



# INSTALLATION, OPERATION AND SERVICE MANUAL

PCGH-3R-V/P-EC

4-WAY CASSETTE



## INVESTING IN QUALITY, RELIABILITY & PERFORMANCE

### ISO 9001 QUALITY



Management Service

Every product is manufactured to meet the stringent requirements of the internationally recognized ISO 9001 standard for quality assurance in design, development and production.

### World Leading Design and Technology

Equipped with the latest air-conditioning test rooms and manufacturing technology, we produce over 50,000 fan coil units each year, all conforming to the highest international standards of quality and safety.

### CE SAFETY STANDARDS



Product Service

All products conform to the Certificate Europe directives (Machinery Safety, Electromagnetic Compatibility and Low Voltage), as required throughout the European Community, to guarantee correct standards of safety.

### The Highest Standards of Manufacturing

In order to guarantee the very highest standards and performance, we manage every stage in the manufacturing of our products. Throughout the production process we maintain strict control, starting with our extensive resources in research and development through to the design and manufacture of almost every individual component, from molded plastics to the assembly of units and controllers.

### EUROVENT CERTIFICATION



### WEEE MARK



All products conform to the "WEEE" directive to guarantee correct standards of environmental solutions.

### Quality Controlled from Start to Finish

Our highly trained staff and strict quality control methods enable us to produce products with an exceptional reputation for reliability and efficiency, maintained over many years. As well as CE certification and ISO 9001, several products ranges have UL / ETL safety approval in the USA and Canada, Eurovent performance and sound certification as well as ROHS compliance for Europe, giving you the confidence of knowing our company is the right choice when selecting fan coil units.

ALWAYS MAKE SURE THIS MANUAL REMAINS WITH THE UNIT. READ THIS MANUAL BEFORE PERFORMING ANY OPERATION ON THE UNIT.

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## Model Code Nomenclature

|            |            |            |           |           |            |
|------------|------------|------------|-----------|-----------|------------|
| <u>1</u>   | <b>2</b>   | <b>3</b>   | <b>4</b>  | <b>5</b>  | <b>6</b>   |
| <u>PCG</u> | <u>-3R</u> | <u>-04</u> | <u>-V</u> | <u>-I</u> | <u>-EC</u> |

| Notation |            | Description                                                                            |
|----------|------------|----------------------------------------------------------------------------------------|
| 1        | <b>PCG</b> | Hydronic Cassette G Series                                                             |
| 2        | <b>3R</b>  | 3R: 2-pipe 3 rows                                                                      |
| 3        | <b>04</b>  | Unit Size<br>(See General Specification Section A for cooling and heating capacities.) |
| 4        | <b>V</b>   | V – 2-pipe<br>P – 4-pipe                                                               |
| 5        | <b>I</b>   | Control type:<br>I – Intelligent Control<br>W – Flexible function Control              |
| 6        | <b>EC</b>  | EC Motor                                                                               |

|            |            |            |           |           |            |
|------------|------------|------------|-----------|-----------|------------|
| <u>1</u>   | <b>2</b>   | <b>3</b>   | <b>4</b>  | <b>5</b>  | <b>6</b>   |
| <u>PCH</u> | <u>-3R</u> | <u>-12</u> | <u>-V</u> | <u>-I</u> | <u>-EC</u> |

| Notation |            | Description                                                                            |
|----------|------------|----------------------------------------------------------------------------------------|
| 1        | <b>PCH</b> | Hydronic Cassette H Series                                                             |
| 2        | <b>3R</b>  | 3R: 2-pipe 3 rows                                                                      |
| 3        | <b>12</b>  | Unit Size<br>(See General Specification Section A for cooling and heating capacities.) |
| 4        | <b>V</b>   | V – 2-pipe<br>P – 4-pipe                                                               |
| 5        | <b>I</b>   | Control type:<br>I – Intelligent Control<br>W – Flexible function Control              |
| 6        | <b>EC</b>  | EC Motor                                                                               |

## A. Technical Data

### A.1. General Description

The Ceiling cassette units make each served area an independent controlled temperature zone to suit diverse requirements.

#### Construction

Cases are constructed of galvanized sheet steel with integral fan mounting rails for added strength. Fire resistant insulation is fitted internally to provide both thermal and acoustic insulation. The RAL9010 fascia is constructed of high-impact polystyrene.

#### Coils

Constructed with seamless copper tubes and headers. The tubes are mechanically expanded into corrugated aluminum fin material for a permanent primary to secondary surface bond. Coils are tested at 35 bar and recommended for operating at 20 bar. Coils include manual air vent and water purge valve.

#### Fan

The backward-curved centrifugal fan is statically and dynamically balanced for quiet operation. Fan impellers are made from fire-retardant plastic for lightweight and corrosion-resistant operation.

#### EC motor

The unit is using EC motor include driven controls PCB, a constant torque, permanent magnet, EC motor with preliminary 3-speed setting that allow for precise air balancing.

#### Filtration

Reusable wire framed filters are fitted and may be vacuum cleaned. G4 efficiency HAF filter is as optional.

#### Condensate pump

A condensate pump is fitted to carry water out of the unit. The pump is fixed to a mounting bracket. The pump can be withdrawn from the bottom after removing the front panel. A float switch is fitted to stop the cooling action, should the pump become blocked or fail.

#### Louver

Louver vanes are manufactured from ABS to prevent condensation from forming, automatic adjustable and driven by stepping motors on unit.

#### Fresh air

The fresh air system for cassette unit allows up to 15% of unit airflow (maximum air flow per connection is 100m<sup>3</sup>/h) as fresh air intake (per connection). Maximum 2 fresh air connections per unit are allowed.

### CONTROL SYSTEMS

#### 1. Intelligent control (I type)

Intelligent control board is controlled via Infra-red handset and/or Intelligent wired wall pad, is field programmable and easy to be configured through the wired wall pad or open Modbus protocol with VWV and VAV control logics, provides variable speed indoor fan control, integrates with Intelligent modulating valves to allow Auto Dynamic Balancing and Intelligent Constant Delta T management systems. It controls 2-pipe, 2-pipe with electric heater, 2-pipe with 6-way valve and 4-pipe systems.

#### 2. Flexible control (W type)

This control options features flexible functionality for external thermostat applications, allowing the independent control of drain pumps (if equipped), offering zone control operations, and limited diagnostics. In products where louvers are required, this control allows the stepping motors to open the louver at maximum position or close them when power of the unit is OFF.

## A.2. General Specifications

### A.2.1. 2-Pipe Systems

**Product range:** PCGH-3R-V-ECM Flexi Hydronic Cassette

PCGH-3R-V~-ECM Hydronic Cassette 2-pipe with EC Motor



| PCGH-3R-[Size]-V~-ECM         |            |                                          |        |           | PCG-04                  | PCG-08         | PCH-12         | PCH-20         | PCH-24         |                  |
|-------------------------------|------------|------------------------------------------|--------|-----------|-------------------------|----------------|----------------|----------------|----------------|------------------|
| Unit Configuration            |            | Configuration                            |        |           | 2-pipe                  |                |                |                |                |                  |
|                               |            | Number Of Fan Blowers                    |        |           | Single                  |                |                |                |                |                  |
|                               |            | Power Supply                             |        | (V/Ph/Hz) | 220-240 / 1 / 50-60     |                |                |                |                |                  |
| Performance Data              | Air        | Air Flow                                 | H      | m³/hr     | 575                     | 810            | 1300           | 2210           | 2750           |                  |
|                               |            |                                          | M      |           | 380                     | 722            | 1050           | 1970           | 2540           |                  |
|                               |            |                                          | L      |           | 200                     | 200            | 360            | 820            | 1020           |                  |
|                               | Cooling    | Cooling Capacity <sup>e</sup>            | H      | kW        | 3.61                    | 4.91           | 7.22           | 11.82          | 15             |                  |
|                               |            |                                          | M      |           | 2.64                    | 4.56           | 6.21           | 10.95          | 14.23          |                  |
|                               |            |                                          | L      |           | 1.61                    | 1.65           | 2.65           | 5.54           | 6.93           |                  |
|                               |            | Sensible Cooling <sup>e</sup> Capacity   | H      |           | 2.53                    | 3.45           | 5.13           | 8.44           | 10.68          |                  |
|                               |            |                                          | M      |           | 1.81                    | 3.2            | 4.38           | 7.76           | 10.1           |                  |
|                               |            |                                          | L      |           | 1.08                    | 1.13           | 1.82           | 3.79           | 4.73           |                  |
|                               |            | Latent cooling capacity                  | H      |           | 1.08                    | 1.46           | 2.09           | 3.38           | 4.32           |                  |
|                               |            |                                          | M      |           | 0.83                    | 1.36           | 1.83           | 3.19           | 4.13           |                  |
|                               |            |                                          | L      |           | 0.53                    | 0.52           | 0.83           | 1.75           | 2.2            |                  |
|                               |            | FCEER <sup>e</sup>                       | Rating |           | 159.73                  | 121.54         | 114.06         | 109.39         | 98.28          |                  |
|                               |            |                                          | Class  |           | B                       | B              | C              | C              | C              |                  |
|                               | Heating    | Heating Capacity <sup>e</sup>            | H      | kW        | 3.47                    | 4.74           | 7.06           | 11.77          | 14.84          |                  |
|                               |            |                                          | M      |           | 2.56                    | 4.36           | 6.03           | 10.85          | 13.9           |                  |
|                               |            |                                          | L      |           | 1.53                    | 1.59           | 2.63           | 5.55           | 6.89           |                  |
|                               |            | Max. Electric Heater Capacity            |        |           | 1                       | 2              | 3              | 4              | 4              |                  |
|                               |            | FCCOP <sup>e</sup>                       | Rating |           | 151.37                  | 129.79         | 115.49         | 113.88         | 99.89          |                  |
|                               | Class      |                                          | C      | C         | C                       | C              | D              |                |                |                  |
|                               | Sound      | Sound Pressure Level ( Outlet )          |        |           | dB(A)                   | 43/39/27       | 50/47/26       | 56/53/32       | 58/53/37       | 64/61/41         |
|                               |            | Sound Power Level (Outlet ) <sup>e</sup> |        |           |                         | 52/48/36       | 59/56/35       | 65/62/41       | 67/62/46       | 73/70/50         |
|                               | Electrical | Power input in cooling <sup>e</sup> mode | H      | W         | 21                      | 47             | 82             | 224            | 220            |                  |
|                               |            |                                          | M      |           | 14.8                    | 42             | 67             | 132            | 178            |                  |
|                               |            |                                          | L      |           | 11                      | 11             | 16             | 27             | 50             |                  |
|                               |            | Power input in heating <sup>e</sup> mode | H      | W         | 21                      | 47             | 82             | 224            | 220            |                  |
|                               |            |                                          | M      |           | 14.8                    | 35             | 67             | 132            | 178            |                  |
|                               |            |                                          | L      |           | 11                      | 11             | 16             | 27             | 50             |                  |
|                               |            | Fan Motor Running Current @ H            |        |           | A                       | 0.18           | 0.41           | 0.71           | 1.95           | 1.91             |
|                               | Hydraulic  | Cooling Water Flow Rate                  | H      | L/h       | 619                     | 841            | 1238           | 2027           | 2571           |                  |
|                               |            |                                          | M      |           | 452                     | 782            | 1065           | 1877           | 2440           |                  |
|                               |            |                                          | L      |           | 276                     | 284            | 453            | 950            | 1188           |                  |
|                               |            | Cooling Pressure Drop <sup>e</sup>       | H      | kPa       | 37.89                   | 42.05          | 65             | 42.19          | 61.67          |                  |
|                               |            |                                          | M      |           | 21.54                   | 36.88          | 49.5           | 36.73          | 56.12          |                  |
|                               |            |                                          | L      |           | 8.85                    | 5.94           | 10.7           | 10.79          | 15.36          |                  |
|                               |            | Heating Water Flow Rate                  | H      | L/h       | 596                     | 813            | 1210           | 2018           | 2545           |                  |
|                               |            |                                          | M      |           | 438                     | 747            | 1033           | 1860           | 2384           |                  |
|                               |            |                                          | L      |           | 262                     | 273            | 452            | 951            | 1182           |                  |
|                               |            | Heating Pressure Drop <sup>e</sup>       | H      | kPa       | 29.08                   | 40.1           | 55.1           | 34.81          | 40.1           |                  |
|                               |            |                                          | M      |           | 16.74                   | 28.05          | 41.4           | 30.05          | 35.64          |                  |
|                               |            |                                          | L      |           | 6.64                    | 4.58           | 9.4            | 8.98           | 10.08          |                  |
| Water Content                 |            |                                          | L      | 1.25      | 1.56                    | 1.78           | 2.41           | 3              |                |                  |
| Construction and Packing Data |            | Water Connections                        | Type   |           | Socket(Threaded Female) |                |                |                |                |                  |
|                               |            |                                          | In     | mm[in]    | 19.05 [3/4]             |                |                |                |                |                  |
|                               |            |                                          |        |           | Out                     | 25.4 (1")      |                |                |                |                  |
|                               |            | Condensate Drainage Connection           |        |           |                         | mm             | 25.4 (1")      |                |                |                  |
|                               |            | Dimensions                               | L      | mm        | 582                     |                | 582            | 730            | 830            | 960              |
|                               |            |                                          | W      |           | 582                     |                | 582            | 730            | 830            | 960              |
|                               |            |                                          | H      |           | 255                     | 290            | 260            | 290            | 290            |                  |
|                               |            | Panel Dimensions                         |        |           |                         | 680 x 680 x 28 | 680 x 680 x 28 | 830 x 830 x 28 | 980 x 980 x 28 | 1140 x 1140 x 28 |
|                               |            | Net Weight                               |        |           | kg                      | 28             | 30             | 36             | 50             | 54               |

"e": Above specifications are based on the published Eurovent test data of the year of publication of this document. To confirm the most updated specifications please visit [www.eurovent-certification.com](http://www.eurovent-certification.com).

Eurovent testing conditions:

- Return air temperature: 27C DB/  
19C WB.

- Return air temperature: 20C.

- Inlet/ Outlet water  
temperature: 7C/ 12C.

- Inlet/ Outlet water  
temperature: 45C/ 40C.

## A.2.2. 4-Pipe Systems



**Product range:** PCGH-3R-P-ECM Flexi Hydronic Cassette

PCGH-3R-P~-ECM Hydronic Cassette 4-pipe with EC Motor

| PCGH-3R-[Size]-P~-ECM         |                                |                                          |        |                         | PCG-04              | PCG-08         | PCH-12         | PCH-20         | PCH-24           |          |
|-------------------------------|--------------------------------|------------------------------------------|--------|-------------------------|---------------------|----------------|----------------|----------------|------------------|----------|
| Unit Configuration            |                                | Configuration                            |        |                         | 4-pipe              |                |                |                |                  |          |
|                               |                                | Number Of Fan Blowers                    |        |                         | Single              |                |                |                |                  |          |
|                               |                                | Power Supply                             |        | (V/Ph/Hz)               | 220-240 / 1 / 50-60 |                |                |                |                  |          |
| Performance Data              | Air                            | Air Flow                                 | H      | m³/hr                   | 575                 | 810            | 1300           | 2210           | 2750             |          |
|                               |                                |                                          | M      |                         | 380                 | 722            | 1050           | 1970           | 2540             |          |
|                               |                                |                                          | L      |                         | 200                 | 200            | 360            | 820            | 1020             |          |
|                               | Cooling                        | Cooling Capacity <sup>e</sup>            | H      | kW                      | 2.85                | 3.82           | 5.51           | 8.93           | 11.31            |          |
|                               |                                |                                          | M      |                         | 2.08                | 3.55           | 4.74           | 8.27           | 10.73            |          |
|                               |                                |                                          | L      |                         | 1.27                | 1.29           | 2.02           | 4.19           | 5.22             |          |
|                               |                                | Sensible Cooling Capacity <sup>e</sup>   | H      |                         | 2.03                | 2.74           | 4.01           | 6.5            | 8.25             |          |
|                               |                                |                                          | M      |                         | 1.45                | 2.54           | 3.42           | 5.98           | 7.8              |          |
|                               |                                |                                          | L      |                         | 0.87                | 0.9            | 1.42           | 2.93           | 3.65             |          |
|                               |                                | Latent Cooling Capacity                  | H      |                         | 0.82                | 1.08           | 1.5            | 2.43           | 3.06             |          |
|                               |                                |                                          | M      |                         | 0.63                | 1.01           | 1.32           | 2.29           | 2.93             |          |
|                               |                                |                                          | L      |                         | 0.4                 | 0.39           | 0.6            | 1.26           | 1.57             |          |
|                               |                                | FCEER <sup>e</sup>                       | Rating |                         | 125.95              | 104.73         | 87.01          | 82.68          | 74.07            |          |
|                               |                                |                                          | Class  |                         | B                   | C              | C              | C              | D                |          |
|                               | Heating                        | Heating Capacity <sup>e</sup>            | H      | kW                      | 2.97                | 4              | 5.79           | 9.43           | 11.95            |          |
|                               |                                |                                          | M      |                         | 2.18                | 3.68           | 4.94           | 8.69           | 11.19            |          |
|                               |                                |                                          | L      |                         | 1.31                | 1.34           | 2.16           | 4.44           | 5.55             |          |
|                               |                                | FCCOP <sup>e</sup>                       | Rating |                         | 129.36              | 109.47         | 94.74          | 91.16          | 80.44            |          |
|                               |                                |                                          | Class  |                         | C                   | C              | D              | D              | D                |          |
|                               | Sound                          | Sound Pressure Level ( Outlet )          |        |                         | dB(A)               | 43/39/27       | 50/40/26       | 56/53/32       | 58/53/37         | 64/61/41 |
|                               |                                | Sound Power Level (Outlet ) <sup>e</sup> |        |                         |                     | 52/48/36       | 59/49/35       | 65/62/41       | 67/62/46         | 73/70/50 |
|                               | Electrical                     | Power input in cooling <sup>e</sup> mode | H      | W                       | 21                  | 47             | 82             | 224            | 220              |          |
|                               |                                |                                          | M      |                         | 14.8                | 35             | 67             | 132            | 178              |          |
|                               |                                |                                          | L      |                         | 11                  | 11             | 16             | 27             | 50               |          |
|                               |                                | Power input in heating <sup>e</sup> mode | H      | W                       | 21                  | 47             | 82             | 224            | 220              |          |
|                               |                                |                                          | M      |                         | 14.8                | 35             | 67             | 132            | 178              |          |
|                               |                                |                                          | L      |                         | 11                  | 11             | 16             | 27             | 50               |          |
|                               | Fan Motor Running Current @ H  |                                          |        | A                       | 0.18                | 0.41           | 0.71           | 1.95           | 1.91             |          |
|                               | Hydraulic                      | Cooling Water Flow Rate                  | H      | L/h                     | 488                 | 655            | 945            | 1531           | 1939             |          |
|                               |                                |                                          | M      |                         | 357                 | 609            | 813            | 1417           | 1840             |          |
|                               |                                |                                          | L      |                         | 218                 | 221            | 346            | 718            | 896              |          |
|                               |                                | Cooling Pressure Drop <sup>e</sup>       | H      | kPa                     | 36.72               | 33.42          | 35.06          | 31.83          | 41.49            |          |
|                               |                                |                                          | M      |                         | 20.88               | 29.3           | 26.73          | 27.71          | 37.75            |          |
|                               |                                |                                          | L      |                         | 8.57                | 4.72           | 5.75           | 8.14           | 10.33            |          |
|                               |                                | Heating Water Flow Rate                  | H      | L/h                     | 254                 | 343            | 496            | 809            | 1024             |          |
|                               |                                |                                          | M      |                         | 187                 | 315            | 423            | 745            | 960              |          |
|                               |                                |                                          | L      |                         | 112                 | 115            | 185            | 381            | 476              |          |
|                               |                                | Heating Pressure Drop <sup>e</sup>       | H      | kPa                     | 13.09               | 43.4           | 53.29          | 59.7           | 69.85            |          |
|                               |                                |                                          | M      |                         | 7.54                | 37.2           | 40.07          | 51.53          | 62.09            |          |
|                               |                                |                                          | L      |                         | 2.99                | 6.1            | 9.04           | 15.4           | 17.57            |          |
| Chilled Water Content         |                                |                                          | L      | 0.83                    | 1.04                | 1.19           | 1.61           | 2              |                  |          |
| Hot Water Content             |                                |                                          |        | 0.42                    | 0.52                | 0.59           | 0.8            | 1              |                  |          |
| Construction and Packing Data | Water Connections              | Type                                     |        | Socket(Threaded Female) |                     |                |                |                |                  |          |
|                               |                                | In                                       | mm[in] | 19.05 [3/4]             |                     |                |                |                |                  |          |
|                               |                                | Out                                      |        |                         |                     |                |                |                |                  |          |
|                               | Condensate Drainage Connection |                                          |        | mm                      | 25.4(1")            |                |                |                |                  |          |
|                               | Dimensions                     | L                                        | 582    |                         | 582                 | 730            | 830            | 960            |                  |          |
|                               |                                | W                                        | 582    |                         | 582                 | 730            | 830            | 960            |                  |          |
|                               |                                | H                                        | 255    | 290                     | 260                 | 290            | 290            |                |                  |          |
|                               | Panel Dimensions               |                                          |        |                         | 680 x 680 x 28      | 680 x 680 x 28 | 830 x 830 x 28 | 980 x 980 x 28 | 1140 x 1140 x 28 |          |
| Net Weight                    |                                |                                          | kg     | 28                      | 30                  | 36             | 50             | 54             |                  |          |

"e": Above specifications are based on the published Eurovent test data of the year of publication of this document. To confirm the most updated specifications please visit [www.eurovent-certification.com](http://www.eurovent-certification.com).

Eurovent Testing conditions:

- a. Cooling mode (2-pipe):                      b. Heating mode (4-pipe):  
 - Return air temperature: 27C DB/ 19C WB. - Return air temperature: 20C.  
 - Inlet/ Outlet water temperature: 7C/ 12C. - Inlet/outlet water temperature: 65/55C.

### A.3. Coil Data

#### 2-Pipe Systems

| Model       | Fin Height (mm) | Fin Length (mm.) |       | Fins / inch | No. of rows | No. of circuits | Tube Diameter (inch) |
|-------------|-----------------|------------------|-------|-------------|-------------|-----------------|----------------------|
|             |                 | Inner            | Outer |             |             |                 |                      |
| PCG-3R-04-V | 210             | 1196             | 1299  | 15.1        | 3           | 4               | 1/4"                 |
| PCG-3R-08-V | 252             | 1196             | 1299  | 15.1        | 3           | 5               | 1/4"                 |
| PCH-3R-12-V | 210             | 1530             | 1634  | 15.1        | 3           | 6               | 1/4"                 |
| PCH-3R-20-V | 252             | 1874             | 1979  | 15.1        | 3           | 10              | 1/4"                 |
| PCH-3R-24V  | 252             | 2450             | 2555  | 15.1        | 3           | 12              | 1/4"                 |

#### 4-Pipe Systems

##### Cooling Coil

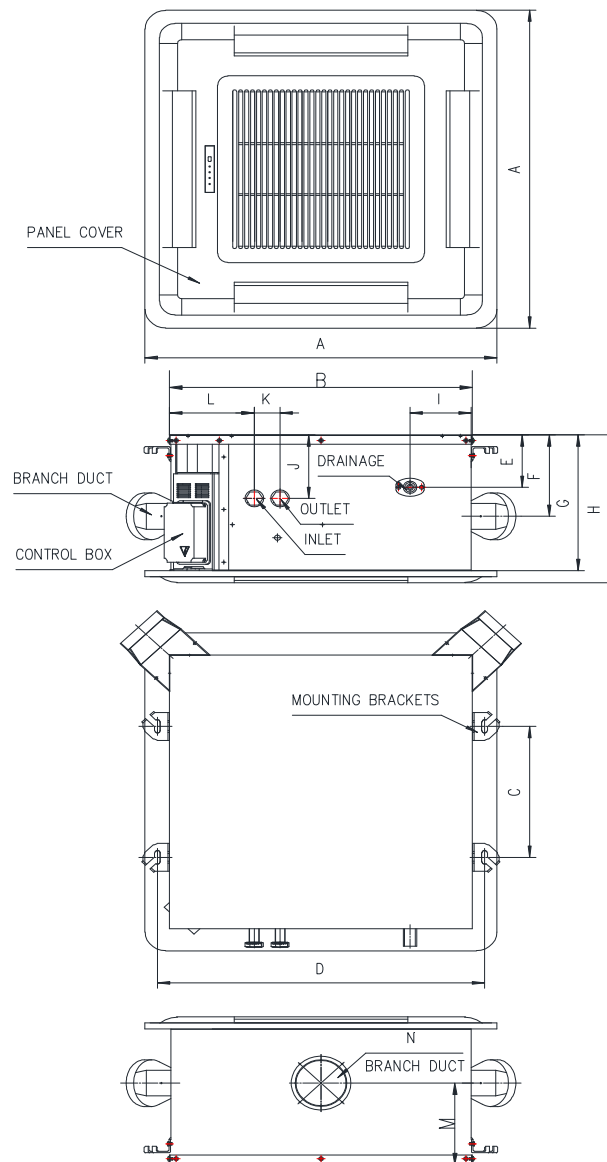
| Model       | Fin Height (mm) | Fin Length (mm.) |       | Fins / inch | No. of rows | No. of circuits | Tube Diameter (inch) |
|-------------|-----------------|------------------|-------|-------------|-------------|-----------------|----------------------|
|             |                 | Inner            | Outer |             |             |                 |                      |
| PCG-3R-04-P | 210             | 1196             | 1299  | 15.1        | 2           | 3               | 1/4"                 |
| PCG-3R-08-P | 252             | 1196             | 1299  | 15.1        | 2           | 4               | 1/4"                 |
| PCH-3R-12-P | 210             | 1530             | 1634  | 15.1        | 2           | 5               | 1/4"                 |
| PCH-3R-20-P | 252             | 1874             | 1979  | 15.1        | 2           | 8               | 1/4"                 |
| PCH-3R-24-P | 252             | 2450             | 2555  | 15.1        | 2           | 10              | 1/4"                 |

##### Heating Coil

| Model       | Fin Height (mm) | Fin Length (mm.) |       | Fins / inch | No. of rows | No. of circuits | Tube Diameter (inch) |
|-------------|-----------------|------------------|-------|-------------|-------------|-----------------|----------------------|
|             |                 | Inner            | Outer |             |             |                 |                      |
| PCG-3R-04-P | 210             | 1196             | 1299  | 15.1        | 1           | 2               | 1/4"                 |
| PCG-3R-08-P | 252             | 1196             | 1299  | 15.1        | 1           | 2               | 1/4"                 |
| PCH-3R-12-P | 210             | 1530             | 1634  | 15.1        | 1           | 2               | 1/4"                 |
| PCH-3R-20-P | 252             | 1874             | 1979  | 15.1        | 1           | 3               | 1/4"                 |
| PCH-3R-24-P | 252             | 2450             | 2555  | 15.1        | 1           | 4               | 1/4"                 |

