

INTERFACE

## AIR-HANDLING UNIT (AHU) DESIGN GUIDELINE

September 2018

[Model Name]

**PAC-IF013B-E**

**PAC-SIF013B-E**

Related document:

Refer to the following manual

- PAC-IF013B-E/PAC-SIF013B-E  
INSTALLATION MANUAL
- PAC-IF013B-E/PAC-SIF013B-E  
Modbus manual

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### CONTENTS

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|                                                                      |    |
|----------------------------------------------------------------------|----|
| 1. Introduction and Notice .....                                     | 2  |
| 2. Basic Specifications and Connectable<br>Outdoor Unit Models ..... | 2  |
| 3. System .....                                                      | 3  |
| 4. Function - System list .....                                      | 6  |
| 5. Input and Output .....                                            | 10 |
| 6. Requirement on local AHU design .....                             | 13 |
| 7. Additional Requirements for using<br>R32 Refrigerant .....        | 15 |

# 1 Introduction and Notice

- This manual shows guidelines regarding the AHU (Air Handling Unit) design and notices for the use of interface unit.
- This guideline details various examples of typical applications for the AHU (Air Handling Unit) controllers and their accompanying units. Please use this in conjunction with the PAC-IF013B-E/PAC-SIF013B-E installation manual, the Modbus manual, and the outdoor unit installation manual for correct use.
- This interface is to connect Mr. SLIM inverter outdoor unit of MITSUBISHI ELECTRIC to local applications. Please check the following guidelines when designing the local system.
- MITSUBISHI ELECTRIC does NOT take any responsibility on the local system design. Therefore, MITSUBISHI ELECTRIC does NOT take any responsibility on the failure (including outdoor unit) caused by local AHU and system design. Also R32 is flammable refrigerant, and the fire safety warranty for the whole system (including outdoor unit) must be done by your side when using R32 refrigerant.
- Conformity of regulations and laws must be confirmed on the system by your side.

## 2 Basic Specifications and Connectable Outdoor Unit Models

### 2.1 Basic specifications of the interface unit

| Model name   | PAC-IF013B-E                | PAC-SIF013B-E             |
|--------------|-----------------------------|---------------------------|
| Power supply | ~N 230V 50Hz                |                           |
| Dimension    | H: 278mm, W: 336mm, D: 69mm |                           |
| Weight       | 2.5kg + Accessories 0.8kg   | 2.5kg + Accessories 0.4kg |

### 2.2 Connectable outdoor unit models

| Outdoor unit model name | Connectability | Pre-defrost signal/Delayed (balanced) defrost function <sup>*1</sup> | Refrigerant                    |                   |
|-------------------------|----------------|----------------------------------------------------------------------|--------------------------------|-------------------|
| PUHZ-ZRP                | 35VKA          | Connectable                                                          | Available from VKA2 model      | R410A             |
|                         | 50VKA          | Connectable                                                          | Available from VKA2 model      | R410A             |
|                         | 60VHA          | Connectable                                                          | Available from VHA2 model      | R410A             |
|                         | 71VHA          | Connectable                                                          | Available from VHA2 model      | R410A             |
|                         | 100V/YKA       | Connectable                                                          | Available from V/YKA3 model    | R410A             |
|                         | 125V/YKA       | Connectable                                                          | Available from V/YKA3 model    | R410A             |
|                         | 140V/YKA       | Connectable                                                          | Available from V/YKA3 model    | R410A             |
|                         | 200YKA         | ONLY from R1 model                                                   | Available from YKA2 model      | R410A             |
| PUHZ-P                  | 250YKA         | ONLY from R1 model                                                   | Available from YKA2 model      | R410A             |
|                         | 250YKA         | ONLY from R1 model                                                   | Available from YKA2 model      | R410A             |
| PUHZ-SHW                | 80VHA          | Connectable                                                          | Available ONLY from R4 model   | R410A             |
|                         | 112V/YHA       | Connectable                                                          | Available ONLY from R4 model   | R410A             |
|                         | 140YHA         | Connectable                                                          | Available ONLY from R4 model   | R410A             |
|                         | 230YKA         | ONLY from YKA2 model                                                 | Available ONLY from YKA2 model | R410A             |
| PUZ-ZM                  | 35VKA          | Connectable if fire-safety is ensured <sup>*3</sup>                  | Available                      | R32 <sup>*2</sup> |
|                         | 50VKA          | Connectable if fire-safety is ensured <sup>*3</sup>                  | Available                      | R32 <sup>*2</sup> |
|                         | 60VHA          | Connectable if fire-safety is ensured <sup>*3</sup>                  | Available                      | R32 <sup>*2</sup> |
|                         | 71VHA          | Connectable if fire-safety is ensured <sup>*3</sup>                  | Available                      | R32 <sup>*2</sup> |
|                         | 100V/YKA       | Connectable if fire-safety is ensured <sup>*3</sup>                  | Available                      | R32 <sup>*2</sup> |
|                         | 125V/YKA       | Connectable if fire-safety is ensured <sup>*3</sup>                  | Available                      | R32 <sup>*2</sup> |
|                         | 140V/YKA       | Connectable if fire-safety is ensured <sup>*3</sup>                  | Available                      | R32 <sup>*2</sup> |

\*1. Refer to "4. Function - System list".

\*2. R32 is flammable refrigerant.

\*3. Fire-safety for the whole system (including outdoor unit) must be ensured by your side. Refer to "7. Additional Requirements for using R32 Refrigerant".

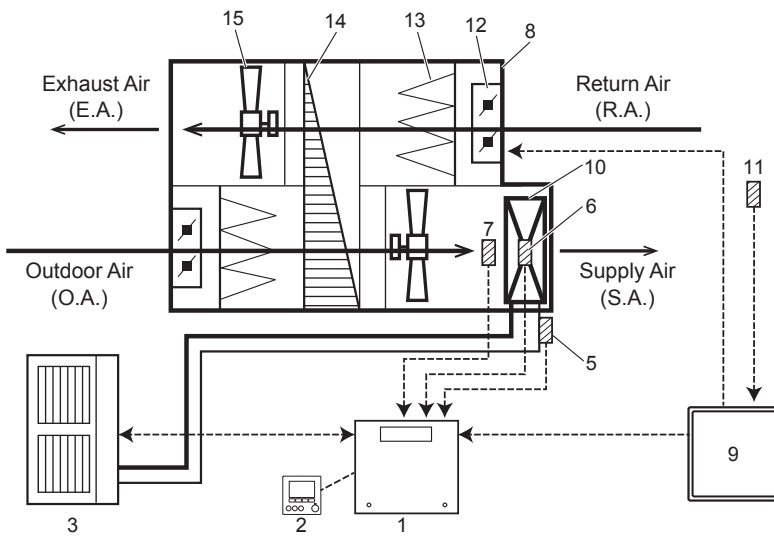
# 3 System

| Step mode (Input) | Target temperature       | Number of outdoor unit | Intelligent multiple outdoor unit control | System             |
|-------------------|--------------------------|------------------------|-------------------------------------------|--------------------|
| Manual            | —                        | 1                      | Not available                             | See (1-1) below.   |
|                   |                          | 2-6                    | Use                                       | See (2-1) below.   |
| Auto              | Supply air temp. control | 1-5                    | Not use                                   | See (1-1) below.*1 |
|                   | Return air temp. control | 1-5                    | Not available                             | See (1-2) below.   |
|                   |                          |                        | Not available                             | See (1-3) below.   |

- \*1. It is recommended to select Intelligent multiple outdoor unit control.  
 Design local AHU controller to make sure the following points.
- Minimum capacity request should be 20% or more of total capacity.
  - Operate all outdoor units when outdoor temperature is below -15 °C.

