

# 2015 Eco-lution

High Performance Air to Water Heat Pump



**Hydrolution**  
**HM**

Air to Water Heat Pump

50Hz  
15HM01E

# Air to Water Heat Pump

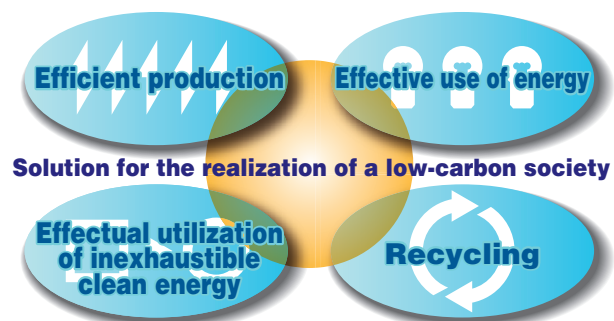
Mitsubishi Heavy Industries has integration of high technology in a variety of areas and provides comprehensive solutions for realization of a low-carbon society.

Air to water heat pump is one of our products supported by our unrivaled technology to realize utmost energy savings, safety and assurance.

## Our realized contributions to global environment

Our contributions to a low-carbon society encompass the entire product life cycle from efficient production, effective use of energy, effectual utilization of inexhaustible clean energy and recycling. This is a part of our accomplishments through unique technological features.

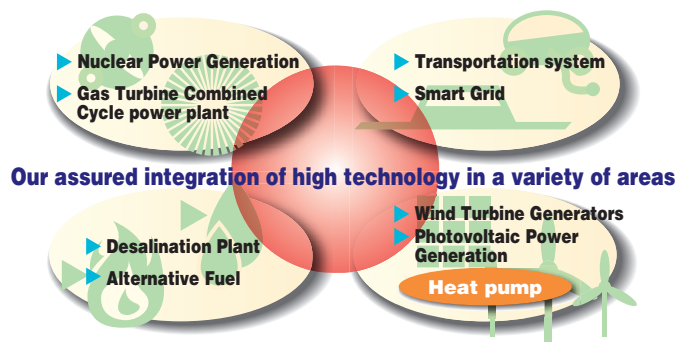
**Mitsubishi Heavy Industries provides total solutions to reduce environmental load in entire social infrastructure.**



## Assured integration of high technology in a variety of areas

Our product portfolio covering entire social infrastructure is supported by our proven high technology. We integrate proprietary technologies which have already demonstrated its significant capabilities in their own fields to augment its effects in our total solutions. Our air to water heat pump is an innovative system developed by such integration of high technology.

**Our assured integration of high technology is the mainstay of low-carbon society.**

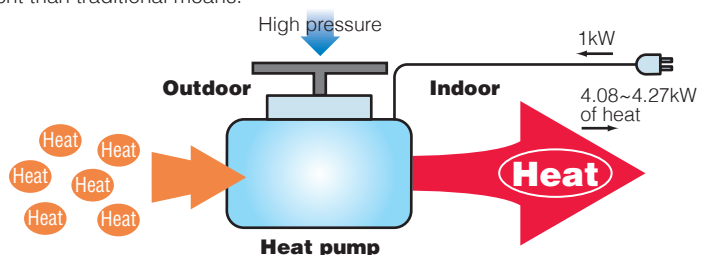


## Heat pump technology for low-carbon society

Air to water heat pump is a revolutionary energy recycling system which reduces environmental load by reusing heat energy produced in daily life. This first-rate energy saving system has been developed by our exceptional technology.