## A.4. Dimensional Drawings

### Dimensional Drawings of 2-pipe unit

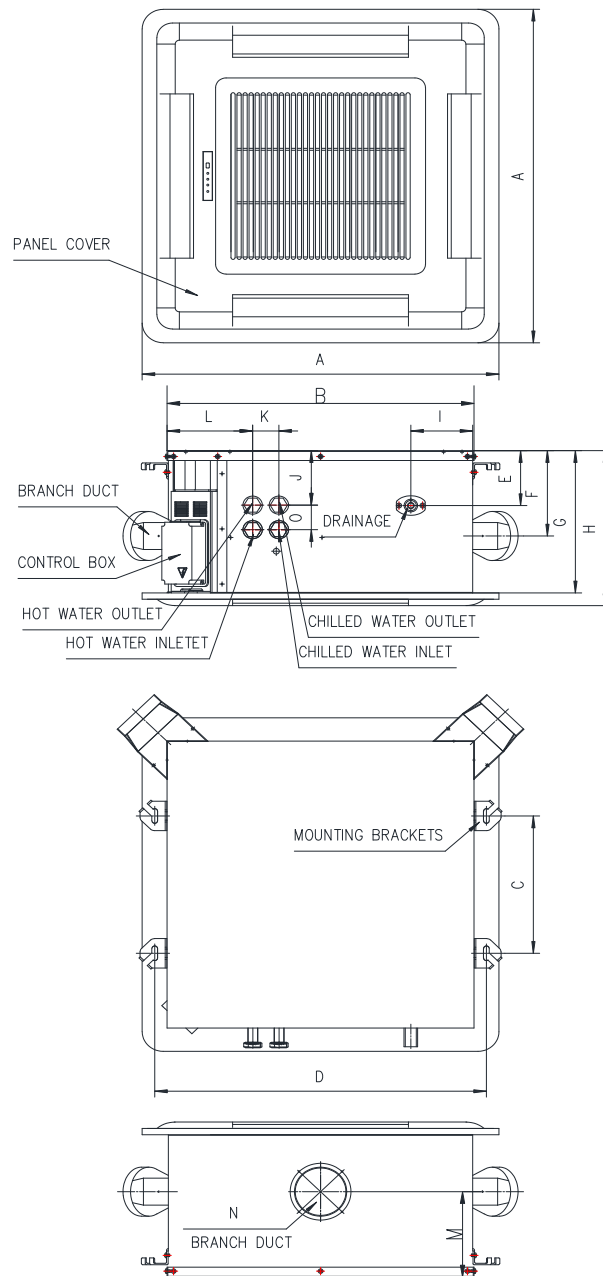


| Model    | A    | B   | C   | D    | E   | F   | G   |
|----------|------|-----|-----|------|-----|-----|-----|
| PCG-04-V | 680  | 582 | 280 | 627  | 62  | 124 | 255 |
| PCG-08-V | 680  | 582 | 280 | 627  | 112 | 174 | 290 |
| PCH-12-V | 830  | 730 | 344 | 775  | 84  | 149 | 260 |
| PCH-20-V | 980  | 830 | 487 | 875  | 106 | 177 | 290 |
| PCH-24-V | 1140 | 960 | 617 | 1005 | 106 | 177 | 290 |

| Model    | H   | I   | J   | K  | L   | M   | N    |
|----------|-----|-----|-----|----|-----|-----|------|
| PCG-04-V | 283 | 118 | 110 | 50 | 162 | 124 | φ100 |
| PCG-08-V | 318 | 118 | 136 | 50 | 162 | 174 | φ100 |
| PCH-12-V | 288 | 125 | 163 | 50 | 162 | 132 | φ100 |
| PCH-20-V | 318 | 118 | 146 | 50 | 155 | 146 | φ100 |
| PCH-24-V | 318 | 118 | 146 | 50 | 155 | 146 | φ100 |

(All dimensions shown in mm)

## Dimensional Drawings of 4-pipe unit



| Model    | A    | B   | C   | D    | E   | F   | G   |
|----------|------|-----|-----|------|-----|-----|-----|
| PCG-04-P | 680  | 582 | 280 | 627  | 62  | 124 | 255 |
| PCG-08-P | 680  | 582 | 280 | 627  | 112 | 174 | 290 |
| PCH-12-P | 830  | 730 | 344 | 775  | 84  | 149 | 260 |
| PCH-20-P | 980  | 830 | 487 | 875  | 106 | 177 | 290 |
| PCH-24-P | 1140 | 960 | 617 | 1005 | 106 | 177 | 290 |

| Model    | H   | I   | J   | K  | L   | M   | N    |
|----------|-----|-----|-----|----|-----|-----|------|
| PCG-04-P | 283 | 118 | 110 | 50 | 162 | 124 | φ100 |
| PCG-08-P | 318 | 118 | 136 | 50 | 162 | 174 | φ100 |
| PCH-12-P | 288 | 125 | 163 | 50 | 162 | 132 | φ100 |
| PCH-20-P | 318 | 118 | 146 | 50 | 155 | 146 | φ100 |
| PCH-24-P | 318 | 118 | 146 | 50 | 155 | 146 | φ100 |

(All dimensions shown in mm)

## A.5. Sound power data

| Model                                                    |         | PCG-3R-04 |         |         |        |        |        |        |        |        |        |        |         |
|----------------------------------------------------------|---------|-----------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| speed                                                    |         | H (570)   | M (450) | L (250) | 200RPM | 300RPM | 400RPM | 500RPM | 600RPM | 700RPM | 800RPM | 900RPM | 1000RPM |
| Sound Power dB(A)                                        |         | 52.3      | 46.3    | 36.8    | 36.8   | 38.8   | 42.8   | 49.2   | 53.3   | 56.4   | 60.4   | 62.4   | 64.6    |
| A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa | 20.0    | 11.7      | 16.1    | 14.3    | 12.1   | 15.2   | 19.3   | 12.9   | 16.9   | 19.3   | 12.0   | 16.2   | 15.6    |
|                                                          | 25.0    | 12.5      | 16.2    | 11.7    | 14.2   | 13.8   | 19.2   | 13.3   | 15.7   | 19.3   | 12.5   | 16.2   | 13.6    |
|                                                          | 31.5    | 11.0      | 14.2    | 11.3    | 18.6   | 10.2   | 16.4   | 12.0   | 10.1   | 13.3   | 13.7   | 13.8   | 15.8    |
|                                                          | 40.0    | 10.1      | 16.4    | 15.6    | 18.2   | 14.4   | 24.4   | 8.4    | 8.9    | 12.2   | 21.5   | 18.0   | 15.3    |
|                                                          | 50.0    | 14.2      | 14.8    | 13.8    | 15.4   | 14.4   | 16.1   | 13.6   | 13.7   | 14.3   | 15.3   | 16.7   | 16.6    |
|                                                          | 63.0    | 15.7      | 15.8    | 11.5    | 12.3   | 10.3   | 18.5   | 13.1   | 16.2   | 20.1   | 20.1   | 27.3   | 27.4    |
|                                                          | 80.0    | 14.4      | 5.2     | 4.7     | 7.2    | 4.5    | 4.3    | 6.1    | 18.3   | 15.2   | 16.2   | 18.9   | 19.6    |
|                                                          | 100.0   | 17.4      | 14.0    | 8.1     | 8.4    | 10.7   | 16.6   | 11.5   | 17.5   | 24.6   | 36.0   | 31.4   | 28.8    |
|                                                          | 125.0   | 23.7      | 21.4    | 13.9    | 17.6   | 18.1   | 18.4   | 24.5   | 24.3   | 27.2   | 34.1   | 46.6   | 44.0    |
|                                                          | 160.0   | 35.3      | 32.1    | 21.8    | 24.7   | 24.1   | 30.7   | 33.6   | 34.8   | 39.3   | 41.1   | 42.1   | 47.4    |
|                                                          | 200.0   | 38.6      | 35.0    | 27.6    | 25.4   | 24.1   | 30.9   | 39.2   | 36.6   | 43.2   | 44.1   | 43.9   | 45.0    |
|                                                          | 250.0   | 41.1      | 34.1    | 20.0    | 26.8   | 25.7   | 30.3   | 38.0   | 41.5   | 42.9   | 45.9   | 50.2   | 52.0    |
|                                                          | 315.0   | 47.8      | 40.8    | 32.6    | 38.1   | 34.7   | 36.0   | 45.5   | 46.3   | 48.4   | 56.4   | 55.1   | 56.6    |
|                                                          | 400.0   | 53.5      | 39.1    | 27.0    | 30.4   | 28.6   | 37.5   | 40.7   | 43.6   | 49.1   | 50.2   | 52.3   | 55.1    |
|                                                          | 500.0   | 43.7      | 39.9    | 29.7    | 33.7   | 34.0   | 40.5   | 39.4   | 49.5   | 49.2   | 51.7   | 54.0   | 57.7    |
|                                                          | 630.0   | 41.0      | 33.4    | 16.5    | 22.5   | 20.8   | 30.3   | 36.4   | 42.3   | 47.2   | 49.4   | 53.2   | 56.2    |
|                                                          | 800.0   | 41.5      | 32.1    | 15.0    | 18.4   | 17.3   | 30.1   | 34.1   | 40.5   | 45.0   | 49.4   | 53.1   | 55.6    |
|                                                          | 1000.0  | 38.9      | 31.0    | 14.7    | 17.8   | 16.0   | 27.4   | 34.5   | 39.9   | 44.3   | 49.2   | 53.0   | 56.0    |
|                                                          | 1250.0  | 37.2      | 25.6    | 14.9    | 16.5   | 15.6   | 21.2   | 29.9   | 37.2   | 42.2   | 46.0   | 49.2   | 52.3    |
|                                                          | 1600.0  | 31.5      | 21.0    | 16.0    | 16.3   | 16.0   | 16.5   | 25.5   | 33.0   | 39.8   | 43.3   | 46.9   | 49.9    |
|                                                          | 2000.0  | 28.9      | 20.0    | 16.9    | 16.6   | 17.0   | 16.6   | 23.4   | 30.5   | 36.8   | 42.9   | 46.9   | 49.4    |
|                                                          | 2500.0  | 26.2      | 18.6    | 17.1    | 16.9   | 17.4   | 16.1   | 21.2   | 27.0   | 33.4   | 39.0   | 43.4   | 47.4    |
|                                                          | 3150.0  | 23.6      | 17.7    | 17.6    | 17.7   | 17.4   | 16.3   | 19.0   | 23.7   | 30.0   | 35.9   | 40.0   | 44.3    |
|                                                          | 4000.0  | 21.0      | 18.5    | 17.8    | 18.2   | 18.0   | 17.9   | 19.1   | 21.8   | 27.7   | 33.1   | 38.1   | 42.5    |
|                                                          | 5000.0  | 19.1      | 17.8    | 17.6    | 17.7   | 17.7   | 17.6   | 18.1   | 19.3   | 23.7   | 29.0   | 34.2   | 39.0    |
|                                                          | 6300.0  | 18.1      | 17.4    | 17.6    | 17.6   | 17.7   | 16.8   | 18.0   | 18.1   | 20.4   | 24.7   | 29.9   | 34.8    |
|                                                          | 8000.0  | 17.1      | 16.9    | 16.6    | 16.7   | 16.8   | 16.8   | 17.0   | 17.0   | 17.9   | 20.6   | 25.1   | 30.1    |
|                                                          | 10000.0 | 15.3      | 14.9    | 15.1    | 14.9   | 15.1   | 14.7   | 15.1   | 15.2   | 15.4   | 16.8   | 19.9   | 25.0    |
|                                                          | 12500.0 | 12.1      | 11.7    | 11.7    | 11.7   | 11.8   | 11.6   | 11.8   | 12.0   | 12.2   | 13.1   | 14.5   | 18.3    |
|                                                          | 16000.0 | 21.2      | 16.9    | 13.0    | 14.6   | 14.6   | 15.8   | 17.9   | 18.6   | 18.7   | 18.5   | 17.7   | 17.3    |

| Model                                                    |         | PCG-3R-08 |         |         |        |        |        |        |        |        |        |        |        |         |
|----------------------------------------------------------|---------|-----------|---------|---------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| speed                                                    |         | H (900)   | M (560) | L (250) | 100RPM | 200RPM | 300RPM | 400RPM | 500RPM | 600RPM | 700RPM | 800RPM | 900RPM | 1000RPM |
| Sound Power dB(A)                                        |         | 59.2      | 45.8    | 32.8    | 31.6   | 32.9   | 33.1   | 37.6   | 43.2   | 47.8   | 52.0   | 55.6   | 59.2   | 62.5    |
| A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa | 20.0    | 18.6      | 14.2    | 16.0    | 14.3   | 15.9   | 10.7   | 12.3   | 14.1   | 12.0   | 13.3   | 15.2   | 18.6   | 17.4    |
|                                                          | 25.0    | 18.7      | 17.5    | 13.7    | 17.9   | 14.3   | 17.2   | 14.3   | 14.2   | 14.3   | 20.8   | 14.5   | 18.7   | 17.8    |
|                                                          | 31.5    | 13.1      | 17.9    | 9.4     | 13.5   | 18.0   | 11.3   | 11.0   | 14.1   | 12.6   | 11.3   | 18.4   | 13.1   | 14.6    |
|                                                          | 40.0    | 12.2      | 10.8    | 6.3     | 11.8   | 10.5   | 8.9    | 5.2    | 9.3    | 10.4   | 8.3    | 11.5   | 12.2   | 9.9     |
|                                                          | 50.0    | 15.6      | 12.3    | 12.3    | 11.2   | 13.3   | 15.7   | 10.1   | 14.0   | 11.2   | 10.6   | 14.3   | 15.6   | 17.9    |
|                                                          | 63.0    | 16.4      | 12.1    | 15.4    | 8.3    | 16.8   | 9.7    | 12.9   | 10.9   | 14.9   | 14.4   | 16.3   | 16.4   | 22.1    |
|                                                          | 80.0    | 15.8      | 9.0     | 5.7     | 3.0    | 5.4    | 2.4    | 4.7    | 7.8    | 12.2   | 11.3   | 18.1   | 15.8   | 23.6    |
|                                                          | 100.0   | 32.4      | 14.2    | 9.4     | 9.4    | 11.1   | 8.7    | 11.8   | 13.8   | 17.6   | 24.7   | 26.4   | 32.4   | 32.4    |
|                                                          | 125.0   | 40.7      | 28.3    | 11.6    | 12.9   | 11.1   | 20.4   | 23.1   | 27.7   | 31.9   | 34.0   | 39.8   | 40.7   | 42.1    |
|                                                          | 160.0   | 44.0      | 32.5    | 15.0    | 16.1   | 16.8   | 19.0   | 26.5   | 32.3   | 33.8   | 38.7   | 41.3   | 44.0   | 48.0    |
|                                                          | 200.0   | 43.4      | 29.3    | 11.2    | 12.9   | 12.8   | 14.1   | 24.3   | 28.7   | 33.5   | 37.1   | 42.0   | 43.4   | 43.4    |
|                                                          | 250.0   | 46.6      | 37.1    | 12.4    | 13.2   | 13.6   | 17.9   | 25.4   | 31.8   | 38.5   | 39.6   | 42.4   | 46.6   | 50.5    |
|                                                          | 315.0   | 49.5      | 39.3    | 16.5    | 15.8   | 15.7   | 19.5   | 28.2   | 34.2   | 40.4   | 43.9   | 46.6   | 49.5   | 52.6    |
|                                                          | 400.0   | 50.3      | 37.0    | 21.5    | 17.5   | 23.0   | 22.6   | 27.0   | 32.8   | 37.4   | 41.1   | 45.7   | 50.3   | 51.8    |
|                                                          | 500.0   | 51.6      | 39.0    | 25.4    | 25.4   | 28.0   | 25.0   | 32.1   | 37.4   | 39.6   | 42.7   | 47.7   | 51.6   | 54.2    |
|                                                          | 630.0   | 49.2      | 34.7    | 21.7    | 21.3   | 22.2   | 22.4   | 26.1   | 31.6   | 36.2   | 40.8   | 45.5   | 49.2   | 52.5    |
|                                                          | 800.0   | 49.5      | 33.8    | 15.0    | 14.8   | 15.2   | 15.8   | 23.1   | 30.4   | 37.2   | 42.4   | 45.4   | 49.5   | 52.2    |
|                                                          | 1000.0  | 48.8      | 32.8    | 16.5    | 15.7   | 15.8   | 16.3   | 21.1   | 27.8   | 34.6   | 39.6   | 44.1   | 48.8   | 51.7    |
|                                                          | 1250.0  | 49.1      | 34.0    | 21.3    | 21.7   | 21.6   | 22.3   | 24.6   | 30.3   | 36.2   | 41.1   | 45.4   | 49.1   | 52.8    |
|                                                          | 1600.0  | 44.7      | 29.3    | 16.9    | 17.0   | 16.9   | 17.2   | 18.9   | 24.5   | 32.1   | 38.2   | 40.9   | 44.7   | 47.2    |
|                                                          | 2000.0  | 44.8      | 25.9    | 17.0    | 16.7   | 16.4   | 16.4   | 16.9   | 21.4   | 29.6   | 36.5   | 40.9   | 44.8   | 48.0    |
|                                                          | 2500.0  | 43.8      | 22.7    | 17.0    | 16.8   | 16.7   | 17.0   | 16.9   | 19.6   | 25.9   | 32.7   | 38.5   | 43.8   | 47.7    |
|                                                          | 3150.0  | 40.4      | 20.4    | 17.9    | 17.2   | 17.3   | 17.5   | 17.2   | 18.7   | 23.0   | 29.0   | 35.1   | 40.4   | 45.6    |
|                                                          | 4000.0  | 35.0      | 18.6    | 18.1    | 17.7   | 17.5   | 17.8   | 17.5   | 18.0   | 19.7   | 24.4   | 29.7   | 35.0   | 39.4    |
|                                                          | 5000.0  | 30.5      | 17.8    | 18.1    | 17.5   | 17.4   | 17.7   | 17.7   | 17.5   | 18.0   | 20.6   | 25.1   | 30.5   | 35.1    |
|                                                          | 6300.0  | 25.6      | 17.2    | 17.6    | 17.2   | 17.2   | 17.1   | 17.0   | 17.0   | 17.2   | 17.9   | 20.7   | 25.6   | 30.8    |
|                                                          | 8000.0  | 21.2      | 16.3    | 16.8    | 16.2   | 16.3   | 16.2   | 16.4   | 16.2   | 16.5   | 16.6   | 17.8   | 21.2   | 26.0    |
|                                                          | 10000.0 | 16.8      | 14.6    | 15.4    | 14.4   | 14.5   | 14.4   | 14.5   | 14.6   | 14.5   | 14.7   | 15.0   | 16.8   | 20.3    |
|                                                          | 12500.0 | 12.7      | 11.7    | 12.5    | 11.7   | 11.6   | 11.7   | 11.7   | 11.8   | 11.6   | 11.6   | 12.0   | 12.7   | 14.6    |
|                                                          | 16000.0 | 12.8      | 12.0    | 12.5    | 11.8   | 11.7   | 11.6   | 11.7   | 11.7   | 12.2   | 12.4   | 12.3   | 12.8   | 13.3    |

| Model                                                    |         | PCH-3R-12 |        |        |        |        |        |        |        |        |        |        |         |
|----------------------------------------------------------|---------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| speed                                                    |         | H(860)    | M(750) | L(350) | 200RPM | 300RPM | 400RPM | 500RPM | 600RPM | 700RPM | 800RPM | 900RPM | 1000RPM |
| Sound Power dB(A)                                        |         | 63.3      | 60     | 40.8   | 34.6   | 37.2   | 44.2   | 51.5   | 54.5   | 57.7   | 61.6   | 66.6   | 68.9    |
| A-weighted Sound Power in 1/3 Octave-bands under ESP:0Pa | 20.0    | 11.8      | 13.3   | 10.3   | 11.0   | 10.2   | 11.8   | 16.2   | 13.9   | 13.4   | 13.2   | 13.7   | 13.6    |
|                                                          | 25.0    | 9.9       | 13.3   | 11.8   | 13.2   | 13.1   | 12.9   | 11.8   | 14.8   | 11.6   | 14.9   | 21.1   | 16.2    |
|                                                          | 31.5    | 10.2      | 12.2   | 11.4   | 12.6   | 10.2   | 15.5   | 13.2   | 11.0   | 11.1   | 13.3   | 9.0    | 12.7    |
|                                                          | 40.0    | 8.9       | 14.2   | 6.2    | 5.2    | 11.2   | 7.7    | 8.4    | 8.0    | 12.2   | 16.2   | 11.3   | 15.4    |
|                                                          | 50.0    | 14.9      | 12.2   | 15.0   | 11.7   | 11.2   | 10.9   | 12.2   | 14.2   | 11.5   | 12.8   | 14.6   | 17.2    |
|                                                          | 63.0    | 13.7      | 16.4   | 11.5   | 9.7    | 5.7    | 7.0    | 15.8   | 11.8   | 14.2   | 18.6   | 19.5   | 18.8    |
|                                                          | 80.0    | 17.9      | 18.6   | 7.8    | 1.8    | 6.0    | 6.7    | 10.4   | 18.7   | 18.6   | 18.5   | 19.6   | 21.2    |
|                                                          | 100.0   | 30.3      | 26.9   | 13.3   | 3.8    | 5.9    | 17.4   | 15.8   | 19.4   | 23.9   | 29.8   | 28.9   | 28.3    |
|                                                          | 125.0   | 38.1      | 32.7   | 20.2   | 8.9    | 12.1   | 20.0   | 30.6   | 26.8   | 31.1   | 34.2   | 37.9   | 46.8    |
|                                                          | 160.0   | 43.6      | 40.9   | 23.0   | 16.3   | 18.9   | 27.7   | 34.2   | 39.4   | 38.2   | 43.6   | 44.5   | 48.6    |
|                                                          | 200.0   | 45.0      | 45.9   | 23.1   | 18.6   | 19.5   | 28.1   | 34.6   | 39.1   | 45.0   | 46.7   | 46.5   | 47.4    |
|                                                          | 250.0   | 51.5      | 47.8   | 31.2   | 23.0   | 26.3   | 33.1   | 40.6   | 45.3   | 46.7   | 48.9   | 55.0   | 60.2    |
|                                                          | 315.0   | 55.1      | 49.2   | 35.8   | 31.2   | 33.2   | 35.0   | 39.9   | 43.9   | 47.7   | 50.7   | 53.9   | 56.9    |
|                                                          | 400.0   | 51.5      | 49.1   | 37.8   | 28.1   | 31.6   | 39.9   | 49.2   | 43.9   | 47.3   | 50.9   | 54.5   | 62.2    |
|                                                          | 500.0   | 56.1      | 52.6   | 31.4   | 23.0   | 26.0   | 35.6   | 40.2   | 47.1   | 51.4   | 53.7   | 56.9   | 59.3    |
|                                                          | 630.0   | 54.2      | 51.0   | 28.7   | 20.3   | 23.8   | 33.5   | 40.0   | 45.0   | 49.1   | 52.9   | 57.2   | 58.7    |
|                                                          | 800.0   | 53.8      | 49.7   | 25.7   | 17.0   | 20.8   | 30.6   | 38.9   | 43.6   | 48.1   | 51.3   | 57.5   | 58.1    |
|                                                          | 1000.0  | 51.9      | 48.1   | 22.1   | 14.7   | 18.2   | 27.2   | 34.9   | 42.3   | 46.3   | 49.9   | 60.0   | 56.8    |
|                                                          | 1250.0  | 51.0      | 46.6   | 21.5   | 14.4   | 16.7   | 25.8   | 33.7   | 39.9   | 44.1   | 49.1   | 53.7   | 55.2    |
|                                                          | 1600.0  | 49.6      | 44.7   | 19.3   | 14.0   | 15.4   | 27.0   | 33.9   | 38.3   | 42.5   | 46.8   | 50.3   | 53.5    |
|                                                          | 2000.0  | 48.9      | 45.2   | 17.1   | 15.7   | 16.2   | 23.1   | 35.5   | 41.4   | 43.8   | 46.5   | 49.6   | 53.7    |
|                                                          | 2500.0  | 49.8      | 46.9   | 16.5   | 16.2   | 16.3   | 18.6   | 29.8   | 41.0   | 45.3   | 48.4   | 50.4   | 53.3    |
|                                                          | 3150.0  | 48.2      | 43.9   | 16.3   | 16.1   | 16.1   | 16.9   | 23.1   | 32.9   | 41.4   | 46.4   | 49.1   | 51.2    |
|                                                          | 4000.0  | 44.6      | 38.1   | 16.0   | 16.6   | 16.1   | 16.2   | 20.6   | 29.0   | 34.8   | 41.4   | 46.9   | 50.3    |
|                                                          | 5000.0  | 41.1      | 35.4   | 15.8   | 15.9   | 16.2   | 16.1   | 18.3   | 26.4   | 32.6   | 38.2   | 43.0   | 47.3    |
|                                                          | 6300.0  | 37.7      | 31.9   | 15.8   | 15.5   | 15.9   | 15.7   | 16.5   | 22.8   | 29.0   | 34.7   | 39.6   | 43.5    |
|                                                          | 8000.0  | 34.3      | 26.9   | 14.6   | 14.8   | 15.2   | 15.0   | 15.1   | 21.0   | 23.5   | 30.2   | 36.0   | 40.5    |
|                                                          | 10000.0 | 28.1      | 21.3   | 13.0   | 13.0   | 13.5   | 13.1   | 13.2   | 19.6   | 18.2   | 24.3   | 30.7   | 36.3    |
|                                                          | 12500.0 | 20.4      | 14.7   | 9.7    | 9.7    | 10.2   | 9.7    | 9.8    | 14.8   | 12.4   | 16.9   | 22.4   | 28.0    |
|                                                          | 16000.0 | 14.2      | 12.9   | 10.4   | 8.7    | 9.7    | 10.8   | 11.7   | 12.8   | 12.5   | 13.2   | 14.9   | 18.8    |

