

**MITSUBISHI
ELECTRIC**

Changes for the Better

AIR CONDITIONING SYSTEMS

for a greener tomorrow



CITY MULTI

- For high outdoor temperature up to 54°C



CM14AS-N (AE)

Air conditioning is an ideal way of controlling the temperature, movement and cleanliness of air inside any building, large or small. With today's buildings being so well insulated and increasingly full of electronic equipment, the need for effective climate control is greater than ever. Not only does it cool in the summer months, but air conditioning can also heat, doing away with the need for separate heating systems altogether. More and more people today are enjoying the benefits of comfortable working and living environments made possible with air conditioning.

Our Latest Technologies

VRF system

VRF stands for Variable Refrigerant Flow.

A VRF air conditioning system modulates the flow of refrigerant depending upon the capacity requirements of the building. In its simplest form, a VRF system comprises an air-cooled outdoor unit and a series of indoor units that regulate the air temperature inside an internal space.

Inverter driven technology

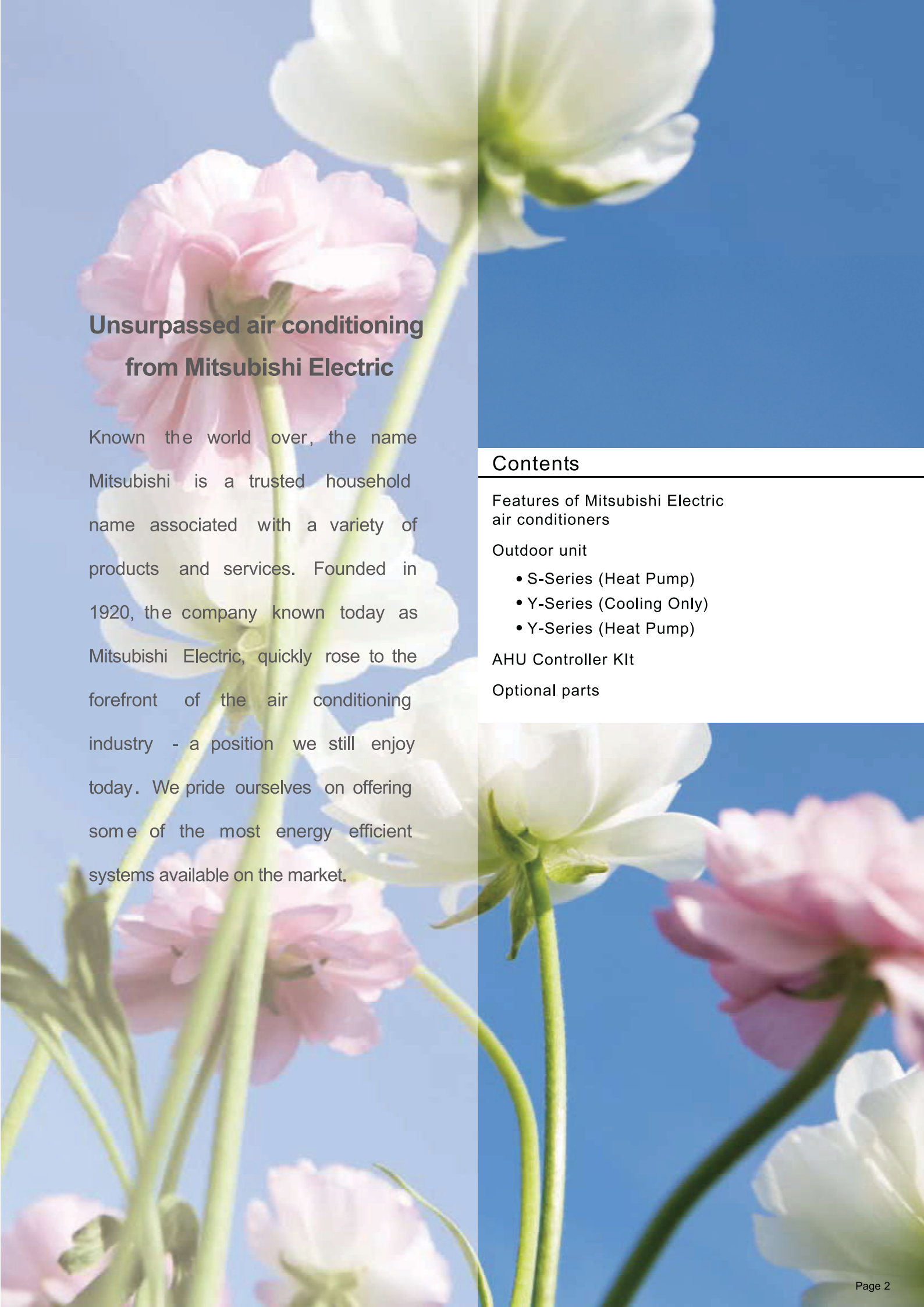
At Mitsubishi Electric we strive to continually meet the increasing demands of our customers, being the first in the industry to offer highly advanced 'inverter driven' systems. Using inverter technology our systems produce just the right amount of output to match the exact requirement of any building. These systems work so efficiently that they don't waste valuable energy by over-heating or over-cooling, resulting in greatly reduced running costs. Alternative systems that may appear cheaper, can often cost substantially more to run, making us the most cost effective choice all round.

