calculate the approximate volume of water in the system. And add the water volume contained in the heat pump to this total volume.

| Antifreeze type  | Antifreeze mixing ratio (by volume) |      |       |       |       |       |
|------------------|-------------------------------------|------|-------|-------|-------|-------|
|                  | 0°C                                 | -5°C | -10°C | -15°C | -20°C | -25°C |
| Methanol         | 0%                                  | 6%   | 12%   | 16%   | 24%   | 30%   |
| Ethylene glycol  | 0%                                  | 12%  | 20%   | 30%   | -     | -     |
| Propylene glycol | 0%                                  | 17%  | 25%   | 33%   | -     | -     |

#### CAUTION

- Use only one of the above antifreeze.
- If a antifreeze is used, pressure drop and capability degradation of the system can be occurred.
- If one of antifreezes is used, corrosion can be occurred. So please add corrosion inhibitor.
- Please check the concentration of the antifreeze periodically to keep same concentration.
- When the antifreeze is used (for installation or operation), take care to ensure that antifreeze must not be touched.
- Ensure to respect all laws and norms of your country about antifreeze usage.

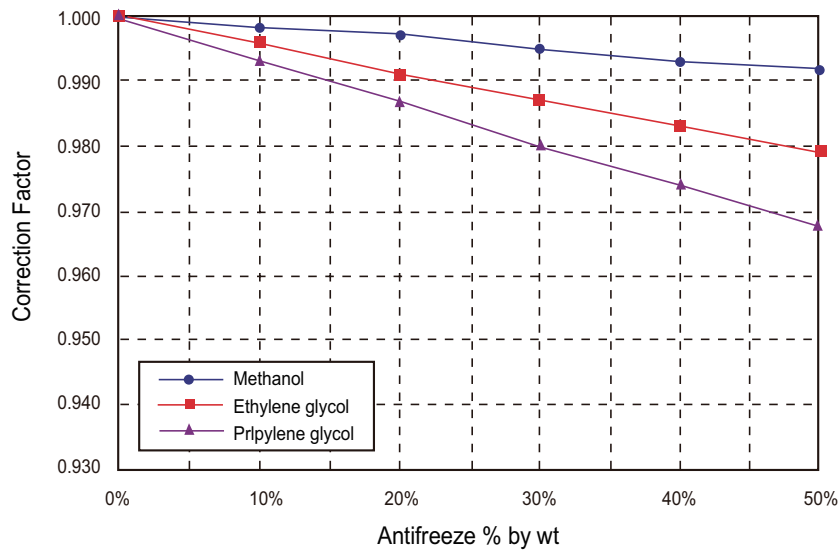


## 4. Water Control

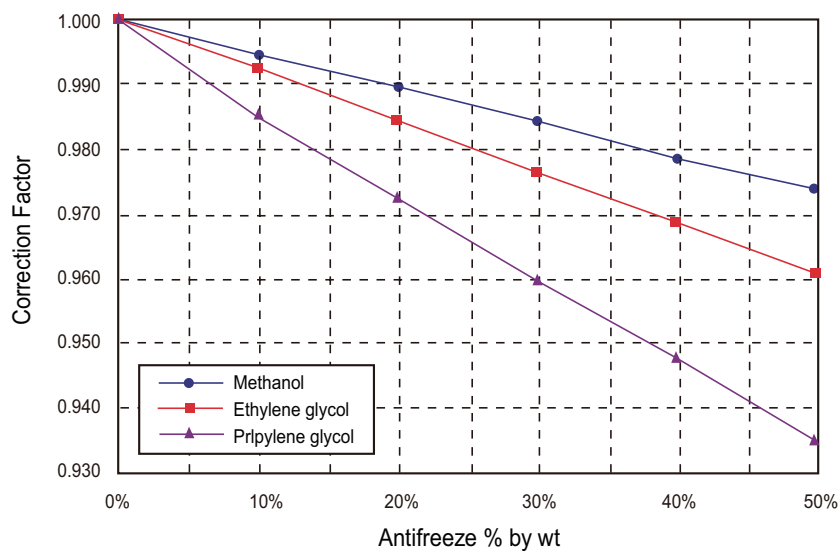
### 4.3 Capacity correction factor by antifreeze