| Model                                                    |         | PCH-3R-20 |        |        |        |        |        |        |        |        |        |        |         |
|----------------------------------------------------------|---------|-----------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|
| speed                                                    |         | H(930)    | M(800) | L(400) | 200RPM | 300RPM | 400RPM | 500RPM | 600RPM | 700RPM | 800RPM | 900RPM | 1000RPM |
| Sound Power dB(A)                                        |         | 67.8      | 63.3   | 43.9   | 34.8   | 36.1   | 43.3   | 50.9   | 55.7   | 59.9   | 63.3   | 66.9   | 68.5    |
| A-weighted Sound Power in 1/3 Octave-bands under ESP:OPa | 20.0    | 10.4      | 11.1   | 11.4   | -1.9   | 8.0    | 5.3    | 6.3    | 8.2    | 12.9   | 11.1   | 23.5   | 15.7    |
|                                                          | 25.0    | 20.8      | 8.3    | 7.3    | 3.4    | 3.9    | 4.6    | 9.2    | 5.6    | 11.9   | 8.3    | 22.5   | 15.4    |
|                                                          | 31.5    | 16.5      | 10.0   | 8.5    | 20.9   | 2.6    | 11.7   | 9.5    | 3.7    | 9.7    | 10.0   | 20.1   | 19.8    |
|                                                          | 40.0    | 20.8      | 9.6    | 3.4    | 8.6    | 1.3    | 22.1   | 12.1   | 13.8   | 13.5   | 9.6    | 21.7   | 20.4    |
|                                                          | 50.0    | 21.8      | 15.0   | 7.0    | 6.6    | 7.8    | 9.1    | 13.1   | 10.8   | 16.4   | 15.0   | 23.4   | 21.8    |
|                                                          | 63.0    | 28.7      | 26.4   | 8.5    | 5.0    | 7.0    | 9.9    | 18.9   | 19.5   | 25.0   | 26.4   | 27.9   | 28.3    |
|                                                          | 80.0    | 30.1      | 25.3   | 7.6    | 7.6    | 7.2    | 6.8    | 11.1   | 18.9   | 23.7   | 25.3   | 29.4   | 31.4    |
|                                                          | 100.0   | 40.0      | 33.3   | 16.2   | 18.6   | 10.4   | 17.8   | 19.8   | 24.0   | 27.0   | 33.3   | 40.5   | 39.9    |
|                                                          | 125.0   | 44.0      | 38.6   | 26.0   | 19.8   | 19.5   | 26.8   | 33.8   | 36.8   | 35.4   | 38.6   | 40.7   | 42.0    |
|                                                          | 160.0   | 48.4      | 41.3   | 29.8   | 22.8   | 24.5   | 28.0   | 37.4   | 40.2   | 43.3   | 41.3   | 45.8   | 47.0    |
|                                                          | 200.0   | 50.3      | 50.1   | 29.9   | 20.6   | 23.2   | 30.1   | 34.9   | 40.6   | 45.6   | 50.1   | 50.7   | 50.8    |
|                                                          | 250.0   | 56.8      | 52.7   | 36.0   | 26.9   | 28.8   | 36.3   | 43.0   | 45.2   | 50.8   | 52.7   | 56.7   | 57.5    |
|                                                          | 315.0   | 59.4      | 55.0   | 38.2   | 27.7   | 28.4   | 36.8   | 43.1   | 49.7   | 51.7   | 55.0   | 56.9   | 58.7    |
|                                                          | 400.0   | 56.9      | 53.6   | 35.0   | 23.4   | 26.0   | 35.0   | 42.4   | 46.8   | 49.8   | 53.6   | 56.5   | 58.4    |
|                                                          | 500.0   | 54.0      | 51.3   | 31.3   | 20.0   | 23.0   | 30.9   | 38.5   | 44.8   | 48.7   | 51.3   | 53.1   | 55.3    |
|                                                          | 630.0   | 58.4      | 56.4   | 33.9   | 24.1   | 25.4   | 33.9   | 40.3   | 46.2   | 51.6   | 56.4   | 57.4   | 60.3    |
|                                                          | 800.0   | 62.2      | 56.7   | 32.5   | 24.2   | 25.7   | 32.5   | 40.6   | 47.1   | 51.4   | 56.7   | 60.9   | 62.2    |
|                                                          | 1000.0  | 58.2      | 53.3   | 29.7   | 18.8   | 21.0   | 29.4   | 37.3   | 43.0   | 48.3   | 53.3   | 56.7   | 59.3    |
|                                                          | 1250.0  | 54.9      | 50.3   | 26.9   | 16.6   | 18.0   | 27.2   | 34.1   | 40.7   | 45.9   | 50.3   | 53.3   | 55.9    |
|                                                          | 1600.0  | 52.6      | 48.6   | 25.1   | 15.9   | 17.1   | 24.7   | 32.7   | 39.2   | 44.2   | 48.6   | 51.7   | 53.4    |
|                                                          | 2000.0  | 49.8      | 45.9   | 21.4   | 15.3   | 15.2   | 21.1   | 30.0   | 37.0   | 41.8   | 45.9   | 49.2   | 50.5    |
|                                                          | 2500.0  | 49.1      | 44.5   | 19.5   | 15.0   | 15.2   | 20.1   | 28.4   | 35.7   | 41.2   | 44.5   | 48.4   | 50.0    |
|                                                          | 3150.0  | 47.8      | 43.4   | 17.3   | 15.4   | 15.5   | 17.4   | 26.0   | 33.5   | 39.3   | 43.4   | 46.7   | 48.4    |
|                                                          | 4000.0  | 45.9      | 41.1   | 16.6   | 15.7   | 15.4   | 16.7   | 23.7   | 31.9   | 36.9   | 41.1   | 45.5   | 47.1    |
|                                                          | 5000.0  | 43.4      | 39.0   | 15.8   | 15.4   | 15.7   | 16.1   | 20.7   | 29.2   | 34.9   | 39.0   | 42.6   | 44.5    |
|                                                          | 6300.0  | 41.1      | 36.3   | 15.5   | 15.5   | 15.4   | 15.5   | 17.8   | 25.8   | 32.3   | 36.3   | 40.2   | 42.0    |
|                                                          | 8000.0  | 39.1      | 34.4   | 15.0   | 15.0   | 14.8   | 14.7   | 16.1   | 22.0   | 29.2   | 34.4   | 38.3   | 40.1    |
|                                                          | 10000.0 | 35.6      | 29.7   | 12.9   | 13.1   | 12.9   | 13.2   | 13.2   | 16.8   | 23.6   | 29.7   | 34.7   | 36.8    |
|                                                          | 12500.0 | 28.9      | 22.3   | 9.7    | 9.8    | 9.7    | 9.6    | 9.8    | 11.5   | 16.5   | 22.3   | 27.7   | 30.3    |
|                                                          | 16000.0 | 21.6      | 16.9   | 12.9   | 10.8   | 10.9   | 12.7   | 13.3   | 14.6   | 15.2   | 16.9   | 21.0   | 23.0    |

## B. Installation

### B.1. Safety Precautions

- When installing, performing maintenance or servicing Polar Air fan coil units observe the precautions stated in this manual as well as those stated on the labels attached to the unit.
- Ensure all local and national safety codes, laws, regulations, as well as general electrical and mechanical safety guidelines are followed for installation, maintenance and service.
- The appliance is for indoor use only.
- Ensure the correct power supply is provided.
- If the power supply cord is damaged, it must be replaced by qualified personnel.
- Installing and servicing fan coil unit should be performed by qualified service personnel only.
- This appliance is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or persons lacking in experience and knowledge of the appliance, unless they have been given supervision or instruction concerning it.
- User of this appliance is responsible for his/her own safety.
- Warranty shall be voided if installation instructions and safety precaution stated in this manual are not observed.
- Never cut off the mains supply when unit is under operation. The unit should only be switched off by using the ON-OFF button on the control interface.
- During connections, select pipe pliers according to pipe diameter to avoid damaging units over forced.
- Untreated frozen water and cooling water may cause dirt accumulation and corrosion. Suggest using treated water. Suggested working water pressure is below 1.6 Mpa.
- When units are in cooling mode, suggested freezing water degree is  $\geq 7^{\circ}\text{C}$ ; When units are in heating mode, suggested hot water degree is  $\leq 60^{\circ}\text{C}$ .
- Condensate water pipe, water connection pipe, water connectors and solenoid valve body must remain heat to avoid condensation.

#### CAUTIONS

*Before any service or maintenance operations turn off the mains electrical supply.*

*DO NOT turn OFF the main power supply when the unit is operating. Turn off the unit BEFORE turning off the main power*

## B.2. Before Installation

- The installation site must be established by the system designer or other qualified professional, taking account of the technical requisites and current standards and regulations.
- Cassette fan coil units must be installed by qualified personnel only.
- Cassette fan coil units are designed for installation in a false ceiling, for intake of fresh air from outside and for diverting a small part of the treated air into a neighboring room.
- They must be installed in such a way as to enable treated air to circulate throughout the room and allow the minimum distances required for technical maintenance operations.
- It is advisable to place the unit close to the installation site without removing it from packaging.
- Do not put heavy tools or weights on packaging.
- Upon receipt, the unit and the packaging must be checked for damage sustained in transit and if necessary, a damage claim must be filed with the shipping company.
- Check immediately for installation accessories inside the packaging.
- Do not lift unit by the condensate drain discharge pipe or by the water connections or front panel. lift the unit using four mounting brackets. (Figure B.4.1)
- Check and note the unit serial number.



Figure B.4.1

### B.3. Installation Location

- Do not install the unit in rooms where flammable gas or alkaline acid substances are present. Aluminum/copper coils and/or internal plastic components can be damaged irreparably.
- Do not install in workshops or kitchens. drawn in oil vapors might deposit on the coils and alter their performance or damage the internal plastic parts of the unit.
- If installation of unit includes using a lift, insert a plywood sheet between the unit and the lift forks to avoid damaging unit. (Figure B.5.1)
- It is recommended to locate the unit near one side of room to ensure optimum air distribution. (Figure B.5.2)
- Generally, the best louver position is the one which allows air diffusion along the ceiling. Alternative positions can be selected.
- Confirm sufficient space is provided to allow removal of panels from the ceiling in the selected position and to allow enough clearance for maintenance and servicing operations.

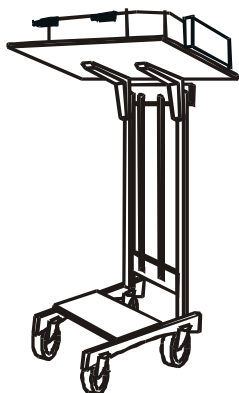


Figure B.5.1

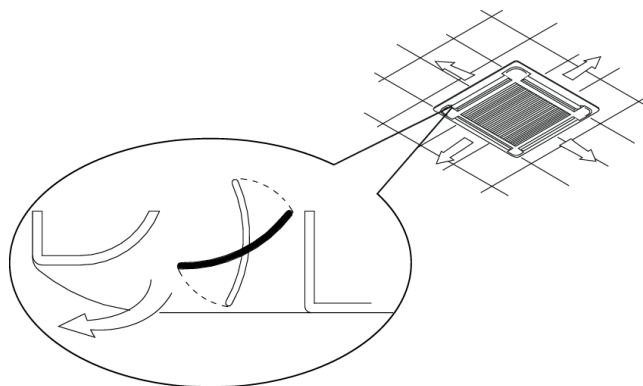


Figure B.5.2

### B.4. False Ceiling Clearance

- Verify inlet and outlet grilles are not obstructed to ensure proper air flow.
- Confirm location allows condensate to be properly drained.
- Confirm height between the bottom of upper deck and top of ceiling is sufficient for installation. (Figure B.6.1)
- Ensure there is sufficient space around the unit to provide installation and service.

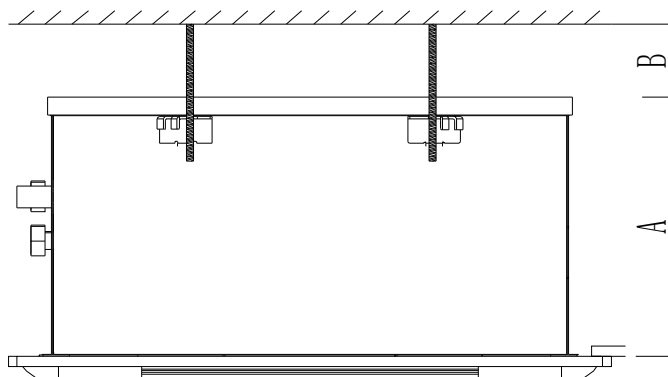


Figure B.6.1

| Model            | A (mm)       | B (mm)     |
|------------------|--------------|------------|
| PCG-04           | Maximum: 265 | Minimum 10 |
| PCG-08<br>PCH-20 | Maximum: 305 | Minimum 10 |
| PCH-12           | Maximum: 275 | Minimum 10 |

## B.5. Condensate Drainage Connection

- The unit is fitted with a condensate pump with a maximum of 990mm lift.
- The unit is provided with 25.4mm diameter ABS drainage outlet.
- Confirm drain outlet has not been damaged before connecting drainpipe to unit.
- Discharge pipe may be connected with hose clamp. (Figure B.7.1)
- The drain must be installed with a downward slope.
- Insulate drainpipe after installation.

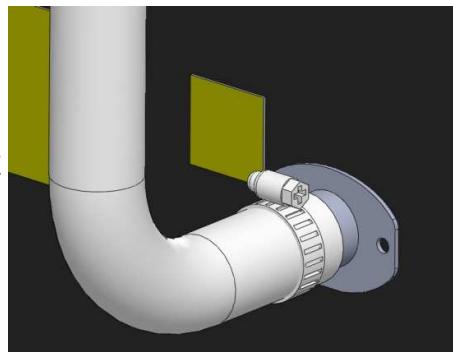
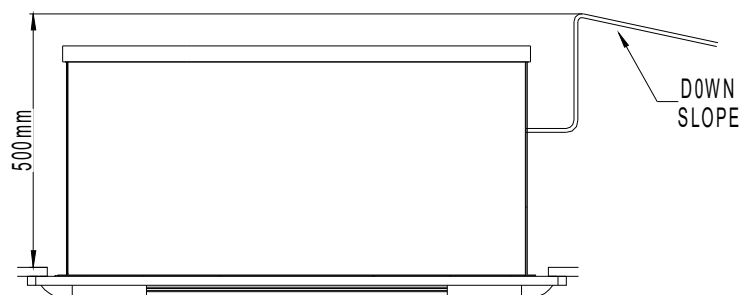


Figure B.7.1

### Caution

*Factory-provided drain outlet is ABS. Using an unsuitable glue may damage the drainage outlet.*

## B.6. External Drain Pan Installation

1. Align the two screw holes in the fixing plate to the two holes in the external drain pan. (Figure B.8.1 and B.8.2)
2. Make sure the drain pan is horizontal.
3. Tighten the two screws while making sure the external drain pan is installed flush against the fixing plate. (Figure B.8.3)
4. When the installation is completed, it is necessary to wrap the connecting pipe with thermal insulation to prevent condensation on ceiling tiles.

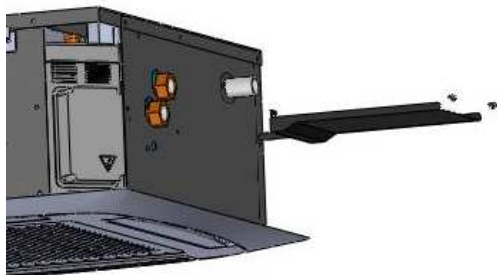


Figure B.8.1

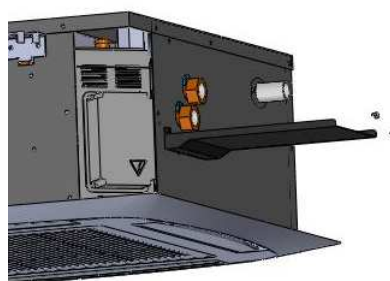


Figure B.8.2

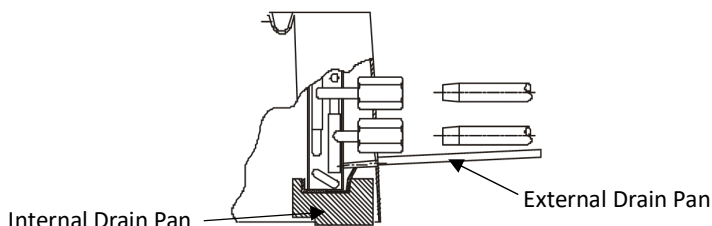


Figure B.8.3

## B.7. Water Connections and Valve Configurations

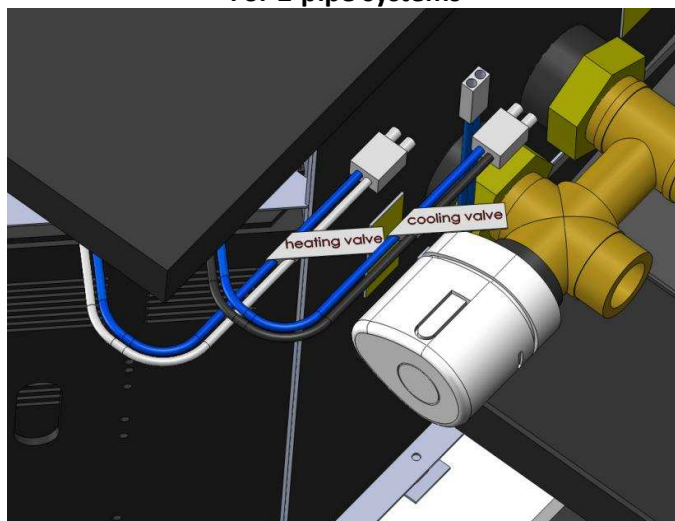
The cassette unit is provided with 3/4" water piping connections with gaskets.

- ~I: Units are compatible with:  
230VAC 2-way and 3-way on/off valves (thermoelectric or electric motor-driven actuation), with OPEN/CLOSE state actuation.  
230VAC 2-way and 3-way modulating valves (thermoelectric or electric motor-driven actuation), with modulating state actuation.
- ~W: Valve control requires external wired thermostat. See thermostat manual for details.
- Connections:  
Review below table for information on valve diameter.

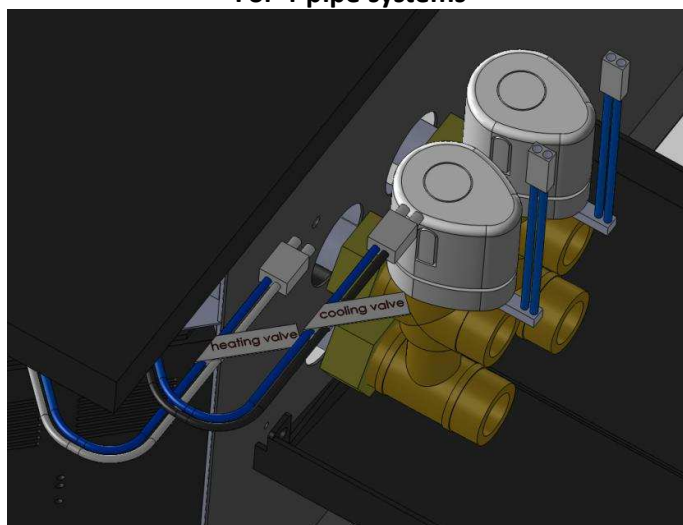
| Model      | External valve information |                       |
|------------|----------------------------|-----------------------|
|            | Type                       | Connector dia. (inch) |
| All models | 2-way & 3-way              | 3/4"                  |

- Valve installations:  
See drawings of external valve installation below by model type.

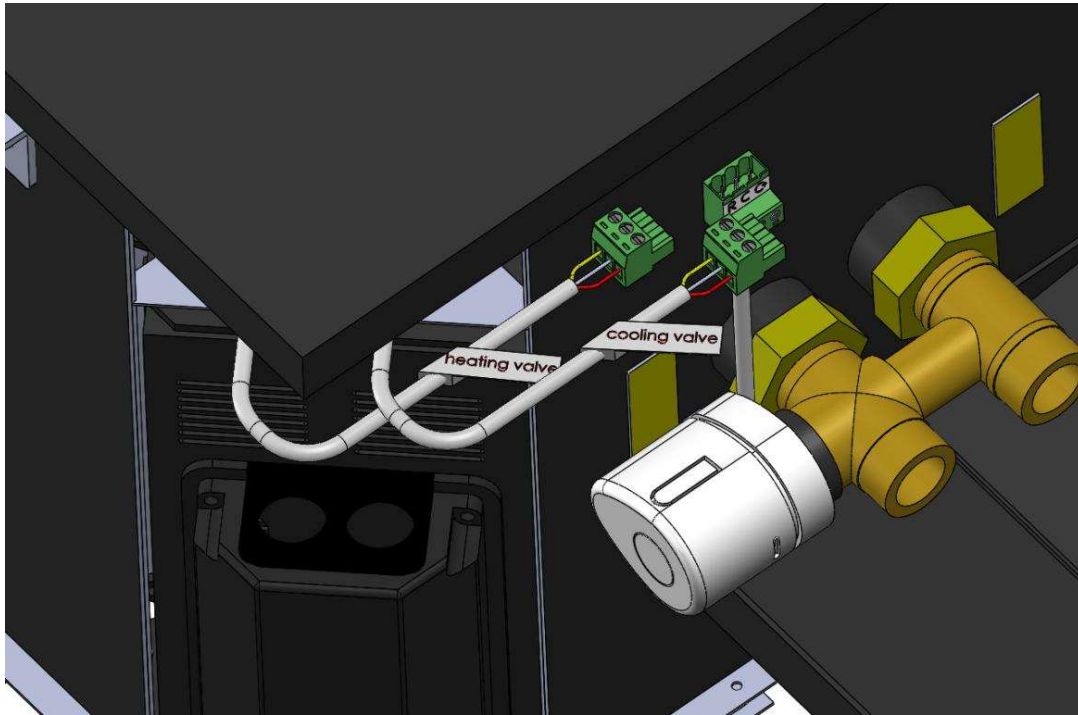
**For 2-pipe systems**



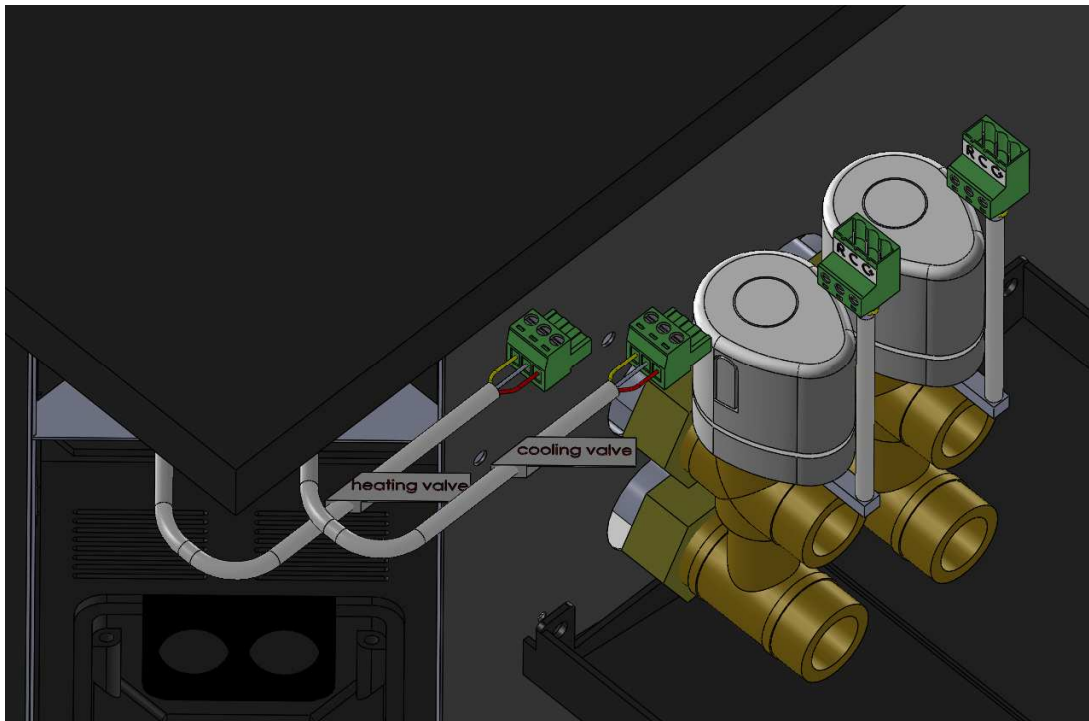
**For 4-pipe systems**



### For 2-pipe system with modulating valve



### For 4-pipe systems with modulating valve



## B.8. Fresh Air Renewal Connection

The fresh air system for cassette unit allows up to 15% of airflow (maximum air flow per connection is 100m<sup>3</sup>/h) to be fresh air intake (per connection). Maximum 2 fresh air connections per unit are allowed.