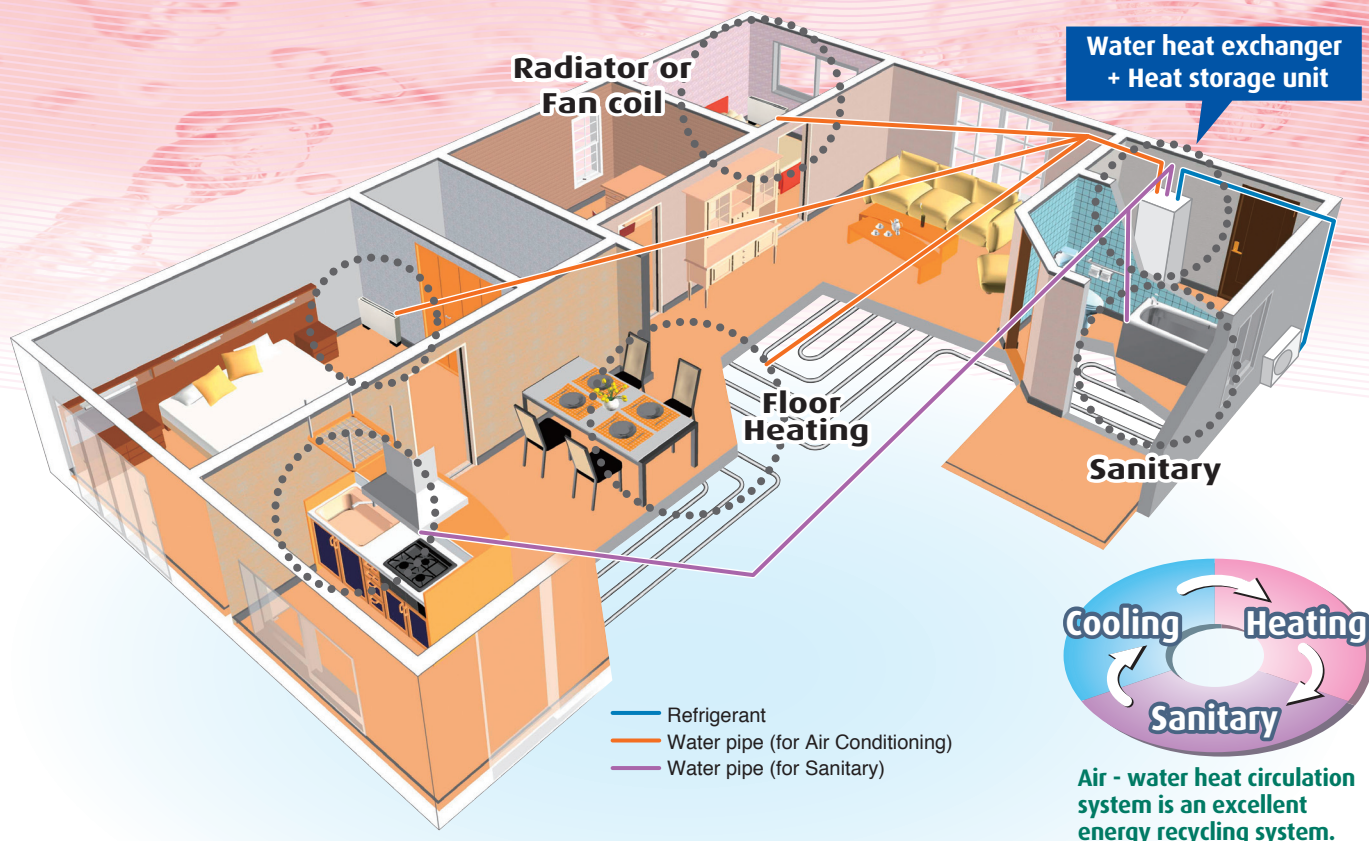
### Saving running cost with use of heat pump technology

Typically less than 1kW of output heat energy can be produced by conventional oil or gas boilers. Heat pump technology is capable of producing up to 4.27kW of heat energy from 1kW of energy input making the system 4.27 times more efficient than traditional means.