Intelligent Power Module (IPM) technology

The CITY MULTI range from Mitsubishi Electric provides precise control of energy input, through utilization of its Intelligent Power Module (IPM) technology. By employing this technology, highly efficient operation is possible with compact units closely matching building requirements.

R410A refrigerant

As scientific evidence points to man-made chemicals for the damage caused to the ozone layer, we only use chlorine-free refrigerants that are safe with zero ODP (Ozone Depletion Potential). Accordingly, our systems require less energy to run, and have a significantly lower indirect global warming potential. In short, we produce the most efficient equipment possible, while helping to protect the environment.



Unsurpassed air conditioning from Mitsubishi Electric

Known the world over, the name Mitsubishi is a trusted household name associated with a variety of products and services. Founded in 1920, the company known today as Mitsubishi Electric, quickly rose to the forefront of the air conditioning industry - a position we still enjoy today. We pride ourselves on offering some of the most energy efficient systems available on the market.

Contents

Features of Mitsubishi Electric air conditioners

Outdoor unit

- S-Series (Heat Pump)
- Y-Series (Cooling Only)
- Y-Series (Heat Pump)

AHU Controller Kit

Optional parts

The New Cooling-only/Heat pump Models

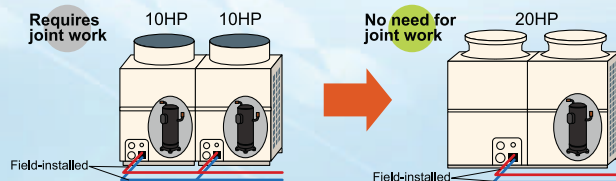
Mitsubishi Electric offers a wide lineup of new cooling-only/heat pump models with the maximum capacity of 60 HP*. Different patterns of combinations of basic modules provide either standard or high COP.

*Applicable to standard model combinations only

New features

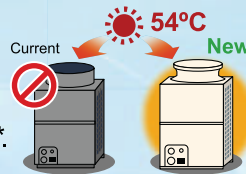
Single module up to 20 HP

Capable of covering up to 20 HP with a single module and a single compressor. Reduced piping work.



Compatibility to outdoor temperature of up to 54°C*1

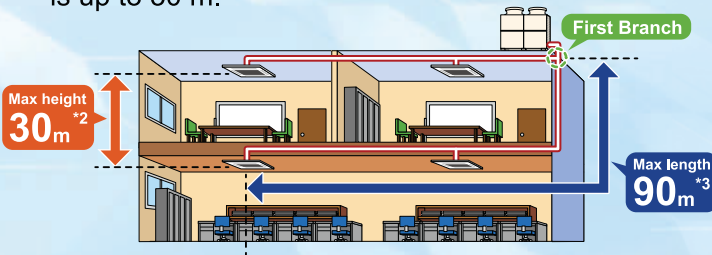
Capable of running cooling operations in the outdoor temperature of up to 54°C*.