1. The corners of the cassette allow separate ductwork to be installed for outside air intake (Figure B.10.1)
2. Cut and remove thermal insulating material.
3. Open the mounting plate (Figure B.10.2 and Figure B.10.3)
4. Install the flange to casing and attach with 2 screws. (Figure B.10.4 and B.10.5)

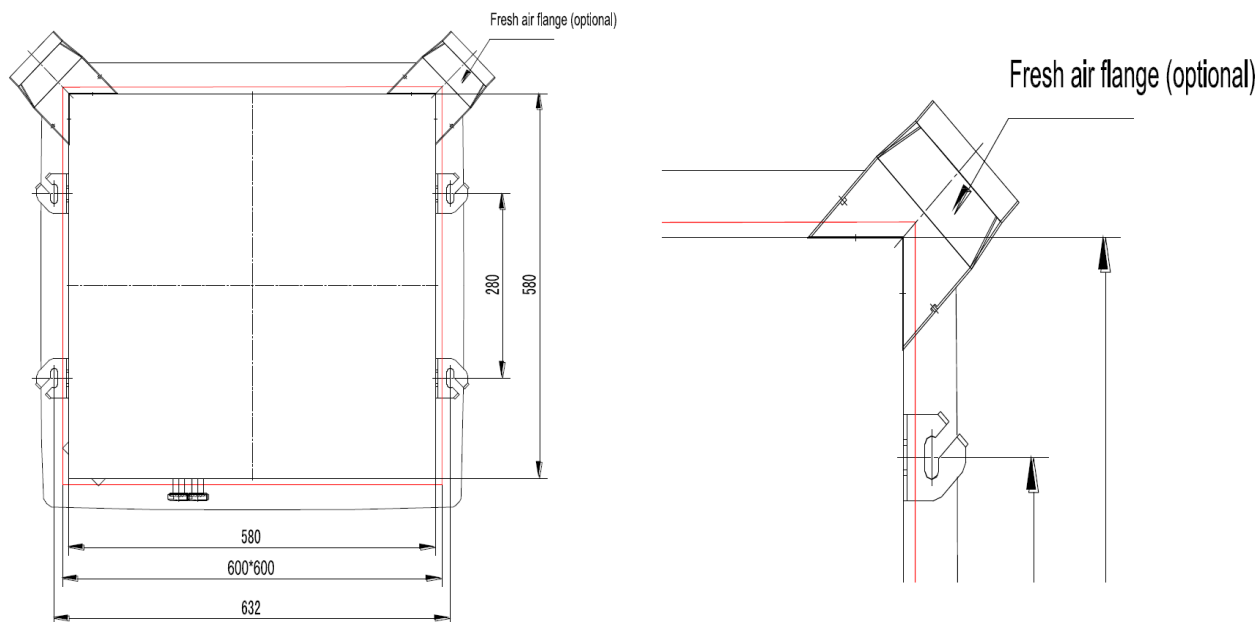


Figure B.10.1

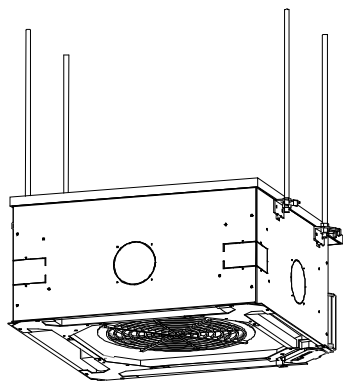


Figure B.10.2

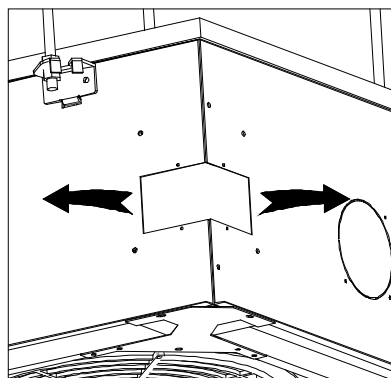


Figure B.10.3

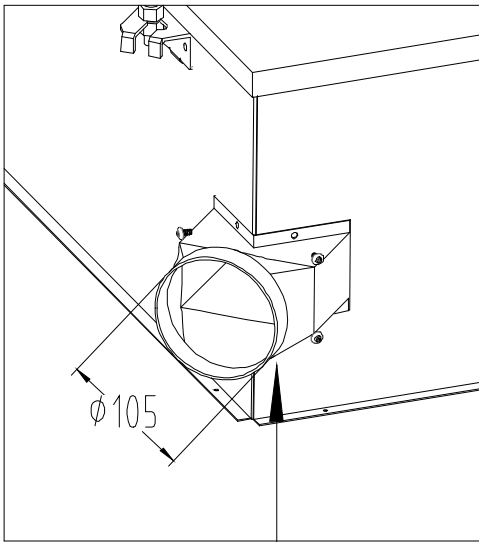


Figure B.10.4

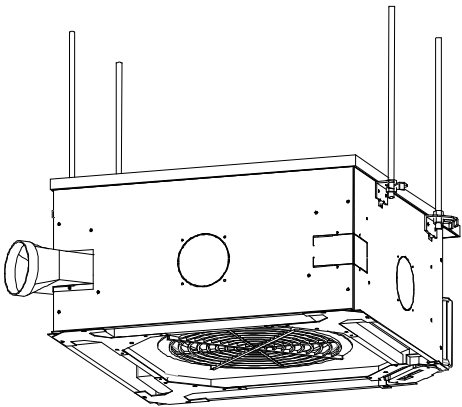
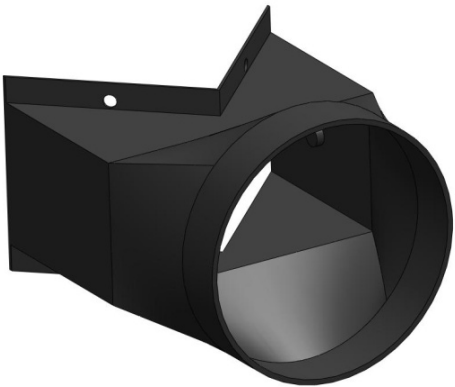
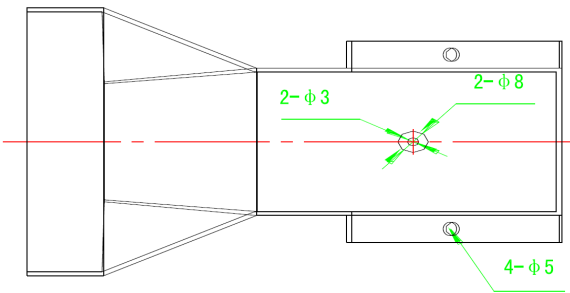
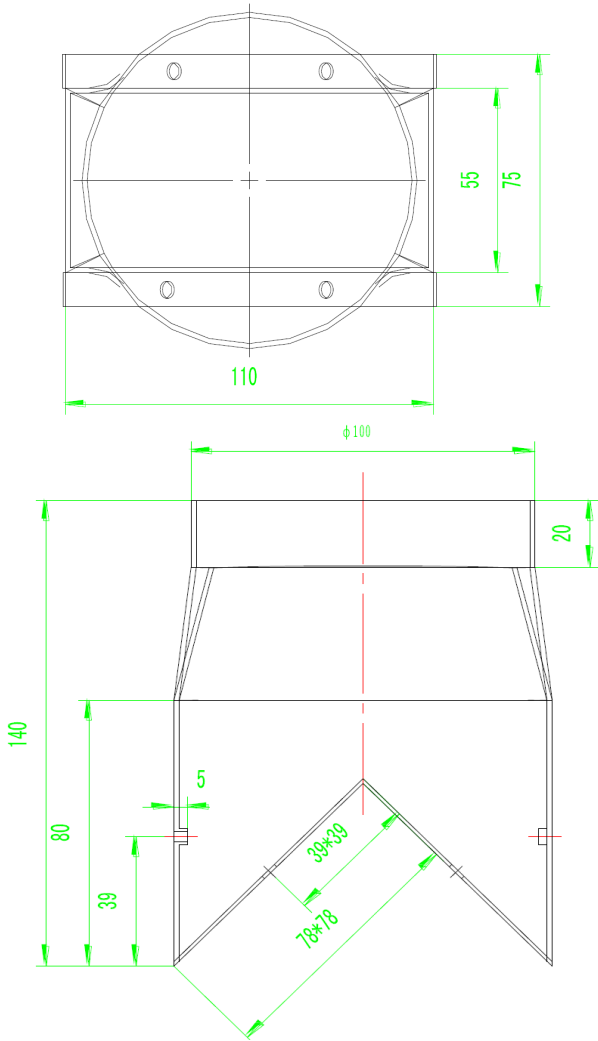


Figure B.10.5



Fresh Air Flange dimension

(All dimensions shown in mm)

## B.9. Branch Duct Connection

- The side opening allows branch duct work to be installed.
- Dimensions and location for connection are shown in Figure B.11.1 and Figure B.11.2.
- Flanges and conduits can be installed to casing.
- Conduits can be flexible polyester with spring core or corrugated aluminum externally insulated.
- Branch duct flange and blanking plates are available as separate accessories items.

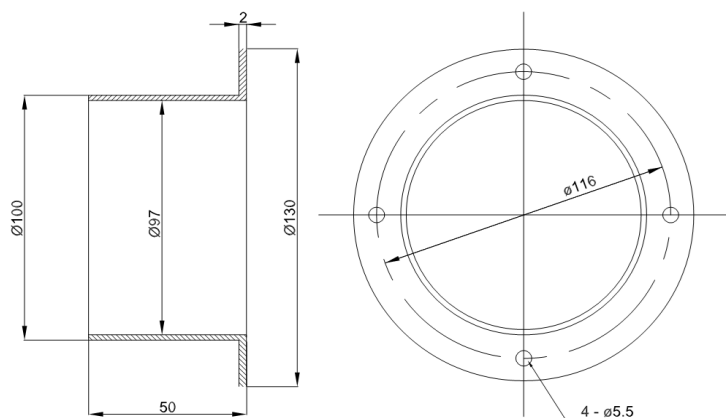


Figure B.11.1

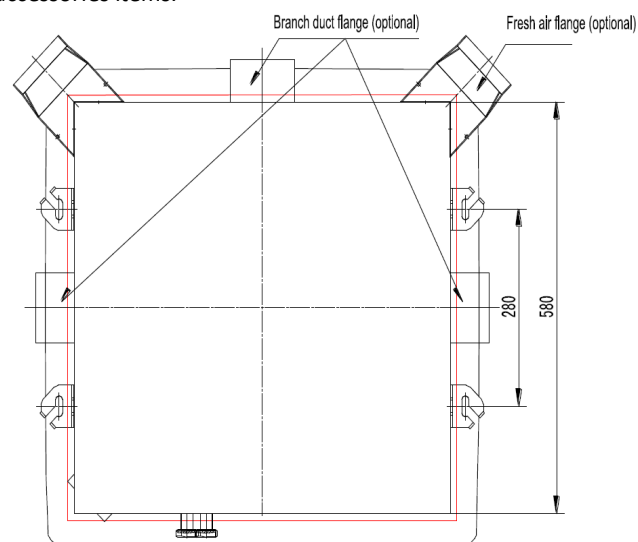


Figure B.11.2

### Installation Procedures:

1. Look for the yellow sticker on the casing for the location of branch duct connections.
2. Use a cutter and follow along the pre-cut circular marking as shown and trim off the insulation.
3. Knock out the pre-cut hole.
4. Connect the flange to the opening with 4 tapping screws ( $\varnothing 3 \times 12$  mm).

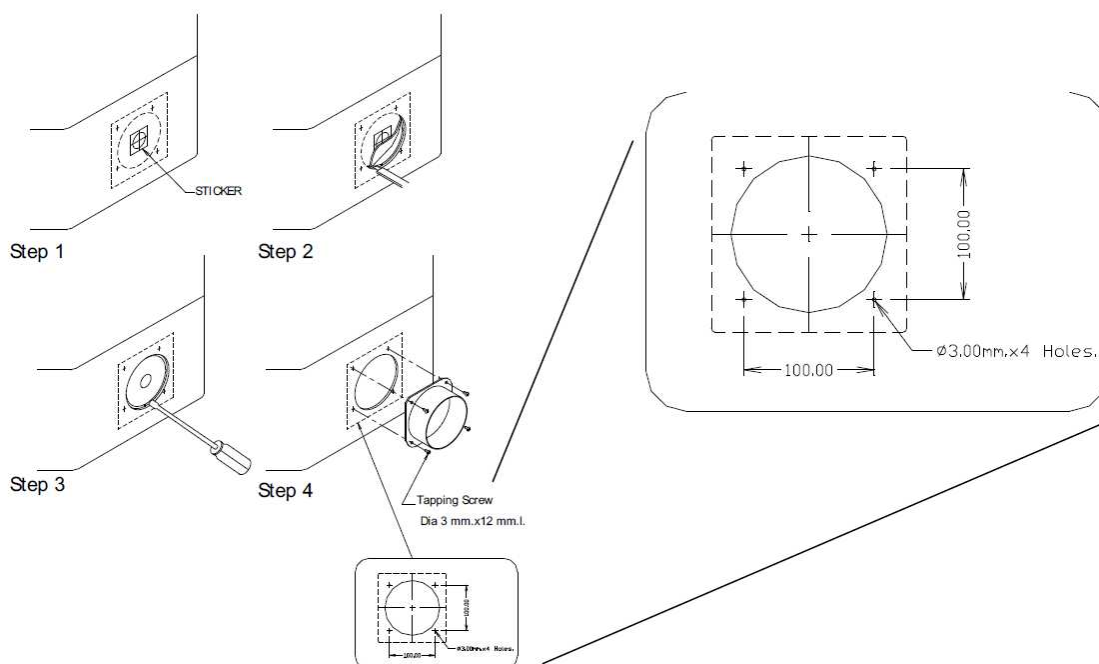


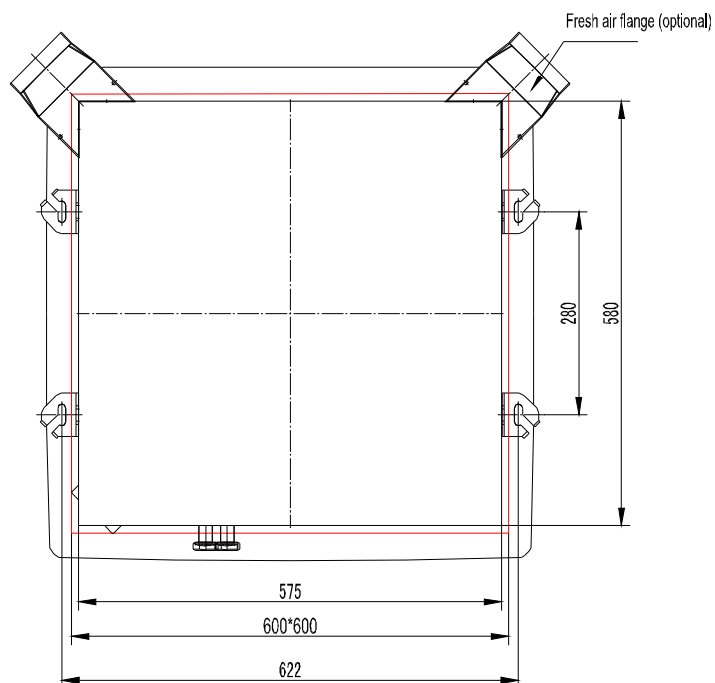
Figure B.11.3

(All dimensions shown in mm)

## B.10. Suspension Bolts Layout and Ceiling Opening

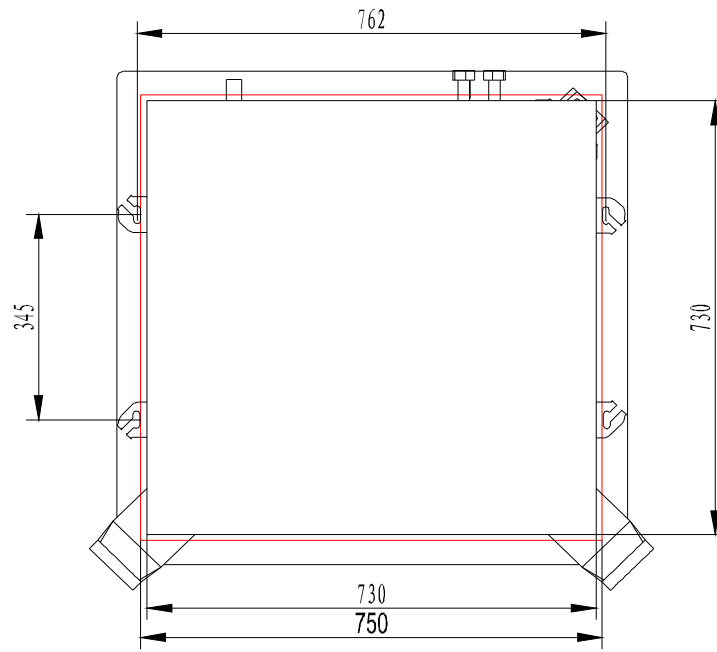
Using installation template, remove and/or modify ceiling panels and install the suspension bolts as in the images below.

PCG-04/08~



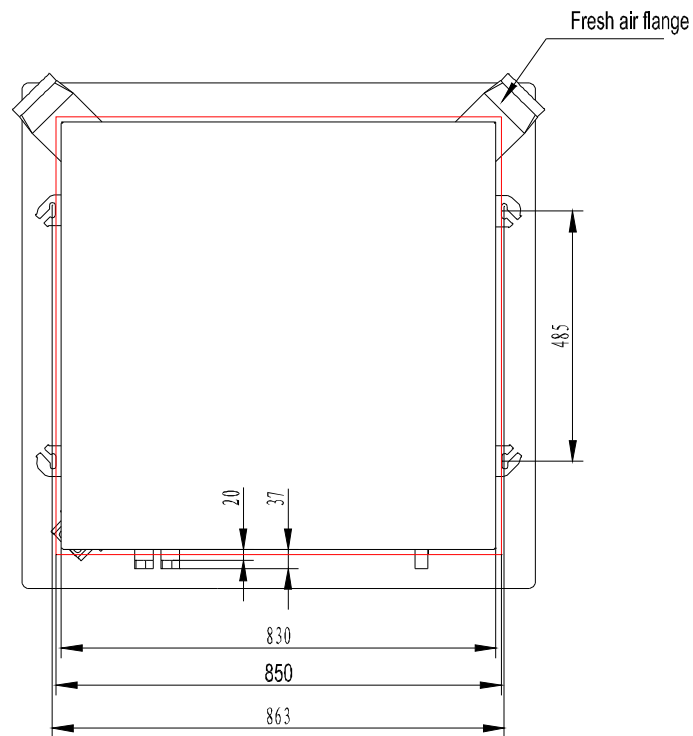
600 x 600: Dimensions for opening  
622 x 280: Suspension Bolts

PCH-12~



750×750: Dimensions for opening  
345×762: Suspension Bolts

PCH-20~



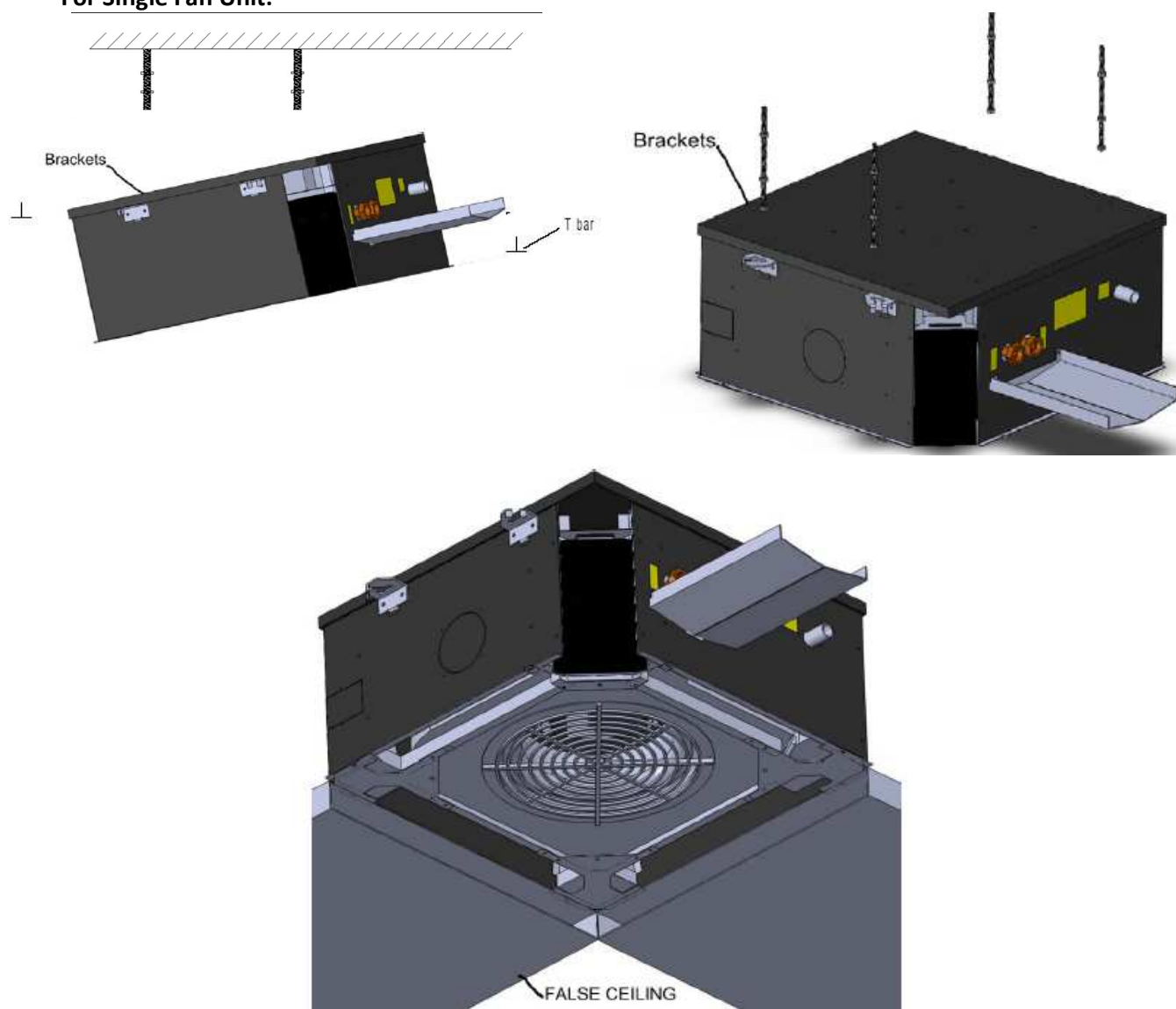
850× 850: Dimensions for opening  
485× 863: Suspension Bolts

(All dimensions shown in mm)

### Installation Procedures:

1. Lift unit (without front panel) with care by four corners only. Do not lift unit by the condensate drain discharge pipe or piping connections.
2. Incline the unit and insert it into ceiling. Insert support rods into the bracket slot.
3. Remove some T bars if necessary to achieve enough clearance.
4. Line up the unit to the supporting bars of the ceiling by tightening the nuts and counter nuts of the suspension rods.
5. After connecting the condensate drain piping and piping connections, confirm fan coil is level.
6. Check to ensure the unit is level. Drain will at the lowest point when unit is level.
7. Tighten nuts on the suspended rods.

### For Single Fan Unit:



Clearance between the unit and ceiling

| MODEL     | All single fan models |
|-----------|-----------------------|
| Clearance | 3mm                   |

## B.11. Interconnecting Wiring

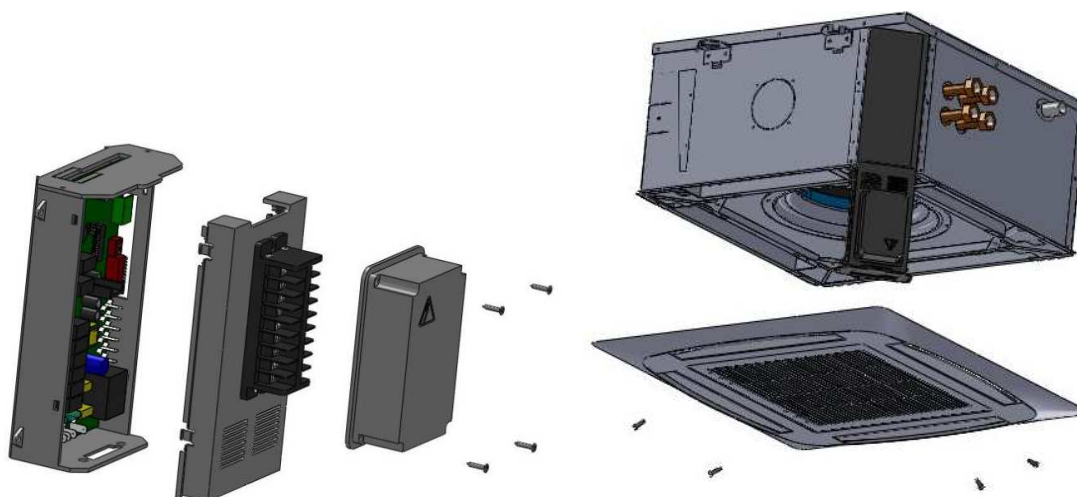
- It is recommended shielded line voltage and low voltage cables in electrically noisy areas.
- Do not install fan coil unit in a location where electromagnetic waves may be directly emitted towards infra-red receiver on the unit.
- Install the unit and components as far away as is practical (at least 5m) from the electromagnetic wave source.
- Use shielded sensor cable in where electromagnetic waves exist.
- Install a noise filter if necessary.

### IMPORTANT NOTES

*Please ensure the cable of the main powers supply is longer than 500mm from the control box terminal block. This is to ensure the control box can be slid out easily during maintenance activities.*

### Wiring Procedures:

1. Open the terminal block cover by removing the 4 screws.
2. Connect power cable to the terminal according to the wiring diagram.
3. Connect room temperature sensor and coil temperature sensors to control box.
4. Connect stepping motors.
5. Connect receiver display.
6. Connect wired wall-pad controller (optional).
7. Slide the control box into the unit casing and attach with screws.



## B.12. Mounting Front Panel Assembly

1. Remove return grille from front panel.
2. Move the front panel to the unit casing.
3. Tighten 4 partially threaded screws to attach the front panel as shown in Figure B.14.1 and Figure B.14.2. The front panel does not move upwards excessively because the screws are not fully threaded (see below Figure B.14.3). Therefore, the height of false ceiling and installation height should be measured accurately to ensure there is no gap between the false ceiling and the front panel.
4. Install the grille back to front panel.

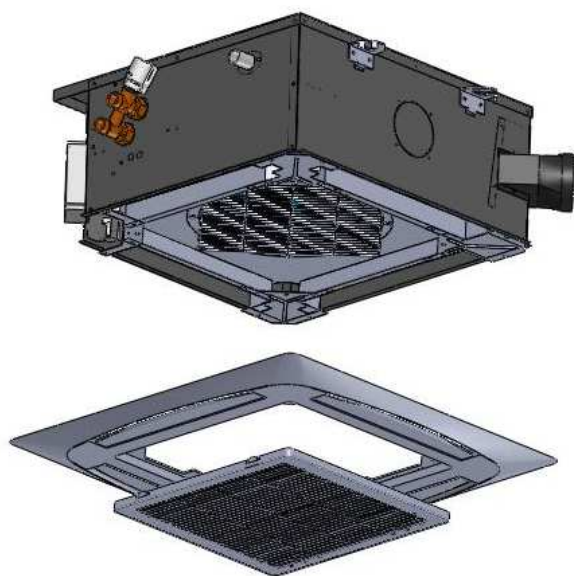


Figure B.14.1

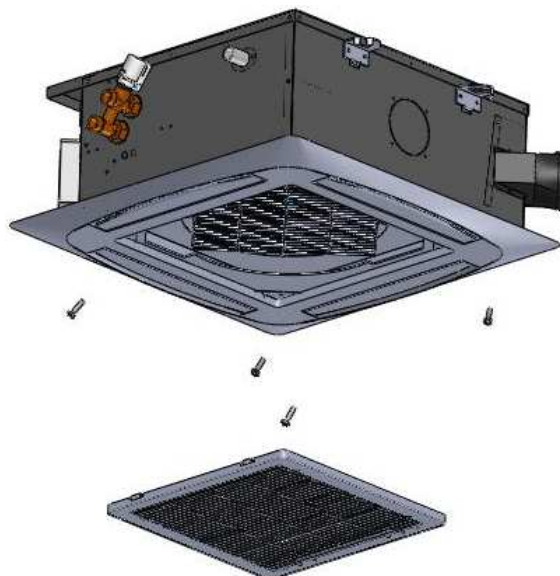


Figure B.14.2



Figure B.14.3

## B.13. Start-Up

- The unit should not be started up until the system piping has been cleaned and all the air has been purged.
- Check condensate drainpipe slope.
- Confirm the condensate drain pump in good working order.
- Confirm float switch is not loosen or become dislodged during shipping. Use the following steps to confirm pump functionality:
  1. Install cassette unit in an absolute horizontal position.
  2. Fill the internal drain pan by pouring water through the external drain pan to confirm drain pump is working.
  3. Confirm flow of water through condensate drainpipe. If the water is not expelled, verify float switch is has not been damaged.
  4. Verify air filter is clean and properly installed.
  5. Ensure that voltage and current values correspond with the unit nameplate values. check electrical connections.
  6. Verify louver is open.