## 3.1 System configuration (Single outdoor unit)

(1-1) Manual step mode \*1



<Fig. 3.1.1>

\*1. Manual step mode:

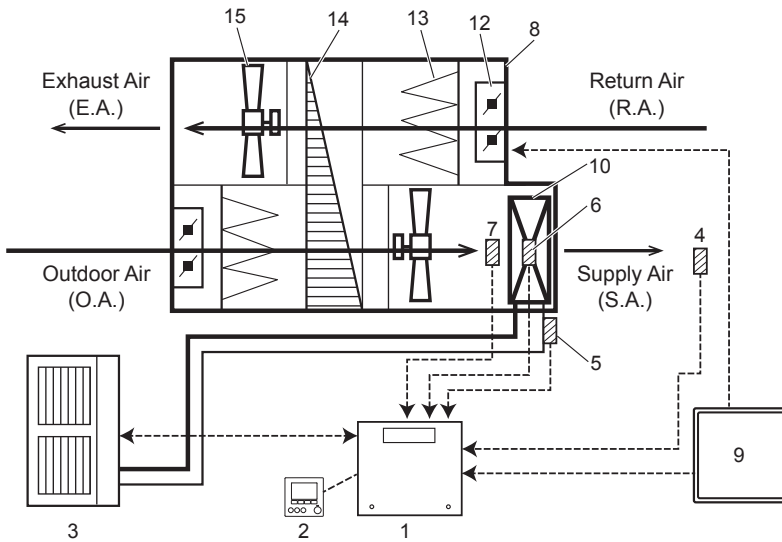
- Variable capacity request signals for heat pump need to be calculated by AHU local controller.
- AHU local controller can send "Capacity steps" by non-voltage contact signals, analog signals, or Modbus signal to the interface unit.
- Operation mode can be set by remote controller, external input, DIP switch, or Modbus signal.

| No. | Part name                                   | System (1-1) |
|-----|---------------------------------------------|--------------|
| 1   | Interface unit                              | ✓            |
| 2   | Remote controller                           | ✓            |
| 3   | Outdoor unit                                | ✓            |
| 4   | Target air temp. thermistor (TH1)           | —            |
| 5   | Ref. liquid temp. thermistor (TH2)          | ✓            |
| 6   | 2-Phase temp. thermistor (TH5)              | ✓*2          |
| 7   | HEX inlet (Coil on) temp. thermistor (TH11) | ✓            |
| 8   | Air-Handling Unit (AHU) (Local supply)      | ✓            |
| 9   | AHU local controller (Local supply)         | ✓            |
| 10  | Direct expansion (DX) coil (Local supply)   | ✓            |
| 11  | Target air temp. thermistor (Local supply)  | ✓            |
| 12  | Louver (Local supply)                       | ✓            |
| 13  | Air filter (Local supply)                   | ✓            |
| 14  | Heat recovery (Local supply)                | ✓            |
| 15  | Fan (Local supply)                          | ✓            |

\*2. If outdoor unit is PUHZ-SHW model, it's not needed to install this thermistor.

# 3 System

## (1-2) Auto step mode \*3 & Supply air temp. control



<Fig. 3.1.2>

\*3. Auto step mode:

- In this mode, the capacity step of the outdoor unit is controlled automatically to let the target temperature reach the set temperature.
- Set temperature can be set by remote controller, DIP switch, or Modbus signal.
- Operation mode can be set by remote controller, external input, DIP switch, or Modbus signal.

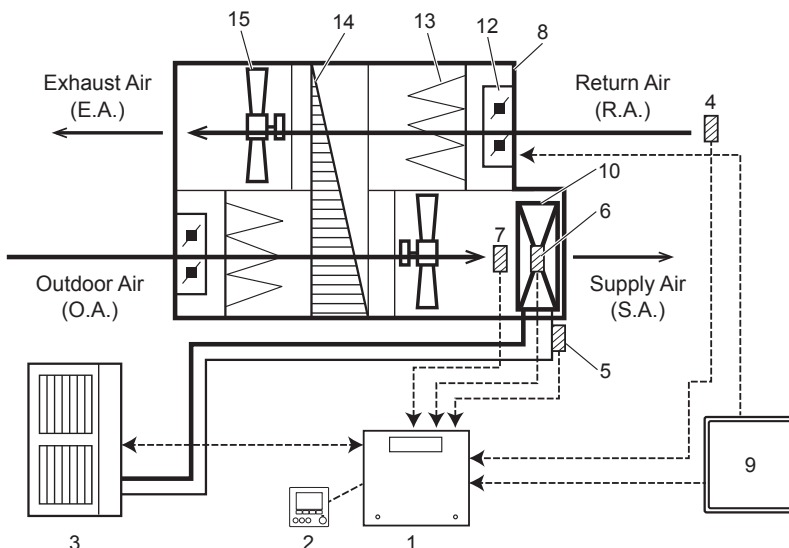
Note

- Auto change over function between cooling and heating mode is NOT available in this system.

| No. | Part name                                   | System (1-2) |
|-----|---------------------------------------------|--------------|
| 1   | Interface unit                              | ✓            |
| 2   | Remote controller                           | ✓            |
| 3   | Outdoor unit                                | ✓            |
| 4   | Target air temp. thermistor (TH1)           | ✓            |
| 5   | Ref. liquid temp. thermistor (TH2)          | ✓            |
| 6   | 2-Phase temp. thermistor (TH5)              | ✓ *4         |
| 7   | HEX inlet (Coil on) temp. thermistor (TH11) | ✓            |
| 8   | Air-Handling Unit (AHU) (Local supply)      | ✓            |
| 9   | AHU local controller (Local supply)         | ✓            |
| 10  | Direct expansion (DX) coil (Local supply)   | ✓            |
| 11  | Target air temp. thermistor (Local supply)  | —            |
| 12  | Louver (Local supply)                       | ✓            |
| 13  | Air filter (Local supply)                   | ✓            |
| 14  | Heat recovery (Local supply)                | ✓            |
| 15  | Fan (Local supply)                          | ✓            |

\*4. If outdoor unit is PUAZ-SHW model, it's not needed to install this thermistor.

## (1-3) Auto step mode \*5 & Return/ Room air temp. control



<Fig. 3.1.3>

\*5. Auto step mode:

- In this mode, the capacity step of the outdoor unit is controlled automatically to let the target temperature reach the set temperature.
- Set temperature can be set by remote controller, DIP switch, or Modbus signal.
- Operation mode can be set by remote controller, external input, DIP switch, or Modbus signal.

Note

- Auto change over function between cooling and heating mode is available ONLY when this system is selected and the input selection of capacity setting (DIP SW1 and SW6) is "No input (Auto step mode)".

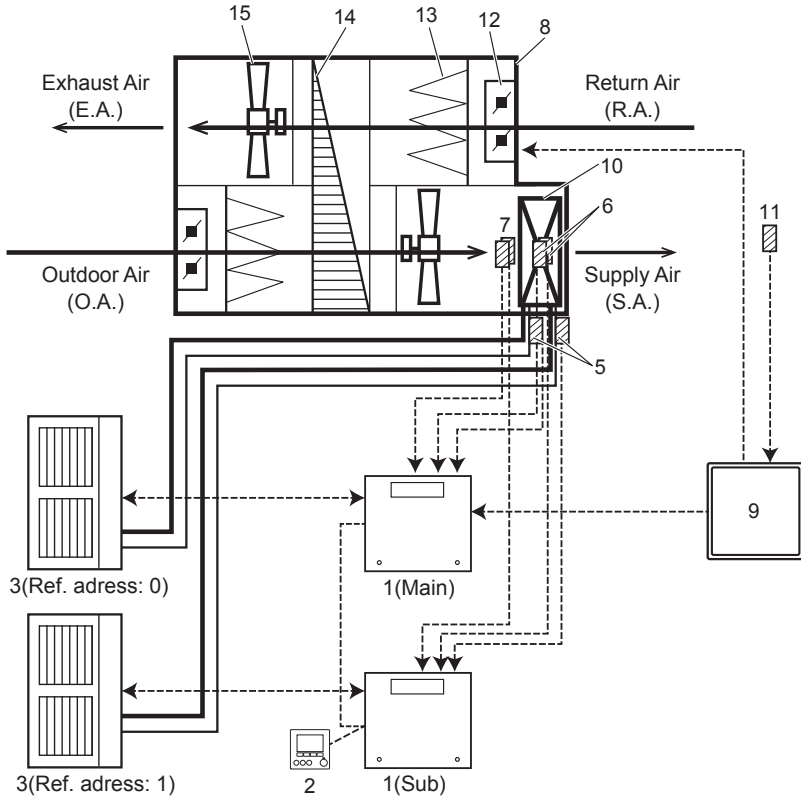
| No. | Part name                                   | System (1-3) |
|-----|---------------------------------------------|--------------|
| 1   | Interface unit                              | ✓            |
| 2   | Remote controller                           | ✓            |
| 3   | Outdoor unit                                | ✓            |
| 4   | Target air temp. thermistor (TH1)           | ✓            |
| 5   | Ref. liquid temp. thermistor (TH2)          | ✓            |
| 6   | 2-Phase temp. thermistor (TH5)              | ✓ *6         |
| 7   | HEX inlet (Coil on) temp. thermistor (TH11) | ✓            |
| 8   | Air-Handling Unit (AHU) (Local supply)      | ✓            |
| 9   | AHU local controller (Local supply)         | ✓            |
| 10  | Direct expansion (DX) coil (Local supply)   | ✓            |
| 11  | Target air temp. thermistor (Local supply)  | —            |
| 12  | Louver (Local supply)                       | ✓            |
| 13  | Air filter (Local supply)                   | ✓            |
| 14  | Heat recovery (Local supply)                | ✓            |
| 15  | Fan (Local supply)                          | ✓            |

\*6. If outdoor unit is PUAZ-SHW model, it's not needed to install this thermistor.