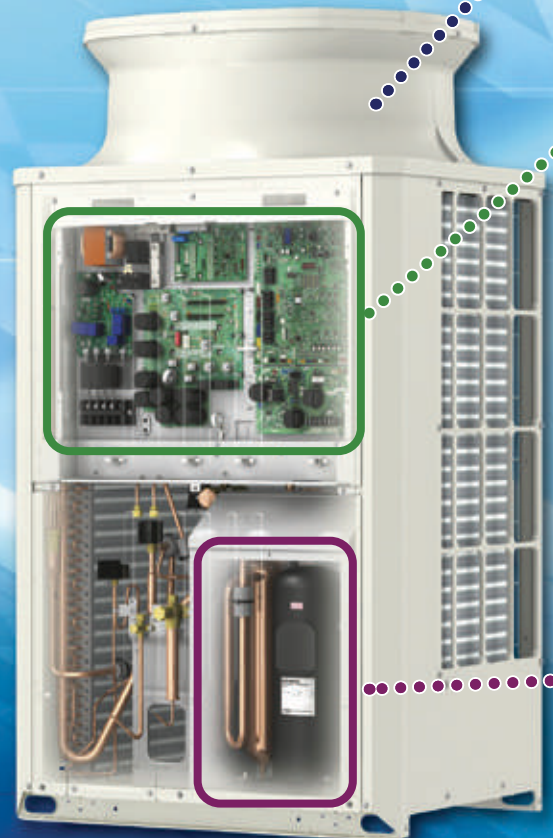
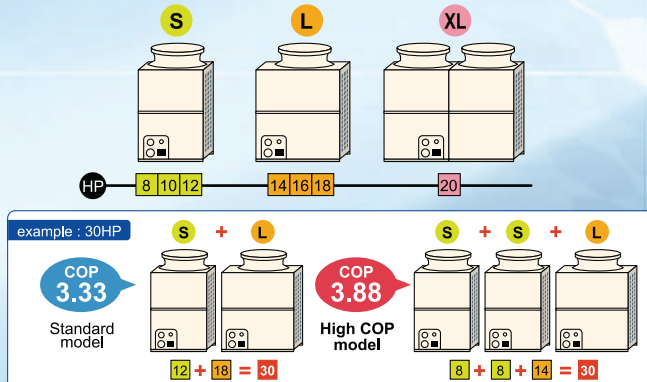
All modules feature inverter-driven compressors. Maximum combined horse power: 60 HP

Increase in the limit of piping length

Farthest indoor from first branch: 90 m
Height difference between indoor and indoor units is up to 30 m.



Standard or high COP options are available by different combinations of modules.



*1 : Any continuous operation over 46°C may require an increased frequency of maintenance.
*2 : When the height difference is 15m or greater, use the one size larger liquid pipe between the indoor unit and the indoor unit.
*3 : When the piping length is 40m or longer, use the one size larger liquid pipe between the indoor unit and the first branch.

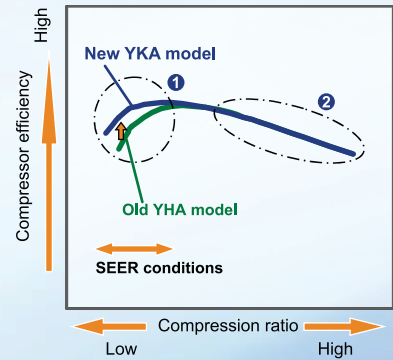
Energy saving

Compressor

- Improved efficiency by the use of DC brushless motor.
- Improved partial-load characteristics achieved by the optimized scroll shape.

Improved SEER performance

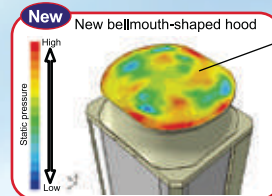
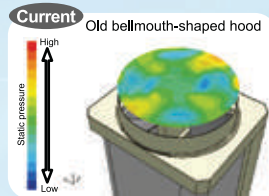
Optimized scroll shape (improved volumetric capacity ratio)



- Reduced standby power consumption by heating the compressor instead of a crankcase heater.

Unit casing

- Improved static pressure at the exhaust air outlet that allows for a reduction in fan input power by the changed shape of the bellmouth hood.