| Antifreeze Type  | Item          | Antifreeze % by wt |       |       |       |       |
|------------------|---------------|--------------------|-------|-------|-------|-------|
|                  |               | 10%                | 20%   | 30%   | 40%   | 50%   |
| Methanol         | Cooling       | 0.998              | 0.997 | 0.995 | 0.993 | 0.992 |
|                  | Heating       | 0.995              | 0.990 | 0.985 | 0.979 | 0.974 |
|                  | Pressure Drop | 1.023              | 1.057 | 1.091 | 1.122 | 1.160 |
| Ethylene glycol  | Cooling       | 0.996              | 0.991 | 0.987 | 0.983 | 0.979 |
|                  | Heating       | 0.993              | 0.985 | 0.977 | 0.969 | 0.961 |
|                  | Pressure Drop | 1.024              | 1.068 | 1.124 | 1.188 | 1.263 |
| Propylene glycol | Cooling       | 0.993              | 0.987 | 0.980 | 0.974 | 0.968 |
|                  | Heating       | 0.966              | 0.973 | 0.960 | 0.948 | 0.935 |
|                  | Pressure Drop | 1.040              | 1.098 | 1.174 | 1.273 | 1.405 |

#### ◆ Correction factor of cooling capacity

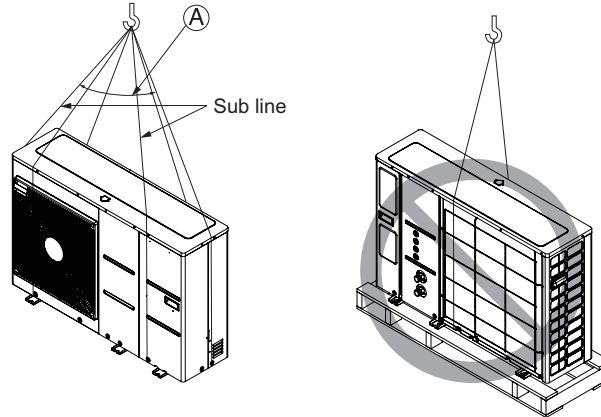


#### ◆ Correction factor of heating capacity

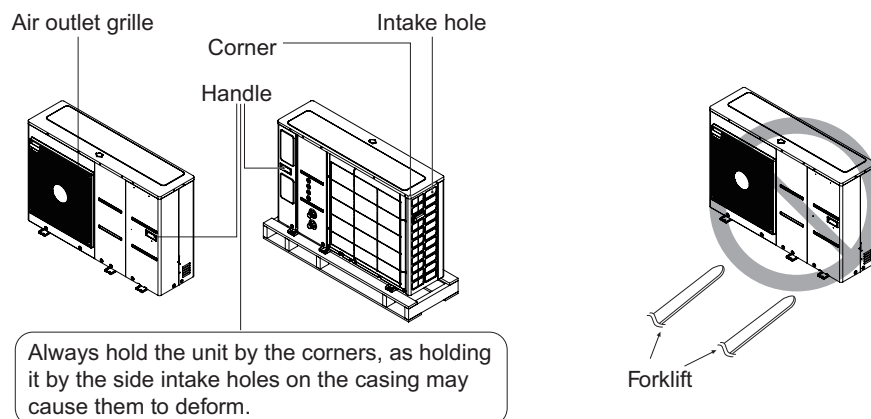


## 5. Lifting Method

- When carrying the suspended unit, pass the ropes under the unit and use the two suspension points each at the front and rear.
- Always lift the unit with ropes attached at four points so that impact is not applied to the unit.
- Attach the ropes to the unit at an angle of 40° or less.
- Use only accessories and parts which are of the designated specification when installing.