# 3 System

## 3.2 System configuration (Intelligent multiple outdoor unit control \*1)

### (2-1) Manual step mode (example)



<Fig. 3.2.1>

\*1. Interface system receives step request signal correspond to total capacity of outdoor units, and calculates necessary capacity for each outdoor unit automatically.

Note

- This intelligent multiple outdoor unit control function is available only when Manual step mode is selected.
- Up to 6 outdoor units can be connected.
- 2 different type of outdoor units (capacity and/or series) can be mixed, but connecting the same capacity outdoor units is highly recommended.
- Ref. address setting on each outdoor unit is needed.
- Interface unit which connects to the Ref. address 0 outdoor unit, becomes main interface unit.
- Connect AHU local controller (Part No. 9) to the main interface unit.
- Connect ONE remote controller (Part No. 2) to the interface unit.
- Connect between the interface units with a remote controller (daisy chain). MAX. : 500m

| No. | Part name                                   | System (2-1) |
|-----|---------------------------------------------|--------------|
| 1   | Interface unit                              | ✓            |
| 2   | Remote controller                           | ✓            |
| 3   | Outdoor unit                                | ✓            |
| 4   | Target air temp. thermistor (TH1)           | —            |
| 5   | Ref. liquid temp. thermistor (TH2)          | ✓            |
| 6   | 2-Phase temp. thermistor (TH5)              | ✓*2          |
| 7   | HEX inlet (Coil on) temp. thermistor (TH11) | ✓            |
| 8   | Air-Handling Unit (AHU) (Local supply)      | ✓            |
| 9   | AHU local controller (Local supply)         | ✓            |
| 10  | Direct expansion (DX) coil (Local supply)   | ✓            |
| 11  | Target air temp. thermistor (Local supply)  | ✓            |
| 12  | Louver (Local supply)                       | ✓            |
| 13  | Air filter (Local supply)                   | ✓            |
| 14  | Heat recovery (Local supply)                | ✓            |
| 15  | Fan (Local supply)                          | ✓            |

\*2. If outdoor unit is PUHZ-SHW model, it's not needed to install this thermistor.

## 3.3 Operation range

### (1) Operation range

Make sure to keep operation range shown at the table below.

| Operation range                   | Outdoor temperature | Cooling | Depend on outdoor unit    |
|-----------------------------------|---------------------|---------|---------------------------|
|                                   |                     | Heating | Depend on outdoor unit    |
|                                   | Coil on temperature | Cooling | 15 - 32°C                 |
|                                   |                     | Heating | Number of outdoor unit: 1 |
| Number of outdoor unit: 2 or more |                     |         | 5 - 28°C                  |

### (2) Set temperature range in Auto step mode

| Set temperature range in Auto step mode *1 | Supply air control                  | Cooling | 12 - 30°C |           |
|--------------------------------------------|-------------------------------------|---------|-----------|-----------|
|                                            |                                     | Heating | 17 - 28°C |           |
|                                            | Return/Room air temperature control | Cooling | 19 - 30°C |           |
|                                            |                                     | Heating | 17 - 28°C |           |
|                                            | Auto cooling/heating *2             |         |           | 19 - 28°C |

Note

\*1. When potential of the DX coil does not match the capacity of outdoor unit, the air temperature may not reach the set temperature or there may be ON-OFF cycle. Design the DX coil to match the capacity of outdoor unit. (As for capacity of outdoor unit, refer to "6.2 Standard conditions".)

\*2. This function is available ONLY when capacity setting (DIP SW1 and SW6) is "No input (Auto step mode)" and return/room air temp. control is selected (DIP SW 1-7 is ON).

# 4 Function - System list

| No. | Item       | Function name                                     | Description                                                                                                                                                                            | Manual                            |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|-----|------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------|---------|-----|---------|---------------------|---------|-----|---------|--------|---------|-----|---------|---|---|---|
|     |            |                                                   |                                                                                                                                                                                        | Analog (0-10V/1-5V/4-20mA/0-10kΩ) |         |     |         | Remote switch (A/B) |         |     |         | Modbus |         |     |         |   |   |   |
|     |            |                                                   |                                                                                                                                                                                        | 1                                 |         | 2-6 |         | 1                   |         | 2-6 |         | 1      |         | 2-6 |         |   |   |   |
|     |            |                                                   |                                                                                                                                                                                        | With                              | Without | Use | Not use | With                | Without | Use | Not use | With   | Without | Use | Not use |   |   |   |
|     |            |                                                   |                                                                                                                                                                                        | A                                 | B       | C   | D       | E                   | A       | B   | C       | D      | E       | A   | B       | C | D | E |
|     |            | Step mode                                         |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|     |            | Input type                                        |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|     |            | Target temp.                                      |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|     |            | No. of outdoor unit                               |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|     |            | Intelligent multiple outdoor unit control (IMOUc) |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|     |            | Group (Auto step mode)                            |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|     |            | Remote controller                                 |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
|     |            | System configuration *1                           |                                                                                                                                                                                        |                                   |         |     |         |                     |         |     |         |        |         |     |         |   |   |   |
| 1   | IMOUc      | Intelligent multiple outdoor unit control (IMOUc) | Interface system receives step request signal correspond to total capacity of outdoor units, and calculates necessary capacity for each outdoor unit automatically. (See "3. System".) | -                                 | -       | ✓   | -       | -                   | -       | -   | ✓       | -      | -       | -   | -       | ✓ | - | - |
| 2   |            | Back up operation                                 | In case of one outdoor unit failure, next outdoor unit starts to operate automatically.                                                                                                | -                                 | -       | ✓   | -       | -                   | -       | -   | ✓       | -      | -       | -   | -       | ✓ | - | - |
| 3   |            | Rotation control                                  | To make cumulative operation time of each outdoor unit even. (This function is only among same capacity outdoor units.)                                                                | -                                 | -       | ✓   | -       | -                   | -       | -   | ✓       | -      | -       | -   | -       | ✓ | - | - |
| 4   |            | Delayed (balanced) defrost                        | To avoid simultaneous defrosting among multiple outdoor units as much as possible. *2                                                                                                  | -                                 | -       | ✓   | -       | -                   | -       | -   | ✓       | -      | -       | -   | -       | ✓ | - | - |
| 5   | Output     | Pre-defrost signal                                | This output becomes ON before defrost starts (to switch ON back up heater on your side). *2                                                                                            | ✓                                 | ✓       | ✓   | ✓       | ✓                   | ✓       | ✓   | ✓       | ✓      | ✓       | ✓   | ✓       | ✓ | ✓ | ✓ |
| 6   | Step input | 11-step control                                   | Refined capacity request in 11 steps becomes possible.                                                                                                                                 | ✓                                 | ✓       | ✓   | ✓       | ✓                   | ✓       | ✓   | ✓       | ✓      | ✓       | ✓   | ✓       | ✓ | ✓ | ✓ |
| 7   | Connection | Modbus connection                                 | Modbus communication is available. (Refer to the Modbus manual.)                                                                                                                       | ✓                                 | ✓       | ✓   | ✓       | ✓                   | ✓       | ✓   | ✓       | ✓      | ✓       | ✓   | ✓       | ✓ | ✓ | ✓ |
| 8   |            | SD card slot                                      | Operation data logging is available.                                                                                                                                                   | ✓                                 | ✓       | ✓   | ✓       | ✓                   | ✓       | ✓   | ✓       | ✓      | ✓       | ✓   | ✓       | ✓ | ✓ | ✓ |
| 9   |            |                                                   | Time stamp function by remote controller for SD card log data is available.                                                                                                            | ✓                                 | ✓       | ✓   | ✓       | ✓                   | ✓       | ✓   | ✓       | ✓      | ✓       | ✓   | ✓       | ✓ | ✓ | ✓ |
| 10  | Other      | Auto heating/cooling                              | Auto change over function between heating and cooling is available.                                                                                                                    | -                                 | -       | -   | -       | -                   | -       | -   | -       | -      | -       | -   | -       | - | - | - |

\*1. As for system configuration, see the following page.  
 \*2. These functions are available ONLY with adaptable outdoor unit. Refer to "2.2 Connectable outdoor unit models".  
 \*3. Only reading is available.