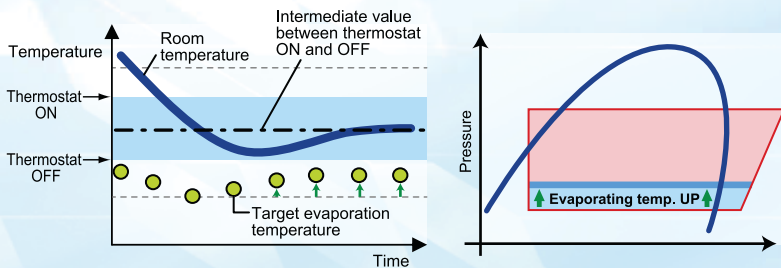


The new bellmouth-shaped hood achieves reduction in fan rotation and increases the pressure at the hood outlet compared to that of the old one, resulting in reduced input power to the fan.

Control

- ET control (Evaporating Temperature control)

Reduced energy consumption in cooling by controlling the refrigerant temperature according to the operation load and raising evaporating temperature.



Current control method

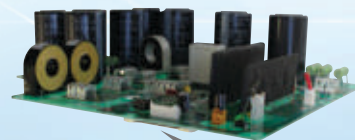
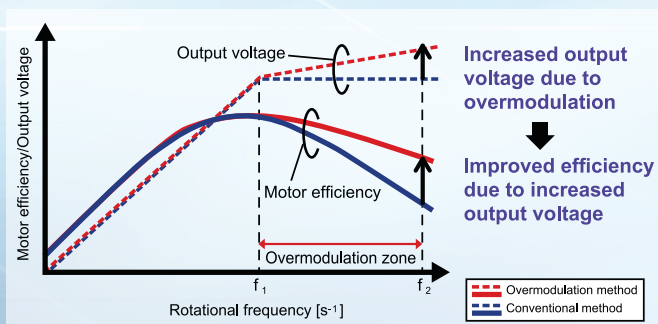
Evaporating temperature was kept constant.

New control method

Evaporating temperature is raised according to the operation load, decreasing compressor input power and increasing operation efficiency.

- Original PWM overmodulation control

Improved total efficiency of motor and inverter with the use of our original PWM overmodulation control, increasing the output voltage during high-load operation (when the motor is rotating at high speed).



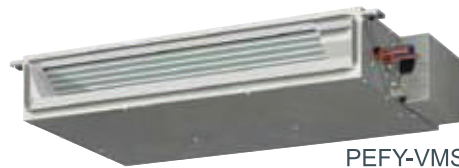


Sophisticated yet simple technology



Reliable

Designed and manufactured to the highest standards, the CITY MULTI range offers one of the most reliable air conditioning systems available. Simple to install and easy to maintain, this range provides ideal solutions you can trust to protect your investment.



PEFY-VMS1



PEFY-VMR



PFFY-VKM

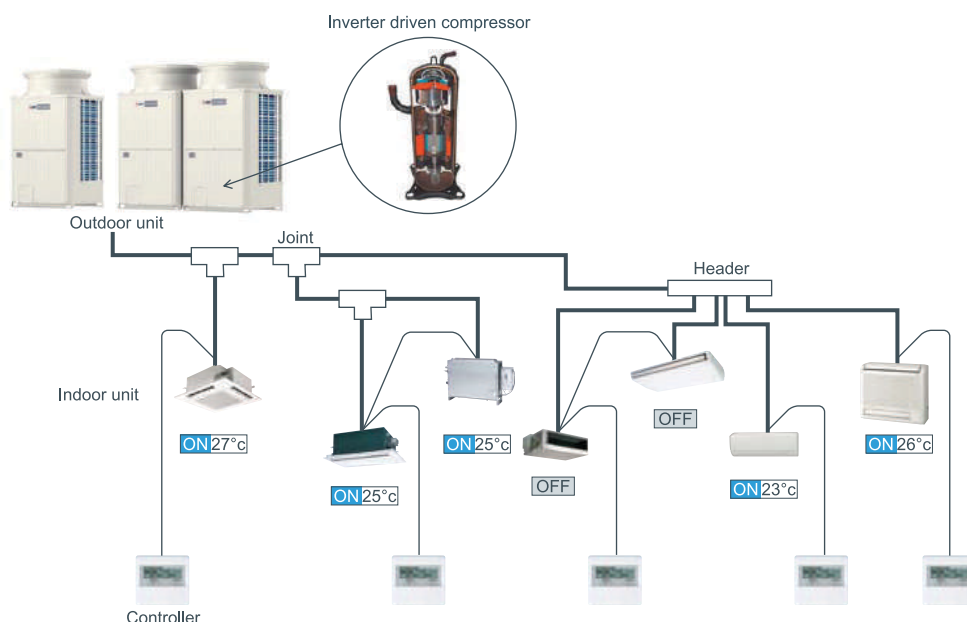
>All the CITY MULTI outdoor units are made under stringent control.