A 40° or less



Always hold the unit by the corners, as holding it by the side intake holes on the casing may cause them to deform.

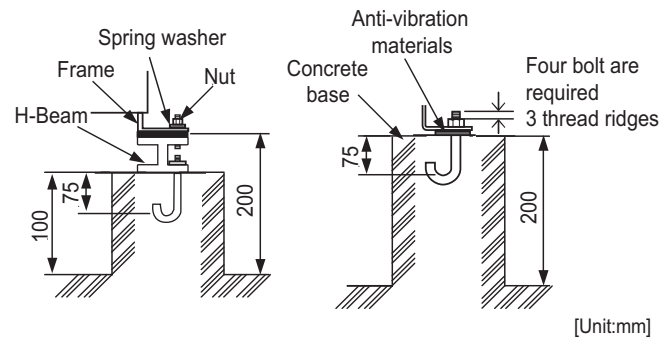
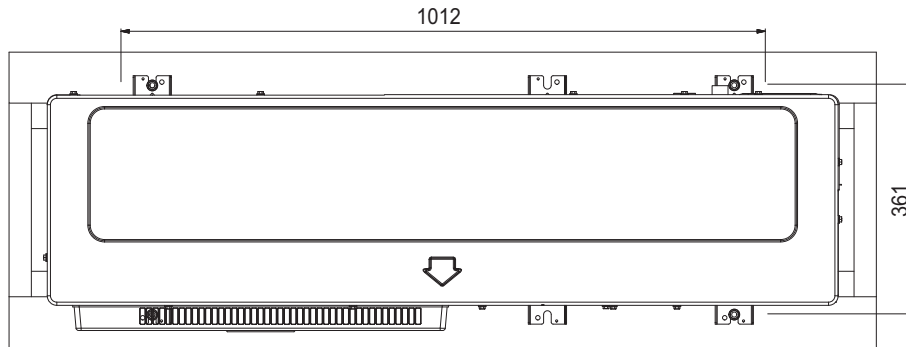
### ⚠ CAUTION

- Do not have only one person carry product if it is more than 20 kg.
- PP bands are used to pack some products. Do not use them as a mean for transportation because they are dangerous.
- Do not touch heat exchanger fins with your bare hands. Otherwise you may get a cut in your hands.
- Tear plastic packaging bag and scrap it so that children cannot play with it. Otherwise plastic packaging bag may suffocate children to death.
- When carrying in Outdoor Unit, be sure to support it at four points. Carrying in and lifting with 3-point support may make Outdoor Unit unstable, resulting in a fall.
- Place extra cloth or bodards in the locations where the casing comes in contact with the sling to prevent damage.
- Hoist the unit making sure it is being lifted at its center of gravity.

## 6. Installation

### 6.1 Foundation for Installation

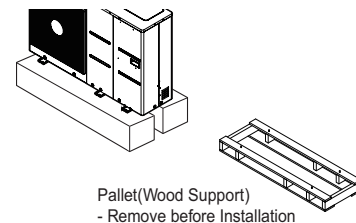
- Check the strength and level of the installation ground so that the unit will not cause any operating vibration or noise after installation.
- Fix the unit securely by means of the foundation bolts.  
(Prepare 4 sets of M12 foundation bolts, nuts and washers each which are available on the market.)
- It is best to screw in the foundation bolts until their length are 20mm from the foundation surface.



Foundation bolt executing method

### **!** WARNING

- Be sure to remove the Pallet(Wood Support) of the bottom side of the outdoor unit Base Pan before fixing the bolt. It may cause the unstable state of the outdoor settlement, and may cause freezing of the heat exchanger resulting in abnormal operations.
- Be sure to remove the Pallet(Wood Support) of the bottom side of the outdoor unit before welding. Not removing Pallet(Wood Support) causes hazard of fire during welding.