## Product Information

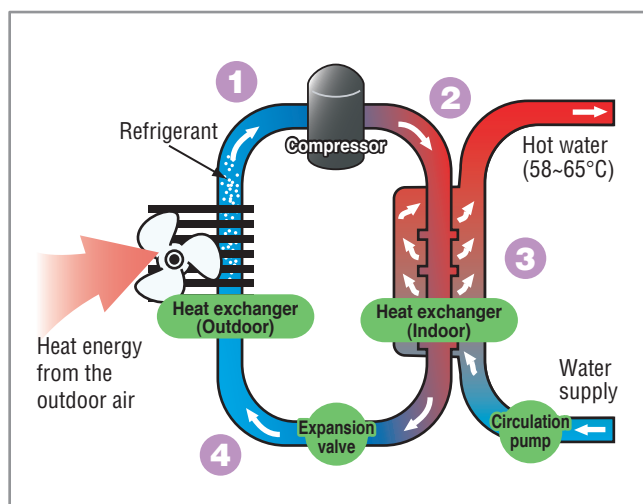


Our Air to Water Heat Pump is a complete modern system for heating, cooling and producing hot sanitary water for houses, offering effective energy saving and reducing carbon dioxide emission. Our product is safe and economical with integrated hot water heater, immersion heater, circulating pump and climate system within the indoor unit.

The heat energy is retrieved from the outdoor air through the outdoor unit, and is transferred to the indoor unit by the medium of refrigerant circulated in closed piping system.

This eliminates the needs of bore holes and coils in the ground for conventional systems.

## Heat pump technology system



Our Air to Water Heat Pump is a system that can offer heating, hot sanitary water and cooling. The mechanism of heat pump during heating can be simplified as follows.

1. The outdoor unit retrieves the heat energy from the outdoor air (heat source) and increases its temperature through compressing process by compressor.
2. The hot refrigerant (now in gas state) is routed to Indoor unit.
3. The refrigerant releases the heating energy to water for further distribution in the climate system.
4. The refrigerant (now in liquid state) is routed back to the outdoor unit and this process is repeated.

By reversing the entire process for cooling, the refrigerant in this system retrieves the heat energy from water and releases it to outdoor air in accordance with heat pump theory. the indoor unit determines when the outdoor unit is to run or not to run by using the collated data from the temperature sensor. In the event of extra heat demands, the indoor unit can utilize additional heat in the form of the immersion heater, or any connected external addition.

## 3HP, 3.5HP

Outdoor unit

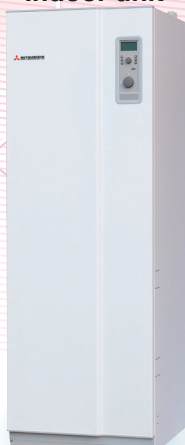
Indoor unit



FDCW71VNX-A



FDCW100VNX-A



HMA100V1/V2  
HMA100VM1

## 6HP

Outdoor unit

Indoor unit



FDCW140VNX-A



HMS140V1/V2  
HMS140VA1/VA2

Tank unit



HT30



MT300



MT500

## Features

### • Energy saving

Optimum annual operation costs thanks to the inverter driven compressor.  
The speed of the compressor is controlled according to the demand resulting in the industries highest COP level of 4.08~4.27\* in heating operation.  
(\*: condition 2 on page 5)

### • Integrated design

The compact size (600 x 650mm footprint) has been achieved by intergrating the hot water tank for sanitary water use together with the water heat exchanger within the indoor unit (HMA100V1/V2 and HMA100VM1 only). Electrical and piping work is simpler due to the intergrated design.

### • 65°C hot water

Max temperature flow line is 65°C with the use of an auxiliary electric heater (as standard) used for hot water back-up and to cope with irregular and excessive hot water demand.  
(58°C with only use of compressor)

### • External heating

Possible to connect external heating sources including solar collectors. Refer to our installation manual for details.  
(except HT30)

### • Drain pan heater

Condensate from the heat pump during heating operation (especially in cold regions) accumulates and freezes within the outdoor unit resulting in insufficient heating capacity or damage to the heat exchanger. Our units have a drain pan heater included as standard preventing condensate from freezing and protecting the heat exchanger in cold conditions.

### • Sterilization

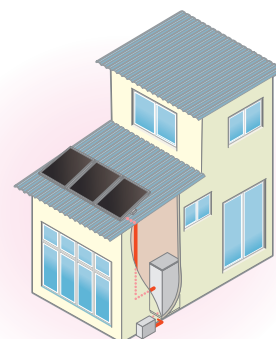
Various sterilization temperature settings according to the requirements of each country.