# 4

# Function - System list

| No. | Item       | Function name                                      | Description                                                                                                                                                                            | Auto                                                          |         |                 |         |                                                    |         |                 |         |                 |         |                 |  |
|-----|------------|----------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------|-----------------|---------|----------------------------------------------------|---------|-----------------|---------|-----------------|---------|-----------------|--|
|     |            |                                                    |                                                                                                                                                                                        | "No input (Auto step mode)"<br>(Input with remote controller) |         |                 |         | "No input (Auto step mode)"<br>(Input with Modbus) |         |                 |         |                 |         |                 |  |
|     |            |                                                    |                                                                                                                                                                                        | Supply air (SA)                                               |         | Return air (RA) |         | Supply air (SA)                                    |         | Return air (RA) |         | Supply air (SA) |         | Return air (RA) |  |
| 1   | 2-5        | 1                                                  | 2-5                                                                                                                                                                                    | 1                                                             | 2-5     | 1               | 2-5     | 1                                                  | 2-5     | 1               | 2-5     |                 |         |                 |  |
|     |            | With                                               | Not use                                                                                                                                                                                | With                                                          | Not use | With            | Not use | With                                               | Not use | With            | Not use | With            | Not use |                 |  |
|     |            | Use                                                | Use                                                                                                                                                                                    | Use                                                           | Use     | Use             | Use     | Use                                                | Use     | Use             | Use     | Use             | Use     |                 |  |
|     |            | With                                               | Without                                                                                                                                                                                | With                                                          | Without | With            | Without | With                                               | Without | With            | Without | With            | Without |                 |  |
|     |            | A                                                  | F                                                                                                                                                                                      | D                                                             | A       | F               | D       | A                                                  | F       | D               | A       | F               | D       |                 |  |
|     |            | E                                                  | Use                                                                                                                                                                                    | Use                                                           | E       | Use             | Use     | E                                                  | Use     | Use             | E       | Use             | Use     |                 |  |
| 1   | IMOUIC     | Intelligent multiple outdoor unit control (IMOUIC) | Interface system receives step request signal correspond to total capacity of outdoor units, and calculates necessary capacity for each outdoor unit automatically. (See "3. System".) | -                                                             | -       | -               | -       | -                                                  | -       | -               | -       | -               | -       |                 |  |
| 2   |            | Back up operation                                  | In case of one outdoor unit failure, next outdoor unit starts to operate automatically.                                                                                                | -                                                             | -       | -               | -       | -                                                  | -       | -               | -       | -               | -       |                 |  |
| 3   |            | Rotation control                                   | To make cumulative operation time of each outdoor unit even. (This function is only among same capacity outdoor units.)                                                                | -                                                             | -       | -               | -       | -                                                  | -       | -               | -       | -               | -       |                 |  |
| 4   |            | Delayed (balanced) defrost                         | To avoid simultaneous defrosting among multiple outdoor units as much as possible. *2                                                                                                  | -                                                             | ✓*2     | -               | -       | -                                                  | ✓*2     | -               | -       | ✓*2             | -       |                 |  |
| 5   | Output     | Pre-defrost signal                                 | This output becomes ON before defrost starts (to switch ON back up heater on your side). *2                                                                                            | ✓*2                                                           | ✓*2     | ✓*2             | ✓*2     | ✓*2                                                | ✓*2     | ✓*2             | ✓*2     | ✓*2             | ✓*2     |                 |  |
| 6   | Step input | 11-step control                                    | Refined capacity request in 11 steps becomes possible.                                                                                                                                 | -                                                             | -       | -               | -       | -                                                  | -       | -               | -       | -               | -       |                 |  |
| 7   | Connection | Modbus connection                                  | Modbus communication is available. (Refer to the Modbus manual.)                                                                                                                       | ✓*3                                                           | ✓*3     | ✓*3             | ✓*3     | ✓*3                                                | ✓*3     | ✓*3             | ✓*3     | ✓*3             | ✓*3     |                 |  |
| 8   |            | SD card slot                                       | Operation data logging is available.                                                                                                                                                   | ✓                                                             | ✓       | ✓               | ✓       | ✓                                                  | ✓       | ✓               | ✓       | ✓               | ✓       |                 |  |
| 9   |            |                                                    | Time stamp function by remote controller for SD card log data is available.                                                                                                            | ✓                                                             | ✓       | ✓               | ✓       | ✓                                                  | ✓       | ✓               | ✓       | ✓               | ✓       |                 |  |
| 10  | Other      | Auto heating/cooling                               | Auto change over function between heating and cooling is available.                                                                                                                    | -                                                             | -       | -               | -       | -                                                  | -       | -               | -       | -               | -       |                 |  |

\*1. As for system configuration, see the following page.

\*2. These functions are available ONLY with adaptable outdoor unit. Refer to "2.2 Connectable outdoor unit models".

\*3. Only reading is available.

# 4 Function - System list

| No.                                               | Item       | Function name                                     | Description                                                                                                                                                                            | Step mode       |         |     |                 |                        |         |                 |         |      |                 |     |         |
|---------------------------------------------------|------------|---------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|---------|-----|-----------------|------------------------|---------|-----------------|---------|------|-----------------|-----|---------|
|                                                   |            |                                                   |                                                                                                                                                                                        | Input type      |         |     |                 | Analog / Remote switch |         |                 |         | Auto |                 |     |         |
| Target temp.                                      |            |                                                   |                                                                                                                                                                                        | Supply air (SA) |         |     | Return air (RA) |                        |         | Supply air (SA) |         |      | Return air (RA) |     |         |
| No. of outdoor unit                               |            |                                                   |                                                                                                                                                                                        | 1               | 2-5     | 1   | 2-5             | 1                      | 2-5     | 1               | 2-5     | 1    | 2-5             | 1   | 2-5     |
| Intelligent multiple outdoor unit control (IMOUC) |            |                                                   |                                                                                                                                                                                        | With            | Without | Use | Not use         | With                   | Without | Use             | Not use | With | Without         | Use | Not use |
| Group (Auto step mode)                            |            |                                                   |                                                                                                                                                                                        | With            | Without | Use | Not use         | With                   | Without | Use             | Not use | With | Without         | Use | Not use |
| Remote controller                                 |            |                                                   |                                                                                                                                                                                        | With            | Without | Use | Not use         | With                   | Without | Use             | Not use | With | Without         | Use | Not use |
| System configuration *1                           |            |                                                   |                                                                                                                                                                                        | A               | B       | F   | D               | E                      | A       | B               | F       | D    | E               | A   | B       |
| 1                                                 | IMOUC      | Intelligent multiple outdoor unit control (IMOUC) | Interface system receives step request signal correspond to total capacity of outdoor units, and calculates necessary capacity for each outdoor unit automatically. (See "3. System".) | -               | -       | -   | -               | -                      | -       | -               | -       | -    | -               | -   | -       |
| 2                                                 |            | Back up operation                                 | In case of one outdoor unit failure, next outdoor unit starts to operate automatically.                                                                                                | -               | -       | -   | -               | -                      | -       | -               | -       | -    | -               | -   | -       |
| 3                                                 |            | Rotation control                                  | To make cumulative operation time of each outdoor unit even. (This function is only among same capacity outdoor units.)                                                                | -               | -       | -   | -               | -                      | -       | -               | -       | -    | -               | -   | -       |
| 4                                                 |            | Delayed (balanced) defrost                        | To avoid simultaneous defrosting among multiple outdoor units as much as possible. *2                                                                                                  | -               | -       | ✓*2 | -               | -                      | -       | -               | ✓*2     | -    | -               | -   | -       |
| 5                                                 | Output     | Pre-defrost signal                                | This output becomes ON before defrost starts (to switch ON back up heater on your side). *2                                                                                            | ✓*2             | ✓*2     | ✓*2 | ✓*2             | ✓*2                    | ✓*2     | ✓*2             | ✓*2     | ✓*2  | ✓*2             | ✓*2 | ✓*2     |
| 6                                                 | Step input | 11-step control                                   | Refined capacity request in 11 steps becomes possible.                                                                                                                                 | -               | -       | -   | -               | -                      | -       | -               | -       | -    | -               | -   | -       |
| 7                                                 | Connection | Modbus connection                                 | Modbus communication is available. (Refer to the Modbus manual.)                                                                                                                       | ✓*3             | ✓*3     | ✓*3 | ✓*3             | ✓*3                    | ✓*3     | ✓*3             | ✓*3     | ✓*3  | ✓*3             | ✓*3 | ✓*3     |
| 8                                                 |            | SD card slot                                      | Operation data logging is available.                                                                                                                                                   | ✓               | ✓       | ✓   | ✓               | ✓                      | ✓       | ✓               | ✓       | ✓    | ✓               | ✓   | ✓       |
| 9                                                 |            |                                                   | Time stamp function by remote controller for SD card log data is available.                                                                                                            | ✓               | -       | ✓   | ✓               | -                      | ✓       | -               | ✓       | ✓    | -               | ✓   | -       |
| 10                                                | Other      | Auto heating/cooling                              | Auto change over function between heating and cooling is available.                                                                                                                    | -               | -       | -   | -               | -                      | -       | -               | -       | -    | -               | -   | -       |

\*1. As for system configuration, see the following page.