## C. Maintenance

- Turn off the main power switch before performing any service or maintenance operations. Please see section B.1. "Safety Precautions".
- The air filter is made of acrylic fiber and is washable in water.
- Open the intake grille by releasing the two fasteners to remove filter.
- Check the filter before the operating season and then periodically while in use. clean or replace as necessary.

### C.1. For Units Out Of Use for Extended Period

Prior to restarting the unit:

- Clean or replace the air filters.
- Check and remove any obstruction from the external drain pan and the internal drain pan.

### C.2. Extra Maintenance

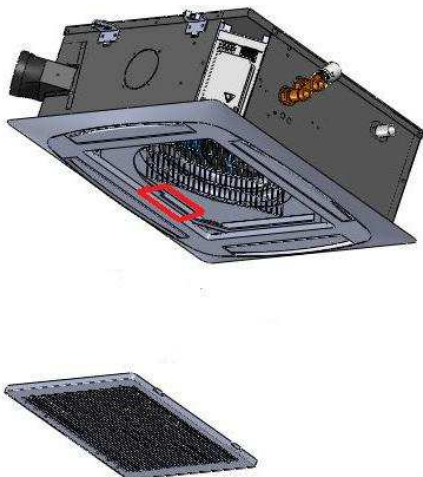
- The electrical panel is easily accessible by removing the cover panel.
- Inspection, servicing, and replacement of internal components such as coils, condensate pump, float switch and drain pan are accessible via cover panel.
- Be aware of water spillage when removing the condensate drain pan
- Release the drain pan fixing screws and remove the condensate drain pan with care.

### C.3. Filter Removal

1. Unlock the two fasteners on the front panel.
2. Open the grille downward with care.
3. Pull the filter out along the slot.
4. Clean the filter and reassemble.



## C.4. Air Vent and Water Purge Valve



Step 1: Remove grille, access the area indicated by the red line.



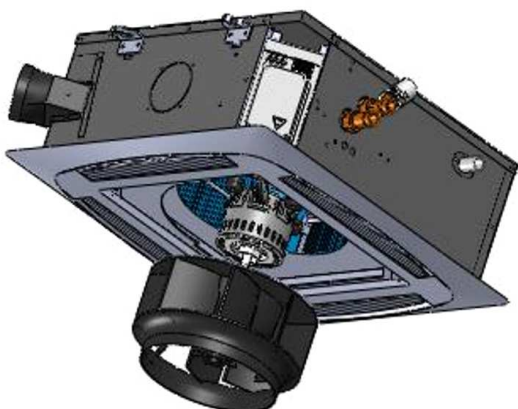
Step 2: Operate the air vent and water purge valve by turning the knobs.

## C.5. Fan Speed Customization

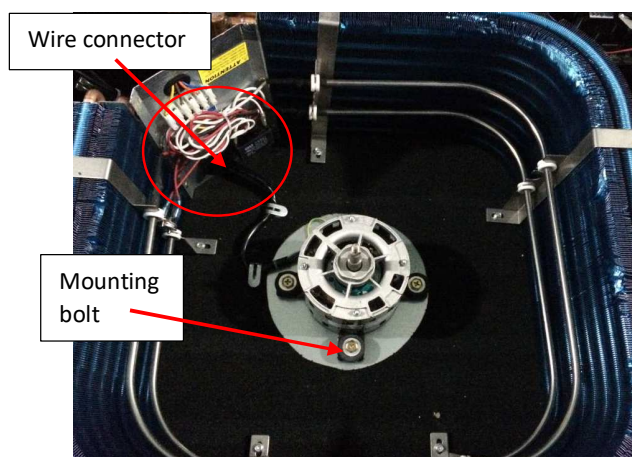
Fan speed can be customized by changing the RPM setting from wired wall pad. Please read F.2. Wired Wall Pad Controller, code S41 for details.

## C.6. Motor and Fan Blower Replacement

Refer to Section C.5. for Steps 1, 2 and 3.



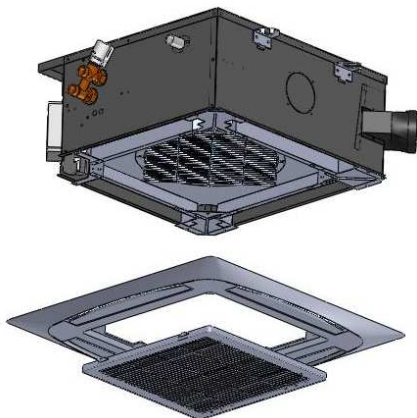
Step 4: Use a spanner to remove the fan blower.



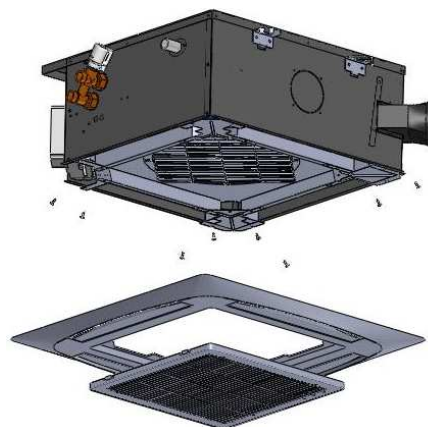
Step 5: Remove motor by undoing the 4 bolts. Disconnect wire connector and replace the motor.

## C.7. Condensate Pump Kit Replacement

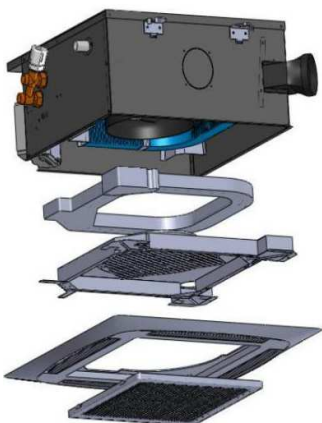
Refer to Section C.5. for Steps 1, 2 and 3.



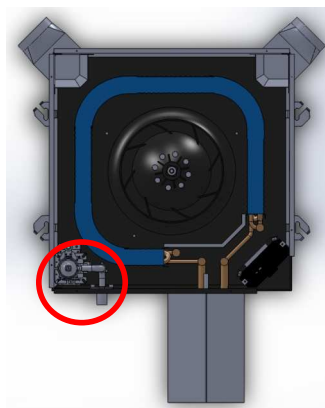
Step 4: Remove front panel and disconnect stepping motor and IR receiver.



Step 5: Unscrewing the 8 screws as shown above.



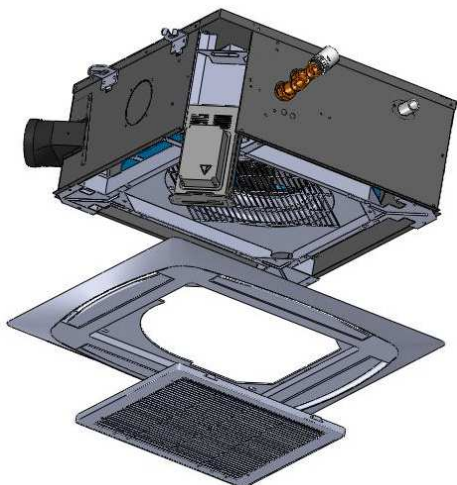
Step 6: Remove the drain pan and internal drain pan.



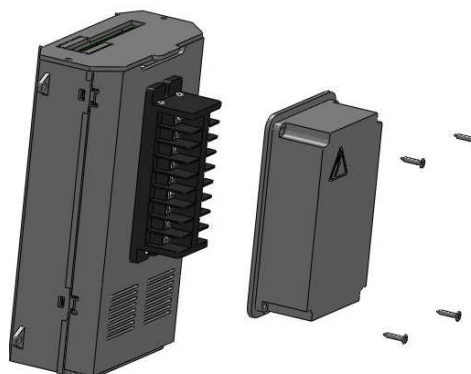
Step 7: Remove the pump kit (including Drain pump and Float switch) and replace it.

## C.8. Control Box Replacement

Refer to Section C.5. for Steps 1, 2 and 3.



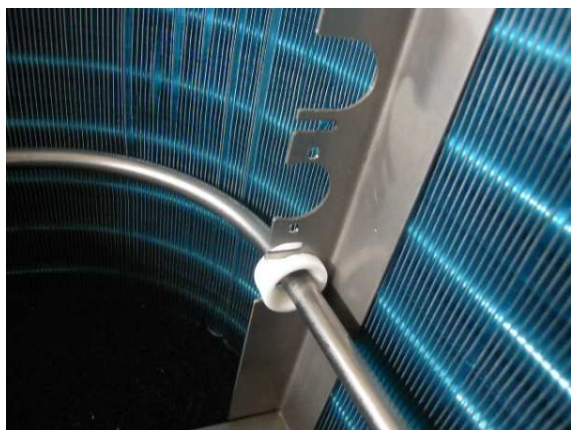
Step 4: Remove 2 screws from the control box and slide it out.



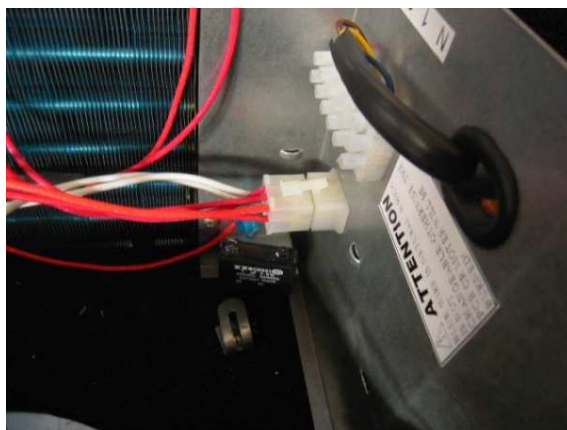
Step 5: Remove the terminal cover by undoing the 4 screws. Disconnect wiring on the terminal. Replace with a new control box and reconnect the wires.

## C.9. Electric Heater Installation

Refer to Section C.7. for Steps 1 to 6.



Step 7: Snap the insulated ring of the electric heater to the electric heater mounting.



Step 9: Plug in the connector of electric heater.

### REMARKS

*If the cassette is installed with an Electric Heater, please use PC to change ECM super low speed.*

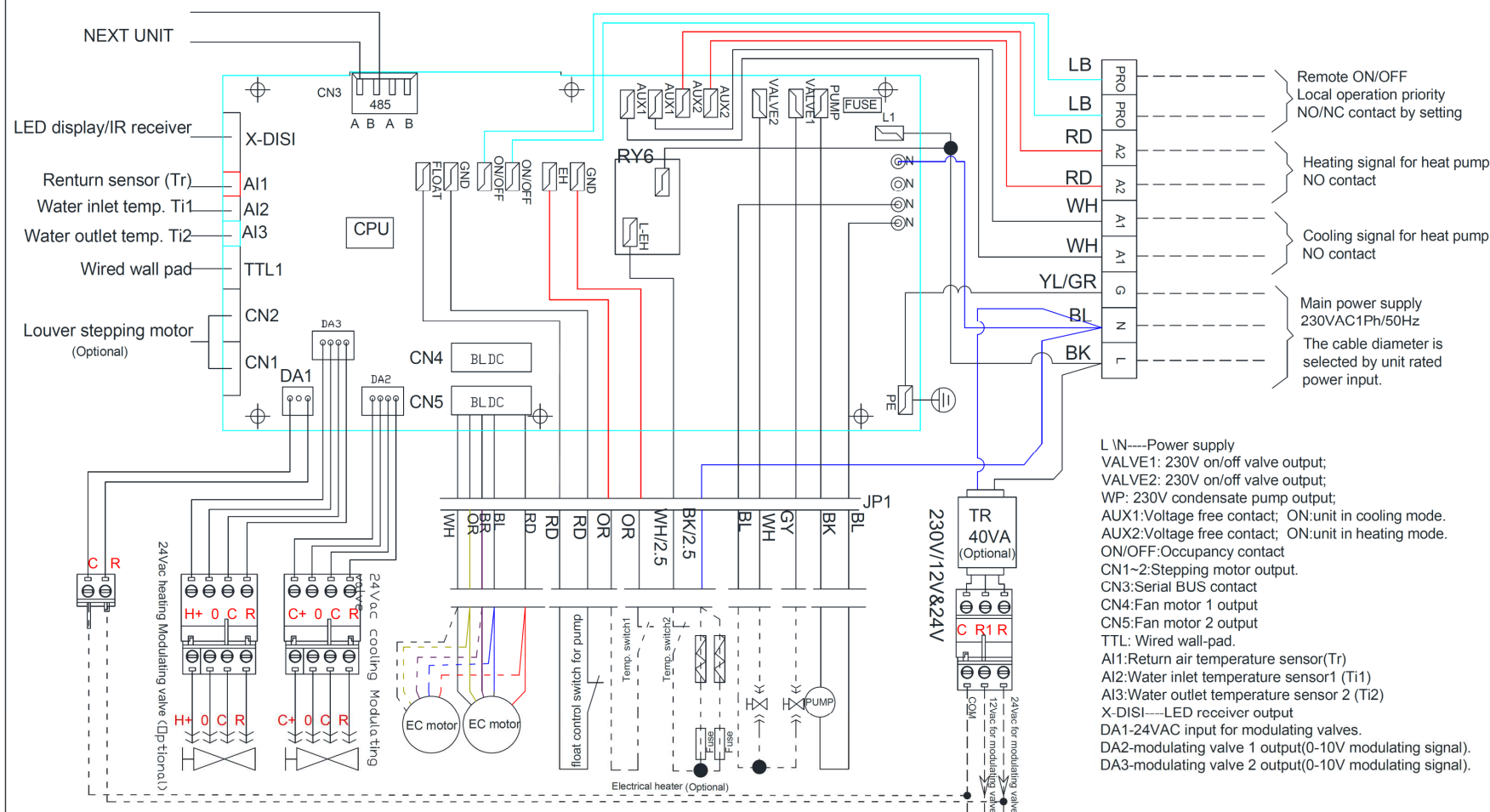
## D. Control Specifications: Intelligent Control (I Type)

### D.1. I/O Port Definitions

| I/O            |                                   | Code    | Description                                                            |
|----------------|-----------------------------------|---------|------------------------------------------------------------------------|
| Analogue Input | Return air sensor                 | AI1     | Return air temperature (Tr)                                            |
|                | 2-pipe coil circuit sensor        | AI2     | Water inlet temperature sensor (Ti1)                                   |
|                | Hot water Sensor                  | AI3     | Water outlet temperature sensor (Ti2)                                  |
| Input          | LED display / IR receiver         | X-DIS 1 | Digital communication port to LED display / IR receiver board.         |
|                | Wired wall pad                    | TTL1    | Digital communication port to wired wall-pad board.                    |
| Digital input  | Occupancy contact                 | ON/OFF  | NO/NC contact by setting                                               |
|                | Float switch                      | Float   | Voltage-free (NC).<br>The contact is connected with float switch (NC). |
|                | Electric Heater safety switch     | EH      | Voltage-free (NC).<br>The contact is connected with E-heater safeties. |
| Power input    | Phase                             | L1      | Power supply to the PCB.                                               |
|                | Neutral                           | N1      | Power supply to the PCB.                                               |
|                | Earth                             | PE1     | Power supply to the PCB.                                               |
| Voltage output | Fan 1                             | CN4     | Fan 1 driver                                                           |
|                | Fan2                              | CN5     | Fan 2 driver                                                           |
|                | Valve1                            | MTV1    | On/off valve                                                           |
|                | Valve2                            | MTV2    | On/off valve                                                           |
|                | Water pump                        | WP      | Voltage output (L), Power supply to condensate pump.                   |
|                | Voltage of Electric Heater (Live) | L-EH    | Voltage output (L), maximum 30A.                                       |
|                | Stepping motor                    | CN1-2   | Power supply to louver stepping motors.                                |
| output         | Cooling signal contact.           | AUX1    | Voltage free contact. Maximum load 5A.                                 |
|                | Heating signal contact.           | AUX2    | Voltage free contact. Maximum load 5A.                                 |
|                | 24VAC power input                 | DA1     | 24VAC external power supply (modulating valve applications only).      |
|                | Modulating valve control          | DA2     | 0~10Vdc                                                                |
|                | Modulating valve control          | DA3     | 0~10Vdc                                                                |
|                | In Modbus signal                  | AB      | Modbus port                                                            |
|                | Out Modbus signal                 | AB      |                                                                        |

## D.2. Wiring Diagrams

# EC-iS1 Wiring Scheme



## D.3. Configuration Settings

### Fan Coil Unit ON/OFF

There are 3 ways to turn the system on or off:

- a) By the ON/OFF button on the remote handset or wired wall pad.
- b) By the programmable timer on the handset or wired wall pad.
- c) By the manual control button on fan coil unit.

### Auto Restart

The system uses a non-volatile memory to save the present operation parameters when the system is turned off or in case of system failure or cessation of power supply.

The restored parameter data-set depends on the type of user interface.

- a) Handset only user interface:

When the power ON signal is received by the fan coil unit and no wired wall-pad is installed, the Mode, Fan Speed, Set temperature and Louver setting will be the same as the handset setting before the last power OFF.

- b) Wall-pad only OR wall-pad and handset user interface:

When the power ON signal is received by the fan coil unit and a wired wall-pad is installed, the Mode, Fan Speed, Set temperature, Louver setting and Timer ON/OFF weekly program will be the same as the wall pad setting before the last power OFF.

## D.4. Control Logic For 2-Pipe System

### D.4.1. With Modulating Valve Configuration

#### COOL MODE

1. When unit is turned on in cooling mode.

- If  $T_r \geq T_s + 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 is turned on. AUX1 is closed. Fan is turned on at setting speed.
- DA2 is turned on at 10VDC for 2 minutes, then check  $T_{i1}$ ,
- When  $T_{i1} \leq 8^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting PID calculation. The output is minimum output (Modbus300015 setting)~10VDC.
- When  $8 < T_{i1} \leq 10^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting minus 1 PID calculation. The output is minimum output (Modbus300015 setting)~10VDC.
- When  $10 < T_{i1} \leq 12^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting minus 2 PID calculation. The output is minimum output (Modbus300015 setting)~10VDC.
- When  $12 < T_{i1} \leq 15^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting minus 3 PID calculation. The output is minimum output (Modbus300015 setting)~10VDC.
- When  $15 < T_{i1} \leq 28^\circ\text{C}$  (Modbus 300017 setting), DA2 output is kept at 10Vdc.
- When  $T_{i1} > 28^\circ\text{C}$  (Modbus 300017 setting), DA2 output is at minimum (Modbus300016 setting), and report pre-heat alarm.
- If  $T_r < T_s - 1^\circ\text{C}$  (Modbus 300033 setting), then cool operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at set speed. DA2 output is 0Vdc.
- When unit is turned off, MTV1 and AUX1 are off. DA2 is 0Vdc. Fan is turned off delaying 30s.
- The range of  $T_s$  is 16 - 30°C
- Indoor fan speed can be adjusted to low, medium, high and auto.

#### LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If  $T_{i1} \leq 2^\circ\text{C}$  for 2 minutes

- MTV1 is turned OFF.
- DA2 is set to 0%.
- Indoor fan is turned on to Medium speed if fan runs at low speed.

If  $T_{i1} \geq 5^\circ\text{C}$  for 2 minutes

- MTV1 is turned ON.
- DA2 is set to original status.
- Indoor fan is changed to setting speed

#### FAN MODE

Indoor fan speed can be adjusted for low, medium and high. If fan speed is set auto by Modbus, fan is running at low speed.

#### HEAT MODE

##### Without Electrical Heater (Modbus300047=0)

When unit is turned on in heating mode:

- When  $T_r \leq T_s - 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 and AUX2 is turned on. DA2 is at 10VDC for 2 minutes, then check  $T_{i1}$ :
- If  $T_{i1} < 28^\circ\text{C}$  (Modbus 300017 setting), fan is turned on at low speed. DA2 is at 10Vdc.
- If  $28^\circ\text{C} < T_{i1} < 28$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , fan is on at original state. DA2 is at original state.
- If  $T_{i1} \geq 28$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , fan is on at setting speed. DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300028 setting PID calculation. The output is minimum output (Modbus300015 setting)~10VDC.
- If  $T_{i1}$  sensor is damaged, fan is worked at setting speed.
- When  $T_r > T_s + 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 and AUX2 is turned off. DA2 is at 0VDC. fan is turned on at lowest speed.

- When unit is turned off, MTV1 and AUX2 is turned off. DA2 is at 00Vdc. Fan is turned off delaying 2 minutes.

#### **With Electrical Heater as booster (Modbus300047=1)**

When unit is turned on in heating mode:

- When  $T_r \leq T_s - 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 and AUX2 is turned on. Fan is turned on at setting speed. DA2 is at 10Vdc for 2 minutes, then check  $T_{i1}$ :
- If  $T_{i1} < 28^\circ\text{C}$  (Modbus 300017 setting), EH is turned on. DA2 is at 10Vdc.
- If  $28^\circ\text{C} < T_{i1} < 28^\circ\text{C} + 4^\circ\text{C}$  (Modbus 300017 setting), EH is kept at original state. DA2 is at original state.
- If  $T_{i1} \geq 28^\circ\text{C} + 4^\circ\text{C}$  (Modbus 300017 setting), EH is turned off. DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300028 setting PID calculation. The output is minimum output (Modbus300015 setting)~10Vdc.
- If  $T_{i1}$  sensor is damaged, fan is worked at setting speed.
- When  $T_r > T_s + 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 and AUX2 is turned off. EH is turned off. DA2 is at 0Vdc. fan is turned on at low speed.
- When unit is turned off, MTV1 and AUX2 is turned off. DA2 is at 00Vdc. Fan is turned off delaying 2 minutes.

#### **With Electrical Heater as primary (Modbus300047=2)**

When unit is turned on in heating mode.

- When  $T_{i2} \leq 35^\circ\text{C}$  (or  $T_{i2}$  is broken) and  $T_r \leq T_s - 1^\circ\text{C}$  (Modbus 300033 setting), fan is turned on at setting speed, EH is turned on.
- When  $T_r > T_s + 1^\circ\text{C}$ , EH is turned off. Fan is turned on at low speed.
- When unit is turned off, EH is turned off. Fan is turned off delaying 2 minutes.

#### **OVER-HEAT PROTECTION OF INDOOR COIL**

- If  $T_{i1} \geq 75^\circ\text{C}$ , then MTV1, AUX2, DA2 and EH are turned off. Indoor fan remains on and runs at high speed.
- If  $T_{i1} < 70^\circ\text{C}$ , then unit keep original state.
- If the indoor coil temperature sensor is damaged or not connected, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

#### **DEHUMIDIFICATION MODE**

**When unit is turned on in dehumidification mode:**

- AUX1 is turned on.  $T_s$  is  $24^\circ\text{C}$ .
- If  $T_r \geq 25^\circ\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA2 is on at 3 times of (Modbus 300016 setting). Fan is turned on at low speed.
- If  $16^\circ\text{C} \leq T_r < 25^\circ\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA2 is on at double of (Modbus 300016 setting). Fan is turned on at low speed.
- If  $T_r < 16^\circ\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA2 is on at (Modbus 300016 setting). Fan is turned on at low speed.
- At the end of the above dehumidification cycle, the system will decide the next dehumidification control option.

#### **AUTO MODE**

When unit is turned on in Auto mode, fan is turned on at setting speed for 30S, then check  $T_r$  and  $T_s$ .

- If  $T_s \geq T_r + 3^\circ\text{C}$ , the unit is worked in heating mode.
- If  $T_r - 3^\circ\text{C} < T_s < T_r + 3^\circ\text{C}$ , the unit is worked in fan mode.
- If  $T_s < T_r - 3^\circ\text{C}$ , the unit is worked in cooling mode.
- If unit working mode is confirmed, the unit will not change the working mode. After the unit is turned off and restart it in 2 hours, working mode will be confirmed again.

#### **PRO INPUT FUNCTION**

**When 100004=0.**

The unit is on:

- PRO input is closed for 60S, the unit is turned off.
- PRO input is open for 60S, the unit is turned on.

**When 100004=1.**

The unit is on or standby, PRO input is open or closed, the unit is kept original state.

The unit is off.

- PRO input is closed for 30S, MTV1 is turned on, DA2 is open at double of minimum setting (Modbus 300027 setting). Fan is turn on at low speed.
- PRO input is opened for 30S, MTV1 is off, DA2 is 0Vdv, Fan is turn off.
- In period of PRO closed time, if unit receives instruction from remote handset, wired wall pad or Modbus, the unit will work according to the instruction at once.

## D.5. Control Logic For 4-Pipe System

Note: 4-pipe system must always be equipped with 2 valves.

### COOL MODE

When unit is turned on in cooling mode.

- If  $T_r \geq T_s + 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 is turned on. AUX1 is closed. Fan is turned on at setting speed.
- DA2 is turned on at 10VDC for 2 minutes, then check  $T_r$  and  $T_s$ .
- DA2 output is from minimum (Modbus 300016 setting)  $\sim 10\text{Vdc}$  based on  $T_r$  and  $(T_s + 2)$  PID calculation.
- If  $T_r < T_s - 1^\circ\text{C}$  (Modbus 300033 setting), then cool operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at set speed. DA2 output is 0Vdc.
- When unit is turned off, MTV1 and AUX1 are off. DA2 is 0Vdc. Fan is turned off delaying 30s.
- The range of  $T_s$  is 16 - 30°C
- Indoor fan speed can be adjusted to low, medium, high and auto.

### LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

If  $T_{i1} \leq 2^\circ\text{C}$  for 2 minutes

- MTV1 is turned OFF.
- DA2 is set to 0%.
- Indoor fan is turned on to Medium speed if fan runs at low speed.

If  $T_{i1} \geq 5^\circ\text{C}$  for 2 minutes

- MTV1 is turned ON.
- DA2 is set to original status.
- Indoor fan is changed to setting speed.