### • Water supply pressure

Water supply pressure at showers and faucets to second and third floors will not drop.  
By utilizing the direct incoming water supply and not using water from a storage tank water pressure and quality is maintained as well as the reduction in risk of legionella bacteria generation.  
(If a third party water storage tank is used there will be a reduction of water pressure at showers and faucets when they are used at the same time.)

### • Silent mode

Silent mode function can reduce the sound level from the outdoor unit in the heating mode by reducing compressor and fan speed. ON/OFF timer operation can be set with a remote control.



Combination with solar collectors

Hot water



Water supply



# Specifications

|   |                                      |            | 3HP  |                   | 3.5HP                                   |                   | 6HP                                     |                      |
|---|--------------------------------------|------------|--|-------------------|---|-------------------|---|----------------------|
| Indoor Model  |                                      |            | HMA100V1<br>HMA100V2                                   | HMA100VM1         | HMA100V1<br>HMA100V2                    | HMA100VM1         | HMS140VA1<br>HMS140VA2                  | HMS140V1<br>HMS140V2 |
| Outdoor Model   |                                      |            | FDCW71VNX-A  |                   | FDCW100VNX-A                            |                   | FDCW140VNX-A                            |                      |
| Power source  |                                      |            | 1 phase 230V 50Hz/<br>3 phase 400V 50Hz                | 3 phase 230V 50Hz | 1 phase 230V 50Hz/<br>3 phase 400V 50Hz | 3 phase 230V 50Hz | 1 phase 230V 50Hz/<br>3 phase 400V 50Hz |                      |
| Heating   | condition 1                          | kW         | 8.0 (3.0-8.0)  |                   | 9.0 (3.5-11.0)                          |                   | 16.0 (5.8-16.0)                         |                      |
| Nominal capacity  | condition 2                          | kW         | 8.3 (2.0-8.3)  |                   | 9.2 (3.5-10.0)                          |                   | 16.0 (4.2-16.0)                         |                      |
| COP   | condition 1                          |            | 3.33   |                   | 3.44                                    |                   | 3.31                                    |                      |
|   | condition 2                          |            | 4.09   |                   | 4.28                                    |                   | 4.20                                    |                      |
| Cooling<br>Nominal capacity                                   | condition 1                          | kW         | 7.1 (2.0-7.1)  |                   | 8.0 (3.0-9.0)                           |                   | 11.8 (3.1-11.8)                         | –                    |
|   | condition 2                          | kW         | 10.7 (2.7-10.7)  |                   | 11.0 (3.3-12.0)                         |                   | 16.5 (5.2-16.5)                         |                      |
| EER   | condition 1                          |            | 2.68   |                   | 2.81                                    |                   | 2.65                                    | –                    |
|   | condition 2                          |            | 3.35   |                   | 3.62                                    |                   | 3.78                                    | 3.59                 |
| Tapping capacity  | 12liter/min                          | liter      | 270  |                   | 270                                     |                   | –                                       |                      |
|   | 16liter/min                          | liter      | 200  |                   | 200                                     |                   | –                                       |                      |
| Operation range<br>(Ambient temperature)                      |                                      | heating    | -20-43*1   |                   |   |                   |   |                      |
|   |                                      | cooling    | 15-43  |                   |   |                   |   |                      |
| Operation range<br>(Water temperature)                        |                                      | heating    | 25-58 (65 with immersion heater)                       |                   |   |                   |   |                      |
|   |                                      | cooling    | 7-25   |                   |   |                   |   | 18-25                |
| Max refrigerant pipe length                                   |                                      | m          | 30   |                   |   |                   |   |                      |
| Max height difference between IU and OU                       |                                      | m          | 7  |                   |   |                   |   |                      |
| Indoor Unit   | Height                               | mm         | 1,760 (+20 - 50mm, adjustable feet)                    |                   |   |                   | 1,004                                   |                      |
|   | Width                                | mm         | 600  |                   |   |                   | 513                                     |                      |
|   | Depth                                | mm         | 650  |                   |   |                   | 360                                     |                      |
|   | Weight (without water in the system) | kg         | 140  |                   |   |                   | 60                                      |                      |
|   | Immersion heater                     |            | 9kW 4steps   |                   |   |                   | –                                       |                      |
|   | Volume total                         | liter      | 270 ±5%  |                   |   |                   | –                                       |                      |
|   | Volume hot water coil                | liter      | 14   |                   |   |                   | –                                       |                      |
|   | Volume expansion vessel              | liter      | –  |                   |   |                   | 18                                      |                      |
|   | Dimensions, climate system pipe      | mm         | 22   |                   |   |                   | 28                                      |                      |
|   | Dimensions, hot water pipe           | mm         | 22   |                   |   |                   | –                                       |                      |
|   | Water pipe connections               |            | Compression fittings                                   |                   |   |                   |   |                      |
|   | Outdoor Unit                         | Height     | mm   | 595               |   | 845               |   | 1,300                |
| Width   |                                      | mm         | 780 (+67 with valve cover)                             |                   | 970                                     |                   | 970                                     |                      |
| Depth   |                                      | mm         | 340  |                   | 370 (+80 with foot rail)                |                   | 370 (+80 with foot rail)                |                      |
| Weight  |                                      | kg         | 60   |                   | 74                                      |                   | 105                                     |                      |
| Sound Power level*2   |                                      | dB(A)      | 64   |                   | 64.5                                    |                   | 71                                      |                      |
| Sound Pressure level*2  |                                      | dB(A)      | 48   |                   | 50                                      |                   | 54                                      |                      |
| Airflow   |                                      | m³/min     | 50   |                   | 73                                      |                   | 100                                     |                      |
| Type of compressor  |                                      |            | Rotary   |                   |   |                   |   |                      |
| Ref control   |                                      |            | EEV  |                   |   |                   |   |                      |
| Refrigerant volume<br>(pipe length without additional charge) |                                      | kg (m)     | 2.55 (15)  |                   | 2.9 (12)                                |                   | 4.0 (15)                                |                      |
| Dimensions, refrigerant pipe                                  |                                      | mm(inches) | Gas pipe: OD 15.88 (5/8"), Liquid pipe: OD 9.52 (3/8") |                   |   |                   |   |                      |
| Ref pipe connections  |                                      |            | Frare  |                   |   |                   |   |                      |