\*2. These functions are available ONLY with adaptable outdoor unit. Refer to "2.2 Connectable outdoor unit models".

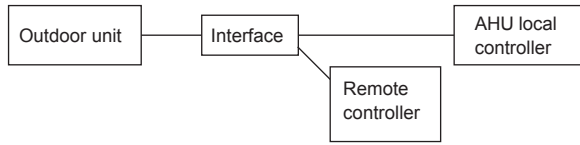
\*3. Only reading is available.



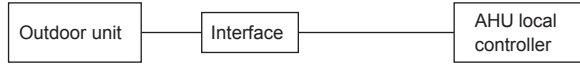
# 4 Function - System list

\*1. Example of system configuration

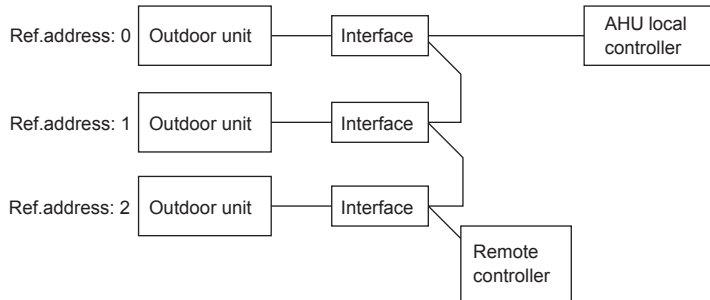
## System A



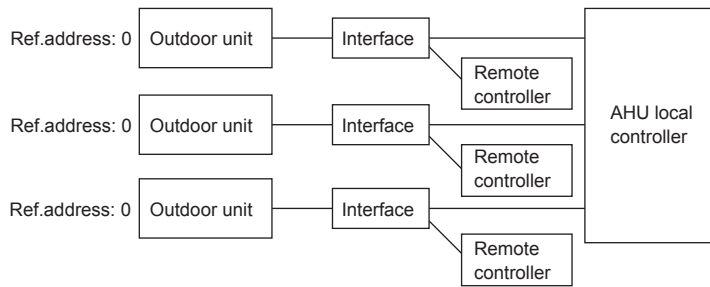
## System B



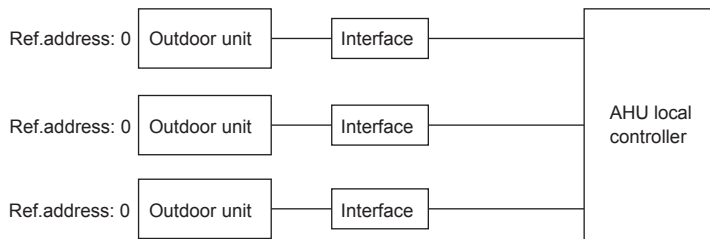
## System C (Manual step mode) (IMOUC)



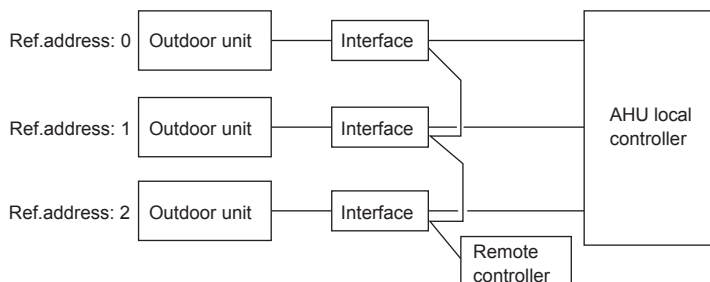
## System D



## System E



## System F (Auto step mode) (Grup)



# 5 Input and Output

## 5.1. Input and output

| Inputs                                        |                                                                 | Availability |
|-----------------------------------------------|-----------------------------------------------------------------|--------------|
| Thermistor<br>(Refrigerant)                   | Ref. liquid temperature (TH2)                                   | ✓            |
|                                               | 2-phase temperature (TH5)                                       | ✓*1          |
| Thermistor<br>(Air)                           | Coil on temperature (TH11)                                      | ✓            |
|                                               | Target air temperature (TH1)<br>(Supply air or Return/Room air) | ✓            |
| Input<br>(Contact signal)                     | Forced Comp. OFF*2                                              | ✓            |
|                                               | Fixed operation mode (Cooling/Heating)                          | ✓            |
|                                               | Capacity request                                                | 7steps       |
| Input for capacity request<br>(Analog signal) | 0-10V                                                           | 11steps      |
|                                               | 1-5V                                                            | 7steps       |
|                                               | 4-20mA                                                          | 7steps       |
|                                               | 0-10kΩ                                                          | 7steps       |
| Modbus connection                             |                                                                 | ✓            |
| Remote controller                             |                                                                 | ✓            |

| Outputs                    |                   | Availability |
|----------------------------|-------------------|--------------|
| Output<br>(Contact signal) | Operation ON/OFF  | ✓            |
|                            | Error             | ✓            |
|                            | Compressor ON/OFF | ✓            |
|                            | Defrost           | ✓            |
|                            | Cooling mode      | ✓            |
|                            | Heating mode      | ✓            |
|                            | Self protection*3 | ✓            |
| Pre-defrost*4              |                   | ✓*5          |

\*1. If connected outdoor unit is PUHZ-SHW model, it is not needed. (PUHZ-SHW models include high-pressure sensor instead.)

\*2. The operation continues during defrosting operation.

The "Forced Comp. OFF" signal should not be turned ON frequently. It should only be used if an abnormality occurs.

\*3. This output is ON when compressor becomes OFF to protect outdoor unit because condition is out of operation range.  
(As for operation range, refer to "3.3 Operation range".)

\*4. This output is ON more than one minute before defrost starts.

\*5. This function is available ONLY with adaptable outdoor unit. Refer to "2.2 Connected outdoor unit models".

## 5.2. Requirements and guides regarding input, output, and settings

### 5.2.1 Requirements on capacity step input to the interface unit (Only manual step mode)

(1) Do NOT input STEP 0 for 3 minutes after compressor is ON. (Keep compressor ON for 3 minutes at least.)

(2) Regarding timing of capacity step changes, follow the note below.

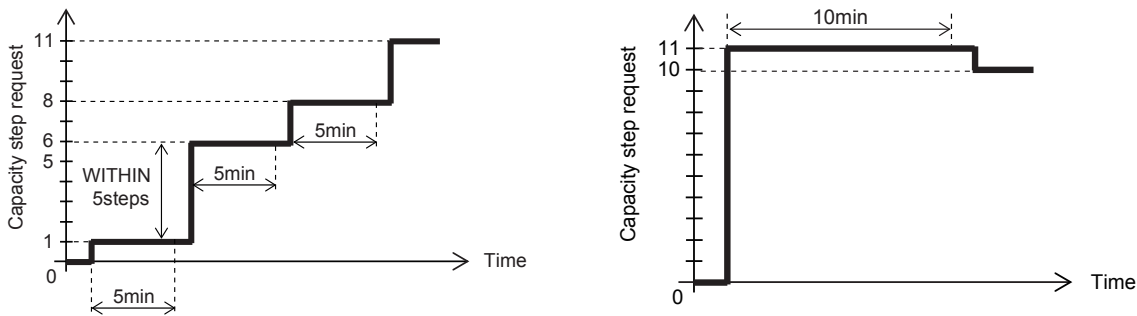
Note: Input next capacity step input after supply air temperature becomes stable.

If this note is difficult to follow by local controller,

- The change must be within 5 steps in a single request with at least 5 minutes interval between every change.

- For 6 step changing or more (such as on start-up of operation), the interval between every change needs to be at least 10 minutes.

(See figure 5-1.)