## 6. Installation

---

### 6.2 Water Piping and water Circuit Connection

#### 6.2.1 General considerations

- Followings are should be considered before beginning water circuit connection.
- Service space should be secured.
- Water pipes and connections should be cleaned using water.
- Space for installing external water pump should be provided if internal water pump capacity is not enough for installation field.
- Never connect electric power while proceeding water charging.

#### 6.2.2 Water piping and water circuit connection

##### 1. Definition of terms are as follow :

- Water piping : Installing pipes where water is flowing inside the pipe.
- Water circuit connecting : Making connection between the unit and water pipes or between pipes and pipes. Connecting valves or elbows are, for example, in this category.

Configuration of water circuit is shown in 6.3 Installation Scenes. All connections should be complied with presented diagram.

##### 2. While installing water pipes, followings should be considered :

- While inserting or putting water pipes, close the end of the pipe with pipe cap to avoid dust entering.
- When cutting or welding the pipe, always be careful that inner section of the pipe should not be defective. For example, no weldments or no burrs are found inside the pipe.
- Drain piping should be provided in case of water discharge by the operation of the safety valve. This situation can be happened when the internal pressure is over 3.0 bar and water inside the indoor unit will be discharged to drain hose.

##### 3. While connecting water pipes, followings should be considered :

- Pipe fittings (e.g. L-shape elbow, T-shape tee, diameter reducer, etc) should be tightened strongly to be free from water leakage.
- Connected sections should be leakage-proof treatment by applying tefron tape, rubber bushing, sealant solution, etc.
- Appropriate tools and tooling methods should be applied to prevent mechanical breakage of the connections.
- Operation time of flow control valve(e.g. 3way valve or 2way valve) should be less than 90 seconds.
- Drain hose should be connected with drain piping.

---

#### WARNING

##### • Water condensation on the floor

If underfloor cooling is performed, it is very important to keep leaving water temperature higher than 16 °C. Otherwise, dew condensation can occur on the floor. If floor is in humid environment, do not set leaving water temperature below 18 °C.

##### • Water condensation on the radiator

While cooling operation, cold water may not flow to the radiator. If cold water enters to the radiator, dew generation on the surface of the radiator can be occurred. Use 2way-valve to block circuits from cooling operation.

##### • Drainage

While cooling operation, condensed dew can drop down to the bottom of the unit. The condensing water must be sufficiently drained from the unit and dissipated frost-free.

##### • Before starting water charging, these two shut-off valves should be assembled with water inlet and outlet pipe of the indoor unit.