\*1 According to the outdoor air temperature and installation condition, it is required to use wind guard for outdoor unit. Refer to Technical manual for details.

\*2 Test condition for sound pressure level

Temperature condition: Heating condition 2

MIC position: 1m away in front of outdoor unit at the height of 1m

## Tank Unit (for HMS140VA1/VA2, HMS140V1/V2 only)

| Model                           |             | HT30                           | MT300            | MT500            |
|---------------------------------|-------------|--------------------------------|------------------|------------------|
| Power source                    |             | 1phase 230V / 3phase 400V 50Hz |                  |                  |
| Volume                          | liter       | 30                             | 300              | 500              |
| Volume hot water coil           | liter       | –                              | 14               | 21               |
| Tapping capacity                | 12liter/min | –                              | 320              | 960              |
|                                 | 16liter/min | –                              | 230              | 560              |
| Immersion heater                |             | 9kW 4steps                     |                  |                  |
| Height                          | mm          | 358                            | 1,880 (+20~45mm) | 1,695 (+20~55mm) |
| Width                           | mm          | 593                            | 600              | 759              |
| Depth                           | mm          | 360                            | 600              | 879              |
| Weight                          | kg          | 23                             | 110              | 131              |
| Dimensions, climate system pipe | mm(inch)    | 25.4(1")                       |                  | 28               |
| Dimensions, hot water pipe      | mm(inch)    | –                              | 25.4(1")         |                  |

Based on European regulations listed below, please refer to the following specification table.

No 813/2013 of 2 August 2013 : Ecodesign requirements for space heaters and combination heaters.

No 811/2013 of 18 February 2013 : Energy labelling of space heaters, combination heaters, packages of space heater, temperature control and solar device and packages of combination heater, temperature control and solar device.