<Fig. 5-1: Examples of step changes>

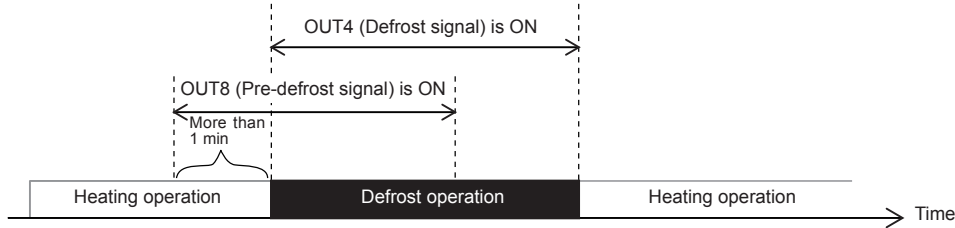
(3) If you input capacity step request by analog signal, use the center value of each step.

(Regarding center values, refer to the section 4 "Electrical work" in the installation manual.)

# 5 Input and Output

## 5.2.2 Requirements and guides regarding defrost and pre-defrost signal

- (1) Do NOT input STEP 0 during defrost operation and while pre-defrost signal is ON.
- (2) After pre-defrost signal becomes ON, do NOT change capacity step request until defrost operation finishes.  
If you change capacity step after pre-defrost signal is ON, outdoor unit may stop starting defrosting and frost may become big.
- (3) Pre-defrost signal becomes OFF before defrost operation finishes. Using both OUT4 (Defrost signal) and OUT8 (Pre-defrost signal) is recommended if you use pre-defrost signal. (See figure 5-2.)

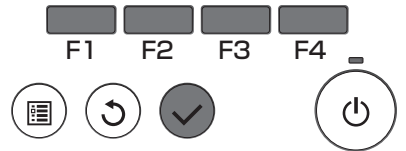
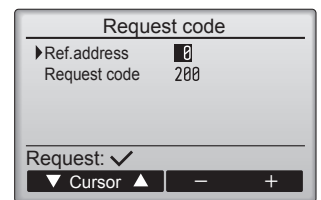


<Fig. 5-2>

- (4) Regarding the delayed (balanced) defrost function and the pre-defrost signal, if you change outdoor unit from non-adaptable to adaptable model, initialization of the function setting on the remote controller is necessary.

- First, select "Menu" → "Service" → "Check" → "Request code" on the remote controller.
- Second, set the refrigerant address of the outdoor unit which is changed from non-adaptable to adaptable.
- Third, select "Request code" item with the F1 or F2 button and set "200" with F3 or F4 button.
- Then, press the button. The function settings are initialized.

Note: You have to set the function settings after this initialization, if necessary.



## 5.2.3 Requirement regarding operation mode setting

- (1) Do NOT change operation mode frequently.

## 5.2.4 Thermistor characteristics

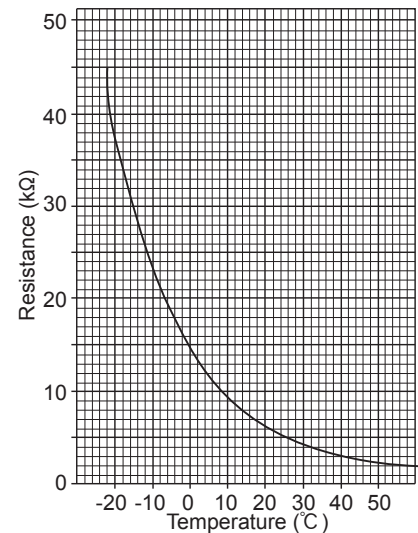
- Target air temp. thermistor (TH1)
- Ref. liquid temp. thermistor (TH2)
- 2-Phase temp. thermistor (TH5)
- HEX inlet (Coil on) temp. thermistor (TH11)

Thermistor R0 = 15kΩ ± 3%

B constant = 3480 ± 2%

$$R_t = 15 \exp \left\{ 3480 \left( \frac{1}{273+t} - \frac{1}{273} \right) \right\}$$

|      |        |
|------|--------|
| 0°C  | 15 kΩ  |
| 10°C | 9.6 kΩ |
| 20°C | 6.3 kΩ |
| 25°C | 5.2 kΩ |
| 30°C | 4.3 kΩ |
| 40°C | 3.0 kΩ |



## 5.2.5 Central control (M-NET connection)

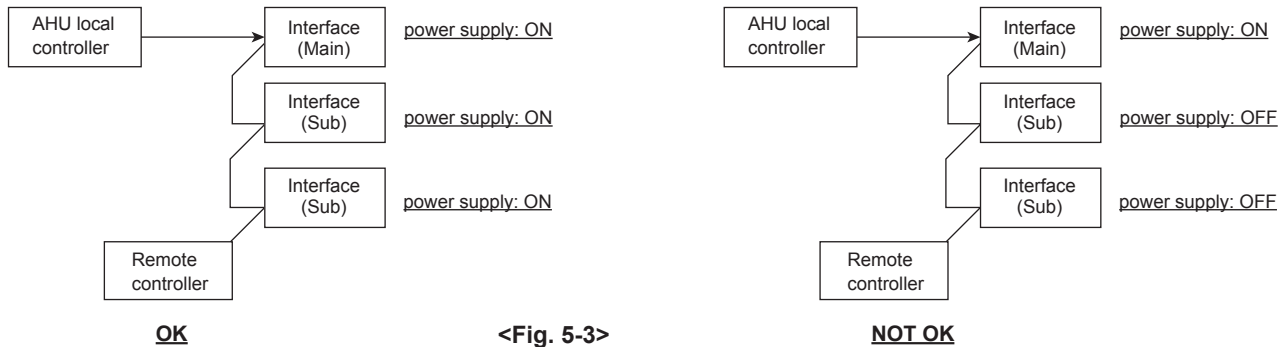
The central control (M-NET converter and A-control sub Interface connection between outdoor unit(s) and MELANS/BMS ) is available ONLY when capacity setting (DIP SW1 and SW6) is "No input (Auto step mode)" and return/room air temp. control is selected (DIP SW 1-7 is ON).

# 5 Input and Output

## 5.3. Requirements and guides when intelligent multiple outdoor unit control (IMOUC) is used

### 5.3.1 Power input timing when intelligent multiple outdoor unit control (IMOUC) is used

When IMOUC is used, supply power to the first interface unit, then the second interface unit within 1 minute. Otherwise system error will occur. (See figure 5-3.)



### 5.3.2 Connection and setting when intelligent multiple outdoor unit control (IMOUC) is used

(1) When IMOUC is used, the following input connections to sub interface unit(s) are necessary.

| Input                      |                                              | Input to sub interface(s)                                                                     |
|----------------------------|----------------------------------------------|-----------------------------------------------------------------------------------------------|
| Thermistor                 | Target air temp. (TH1)                       | Input is <b>not necessary</b> because IMOUC is only in manual step mode.                      |
|                            | Coil on air temp. (TH11)                     | Input to sub interface(s) is <b>necessary</b> .                                               |
|                            | Liquid ref. temp. (TH2)                      | Input to sub interface(s) is <b>necessary</b> .                                               |
|                            | 2-phase ref. temp. (TH5)                     | Input to sub interface(s) is <b>necessary</b> . <sup>*1</sup>                                 |
| Input for capacity request | Analog input (0-10V/1-5V/4-20mA/0-10kΩ)      | Input to sub interface(s) is <b>not necessary</b> .                                           |
|                            | Modbus                                       | Input to sub interface(s) is necessary <b>only for monitoring sub interface(s)</b> .          |
|                            | Remote switch                                | Input to sub interface(s) is <b>not necessary</b> .                                           |
| Other inputs               | Forced compressor OFF (IN1)                  | Input to sub interface(s) is <b>necessary</b> , if you use this function to sub interface(s). |
|                            | Fixed operation mode (Cooling/Heating) (IN2) | Input to sub interface(s) is <b>not necessary</b> .                                           |
| Remote controller          |                                              | Daisy chain wiring among interfaces is <b>necessary</b> .                                     |

\*1. It is not necessary if connected outdoor units are PUAH-SHW models (which include high-pressure sensor).

(2) When IMOUC is used, the following output connections to sub interface unit(s) are necessary.

| Output            | Output from sub interface(s)                                                                  |
|-------------------|-----------------------------------------------------------------------------------------------|
| 1 Operation       | It can be monitored via main interface.                                                       |
| 2 Error           | Output connection is <b>necessary</b> , if you monitor error information of sub interface(s). |
| 3 Compressor ON   | Output connection is <b>necessary</b> , if you monitor this information of sub interface(s).  |
| 4 Defrost         | Output connection is <b>necessary</b> , if you monitor this information of sub interface(s).  |
| 5 Cooling mode    | It can be monitored via main interface.                                                       |
| 6 Heating mode    | It can be monitored via main interface.                                                       |
| 7 Self protection | Output connection is <b>necessary</b> , if you monitor this information of sub interface(s).  |
| 8 Pre-defrost **  | Output connection is <b>necessary</b> , if you monitor this information of sub interface(s).  |

\*1. This function is available ONLY with adaptable outdoor unit. See "2.2 Connectable outdoor unit models".