### FAN MODE

Indoor fan speed can be adjusted for low, medium and high. If fan speed is set auto by Modbus, fan is running at low speed.

### HEAT MODE

#### Without Electrical Heater (Modbus300047=0)

When unit is turned on in heating mode:

- When  $T_r \leq T_s - 1^\circ\text{C}$  (Modbus 300033 setting), MTV2 and AUX2 is turned on. DA3 is at 10VDC for 2 minutes, then check  $T_{i2}$ :
- If  $T_{i2} < 28^\circ\text{C}$  (Modbus 300017 setting), fan is turned on at low speed. DA3 is at 10Vdc.
- If  $28^\circ\text{C} < T_{i2} < 28^\circ\text{C} + 4^\circ\text{C}$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , fan is on at original state. DA3 is at original state.
- If  $T_{i2} \geq 28^\circ\text{C} + 4^\circ\text{C}$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , fan is on at setting speed. DA3 output is from minimum (Modbus 300016 setting)  $\sim 10\text{Vdc}$  based on  $T_r$  and  $(T_s - 2)$  PID calculation.
- If  $T_{i2}$  sensor is damaged, fan is worked at setting speed.
- When  $T_r > T_s + 1^\circ\text{C}$  (Modbus 300033 setting)  $^\circ\text{C}$ , MTV2 and AUX2 is turned off. DA3 is at 0VDC. fan is turned on at lowest speed.
- When unit is turned off, MTV2 and AUX2 is turned off. DA3 is at 00VDC. Fan is turned off delaying 2 minutes.

#### With Electrical Heater as booster (Modbus300047=1)

When unit is turned on in heating mode:

- When  $T_r \leq T_s - 1^\circ\text{C}$  (Modbus 300033 setting), MTV2 and AUX2 is turned on. Fan is turned on at setting speed. DA3 is at 10VDC for 2 minutes, then check  $T_{i2}$ :
- If  $T_{i2} < 28^\circ\text{C}$  (Modbus 300017 setting), EH is turned on. DA3 is at 10Vdc.
- If  $28^\circ\text{C} < T_{i2} < 28^\circ\text{C} + 4^\circ\text{C}$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , EH is kept at original state. DA3 is at original state.
- If  $T_{i2} \geq 28^\circ\text{C} + 4^\circ\text{C}$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , EH is turned off. DA3 output is from minimum (Modbus 300016 setting)  $\sim 10\text{Vdc}$  based on  $T_r$  and  $(T_s - 2)$  PID calculation.
- If  $T_{i2}$  sensor is damaged, fan is worked at setting speed.
- When  $T_r > T_s + 1^\circ\text{C}$  (Modbus 300033 setting), MTV2 and AUX2 is turned off. EH is turned off. DA3 is at 0VDC. fan is turned on at low speed.

- When unit is turned off, MTV2 and AUX2 is turned off. DA3 is at 0VDC. Fan is turned off delaying 2 minutes.

#### OVER-HEAT PROTECTION OF INDOOR COIL

- If  $T_{i2} \geq 75^{\circ}\text{C}$ , then MTV, AUX2, DA2 and EH are turned off. Indoor fan remains on and runs at high speed.
- If  $T_{i2} < 70^{\circ}\text{C}$ , then unit keep original state.
- If the indoor coil temperature sensor is damaged or not connected, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

#### DEHUMIDIFICATION MODE

When unit is turned on in dehumidification mode:

- AUX1 is turned on.  $T_s$  is  $24^{\circ}\text{C}$ .
- If  $T_r \geq 25^{\circ}\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA2 is on at 3 times of ( Modbus 300016 setting). Fan is turned on at low speed.
- If  $16^{\circ}\text{C} \leq T_r < 25^{\circ}\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA2 is on at double of ( Modbus 300016 setting). Fan is turned on at low speed.
- If  $T_r < 16^{\circ}\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA2 is on at ( Modbus 300016 setting). Fan is turned on at low speed.
- At the end of the above dehumidification cycle, the system will decide the next dehumidification control option.

#### AUTO MODE

When unit is turned on in Auto mode, fan is turned on at setting speed for 30S, then check  $T_r$  and  $T_s$ :

- If  $T_s \geq T_r + 3^{\circ}\text{C}$ , the unit is worked in heating mode.
- If  $T_r - 3^{\circ}\text{C} < T_s < T_r + 3^{\circ}\text{C}$ , the unit is worked in fan mode.
- If  $T_s < T_r - 3^{\circ}\text{C}$ , the unit is worked in cooling mode.
- If unit works in heating or fan mode, when  $T_r - T_s > 3.0^{\circ}\text{C}$ , MTV2, MTV1 and DA2 is off for more than 10minutes. EH is off for more than 10 minutes, the unit will work in cooling mode.
- If unit works in cooling or fan mode, when  $T_s - T_r > 3.0^{\circ}\text{C}$ , MTV2, MTV1 and DA1 is off for more than 10minutes. The unit will work in heating mode.

#### PRO INPUT FUNCTION

The unit is on:

- PRO input is closed for 60S, the unit is turned off.
- PRO input is open for 60S, the unit is turned on.

## D.6. Control Logic for 2-pipe with 6-way modulating valve configuration

### COOL MODE

When unit is turned on in cooling mode:

- If  $T_r \geq T_s + 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 is turned on. AUX1 is closed. Fan is turned on at setting speed.
- DA2 is turned on at 0VDC for 2 minutes, then check  $T_{i1}$ ,
- When  $T_{i1} \leq 8^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting PID calculation. The output is 4~0VDC.
- When  $8 < T_{i1} \leq 10^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting minus 1 PID calculation. The output is 4~0VDC.
- When  $10 < T_{i1} \leq 12^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting minus 2 PID calculation. The output is 4~0VDC.
- When  $12 < T_{i1} \leq 15^\circ\text{C}$ , DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300027 setting minus 3 PID calculation. The output is 4~0VDC.
- When  $15 < T_{i1} \leq 28^\circ\text{C}$  (Modbus 300017 setting), DA2 output is kept at 0Vdc.
- When  $T_{i1} > 28^\circ\text{C}$  (Modbus 300017 setting), DA2 output is 4Vdc. and report pre-heat alarm.
- If  $T_r < T_s - 1^\circ\text{C}$  (Modbus 300033 setting), then cool operation is terminated and MTV1 and AUX1 are turned off. Indoor fan runs at set speed. DA2 output is 5Vdc.
- When unit is turned off, MTV1 and AUX1 are off. DA2 is 5Vdc. Fan is turned off delaying 30s.
- The range of  $T_s$  is 16 - 30°C
- Indoor fan speed can be adjusted to low, medium, high and auto.

### LOW TEMPERATURE PROTECTION OF INDOOR COIL IN COOLING MODE

- If  $T_{i1} \leq 2^\circ\text{C}$  for 2 minutes
- MTV1 is turned OFF,
- DA2 is set to 5Vdv,
- Indoor fan is turned on to Medium speed if fan runs at low speed.
- If  $T_{i1} \geq 5^\circ\text{C}$  for 2 minutes
- MTV1 is turned ON,
- DA2 is set to original status,
- Indoor fan is changed to setting speed

### FAN MODE

Indoor fan speed can be adjusted for low, medium and high. If fan speed is set auto by Modbus, fan is running at low speed.

### HEAT MODE

#### Without Electrical Heater (Modbus300047=0)

When unit is turned on in heating mode:

- When  $T_r \leq T_s - 1^\circ\text{C}$  (Modbus 300033 setting), MTV2 and AUX2 is turned on. DA2 is at 10VDC for 2 minutes, then check  $T_{i1}$ :
- If  $T_{i1} < 28^\circ\text{C}$  (Modbus 300017 setting), fan is turned on at low speed. DA2 is at 10Vdc.
- If  $28^\circ\text{C} < T_{i1} < 28$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , fan is on at original state. DA2 is at original state.
- If  $T_{i1} \geq 28$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , fan is on at setting speed. DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300028 setting PID calculation. The output is 6~10VDC.
- If  $T_{i1}$  sensor is damaged, fan is worked at setting speed.
- When  $T_r > T_s + 1^\circ\text{C}$  (Modbus 300033 setting), MTV1 and AUX2 is turned off. DA3 is at 5VDC. fan is turned on at lowest speed.
- When unit is turned off, MTV1 and AUX2 is turned off. DA2 is at 5VDC. Fan is turned off delaying 2 minutes.

#### With Electrical Heater as booster (Modbus300047=1)

When unit is turned on in heating mode:

- When  $T_r \leq T_s - 1^\circ\text{C}$  (Modbus 300033 setting), MTV2 and AUX2 is turned on. Fan is turned on at setting speed. DA2 is at 10VDC for 2 minutes, then check  $T_{i1}$ :
- If  $T_{i1} < 28^\circ\text{C}$  (Modbus 300017 setting), EH is turned on. DA2 is at 10Vdc.
- If  $28^\circ\text{C} < T_{i1} < 28$  (Modbus 300017 setting)  $+4^\circ\text{C}$ , EH is kept at original state. DA2 is at original state.

- If  $T_{i1} \geq 28$  (Modbus 300017 setting)  $+4^{\circ}\text{C}$ , EH is turned off. DA2 output is based on water temperature difference ( $T_{i1}/T_{i2}$ ) and Modbus parameter 300028 setting PID calculation. The output is 6~10VDC.
- If  $T_{i1}$  sensor is damaged, fan is worked at setting speed.
- When  $T_r > T_s + 1^{\circ}\text{C}$ , MTV2 and AUX2 is turned off. EH is turned off. DA2 is at 5VDC. fan is turned on at low speed.
- When unit is turned off, MTV2 and AUX2 is turned off. DA2 is at 5VDC. Fan is turned off delaying 2 minutes.

#### OVER-HEAT PROTECTION OF INDOOR COIL

- If  $T_{i1} \geq 75^{\circ}\text{C}$ , then MTV1, AUX2, DA2 and EH are turned off. Indoor fan remains on and runs at high speed.
- If  $T_{i1} < 70^{\circ}\text{C}$ , then unit keep original state.
- If the indoor coil temperature sensor is damaged or not connected, then the protection mode will be overridden and the unit will work according to the pre-heat and post-heat program.

#### DEHUMIDIFICATION MODE

When unit is turned on in dehumidification mode:

- AUX1 is turned on.  $T_s$  is  $24^{\circ}\text{C}$ .
- If  $T_r \geq 25^{\circ}\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 4 minutes. DA2 is 2vdc. Fan is turned on at low speed.
- If  $16^{\circ}\text{C} \leq T_r < 25^{\circ}\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 6 minutes. DA2 is 2.5VDC. Fan is turned on at low speed.
- If  $T_r < 16^{\circ}\text{C}$  for 30S, then MTV1 will be ON for 3 minutes, and then OFF for 10 minutes. DA2 is 3.5VDC.
- At the end of the above dehumidification cycle, the system will decide the next dehumidification control option.

#### AUTO MODE

When unit is turned on in Auto mode, fan is turned on at setting speed for 30S, then check  $T_r$  and  $T_s$ :

- If  $T_s \geq T_r + 3^{\circ}\text{C}$ , the unit is worked in heating mode.
- If  $T_r - 3^{\circ}\text{C} < T_s < T_r + 3^{\circ}\text{C}$ , the unit is worked in fan mode.
- If  $T_s < T_r - 3^{\circ}\text{C}$ , the unit is worked in cooling mode.
- If unit works in heating or fan mode, when  $T_r - T_s > 3.0^{\circ}\text{C}$ , MTV2, MTV1 and DA2 is off for more than 10minutes. EH is off for more than 10 minutes, the unit will work in cooling mode.
- If unit works in cooling or fan mode, when  $T_s - T_r > 3.0^{\circ}\text{C}$ , MTV2, MTV1 and DA2 is off for more than 10minutes. The unit will work in heating mode.

#### PRO INPUT FUNCTION

The unit is on:

- PRO input is closed for 60S, the unit is turned off.
- PRO input is open for 60S, the unit is turned on.

## D.7. Sleep Mode

SLEEP mode can only be set when the unit is in COOL or HEAT mode.

- In COOL mode, after SLEEP mode is set, the indoor fan will run at auto speed and Ts will increase by 0.5°C each 30 minutes. Maximum setting temperature increased is 3°C.
- In HEAT mode, after SLEEP mode is set, the indoor fan will run at auto speed and Ts will decrease by 0.5 °C each 30 minutes.
- Sleep mode is turned off, Setting temperature go back and Fan is changed to setting speed.

## D.8. Louver

### For remote handset.

Whenever the indoor fan is running, the louver can swing or stop at the desired position.

Louver angle: 0~100 °, opens clockwise with widest angle at 100 °.

Swing angle: 35~100 °, opens clockwise to 68°. Below are the 4 fixed positions which can be set from wireless LCD handset.

| Position | Angle of opening |
|----------|------------------|
| 1        | 35 °             |
| 2        | 57 °             |
| 3        | 83 °             |
| 4        | 100 °            |

### For wired wall pad

Louver angle: 0~100 °, opens clockwise, with widest angle at 100 °.

Swing angle: 35~100 °, opens clockwise to 68°. User may stop louver at any desired position between 35~100 °.

## D.9. Buzzer

The unit will beep once when it receives 1 signal.

## D.10. Auto Restart

The system uses non-volatile memory to save the present operation parameters when system is turned off or in case of system failure or cessation of power supply. Operation parameters are mode, set temperature, louver's position, and the fan speed. When power supply resumes or the system is switched on again, the same operations as previously set will function.

## D.11. On/Off Switch On The LED Panel

- This is a tact switch to select Cool→Heat→Off operation mode.
- In COOL mode, the set temperature of the system is 24°C with auto fan speed. There are no timer and sleep modes.
- In HEAT mode, the set temperature of the system is 24°C with auto fan speed. There are no timer and sleep modes.
- Master unit that does not use a wall pad will globally broadcast.

### NOTE

*When button pressing is effective, the master unit buzzer will beep twice and the slave unit will beep once.*

## D.12. Drain Pump

Drain pump turns ON if the unit is turned on in cooling or dehumidification mode. It remains on for at least 5 minutes after unit is turned OFF. During mode change from cooling or dehumidification to heating or fan mode, the water pump will turn on for a minimum of 5 minutes.

### CAUTION

*If the system is turned off at the circuit breaker (or main power supply), the drain pump will not work.*

## D.13. Float Switch

### Float-switch opens before unit is turned on

- If the float switch (N/C) is opened before the unit is turned on, then MTV1 is turned off. The drain pump and indoor fan will operate.
- After float switch is closed, MTV1 is turned on.

### Float switch is opened when unit is turned on

- If the float switch is opened continuously  $\geq 5$  seconds, then the drain pump will work and MTV1 will remain off.
- After the float switch is closed, the drain pump will run for an additional 5 minutes.
- If the float switch is opened for 10 minutes continuously, then MTV1 will remain off. The indoor fan runs at set speed and the system reports an error.

### Float switch is opened when unit is turned off

- If the float switch is opened, then the drain pump will work.
- After the float switch is closed, the drain pump will run for an additional 5 minutes. If the float switch is opened for 10 minutes continuously, then the system reports an error.

## D.14. Electric Heater Safety Switch

- Before the electrical heater is turned on, the EH safety switch must be closed and EC motor RPM must be more than Modbus 31000 setting.

- When electrical heater is ON, electrical heater safety switch is opened for  $\geq 1$  second or EC motor RPM is lower than Modbus 310000 setting, EH will be turned off immediately and report an error and fan speed is changed to high speed.
- Once the contact is returned to the closed  $\geq 180$  seconds, reset the error and the heater will start again.
- When the EH safety switch is opened  $\geq 3$  times within 60 minutes the heater is not allowed to start anymore.
- Turn off the unit to reset the fault, provided that the switch has returned to the closed position.

## D.15. Low Temperature Protection of Indoor Coil in Winter

This is frost protection for when the unit is off to prevent water in the coil and room from freezing

### If 2pipe unit is in Standby Mode

If  $Tr \leq 2^{\circ}\text{C}$  for 2 minutes

- MTV1 is turned ON.
- AUX2 is closed.
- DA2 is 5 VDC.
- If  $Ti1 < 5^{\circ}\text{C}$  for 2 minutes EH (if present) is switched on.
- Indoor fan is turned on at low speed.

If  $Tr \geq 5^{\circ}\text{C}$  for 2 minutes

- MTV2 is OFF.
- AUX2 is open.
- DA2 is set to 0 VDC.
- Electric Heater is turned off.
- Indoor fan Switched OFF.

### If 4-pipe unit is in Standby Mode

If  $Tr \leq 2^{\circ}\text{C}$  for 2 minutes

- MTV2 is turned ON.
- AUX2 is closed.
- DA3 is 5VDC. If unit with 6-way valve, DA2 is 8 VDC.
- If  $Ti1 < 5^{\circ}\text{C}$  for 2 minutes EH (if present) is switched on.
- Indoor fan is turned on at low speed.

If  $Tr \geq 5^{\circ}\text{C}$  for 2 minutes

- MTV2 is OFF.
- AUX2 is open.
- DA3 is set to 0. If unit with 6-way valve, DA2 is 5 VDC.
- Electric Heater is turned off.
- Indoor fan Switched OFF.

## D.16. Network Setup

- 1) Disconnect the communication plug from the control box



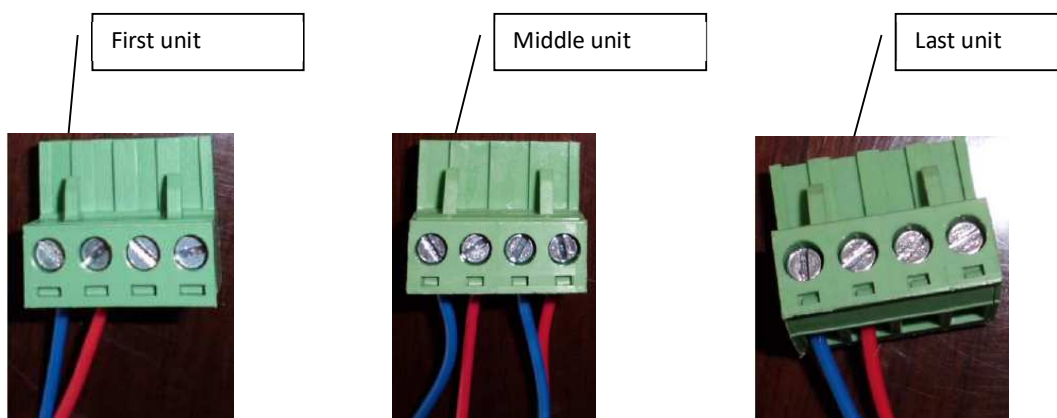
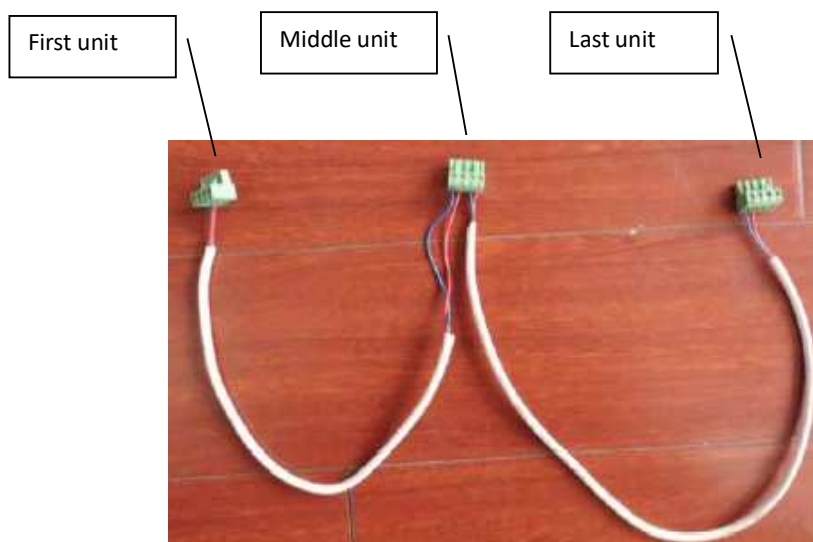
- 2) Communication plug

A, B, A, B is printed on the main PCB. When you connect the wires, please ensure connection of A to A and B to B.

- 3) Connection wire

If the total length of wire is more than 1000m, please use shielded wire in order to protect the signal transmission.

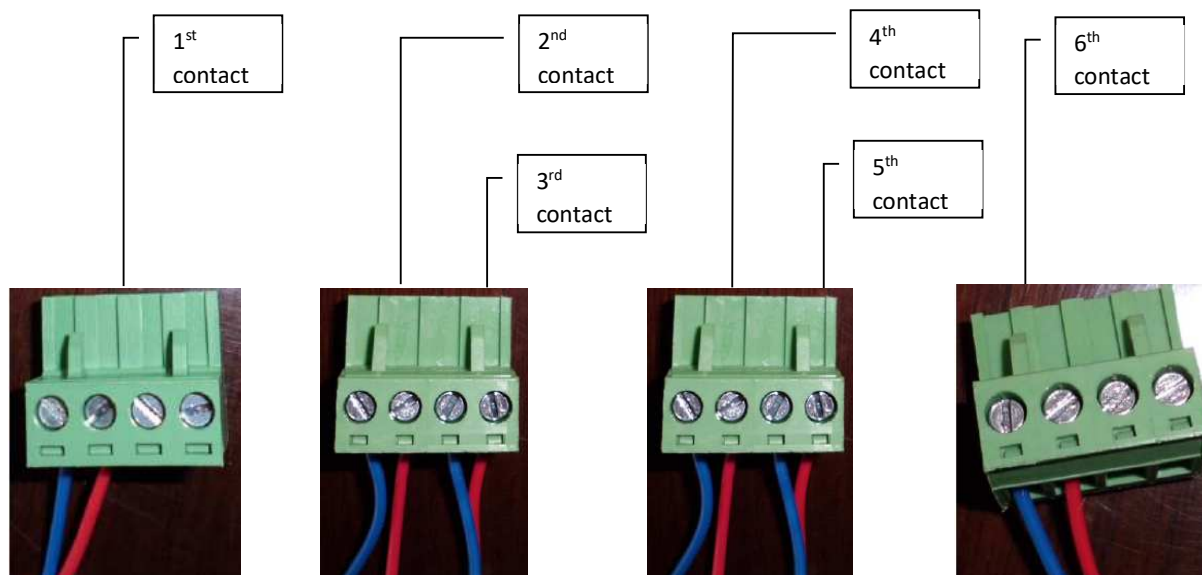
Complete wire connection



Wire connection check

3.3.1) After the wire connection is completed, please check that the wire colors correspond.

3.3.2) Check the wire contact by using a multimeter.



3.3.3) Check 1 and 2, 3 and 4, 5 and 6 to be sure connections are correct.

3.3.4) If the resistance between two wire contacts is too high, please check and reconnect the wire contacts.

Reconnect the communication plug to control box

Using wired wall pad or Modbus to set each unit address.

## D.17. Open Modbus Protocol

Transfer Mode: RTU BAUD Rate: 9600bps, 8 data bit, 1 stop bit, None parity bit

The communications require a delay between reading an answer and sending the next command of 80 ms. All temperature is equal to reading data\*10 accuracy: 0.1 degree C.

### Supported Functions

| Function Code | Function description                      |
|---------------|-------------------------------------------|
| 01(01H)       | Read Coils                                |
| 02(02H)       | Read Discrete Inputs                      |
| 03(03H)       | Read Holding Registers                    |
| 04(04H)       | Read Input Registers                      |
| 05(05H)       | Write Single Coil                         |
| 06(06H)       | Write Single Register                     |
| 15(0FH)       | Write Multiple Coils                      |
| 16(10H)       | Write Multiple Registers                  |
| 255(FFH)      | Extended Commands which are used to test. |

### Valid Error code table:

| Error code | description            | definition                               |
|------------|------------------------|------------------------------------------|
| 01 (01H)   | Invalid commands       | Received commands beyond valid commands  |
| 02 (02H)   | Invalid data address   | Data addresses beyond valid data address |
| 03 (03H)   | Invalid data           | Data beyond definition range             |
| 04 (04H)   | Write data not succeed | Write data not succeed                   |

### Coils table:

| Description        | Address | Type* | Remark |
|--------------------|---------|-------|--------|
| ON/OFF             | 100000  | R/W   |        |
| Sleeping mode      | 100001  | R/W   |        |
| Louver swings      | 100002  | R/W   |        |
| Energy Saving Mode | 100003  | R/W   |        |
| PRO function       | 100004  | R/W   |        |

### Discrete table:

| Description       | Address | Type* | Remark                |
|-------------------|---------|-------|-----------------------|
| MTV1              | 200000  | R     |                       |
| MTV2              | 200001  | R     |                       |
| AUX1              | 200002  | R     |                       |
| AUX2              | 200003  | R     |                       |
| Condensate pump   | 200004  | R     |                       |
| Electrical heater | 200005  | R     |                       |
| Wired wall pad    | 200006  | R     |                       |
| PR-O1             | 200007  | R     |                       |
| Float switch      | 200008  | R     |                       |
| Reserved          | 200009  | R     |                       |
| EH safety switch  | 200010  | R     |                       |
| Internal test     | 200011  | R     | Testing purpose only. |

\* R = read only, W = write only, R/W = read and write.