## Test conditions

|         |             | Water Temperature  | Ambient Temperature |
|---------|-------------|--------------------|---------------------|
| Heating | condition 1 | 45°C out / 40°C in | 7°C DB / 6°C WB     |
|         | condition 2 | 35°C out / 30°C in |                     |
| Cooling | condition 1 | 7°C out / 12°C in  | 35°C DB             |
|         | condition 2 | 18°C out / 23°C in |                     |
| Tapping |             | 40°C out / 15°C in | 7°C DB / 6°C WB     |

## Specification table

|  | 3HP      | 3.5HP     | 6HP       |
|--|----------|-----------|-----------|
| Seasonal Space Heating Energy Efficiency Class (W55/W35)               | A+ / A+  | A++ / A++ | A++ / A++ |
| Water Heating Energy Efficiency Class                                  | A        | A         | A / A *   |
| Seasonal Space Heating Energy Efficiency, % (W55/W35)                  | 119/149  | 126/165   | 133/166   |
| Water Heating Energy Efficiency, %                                     | 94       | 92        | 94/ 108 * |
| Seasonal Space Heating Energy Efficiency Class of package (W55/W35) *2 | A+ / A++ | A++ / A++ | A++ / A++ |
| Seasonal Space Heating Energy Efficiency of package (W55/W35) *2       | 123/153  | 130/169   | 137/170   |

(All are average climate condition)