(3) When IMOUC is used, the following DIP switch settings of sub interface unit(s) are necessary.

| DIP switch                                      | DIP switch setting of sub interface(s)                                                                   |
|-------------------------------------------------|----------------------------------------------------------------------------------------------------------|
| 1-1 to 1-3 Input selection                      | Setting of main interface is only necessary.                                                             |
| 1-4 to 1-5 Thermistor (TH11, TH5)               | Setting of each sub interface(s) is <b>necessary</b> .                                                   |
| 1-6 Time stamp for SD card                      | Setting of each sub interface(s) is <b>necessary</b> , if you use this function.                         |
| 1-7 Position of TH1                             | Setting is not necessary because IMOUC is manual step mode.                                              |
| 1-8 IMOUC                                       | Setting of each sub interface(s) is <b>necessary</b> .                                                   |
| 2-1 to 2-2 Fixed operation mode                 | Setting of main interface is only necessary, if you use this function.                                   |
| 2-3 to 2-5 Fixed set temp.                      | Setting is not necessary because IMOUC is manual step mode.                                              |
| 2-7 to 2-8 Thermistor (TH2, TH1)                | Setting of each sub interface(s) is <b>necessary</b> .                                                   |
| 3-1 to 3-3 LED display setting                  | Setting of each sub interface(s) is <b>necessary</b> , if you use this function.                         |
| 3-4 to 3-5 Thermo differential (Auto step mode) | Setting is not necessary because IMOUC is manual step mode.                                              |
| 3-6 to 3-8 Baud rate of Modbus                  | Setting of each sub interface(s) is <b>necessary</b> , if you use Modbus connection to sub interface(s). |
| 4-1 to 4-8 Settings for Modbus                  | Setting of each sub interface(s) is <b>necessary</b> , if you use Modbus connection to sub interface(s). |
| 6-1 to 6-2 Input selection                      | Setting of main interface is only necessary.                                                             |

## 5.4 SD card data logging

### 5.4.1 Time stamp function

Time stamp function enables to log the time of operation. Please use this function.

To use this function, setting DIP SW (SW 1-6) of interface unit to ON, connecting remote controller, and clock setting of remote controller ("Menu" → "Initial setting" → "Clock") are necessary.

## 6 Requirement on local AHU design

### 6.1 Air flow volume

Standard air flow volume

|                                |                       |      |      |      |      |      |      |      |      |      |
|--------------------------------|-----------------------|------|------|------|------|------|------|------|------|------|
| Model capacity of outdoor unit | ZRP                   | 35   | 50   | 60   | 71   | 100  | 125  | 140  | 200  | 250  |
|                                | P                     | –    | –    | –    | –    | –    | –    | –    | 200  | 250  |
|                                | SHW                   | –    | –    | –    | 80   | 112  | 140  | –    | 230  | –    |
|                                | ZM                    | 35   | 50   | 60   | 71   | 100  | 125  | 140  | –    | –    |
| Maximum air volume             | [m <sup>3</sup> /min] | 12.3 | 18   | 21   | 24   | 33.6 | 42   | 48   | 67.2 | 81   |
|                                | [m <sup>3</sup> /h]   | 738  | 1080 | 1260 | 1440 | 2016 | 2520 | 2880 | 4032 | 4860 |
| Minimum air volume             | [m <sup>3</sup> /min] | 6.2  | 8.6  | 10.5 | 12.2 | 16.3 | 21.5 | 23.0 | 32.6 | 37.8 |
|                                | [m <sup>3</sup> /h]   | 372  | 516  | 630  | 732  | 978  | 1290 | 1380 | 1956 | 2268 |

Make sure to keep the air flow volume within the limits of maximum and minimum below.

#### (1) Maximum air volume

| Step mode | Number of outdoor unit | Capacities of the connected outdoor units | Maximum air volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|-----------|------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Manual    | 2-6                    | The same                                  | [For PUHZ-ZRP, P, SHW models] 500% of selected outdoor unit's maximum standard air volume *1<br>[For PUZ-ZM models] 440% of selected outdoor unit's maximum standard air volume *2                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
|           |                        | Different                                 | [For PUHZ-ZRP, P, SHW models] If smaller capacity outdoor unit's rated heating capacity is under 20% of total heating capacity, 500% of bigger capacity outdoor unit's maximum standard air volume is allowable.<br>If smaller capacity outdoor unit's rated heating capacity is 20% or more of total heating capacity, 500% of smaller capacity outdoor unit's maximum standard air volume is allowable.<br>[For PUZ-ZM models] If smaller capacity outdoor unit's rated heating capacity is under 20% of total heating capacity, 440% of bigger capacity outdoor unit's maximum standard air volume is allowable.<br>If smaller capacity outdoor unit's rated heating capacity is 20% or more of total heating capacity, 440% of smaller capacity outdoor unit's maximum standard air volume is allowable. |
|           | 1                      | –                                         | 200% of selected outdoor unit's maximum standard air volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| Auto      | 2-5                    | –                                         | [For PUHZ-ZRP, P, SHW models] 500% of the smallest capacity outdoor unit's maximum standard air volume<br>[For PUZ-ZM models] 440% of the smallest capacity outdoor unit's maximum standard air volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
|           | 1                      | –                                         | 200% of selected outdoor unit's maximum standard air volume                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |

\*1. 600% of selected outdoor unit's maximum standard air volume is available ONLY when 6 same capacity outdoor units are connected.

\*2. 528% of selected outdoor unit's maximum standard air volume is available ONLY when 6 same capacity outdoor units are connected.

#### (2) Minimum air volume

Total amount of selected outdoor unit's minimum standard air volume is allowable.

### 6.2 Standard conditions

When calculating capacity for designing AHU DX (Direct expansion) coil, refer to standard conditions below.  
It is recommended to keep nominal capacity within 90%-110% under the standard condition.

<Standard conditions>

#### [1] COOLING

|                                       |           |
|---------------------------------------|-----------|
| Evaporation temp.                     | 10°C      |
| Superheat at evaporator outlet        | 5°C       |
| Expansion valve inlet temp.           | 40°C      |
| Coil on air temp. (dry-bulb/wet-bulb) | 27°C/19°C |
| Outdoor temp. (dry-bulb/wet-bulb)     | 35°C/27°C |

#### [2] HEATING

|                                       |           |
|---------------------------------------|-----------|
| Condensing temp.                      | 45°C      |
| Superheat at condenser inlet          | 20°C      |
| Subcool at condenser outlet           | 5°C       |
| Coil on air temp. (dry-bulb/wet-bulb) | 20°C/15°C |
| Outdoor temp. (dry-bulb/wet-bulb)     | 7°C/6°C   |

<Nominal capacity>

|                                |     |     |     |     |     |      |      |      |      |      |
|--------------------------------|-----|-----|-----|-----|-----|------|------|------|------|------|
| Model capacity of outdoor unit | ZRP | 35  | 50  | 60  | 71  | 100  | 125  | 140  | 200  | 250  |
|                                | P   | –   | –   | –   | –   | –    | –    | –    | 200  | 250  |
|                                | SHW | –   | –   | –   | 80  | 112  | 140  | –    | 230  | –    |
|                                | ZM  | 35  | 50  | 60  | 71  | 100  | 125  | 140  | –    | –    |
| COOLING (kW)                   |     | 3.5 | 5.0 | 6.0 | 7.1 | 10.0 | 12.5 | 14.0 | 20.0 | 25.0 |
| HEATING (kW)                   |     | 4.1 | 6.0 | 7.0 | 8.0 | 11.2 | 14.0 | 16.0 | 22.4 | 27.0 |