Holding Register table:

| Description                            | Address | Type* | Remark                                                                                                                                        |
|----------------------------------------|---------|-------|-----------------------------------------------------------------------------------------------------------------------------------------------|
| Mode setting                           | 300000  | R/W   | Cooling mode = 01(H)<br>Humidify mode = 02(H)<br>Fan mode = 04(H)<br>Heating mode = 08(H)<br>Auto mode = 10(H)                                |
| Fan speed setting                      | 300001  | R/W   | Low speed = 04(H)<br>Medium speed = 02(H)<br>High speed = 01(H)<br>Auto fan speed = 07(H)                                                     |
| Louver swing setting                   | 300002  | R/W   | Position 1=01(H)                                                                                                                              |
|                                        |         |       | Position2=02(H)                                                                                                                               |
|                                        |         |       | Position3=03(H)                                                                                                                               |
|                                        |         |       | Position4=04(H)                                                                                                                               |
|                                        |         |       | Auto=0F(H)                                                                                                                                    |
|                                        |         |       | Stop=00(H)                                                                                                                                    |
| Setting temperature                    | 300003  | R/W   | 16~30 (actual*10 format)                                                                                                                      |
| Address setting                        | 300004  | R/W   | 1~255                                                                                                                                         |
| Reset                                  | 300005  | W     | =0x33 reset error                                                                                                                             |
| Week                                   | 300006  | W     |                                                                                                                                               |
| Hour                                   | 300007  | W     |                                                                                                                                               |
| Minute                                 | 300008  | W     |                                                                                                                                               |
| Second                                 | 300009  | W     |                                                                                                                                               |
| Hours in Timer on                      | 300010  | R/W   | Timer ON                                                                                                                                      |
| Minute in Timer on                     | 300011  | R/W   | Timer ON                                                                                                                                      |
| Hours in Timer off                     | 300012  | R/W   | Timer OFF                                                                                                                                     |
| Minute in Timer off                    | 300013  | R/W   | Timer OFF                                                                                                                                     |
| Icon of Timer ON or OFF                | 300014  | R/W   | BIT0 = Icon of Timer ON<br>BIT1 = Icon of Timer OFF<br>1 = enable<br>0 = disable                                                              |
| Minimum output DA1                     | 300015  | R/W   | Default 25% (2.5vdc)                                                                                                                          |
| Minimum output DA2                     | 300016  | R/W   | Default 25% (2.5vdc)                                                                                                                          |
| Pre-heat temperature setting           | 300017  | R/W   | 25~35, default: 30                                                                                                                            |
| Reserved-                              | 300018  | R/W   |                                                                                                                                               |
| Super low speed rpm                    | 300019  | R/W   |                                                                                                                                               |
| Low speed rpm                          | 300020  | R/W   |                                                                                                                                               |
| Medium speed rpm                       | 300021  | R/W   |                                                                                                                                               |
| High speed rpm                         | 300022  | R/W   |                                                                                                                                               |
| Signal output setting                  | 300023  | R/W   | 1~10VDC (used to test , 0 = disable)                                                                                                          |
| Temperature sampling time              | 300024  | R/W   | 2~100, default: 5S                                                                                                                            |
| Factor of auto fan speed               | 300025  | R/W   | 2~150, default:20                                                                                                                             |
| Factor of modulating valve             | 300026  | R/W   | 2~250, default:150                                                                                                                            |
| Ti1 and Ti2 Cooling difference setting | 300027  | R/W   | 3~15, default:5                                                                                                                               |
| Ti1 and Ti2 Heating difference setting | 300028  | R/W   | 3~15 default:5                                                                                                                                |
| Controller Hardware type setting       | 300029  | R/W   | 0=air cleaner (S5)<br><b>1=FCU (S1/S2/S3, SWC-S)</b><br>2=AHU (S6) or (AHU+W5)<br>3=AHU+AQI (S5+S6 )<br>4=Zone controller(S7)      Setting: 1 |
| Degree unit setting                    | 300030  | R/W   | 0=degree C<br>1=degree F                                                                                                                      |
| Temperature display setting            | 300031  | R/W   | 0=Room temperature display on LED<br>1=Setting temperature display on LED                                                                     |
| Setting temperature range              | 300032  | R/W   | 0=setting temperature range is from 16~30                                                                                                     |

|                                  |        |     |                                                                                       |
|----------------------------------|--------|-----|---------------------------------------------------------------------------------------|
|                                  |        |     | 1=Setting temperature range is fixed.<br>Cooling=24oC Heating=21oC                    |
| Temperature band setting         | 300033 | R/W |                                                                                       |
| Reserved                         | 300034 | R/W |                                                                                       |
| Reserved                         | 300035 | R/W |                                                                                       |
| Reserved                         | 300036 | R/W |                                                                                       |
| Reserved                         | 300037 | R/W |                                                                                       |
| Reserved                         | 300038 | R/W |                                                                                       |
| Reserved                         | 300039 | R/W |                                                                                       |
| Reserved                         | 300040 | R/W |                                                                                       |
| Reserved                         | 300041 | R/W |                                                                                       |
| Reserved                         | 300042 | R/W |                                                                                       |
| Reserved                         | 300043 | W   |                                                                                       |
| Reserved                         | 300044 | W   |                                                                                       |
| Reserved                         | 300045 | W   |                                                                                       |
| Software type                    | 300046 | R/W | 0=2-pipe+MTV.<br>1=2-pipe without valve<br>2=4-pipe+std valve<br>3=4-pipe+6-way valve |
| EH type                          | 300047 | R/W | 0=without EH, 1=EH as booster. 2=EH as primary                                        |
| DA1 control signal               | 300048 | R/W | 0=Tr/Ts<br>1=ESP                                                                      |
| EC motor input ports             | 300049 | R/W | 0=CN4 working.<br>1=CN5 working<br>2=CN4+CN5 working default : 0                      |
| PRO1 input type                  | 300050 | R/W | 0=NO.<br>1=NC                                                                         |
| Tr sensor setting                | 300051 | R/W | 0=sensor on the wired wall pad.<br>1=sensor on the main PCB. default : 0              |
| Reserved                         | 300052 | R/W | 0~120 , default : 80                                                                  |
| Optimized swing angle            | 300053 | R/W | 200~999 default : 0.                                                                  |
| E-heater                         | 300054 | R/W | Unit : KW*10                                                                          |
| Room temp. factor                | 300055 | R/W | 90~120, default : 103                                                                 |
| Water inlet temp. factor         | 300056 | R/W | 90~120, default : 103                                                                 |
| Delta T factor                   | 300057 | R/W | 90~120, default : 102                                                                 |
| Product type                     | 300058 | R/W | 00~99, default : 00                                                                   |
| Product model                    | 300059 | R/W | 000~999, default : 000                                                                |
| Ex-works data                    | 300060 | R/W | 0000 — 9999                                                                           |
| Software version                 | 300061 | R   | 10~99 default: 10                                                                     |
| Hardware version                 | 300062 | R   | 10~99 default: 10                                                                     |
| Reserved                         | 300063 | R/W |                                                                                       |
| Reserved                         | 300064 | R/W |                                                                                       |
| Reserved                         | 300065 | R/W |                                                                                       |
| Reserved                         | 300066 | R/W |                                                                                       |
| Reserved                         | 300067 | R/W |                                                                                       |
| In auto mode, temp. Band setting | 300068 | R/W | 1~15, default: 3                                                                      |
| Reserved                         | 300069 | R/W |                                                                                       |
| Reserved                         | 300070 | R/W |                                                                                       |
| Unit power input at High speed   | 300071 | R/W | W*10                                                                                  |
| Unit power input at Med. speed   | 300072 | R/W | W*10                                                                                  |
| Unit power input at Low speed    | 300073 | R/W | W*10                                                                                  |
| Unit heat capacity at High speed | 300074 | R/W | KW*10                                                                                 |
| Unit heat capacity at Med. speed | 300075 | R/W | KW*10                                                                                 |
| Unit heat capacity at Low speed  | 300076 | R/W | KW*10                                                                                 |
| Unit cool capacity at High speed | 300077 | R/W | KW*10                                                                                 |
| Unit cool capacity at Med. speed | 300078 | R/W | KW*10                                                                                 |
| Unit cool capacity at Low speed  | 300079 | R/W | KW*10                                                                                 |

\* R = read only, W = write only, R/W = read and write.

Input Register table:

| Description             | Address       | Type*    | Remark                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|-------------------------|---------------|----------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Tr temperature sensor   | 400000        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Ti1 temperature sensor  | 400001        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Ti2 temperature sensor  | 400002        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | 400003        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | 400004        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Error code              | 400005        | R        | Bit0 = Room temperature sensor error<br>Bit1 = Ti1 temperature sensor error<br>Bit2 = Ti2 temperature sensor error<br>Bit3 = Float switch error<br>Bit4 = Indoor coil low temperature protection<br>Bit5 = Indoor coil overheat protection<br>Bit6 = Filter switch<br>Bit7 = Electrical heater failure<br>Bit8 = Motor1 Error<br>Bit9 = Motor2 Error<br>Bit10 = System parameters error<br>Bit11 = Anti-frozen error<br>Bit12 = Ti3 temperature sensor error<br>Bit13 = Ti4 temperature sensor error<br>Bit14 = PM2.5 sensor<br>Bit15 = AQI Error |
| Fan speed status        | 400006        | R        | Low = 04(H)<br>Medium = 02(H)<br>High = 01(H)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Reserved                | 400007        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | 400008        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| EH                      | 400009        | R        | 0= disable, 1=booster, 2=primary                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Unit type               | 400010        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DA1                     | 400011        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| DA2                     | 400012        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | 400013        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | <b>400014</b> | <b>R</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | <b>400015</b> | <b>R</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | <b>400016</b> | <b>R</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Unit status             | <b>400017</b> | <b>R</b> | Cooling mode = 01(H)<br>Humidify mode = 02(H)<br>Fan mode = 04(H)<br>Heating mode = 08(H)<br>Unit OFF=32(H)                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| Temperature in wall pad | <b>400018</b> | <b>R</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Motor running time      | <b>400019</b> | <b>R</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Motor running terms     | <b>400020</b> | <b>R</b> | 0~100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Cooling capacity        | <b>400021</b> | <b>R</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Cooling capacity terms  | <b>400022</b> | <b>R</b> | 0~100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Heating capacity        | <b>400023</b> | <b>R</b> |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Heat capacity terms     | <b>400024</b> | <b>R</b> | 0~100                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| Reserved                | 400025        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Reserved                | 400026~35     | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| EC motor1 actual RPM    | 400036        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| EC motor2 actual RPM    | 400037        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| EC motor1 error         | 400038        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| EC motor2 error         | 400039        | R        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

## D.18. LED Display and Error Description



| Complete Function PCB – I Control Type |                |           |
|----------------------------------------|----------------|-----------|
| Fan speed setting                      | LED indication | Condition |
| High speed                             | Red LED On     | Normal    |
| Medium speed                           | Yellow LED On  | Normal    |
| Low speed                              | Green LED On   | Normal    |

| For all units - Green LED              |                                         |                                                       |                                                                                                           |
|----------------------------------------|-----------------------------------------|-------------------------------------------------------|-----------------------------------------------------------------------------------------------------------|
| Error Description                      | Blink                                   | Reason                                                | Remedy                                                                                                    |
| Return air sensor failure              | Green LED blinks 1 times, stops for 3s  | Room sensor unplugged or damaged.                     | 1. Check if Tr plug is connected or not.<br>2. Check if sensor's resistance is correct or not.            |
| Indoor coil sensor 1 failure           | Green LED blinks 2 times, stops for 3s  | Ti1 sensor unplugged or damaged.                      | 1. Check if Ti1 plug is connected or not.<br>2. Check if sensor's resistance is correct or not.           |
| Indoor coil sensor 2 failure           | Green LED blinks 3 times, stops for 3s  | Ti2 sensor unplugged or damaged.                      | 1. Check if Ti2 plug is connected or not.<br>2. Check if sensor's resistance is correct or not.           |
| Water pump failure                     | Green LED blinks 4 times, stops for 3s  | Float switch is opened.                               | 1. Check if the condensate water pipe is connected or not.<br>2. Check if the pump is functioning or not. |
| Indoor coil low temperature protection | Green LED blinks 5 times, stops for 3s  | Water temperature is lower than 3 °C.                 | Check the water temperature.                                                                              |
| Indoor coil overheat protection        | Green LED blinks 6 times, stops for 3s  | Water temperature is higher than 70 °C.               | Check the water temperature                                                                               |
| Filter Switch (S6 PCB)                 | Green LED blinks 7 times, stops for 3s  | Filter switch is opened.                              | 1. Check if filter block or not<br>2. replace the new filter                                              |
| Electric Heater failure                | Green LED blinks 8 times, stops for 3s  | Only for unit with EH.<br>EH safety switch is opened. | 1. Change fan speed to high.<br>2. Replace the damaged EH safety switch.                                  |
| EC motor failure(CN4)                  | Green LED blinks 9 times, stops 3s      | No EC motor feedback                                  | 1. Check Modbus setting.<br>2. Check the EC motor.                                                        |
| EC motor failure(CN5)                  | Green LED blinks 10 times, stops 3s     | No EC motor feedback                                  | 1. Check Modbus setting.<br>2. Check the EC motor.                                                        |
| Anti-frozen protection                 | Green LED blinks 12 times, stops for 3s | When unit is standby, Tr<2°C                          | 1. Turn on unit to keep Tr high than 5°C                                                                  |

## E. Control Specifications: Flexible Function PCB – EC-W1 Control

### E.1. Features

- Condensate management with valve protection and NC alarm contact.
- Integrated fan relays for zone control applications.
- ON/OFF thermostat input and low-voltage modulating fan speed input flexibility.
- Simple error diagnostic and LED error display.

### E.2. I/O Port Definitions

| I/O                 |                         | Code                                                                              | 2-Pipe                                                                                       | 4-Pipe                         |
|---------------------|-------------------------|-----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|--------------------------------|
| Analogue input      | Coil temperature sensor | AI1                                                                               | Cooling / heating coil sensor (Ti1)                                                          | Cooling only coil sensor (Ti1) |
| Voltage input       | High fan speed          | H                                                                                 | 230VAC input signals from wired thermostat.                                                  |                                |
|                     | Medium fan speed        | M                                                                                 |                                                                                              |                                |
|                     | Low fan speed           | L                                                                                 |                                                                                              |                                |
|                     | Phase                   | L1                                                                                | External 230VAC power supply connection to the PCB.                                          |                                |
|                     | Neutral                 | N1, N2                                                                            |                                                                                              |                                |
|                     | Earth                   |  |                                                                                              |                                |
| Signal Input        | Modulating signal       | +/-                                                                               | Low voltage modulating signal input (standard 0~5VDC, S1=Open, optional 0~10VDC, S1=Closed). |                                |
| Digital input       | Programming interface   | TTL                                                                               | Low voltage digital signal input for board programming.                                      |                                |
|                     | Float switch            | Float                                                                             | Voltage-free (NC)                                                                            |                                |
| Voltage output      | Water pump              | PUMP                                                                              | Voltage output (L)                                                                           |                                |
|                     | EC motor                | CN4                                                                               | 5-wire connection                                                                            |                                |
|                     | Stepping motor          | CN1, CN2                                                                          | Low-voltage output                                                                           |                                |
| Digital output      | LED display             | X-DIS                                                                             | Low-voltage output                                                                           |                                |
| Voltage-free output | Alarm                   | ALARM                                                                             | Voltage-free alarm contact:<br>(a) Standard configuration is (NC) and (NO).                  |                                |

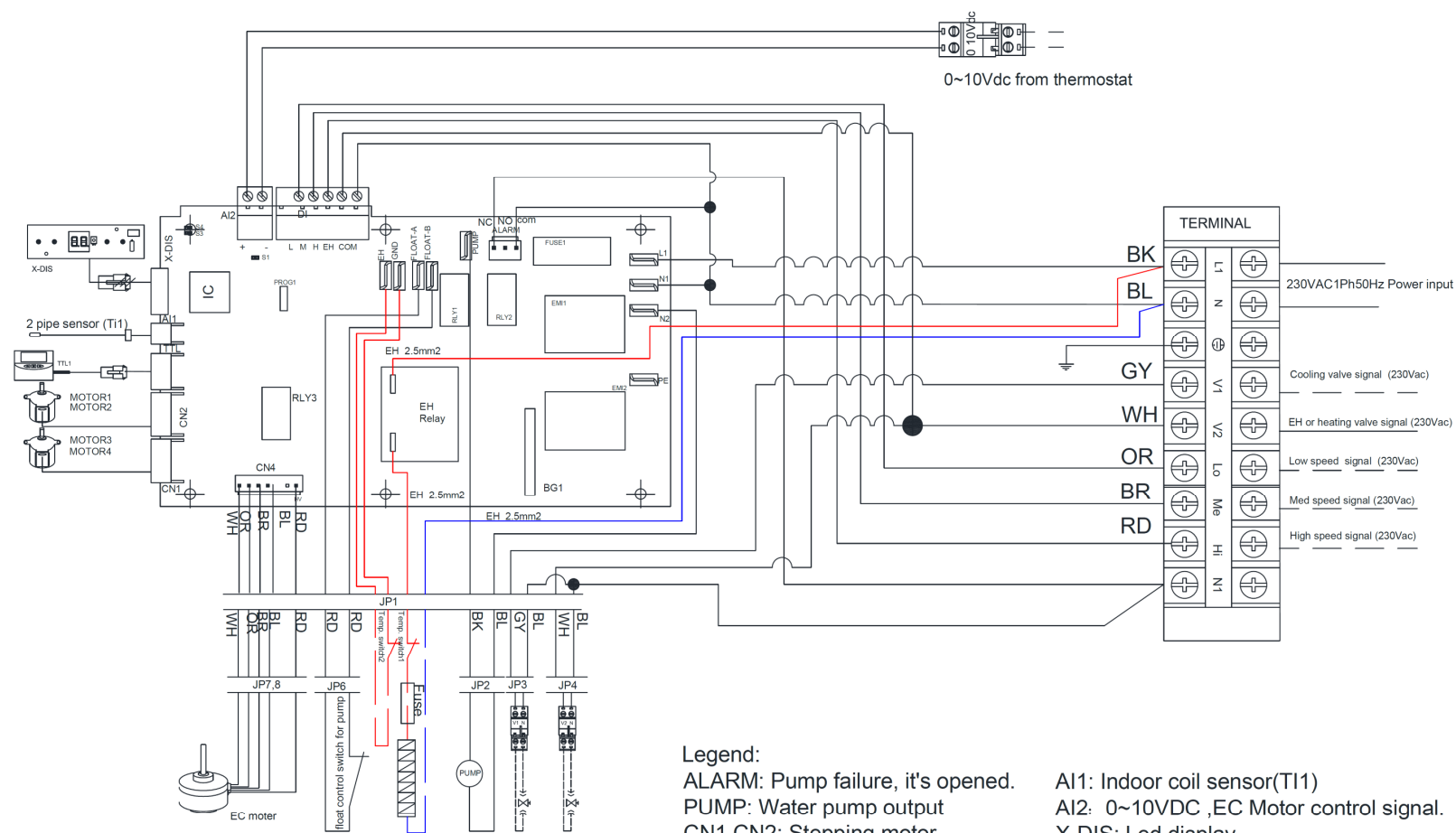
### E.3. Onboard Configurations

The PCB can be configured for different modulating signal inputs.  
Refer to jumper configuration table below.

| Code | State  | Description                                         |
|------|--------|-----------------------------------------------------|
| S1   | Open   | PCB configured for 0~5VDC modulating signal input.  |
| S1   | Closed | PCB configured for 0~10VDC modulating signal input. |
| S3   | N/A    | Reserved                                            |
| S4   | N/A    | Reserved                                            |

## E.4. Wiring Diagrams

## EC-W1B Wiring Scheme



## E.5. Control Logic Specifications

### E.5.1. Unit Power ON/OFF

- a) *The unit is turned ON when* any of the fan speed inputs (H/M/L) are ON, or modulating signal input is more than 2.0 VDC.
- b) The unit is turned OFF only if all of the fan speed inputs (H/M/L) are OFF and modulating signal input is less than 2.0 VDC.

### E.5.2. Alarm Protection and Error Display

- a) If the float switch is open for 5 minutes or EC motor is failed, then the (NC) voltage-free alarm contact shall be opened and the (NO) voltage free alarm contact shall be closed.
- b) If the float switch is open for 10 minutes, the LED display reports a condensate management failure (see table on the next page).

### E.5.3. Drain Pump Operation

- a) When the unit turns ON:
  - i. If  $Ti1 < 14^{\circ}\text{C}$ , the drain pump turns ON.
  - ii. If  $14^{\circ}\text{C} \leq Ti < 16^{\circ}\text{C}$ , the drain pan keeps original state.
  - iii. If  $Ti1 \geq 16^{\circ}\text{C}$ , the drain pump turns OFF.
- b) When the unit turns OFF, the drain pump will remain ON for 5 minutes and then turn OFF.
- c) At any time:
  - i. If the float switch is OPEN, the drain pump will turn ON.
  - ii. If the float switch is OPEN and then CLOSED, the drain pump will remain ON for 5 minutes, and then turn OFF.

### E.5.4. Louver Control

- a) When the unit is OFF, the louvers are closed (angle at  $100^{\circ}$ ).
- b) When the unit turns ON, the louvers open (angle at  $87^{\circ}$ ).
- c) When the unit turns OFF, the louvers return to a closed position (angle at  $100^{\circ}$ ).

### E.5.5. Modulating Signal Input

- a) The standard configuration is for 0~5 VDC modulating signal input.
- b) The optional configuration is for 0~10 VDC modulating signal. To set the PCB to the optional configuration, the S1 jumper must be closed.

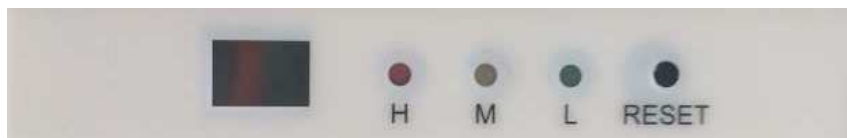
### E.5.6. Low Temperature Protection of Indoor Coil in Winter

This is frost protection for when the unit is off to prevent water in the coil and room from freezing.

#### Unit is in Standby Mode

If  $Ti1 \leq 2^{\circ}\text{C}$  for 2 minutes, report error code and Buzzer is beeping for 3 minutes.

## E.6. LED Display and Error Description

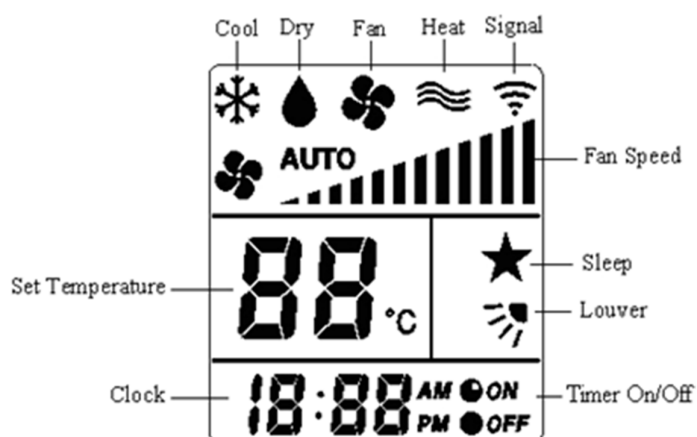
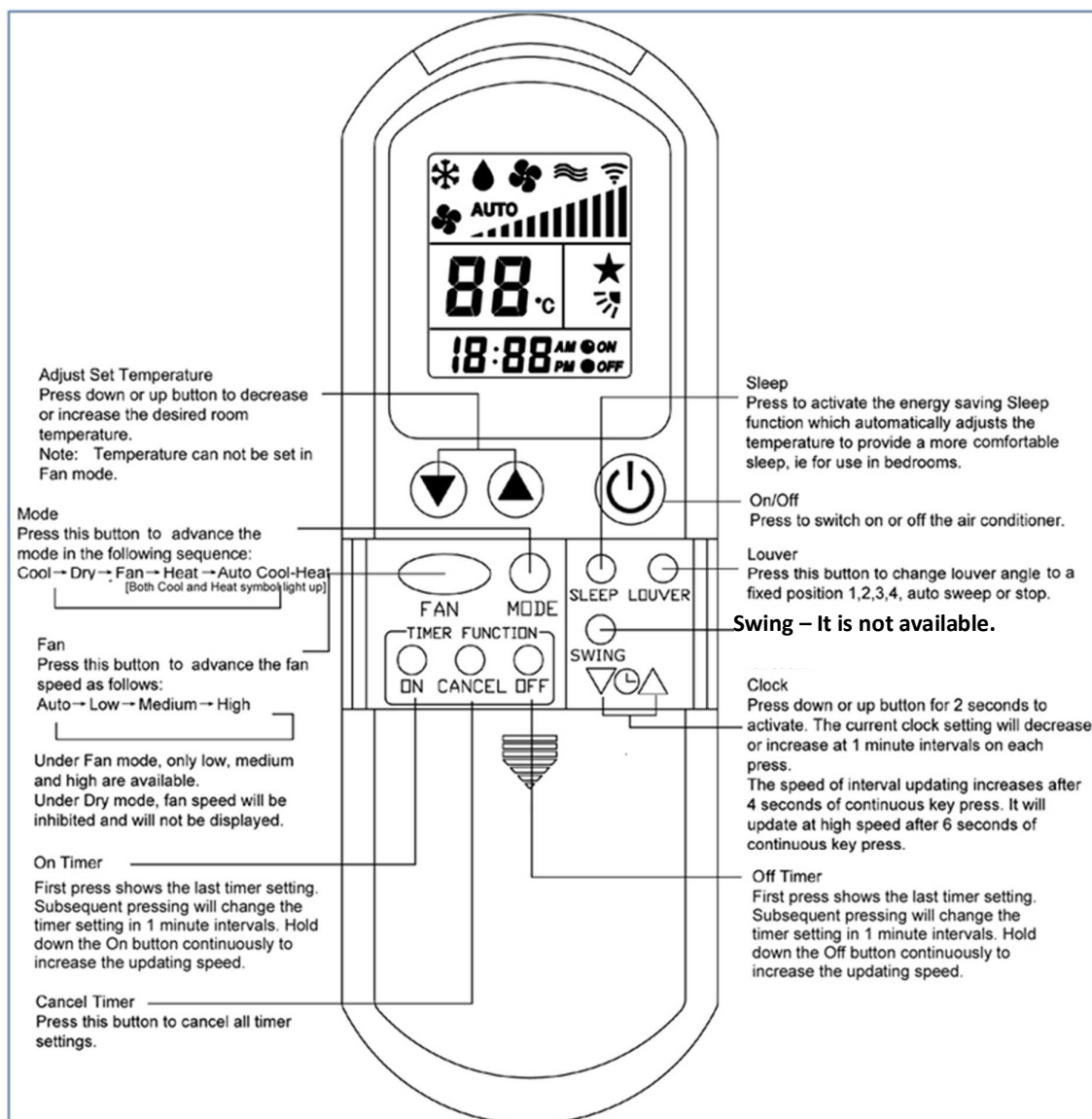


| Flexible Control PCB - W Control Type |               |           |
|---------------------------------------|---------------|-----------|
| Fan speed setting                     | LED Display   | Condition |
| High speed                            | Red LED On    | Normal    |
| Medium speed                          | Yellow LED On | Normal    |
| Low speed                             | Green LED On  | Normal    |

| For all units - Green LED blinks |                                         |                                                   |                                                                                                                                                                   |
|----------------------------------|-----------------------------------------|---------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Item                             | Blink                                   | Reason                                            | Remedy                                                                                                                                                            |
| Indoor coil sensor 1 failure     | Green LED blinks 4 times, stops for 3s  | Ti1 sensor connection is not good or damaged.     | <ol style="list-style-type: none"> <li>1. Check if Ti1 plug is connected or not.</li> <li>2. Check sensor's resistor is good or not.</li> </ol>                   |
| Water pump failure               | Green LED blinks 7 times, stops for 3s  | Float switch is opened.                           | <ol style="list-style-type: none"> <li>1. Check if the condensate water pipe is connected or not.</li> <li>2. Check if the pump is functioning or not.</li> </ol> |
| EC motor failure                 | Green LED blinks 9 times, stops for 3s  | No EC motor feedback                              | <ol style="list-style-type: none"> <li>1. Check DIPB-SW5 and SW6 setting.</li> <li>2. Check the EC motor</li> </ol>                                               |
| Anti-frozen protection           | Green LED blinks 11 times, stops for 3s | When unit is standby, $Ti1 < 2^{\circ}\text{C}$ . | <ol style="list-style-type: none"> <li>1. Turn on unit to keep Ti higher than <math>5^{\circ}\text{C}</math></li> </ol>                                           |

## F. User Interface

### F.1. Remote Handset



#### Attention

When unit with handset is the master unit, its settings are automatically sent to the slave units. Auto Cool-Heat operation will be applicable in 4-pipe system only.