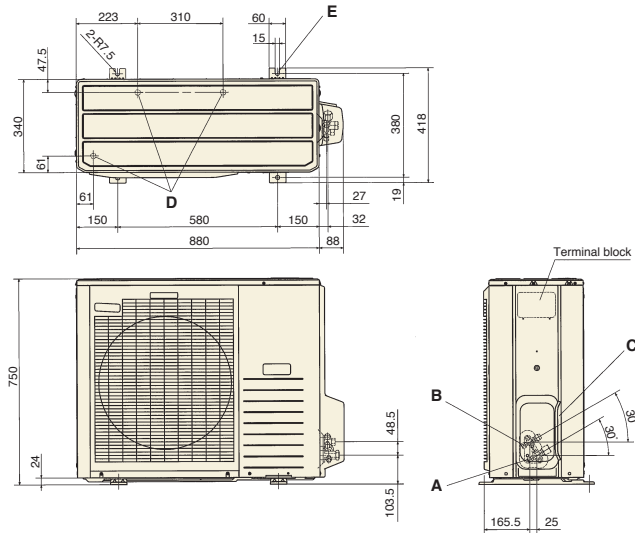
\*1 In case of using MT300/MT500

\*2 In case of including temperature control MH-RG10

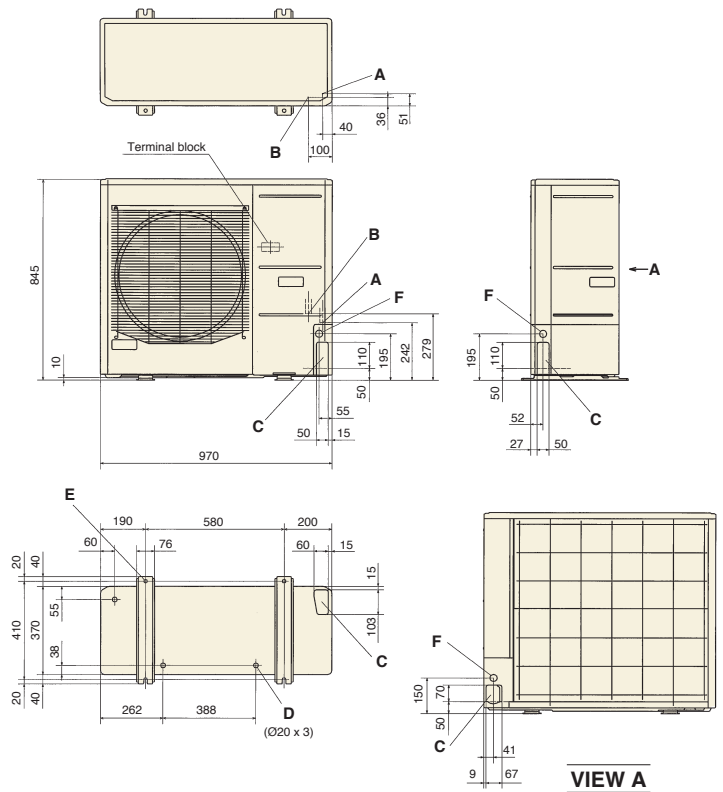




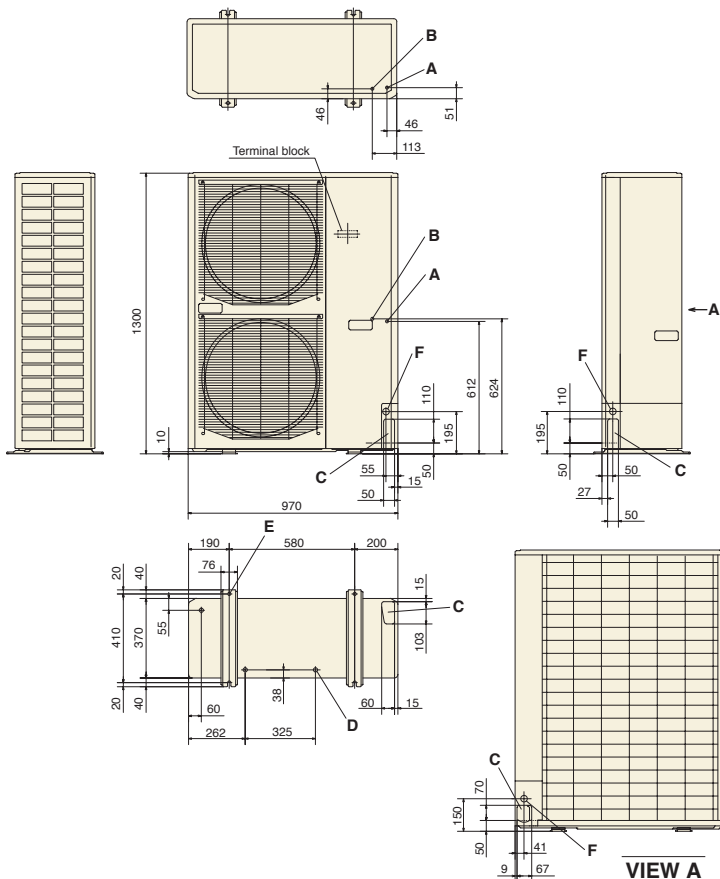
**Outdoor unit**  
**FDCW71VNX-A(3HP)**



**FDCW100VNX-A(3.5HP)**



# FDCW140VNX-A(6HP)



| Mark | Item                                   | 3HP / 3.5HP          | 6HP                                  |
|------|--|----------------------|--------------------------------------|
| A    | Service valve connection (gas side)    | ø15.88(5/8") (Flare) |                                      |
| B    | Service valve connection (liquid side) | ø9.52(3/8") (Flare)  |                                      |
| C    | Pipe/cable draw-out hole               |                      |                                      |
| D    | Drain discharge hole                   | ø20x3places          |                                      |
| E    | Anchor bolt hole                       | M10x4places          |                                      |
| F    | Cable draw-out port                    | ø30.3x3places        | ø30(front)<br>ø45(side)<br>ø50(back) |

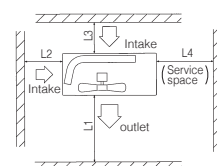
Notes:

- (1) It must not be surrounded by walls on the four sides.
- (2) The unit must be fixed with anchor bolts. An anchor bolt must not protrude more than 15mm.
- (3) Where the unit is subject to strong winds, lay it in such a direction that the blower outlet faces perpendicularly to the dominant wind direction.
- (4) Leave 1m or more space above the unit.
- (5) A wall in front of the blower outlet must not exceed the units height.
- (6) The model name label is attached on the lower right corner of the front panel.