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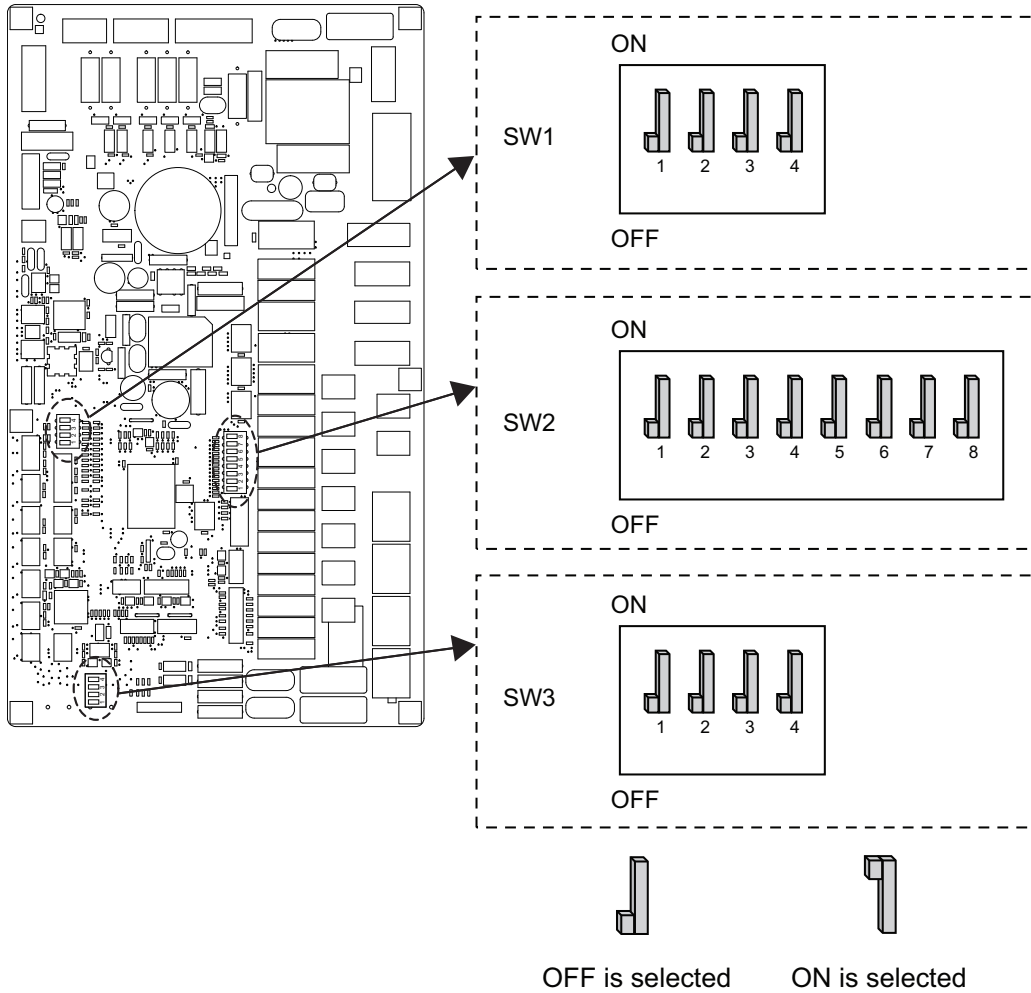
## 7. Electrical Wiring

### 7.1 Dip switch information

Turn off electric power supply before setting DIP switch













- Whenever adjusting DIP switch, turn off electric power supply to avoid electric shock.

#### ■ Indoor PCB















## 7. Electrical Wiring

### ◆ Option Switch 1

































| Description               | Setting   |           | Default   |
|---------------------------|---|-----------|---|
| MODBUS Communication Type | 1    | As Master | 1  |
|                           | 1    | As Slave  |   |
| Reserved                  | 2  2  | Reserved  | 2  |
| Reserved                  | 3  3  | Reserved  | 3  |
| Reserved                  | 4  4  | Reserved  | 4  |

### ◆ Option Switch 3

| Description              | Setting   |                                 | Default   |
|--------------------------|---|---------------------------------|---|
| (Remote) Room air sensor | 1    | LG Room sensor is not installed | 1   |
|                          | 1    | Remote sensor is installed      |   |
| Antifreeze mode          | 2    | Antifreeze mode not used        | 2  |
|                          | 2    | Antifreeze mode used            |   |
| Reserved                 | 3  3  | Reserved                        | 3  |
| Reserved                 | 4  4  | Not Use                         | 4  |