# 6 Requirement on local AHU design

## 6.3 Requirement on DX (Direct expansion) coil

### (1) Heat exchanger volume of DX coil

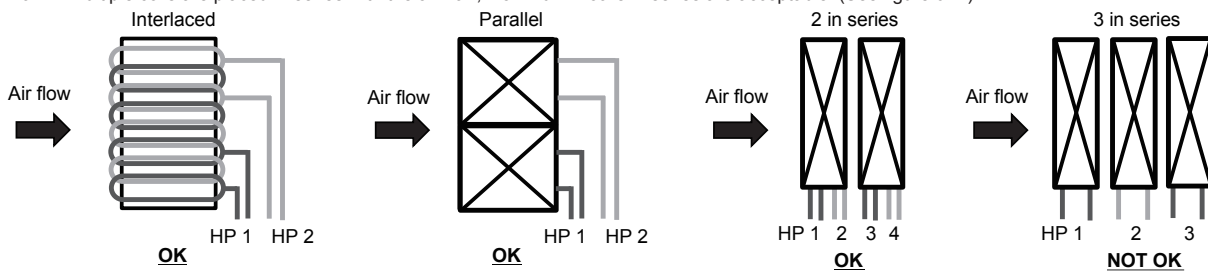
Make sure to keep the DX coil capacity within the following range.  
If the piping length is 30m or shorter, DX coil capacity can be increased as follows.

|                                |             |                                |      |      |      |      |      |      |      |      |       |
|--------------------------------|-------------|--------------------------------|------|------|------|------|------|------|------|------|-------|
| Model capacity of outdoor unit | ZRP         | 35                             | 50   | 60   | 71   | 100  | 125  | 140  | 200  | 250  |       |
|                                | P           | -                              | -    | -    | -    | -    | -    | -    | 200  | 250  |       |
|                                | SHW         | -                              | -    | -    | 80   | 112  | 140  | -    | 230  | -    |       |
|                                | ZM          | 35                             | 50   | 60   | 71   | 100  | 125  | 140  | -    | -    |       |
| Max. volume [cm <sup>3</sup> ] | Pipe length | 30m -                          | 1050 | 1500 | 1800 | 2130 | 3000 | 3750 | 4200 | 6000 | 7500  |
|                                |             | 20m                            | 1350 | 1800 | 2700 | 3030 | 3900 | 4650 | 5100 | 7800 | 9300  |
|                                |             | 10m                            | 1650 | 2100 | 3600 | 3930 | 4800 | 5550 | 6000 | 9600 | 11100 |
|                                |             | Min. volume [cm <sup>3</sup> ] | 350  | 500  | 600  | 710  | 1000 | 1250 | 1400 | 2000 | 2500  |

Note: Calculate them by linear interpolation in case of other piping lengths not shown on this table.

### (2) Structure of DX coil

When multiple outdoor units are connected, basically select one interlaced DX coil which has multiple refrigerant circuit, or multiple coil placed in parallel to the air flow. If multiple coils are placed in series with the air flow, maximum 2 coils in series are acceptable. (See figure 6-1.)



<Fig. 6-1: Example of DX coil structure>

### (3) Diameter of header

With a bigger size header, the refrigerant flow velocity decreases and this disturbs the sufficient circulation of refrigerant oil. As a result, the refrigerant oil does not flow properly and could cause a serious damage of compressor.

Use the pipe whose outside diameter is less than the value shown in the table below.

|                                |                              |     |     |    |    |     |     |     |     |     |  |
|--------------------------------|------------------------------|-----|-----|----|----|-----|-----|-----|-----|-----|--|
| Model capacity of outdoor unit | ZRP                          | 35  | 50  | 60 | 71 | 100 | 125 | 140 | 200 | 250 |  |
|                                | P                            | -   | -   | -  | -  | -   | -   | -   | 200 | 250 |  |
|                                | SHW                          | -   | -   | -  | 80 | 112 | 140 | -   | 230 | -   |  |
| Max. diameter of header [mm]   |                              | φ19 |     |    |    |     | φ28 |     |     |     |  |
| Model capacity of outdoor unit | ZM                           | 35  | 50  | 60 | 71 | 100 | 125 | 140 |     |     |  |
|                                | Max. diameter of header [mm] |     | φ14 |    |    |     |     | φ21 |     |     |  |

### (4) Withstanding pressure

Design pressure of outdoor unit is 4.15 MPa. Following must be satisfied for burst pressure of connecting application.

Burst pressure : More than 12.45 MPa (3 times more than design pressure)

### (5) Contamination maintenance

1. Wash the inside of heat exchanger to keep it clean. Be sure to rinse not to leave flux. Do not use chlorine detergent when washing.
2. Be sure that the amount of contamination per unit cubic content of heat transfer pipe is less than the following amount.

Example) In case of ø9.52mm

Residual water : 0.6 mg/m, Residual oil : 0.5 mg/m, Solid foreign object : 1.8 mg/m

## 6.4 Additional refrigerant charging amount

Regarding additional refrigerant charging amount of PUZ-ZM100, 125, 140 models, follow the table below.

For other models, see the installation manual of each outdoor unit.

| Model       | Permitted pipe length | Permitted vertical difference | Additional refrigerant charging amount |          |          |          |          | © Maximum amount of refrigerant |
|-------------|-----------------------|-------------------------------|----------------------------------------|----------|----------|----------|----------|---------------------------------|
|             |                       |                               | 31 - 40m                               | 41 - 50m | 51 - 60m | 61 - 70m | 71 - 85m |                                 |
| ZM100 - 140 | - 85m                 | - 30m                         | 0.5kg                                  | 1.0kg    | 1.5kg    | 2.0kg    | 2.8kg    | 6.8kg                           |

## 6 Requirement on local AHU design

### 6.5 Thermistor position

< Target temp. thermistor (Locally supplied) >

Put thermistor where average supply or return air temperature can be detected.  
Put thermistor where it does NOT pick up the temperature of DX coil.

< Liquid refrigerant pipe thermistor (TH2) >

Put thermistor where liquid refrigerant pipe temperature can be detected.  
Protect the thermistor with heat insulating materials not to be affected by the ambient temperature, etc.  
In case that the refrigerant is distributed by distributor, put thermistor before the distributor.

< 2-Phase temp. thermistor (TH5) >

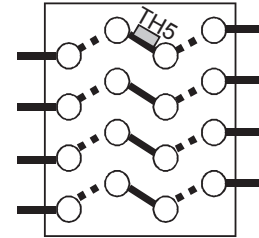
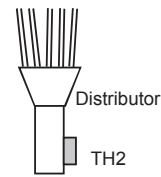
Put thermistor where 2-Phase temperature can be detected on the DX coil pipe.  
It should be located in the middle of inlet and outlet ports.  
If there are some paths, locate it on the top of them.  
Protect the thermistor with heat insulating materials not to be affected by the ambient temperature, etc.

< Target temp. thermistor (TH1) >

Put thermistor where average supply or return air temperature can be detected.  
Put thermistor where it does NOT pick up the temperature of DX coil.

< Coil on temp. thermistor (TH11) >

Put thermistor where average air temperature of DX coil inlet can be detected.  
Put thermistor where it does NOT pick up the temperature of DX coil.



## 7 Additional Requirements for using R32 Refrigerant

### 7.1 Important Notice (Fire safety)

R32 is flammable refrigerant, and the fire safety warranty for the whole system (including outdoor unit) must be done by your side. Conformity of regulations and laws must be confirmed on the system by your side.

As a reference, the following section 7.3 and 7.4 describe outlines of IEC 60335 2-40 (Edition 6.0). However, if you follow this standard, make sure to read the original IEC 60335. Also satisfying the following descriptions does NOT mean the guarantee of safety or the conformity with IEC 60335 2-40 (Edition 6.0).

### 7.2 Method to disable the compressor operation when using R32 refrigerant

If you need to disable the compressor operation as a measure to satisfy the fire safety (e.g. in the case of refrigerant leakage), take the following method.

- Input STEP 0 when the manual step mode is selected.
- Turn ON IN1 (Forced Comp. OFF) after changing the operation mode to cooling, when the auto step mode is selected.

### 7.3 Outline of Annex GG Requirements (regarding Charge limits and Ventilation) for AHU connection

Requirements depend on the installation space of AHU and the size of each room.

- All spaces where R32 refrigerant reaches when the refrigerant leaks, shall be considered.
- Regarding room size restriction, see the Annex GG.2.1.
- When the system does not satisfy GG.2.1, measures according to Clause GG.8 or GG.9 shall be provided.

### 7.4 Other requirements

- Requirements for marking (e.g. flame symbol) and information in the manual shall be satisfied.
- Requirements for constructions (e.g. location of the refrigerant detection sensor) shall be satisfied.

This product is designed and intended for use in the residential,  
commercial and light-industrial environment.

**mitsubishi** **ELECTRIC CORPORATION**

HEAD OFFICE: TOKYO BUILDING, 2-7-3, MARUNOUCHI, CHIYODA-KU, TOKYO 100-8310, JAPAN