### Minimum installation space

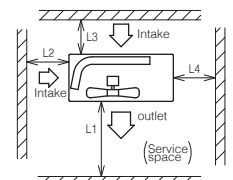
### ЗНР

| Examples of installation<br>Dimensions | 1    | 2    | 3    |
|--|------|------|------|
| L <sub>1</sub>                         | Open | Open | 500  |
| L <sub>2</sub>                         | 300  | 250  | Open |
| L <sub>3</sub>                         | 100  | 150  | 100  |
| L <sub>4</sub>                         | 250  | 250  | 250  |



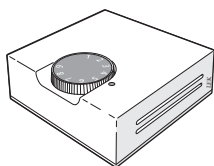
### 3.5HP/6HP

| Examples of installation<br>Dimensions | 1    | 2    | 3    |
|--|------|------|------|
| L <sub>1</sub>                         | Open | Open | 500  |
| L <sub>2</sub>                         | 300  | 5    | Open |
| L <sub>3</sub>                         | 150  | 300  | 150  |
| L <sub>4</sub>                         | 5    | 5    | 5    |



## Accessories

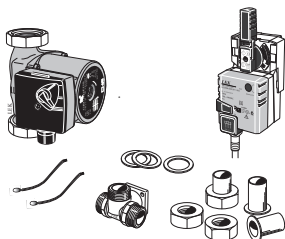
### MH-RG10



Room sensor  
Part No. MCD291A001

### ESV22 for HMA100

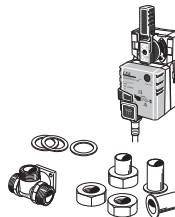
### ESV28 for HMS140



Extra mixing valve group for adjusting temperature in heating operation  
Part No. MCD291A003(ESV22)  
MCD291A006(ESV28)

### VCC22 for HMA100

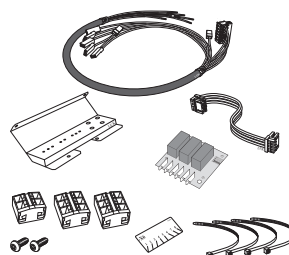
### VCC28 for HMS140



Reversing valve for changing operation of cooling and heating  
Part No. MCD291A002(VCC22)  
MCD291A005(VCC28)

### ACK22 for VCC22/ESV22

### ACK28 for VCC28/ESV28



Cable kit  
Part No. MCD291A004(ACK22)  
MCD291A007(ACK28)

## Before starting use

### Before use

In order to get the greatest benefit from Our Air to Water Heat Pump, read thoroughly the User's manual.

### Places

Do not install in places where combustible gas could leak or where there are sparks.

Keep away from places where combustible gas could be generated, flow or accumulate, or locations containing carbon fibers otherwise there is a danger of fire.

### Installation

Installation must be carried out in accordance with current norms and directives.

Current regulations require the inspection of installation before commissioning and the inspection must be carried out by suitable qualified personnel and should be documented.

Improper installation will lead to water leakage, electric shocks, fires and other serious problems.

Make sure that the indoor unit and the outdoor unit are stable in installation and fixed on stable base.



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<http://www.mhi.co.jp>

#### ISO9001

Our Air Conditioning & Refrigeration Systems Headquarters is an ISO9001 approved factory for residential air conditioners and commercial-use air conditioners (including heat pumps).



BIWAJIMA PLANT  
Mitsubishi Heavy Industries, Ltd.  
Air-conditioning & Refrigeration Systems Headquarters  
Certified ISO 9001  
Certificate Number: JQA-0709



MITSUBISHI HEAVY INDUSTRIES-  
MAHAJAK AIR CONDITIONERS CO., LTD.  
Certified ISO 9001  
Certificate Number: 04100 1998 0813

#### ISO14001

Our Air Conditioning & Refrigeration Systems Headquarters has been assessed and found to comply with the requirements of ISO14001.



BIWAJIMA PLANT  
Mitsubishi Heavy Industries, Ltd.  
Air-conditioning & Refrigeration Systems Headquarters  
Certificate Number: 19A4000022



MITSUBISHI HEAVY INDUSTRIES-  
MAHAJAK AIR CONDITIONERS CO., LTD.  
Certified ISO 14001  
Certificate Number: 04100 1998 0813 E3