## 7. Electrical Wiring

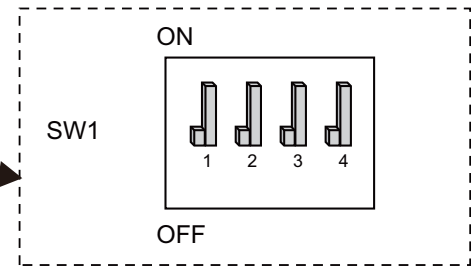
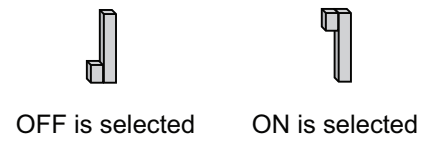
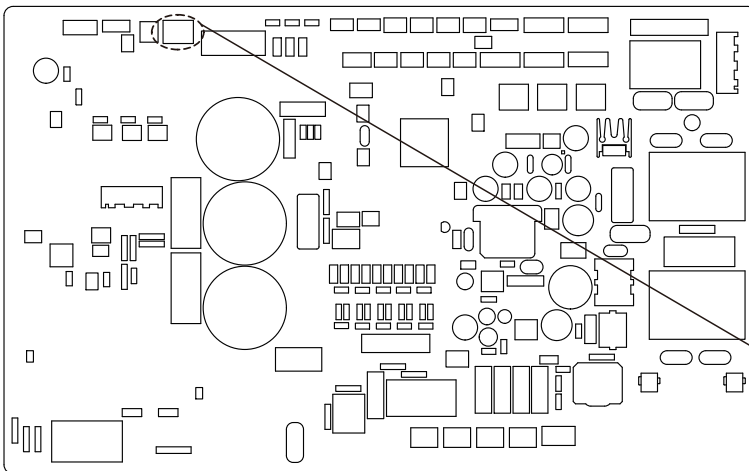
### ◆ Option Switch 2

| Description                              | Setting   | Default  |
|--|---|--|
| Role when central controller is equipped | 1  As Master   | 1   |
|  | 1  As Slave  |  |
| Accessory installation information       |   Heat pump is installed (Heating(Cooling) circuit only)                  | 2 <br>3      |
|  |   Heat pump + DHW tank is installed                                       |  |
|  |   Heat pump + DHW tank + Solar thermal system is installed                |  |
|  |   DHW tank is installed (no Heating (Cooling) circuit)                    |  |
| Cycle                                    | 4  Heating Only   | 4   |
|  | 4  Heating & Cooling   |  |
| Flow Switch Detection                    | 5  Always  | 5   |
|  | 5  While water pump is on  |  |
| Selecting Backup Heater capacity         |   Backup Heater is not used   | 6 <br>7  |
|  |   1Ø model : Half capacity is used<br>3Ø model : 1/3 capacity is used |  |
|  |   Unused  |  |
|  |   Full capacity is used   |  |
| Thermostat installation information      | 8  Thermostat is NOT installed   | 8   |
|  | 8  Thermostat is installed   |  |

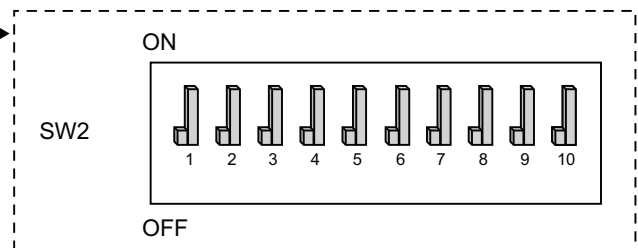
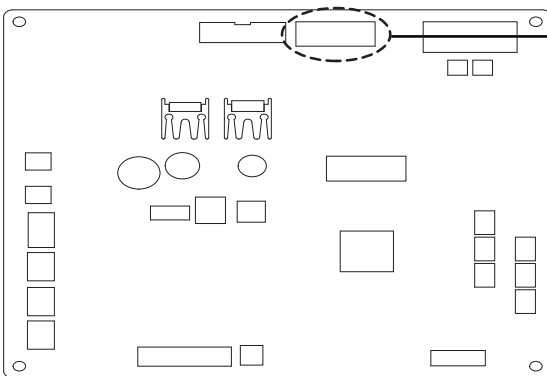
# 7. Electrical Wiring

## Outdoor PCB

### UN4 Chassis



### UN3 Chassis



### Peak Control

| Description  | Setting  | Default |
|--------------|--|---------|
| Peak Control | 3  Max Mode  | 3       |
|              | 3  Peak Control : To limit maxium current (Power saving) |         |

※ Only DIP-switch no.3 has a function. Others have no function.





**Air Solution**

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