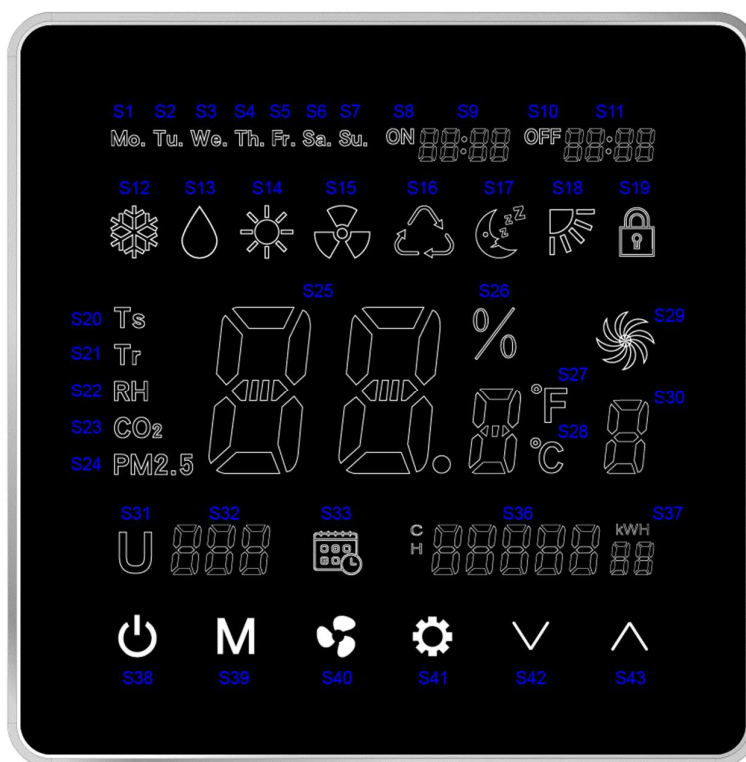
“Swing” function is not applicable.

European version only uses degree C setting.

## F.2. Wired Wall Pad Controller Operation Guide



### F.2.1. LED display



| Code | Legend        | Code | Legend                  | Code | Legend                   |
|------|---------------|------|-------------------------|------|--------------------------|
| S1   | Monday        | S16  | Auto Mode               | S31  | Unit address             |
| S2   | Tuesday       | S17  | Sleep mode              | S32  | Unit No. / Error code    |
| S3   | Wednesday     | S18  | Swing mode              | S33  | Weekly timer             |
| S4   | Thursday      | S19  | LED lock                | S34  | C-cooling                |
| S5   | Friday        | S20  | Setting Temperature     | S35  | H-heating                |
| S6   | Saturday      | S21  | Room Temperature        | S36  | Energy consumption       |
| S7   | Sunday        | S22  | RH (if need)            | S37  | Energy consumption cycle |
| S8   | Timer-ON      | S23  | CO2 density (if need)   | S38  | On/Off Button            |
| S9   | Timer-ON time | S24  | PM2.5 density (if need) | S39  | Mode setting             |

|     |                                         |     |                                 |     |                   |
|-----|-----------------------------------------|-----|---------------------------------|-----|-------------------|
|     | (When Timer-ON is off:<br>Current time) |     |                                 |     |                   |
| S10 | Timer-OFF                               | S25 | Data Display                    | S38 | On/Off Button     |
| S11 | Timer-OFF time                          | S26 | RH percentage                   | S39 | Mode setting      |
| S12 | Cooling Mode                            | S27 | Fahrenheit degree               | S40 | Fan speed setting |
| S13 | Dehumidification                        | S28 | Celsius degree                  | S41 | Parameter setting |
| S14 | Heating Mode                            | S29 | Fan                             | S42 | Up                |
| S15 | Ventilation Mode                        | S30 | 0-Auto. 1-Low. 2-Medium. 3-High | S43 | Down              |

## F.2.2. Operation guide

|     |                          |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-----|--------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| S38 | On/OFF Button            | Press  to turn on. Press it again to turn off.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| S39 | Mode button              | With wall pad on, press  to select Cooling, Dehumidification, Heating, Ventilation or Auto sequentially. or Auto sequentially.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| S40 | Fan Speed Button         | Press  S30 to change from 0 to 3. 0=Auto speed, 1=Low speed, 2=Medium speed, 3=High speed.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| S41 | Parameter Setting Button | <p>Long press  for 5 seconds to set today's day of week. Press  or  to change from Monday to Sunday.</p> <p>Long press  for 5 seconds then short press it once to set current time. Press  or  to change current time.</p> <p>Long press  for 5 seconds then short press it twice to set Timer ON.<br/> Press  to set day of week from Monday to Sunday.<br/> Press  or  to change Timer ON time.<br/> Press  to turn Timer ON on or off and S8 appears or disappears.</p> <p>Long press  for 5 seconds then short press it 3 times to set Timer OFF time.<br/> Press  to set day of week from Monday to Sunday.<br/> Press  or  to change Timer OFF time.<br/> Press  to turn Timer OFF on or off and S10 appears or disappears.</p> <p>Long press  for 5 seconds then short press it 4 times to set group control and U31 appears. The function is reserved.</p> <p>Long press  for 5 seconds then short press it 5 times to set unit address and U32 appears.<br/> Press  or  to change unit address.</p> |

Long press  for 5 seconds then short press it 6 times to set unit parameters (Professional Engineer)

U00 and 0000 appear.

0000 is password for below parameters reading or writing.

Password Setting:

Press  to select number position and Press  or  to increase or decrease number.

1111 is a default password for below parameter reading.

8888 is a default password for below parameter reading and setting.

Press  to read U001~U031 parameters.

Press  to set U001~U031 parameters and Press  or  to increase or decrease parameter setting.

S31/S32 displays "U001", which is used to set unit type.

0=iAIR ..... Mode: Ventilation T, RH, CO2, PM2.5 are displayed.

1=iFCU ..... Mode: S12, S13, S14, S15, S16, S21 or S20 is displayed.

2=iAHU ..... Mode: S12, S13, S14, S15, S16, S21 or S20 is displayed.

3=iAHU with air cleaner ..... Mode: S12, S13, S14, S15, S16, T, RH, CO2, PM2.5 are displayed.

S31/S32 displays "U002", which is used to set unit of temperature degree.

0=Celsius degree.

1=Fahrenheit degree.

S31/S32 displays "U003", which is used to select display temperature on LCD.

1=Setting temperature.

0=Room temperature.

S31/S32 displays "U004", which is used to set setting temperature range.

0=Setting temperature is from 16~30°C.

1=Cooling setting temperature 24°C, Heating setting temperature 21°C.

S31/S32 displays "U005", which is used to set setting temperature band.

1~9°C.

S31/S32 displays "U006-U009", which are reserved to set parameters with optional accessory to measure PM2.5 and CO2 values.

S31/S32 displays "U010~U011", which are reserved.

S31/S32 displays "U012", which is used to set setting RH point.

30~70, default: 50

S31/S32 displays "U013", which is used to set setting RH band.

10~30, default: 10

S31/S32 displays "U014", which is used to set unit address.

1~255, default: 1

S31/S32 displays "U015", which is used to set unit ESP.

0~100%, default: 40%

S31/S32 displays "U016", which is reserved.

S31/S32 displays "U017", which is used to set software. (please refer to different PCB)

0=2-pipe with valve

1=2-pipe without valve

2=4-pipe with std valve

3=4-pipe with 6-way valve

S31/S32 displays "U018", which is reserved.

S31/S32 displays "U019", which is used to set DA1 function When

U001=2,3

U019=0, fan control signal is based on Tr, Ts PID calculation U019=1, fan control signal is based on ESP PID calculation

S31/S32 displays "U020", which is used to calibrate the sensor on the wired wall pad. -5~5, default:-3

S31/S32 displays "U021", which is used to set EH function U021= 0, without EH.

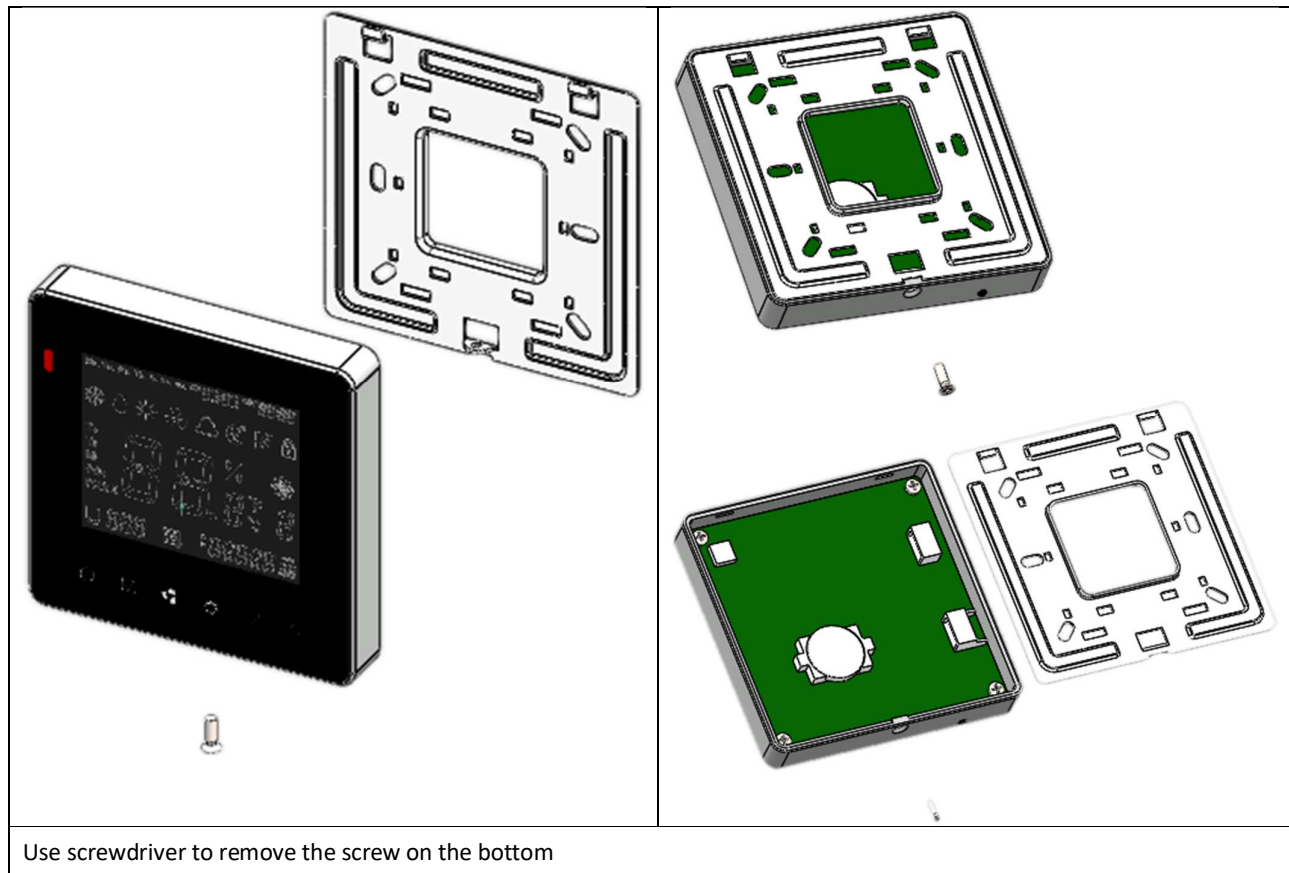
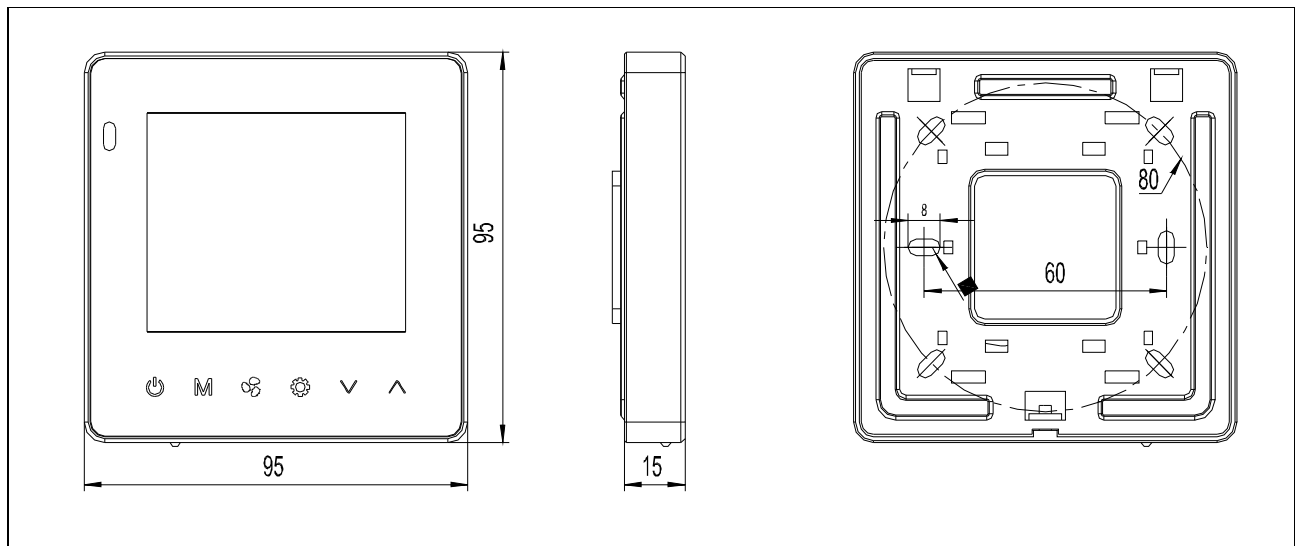
U021= 1, EH as booster.

|                             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|-----------------------------|------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                             |            | <p>U021=2, EH as primary.</p> <p>S31/S32 displays "U022", which is used to select Tr sensor.<br/>0=the sensor in the WWP.<br/>1=the sensor in the PCB.</p> <p>S31/S32 displays "U023", which is used to display cooling and heating energy consumption.<br/>0=S34/S35/S36/S37 disappears<br/>1=S34/S35/S36/S37 appears<br/>In cooling and dehumidification mode, cooling energy consumption is shown.<br/>In heating mode, heating energy consumption is shown.<br/>2=Motor running time is shown.</p> <p>S31/S32 displays "U024", which is used to set low speed RPM or control signal.</p> <p>S31/S32 displays "U025", which is used to set medium speed RPM or control signal.</p> <p>S31/S32 displays "U026", which is used to set high speed RPM or control signal.</p> <p>S31/S32 displays "U027", which is used to set Delta T OF Ti1/Ti2.</p> <p>S31/S32 displays "U028", which is used to set Delta T OF Ti3/Ti4.</p> <p>S31/S32 displays "U029", which is used to read unit type.</p> <p>S31/S32 displays "U030", which is used to read unit model.</p> <p>S31/S32 displays "U031", which is used to read unit manufacturing date.</p> |
| S32                         | Error code | <p>S32 : E** blinks</p> <p>Bit0 = Room temperature sensor error<br/>Bit1 = Ti1 temperature sensor error<br/>Bit2 = Ti2 temperature sensor error<br/>Bit3 = Float switch error<br/>Bit4 = Indoor coil low temperature protection<br/>Bit5 = Indoor coil overheat protection<br/>Bit6 = Filter switch<br/>Bit7 = Electrical heater failure<br/>Bit8 = Motor1 Error<br/>Bit9 = Motor2 Error<br/>Bit10 = System parameters error<br/>Bit11 = Anti-frozen error<br/>Bit12 = Ti3 temperature sensor error<br/>Bit13 = Ti4 temperature sensor error<br/>Bit14 = PM2.5 sensor error<br/>Bit15 = AQI Error</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| Combination Button Function |            | <p>Screen Lock Function</p> <p>Long press  for 5 seconds, S19 appears and screen is locked.</p> <p>Long press  for 5 seconds again, S19 disappears and screen is unlocked.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|                             |            | <p>Swings Function</p> <p>Long press  for 5 seconds, S18 appears and swings is ON.</p> <p>Long press  for 5 seconds again, S18 disappears and swings is OFF.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|                             |            | <p>Sleep Mode</p> <p>Long press  for 5 seconds, S17 appears and sleep mode is ON.</p> <p>Long press  for 5 seconds again, S17 disappears and sleep mode is OFF.</p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
|                             |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

## F.2.3. Error Code List

| Error Description                      | Code | Reason                                  | Remedy                                                     |
|----------------------------------------|------|-----------------------------------------|------------------------------------------------------------|
| Room temperature sensor error          | E1   | Room sensor unplugged or damaged.       | 1. Check if Tr plug is connected or not.                   |
|                                        |      |                                         | 2. Check if sensor's resistance is correct or not.         |
| Indoor coil sensor 1 failure           | E2   | Ti1 sensor unplugged or damaged.        | 1. Check if Ti1 plug is connected or not.                  |
|                                        |      |                                         | 2. Check if sensor's resistance is correct or not.         |
| Indoor coil sensor 2 failure           | E3   | Ti2 sensor unplugged or damaged.        | 1. Check if Ti2 plug is connected or not.                  |
|                                        |      |                                         | 2. Check if sensor's resistance is correct or not.         |
| Float switch error                     | E4   | Float switch is opened.                 | 1. Check if the condensate water pipe is connected or not. |
|                                        |      |                                         | 2. Check if the pump is functioning or not.                |
| Indoor coil low temperature protection | E5   | Water temperature is lower than 3 °C.   | Check the water temperature.                               |
| Indoor coil overheat protection        | E6   | Water temperature is higher than 70 °C. | Check the water temperature                                |
| Filter switch protection               | E7   | Filter Switch is open.                  | Replace or clean filter.                                   |
| Electric Heater failure                | E8   | Only for unit with EH.                  | 1. Change fan speed to high.                               |
|                                        |      | EH safety switch is opened.             | 2. Replace the damaged EH safety switch.                   |
| EC motor failure(CN4)                  | E9   | No EC motor feedback                    | 1. Check Modbus setting.                                   |
|                                        |      |                                         | 2. Check the EC motor.                                     |
| EC motor failure(CN5)                  | E10  | No EC motor feedback                    | 1. Check Modbus setting.                                   |
|                                        |      |                                         | 2. Check the EC motor.                                     |
| Motor qty setting error (S6 PCB)       | E11  | Motor Qty setting error                 | 1: check Modbus setting                                    |
| Anti-frozen protection                 | E12  | When unit is standby, Tr<2°C.           | 1. Turn on unit to keep Tr high than 5°C                   |
| Indoor coil sensor 3 failure (S6 PCB)  | E13  | Ti3 sensor unplugged or damaged.        | 1. Check if Ti3 plug is connected or not.                  |
|                                        |      |                                         | 2. Check if sensor's resistance is correct or not.         |
| Indoor coil sensor 4 failure (S6 PCB)  | E14  | Ti4 sensor unplugged or damaged.        | 1. Check if Ti4 plug is connected or not.                  |
|                                        |      |                                         | 2. Check if sensor's resistance is correct or not.         |
| PM2.5 sensor failure (S6 PCB)          | E15  | PM2.5 sensor unplugged or damaged.      | 1. Check if PM2.5 plug is connected or not.                |
|                                        |      |                                         | 2. Check if sensor's resistance is correct or not.         |
| AQI sensor failure (S6 PCB)            | E16  | AQI sensor unplugged or damaged.        | 1. Check if AQI plug is connected or not.                  |
|                                        |      |                                         | 2. Check if sensor's resistance is correct or not.         |
| Wired Wall Pad failure                 | E17  | WWP unplugged or not well               | 1. Check plugs                                             |

## F.2.4. Dimensions and installation



Use screwdriver to remove the screw on the bottom

## G. Sensor Resistance R-T Conversion Table

Resistance:  $R(25^{\circ}\text{C}) = 10\text{K}\Omega \pm 1\%$  Beta Constant:  $B(25/85) = 3950 \pm 1\%$

| Temp.<br>(deg. C) | Rmax<br>(k Ohms) | Rnor (k<br>Ohms) | Rmin<br>(k Ohms) | Temp.<br>(deg. C) | Rmax<br>(k Ohms) | Rnor (k<br>Ohms) | Rmin<br>(k Ohms) |
|-------------------|------------------|------------------|------------------|-------------------|------------------|------------------|------------------|
| -30               | 186.3613         | 179.2666         | 172.4247         | 5                 | 25.9521          | 25.4562          | 24.9672          |
| -29               | 174.9608         | 168.4053         | 162.0793         | 6                 | 24.6872          | 24.2274          | 23.7738          |
| -28               | 164.3317         | 158.2726         | 152.4218         | 7                 | 23.4912          | 23.0650          | 22.6443          |
| -27               | 154.4170         | 148.8151         | 143.4022         | 8                 | 22.3599          | 21.9650          | 21.5750          |
| -26               | 145.1643         | 139.9837         | 134.9746         | 9                 | 21.2897          | 20.9239          | 20.5622          |
| -25               | 136.5254         | 131.7332         | 127.0964         | 10                | 20.2768          | 19.9380          | 19.6028          |
| -24               | 128.4558         | 124.0216         | 119.7285         | 11                | 19.3178          | 19.0041          | 18.6937          |
| -23               | 120.9146         | 116.8107         | 112.8348         | 12                | 18.4096          | 18.1193          | 17.8318          |
| -22               | 113.8640         | 110.0648         | 106.3818         | 13                | 17.5493          | 17.2807          | 17.0146          |
| -21               | 107.2691         | 103.7512         | 100.3387         | 14                | 16.7340          | 16.4857          | 16.2394          |
| -20               | 101.0977         | 97.8396          | 94.6771          | 15                | 15.9612          | 15.7317          | 15.5040          |
| -19               | 95.3201          | 92.3020          | 89.3705          | 16                | 15.2284          | 15.0164          | 14.8059          |
| -18               | 89.9088          | 87.1124          | 84.3946          | 17                | 14.5333          | 14.3376          | 14.1432          |
| -17               | 84.8385          | 82.2471          | 79.7268          | 18                | 13.8738          | 13.6933          | 13.5139          |
| -16               | 80.0856          | 77.6837          | 75.3463          | 19                | 13.2479          | 13.0816          | 12.9160          |
| -15               | 75.6284          | 73.4018          | 71.2336          | 20                | 12.6537          | 12.5005          | 12.3479          |
| -14               | 71.4468          | 69.3823          | 67.3708          | 21                | 12.0895          | 11.9485          | 11.8080          |
| -13               | 67.5220          | 65.6077          | 63.7412          | 22                | 11.5535          | 11.4239          | 11.2946          |
| -12               | 63.8370          | 62.0616          | 60.3295          | 23                | 11.0442          | 10.9252          | 10.8064          |
| -11               | 60.3755          | 58.7288          | 57.1212          | 24                | 10.5602          | 10.4510          | 10.3419          |
| -10               | 57.1228          | 55.5953          | 54.1032          | 25                | 10.1000          | 10.0000          | 9.9000           |
| -9                | 54.0651          | 52.6480          | 51.2629          | 26                | 9.6709           | 9.5709           | 9.4710           |
| -8                | 51.1895          | 49.8747          | 48.5889          | 27                | 9.2623           | 9.1626           | 9.0630           |
| -7                | 48.4842          | 47.2643          | 46.0705          | 28                | 8.8732           | 8.7738           | 8.6747           |
| -6                | 45.9381          | 44.8062          | 43.6978          | 29                | 8.5025           | 8.4037           | 8.3052           |
| -5                | 43.5409          | 42.4906          | 41.4615          | 30                | 8.1494           | 8.0512           | 7.9534           |
| -4                | 41.2831          | 40.3086          | 39.3531          | 31                | 7.8128           | 7.7154           | 7.6184           |
| -3                | 39.1559          | 38.2516          | 37.3644          | 32                | 7.4919           | 7.3953           | 7.2993           |
| -2                | 37.1508          | 36.3117          | 35.4880          | 33                | 7.1859           | 7.0903           | 6.9953           |
| -1                | 35.2603          | 34.4817          | 33.7169          | 34                | 6.8940           | 6.7995           | 6.7056           |
| 0                 | 33.4771          | 32.7547          | 32.0447          | 35                | 6.6156           | 6.5221           | 6.4294           |
| 1                 | 31.7945          | 31.1243          | 30.4652          | 36                | 6.3498           | 6.2576           | 6.1660           |
| 2                 | 30.2064          | 29.5847          | 28.9728          | 37                | 6.0962           | 6.0051           | 5.9148           |
| 3                 | 28.7068          | 28.1301          | 27.5623          | 38                | 5.8540           | 5.7642           | 5.6752           |
| 4                 | 27.2904          | 26.7556          | 26.2286          | 39                | 5.6227           | 5.5342           | 5.4465           |

## H. Troubleshooting

| Symptoms                       | Cause                              | Remedy                                               |
|--------------------------------|------------------------------------|------------------------------------------------------|
| The fan coil does not start up | No voltage                         | Check for presence of voltage<br>Check fuse on board |
|                                | Mains switch in the "OFF" position | Place in the "ON" position                           |
|                                | Faulty room control                | Check the room control                               |
|                                | Faulty fan                         | Check fan motor                                      |
| Insufficient output            | Filter clogged                     | Clean the filter                                     |
|                                | Air flow obstructed                | Remove obstacles                                     |
|                                | Room control regulation            | Check the room air sensor                            |
|                                | Incorrect water temperature        | Check the water source                               |
|                                | Air present                        | Check the air vent                                   |
| Noise and vibrations           | Contact between metal parts        | Check for loosening parts                            |
|                                | Loose screws                       | Tighten screws                                       |



Note: All the information or data in this manual may be changed without notice.

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