VRF system

Our answer to VRF

Mitsubishi Electric sets the boundaries of VRF technology with the CITY MULTI range, which is available using R410A refrigerant with zero ODP (Ozone Depletion Potential). The range has been specifically designed for today's building requirements and addresses key market issues such as energy efficiency, adaptability and reliability. With user friendly control systems utilizing internet technology and integrated cooling and ventilation indoor units, CITY MULTI is the benchmark and market leader in VRF technology.

VRF is a multi and direct expansion type air conditioning system where by one outdoor unit can be connected with multiples indoor units. The amount of refrigerant can be regulated freely according to the load on the indoor unit by the inverter driven compressor in the outdoor unit. Zoning in a small office is possible with a small capacity indoor unit. Energy conservation is easily handled because individual indoor units can stop and start their operation as needed. There are various indoor units available in order to suit various interior design needs.



Intelligent Power Module (IPM) Technology

The YKA range from Mitsubishi Electric provides precise control of energy input, through utilization of its Intelligent Power Module (IPM) technology. By employing this technology, it is possible to closely match the building requirements and to achieve more accurate control of the occupied space. By using incremental 1Hz steps of capacity control, the amount of required power input is significantly reduced, resulting in greatly improved EER's.

In addition, IPM technology ensures effective performance under partial load conditions, a condition that most systems will be in for the majority of the normal working life cycle. By taking account the efficiency at both part load, and peak load conditions, R410A CITY MULTI is designed to provide unbeatable year round/seasonal efficiency.

The Importance of EER

EER stands for "Energy Efficiency Ratio". It is a measure of the useful energy a system can deliver compared to the energy it consumes. It is calculated by dividing the energy output by the energy input of a system. The higher the figure then the more efficient the system is deemed to be. Mitsubishi Electric VRF models, the world's highest energy-efficient air-conditioners, will undoubtedly reduce millions of tons of CO2 emissions.

For the Environment



Enhancing environmental care (measures for the RoHS Directive and the refrigerant reduction)

Every unit is in compliance with the RoHS Directive,* which stands for the Restriction of Hazardous Substances: Lead-free soldering is used to avoid Lead Groundwater Contamination on the print board. The amount of refrigerant on the unit has also been reduced to enhance environmental care.

* RoHS Directive: the restriction of the use of certain hazardous substances in electrical and electronic equipment that has been sold in EU since July 2006

Efficient R410A refrigerant



History of refrigerant

R22, an HCFC-based refrigerant, has been a popular choice for most chillers. R22 has been targeted by the Montreal Protocol to be phased out in new equipment. Additionally, governments in many countries are enforcing a ban of HCFC-based refrigerants for new installations.



Because of these restrictions, R410A refrigerants are desirable. R410A is a blend of HFCs, which do not deplete the ozone.

Technical aspects of refrigerant

R410A is a more efficient refrigerant as it has a higher specific heat capacity when compared to R407C or R22. This higher energy carrying capacity allows for smaller pipe sizes, longer pipe runs and reduces the volume of refrigerant within a system. This is a major factor when concerning safety and environmental requirements in the design, manufacture, installation, operation, maintenance and disposal of refrigerating systems.

Inverter Driven Compressor Technology - now up to 60HP



Low Starting Currents

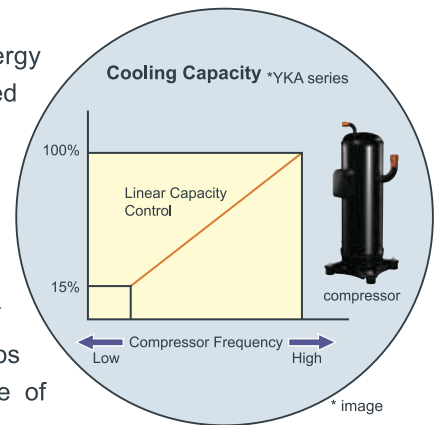
Using inverter driven technology saves energy for several reasons:

The compressor varies its speed to match the indoor cooling or heating demand and therefore only consumes the energy that is required.

When an inverter driven system is operating at partial load, the energy efficiency of the system is significantly higher than that of a standard fixed speed, non inverter system.

The fixed speed system can only operate at 100%, however, partial load conditions prevail for the majority of the time. Therefore fixed speed systems cannot match the annual efficiencies of inverter driven systems.

Using proven single inverter driven compressor technology, the CITY MULTI range is favored by the industry for low starting currents (only 8 amps for a 16HP YKA outdoor unit), and smooth transition across the range of compressor frequencies.



* The values vary depending on the actual conditions such as ambient temperature.

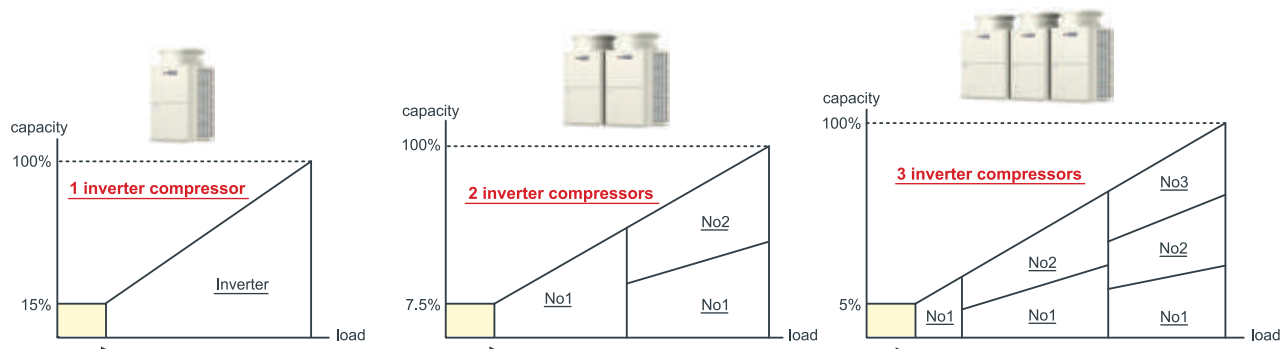
All CITY MULTI compressors are inverter-driven type.

-Capable of precisely matching a building's cooling and heating demands.

The outdoor unit combinations comprise 1 unit for 8-20HP systems, 2 units for 22-40HP systems and 3 units for 42-60HP systems. Each unit carries one inverter compressor making simple and highly reliable control possible.

Not only does it allow low starting currents, the inverter-driven compressor also provides precise indoor comfort and adapts to the air conditioning load.

Stable and Smooth Operation (for standard models)

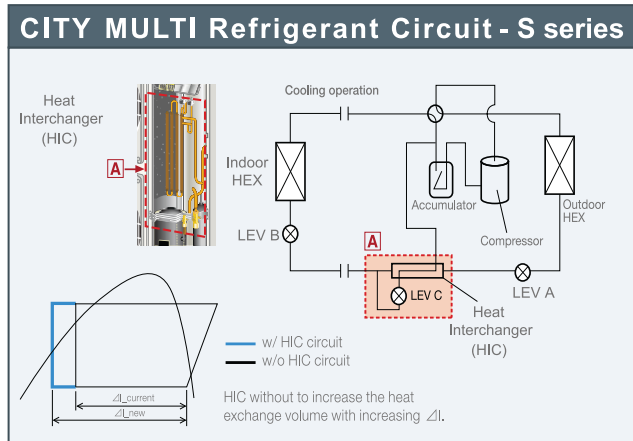
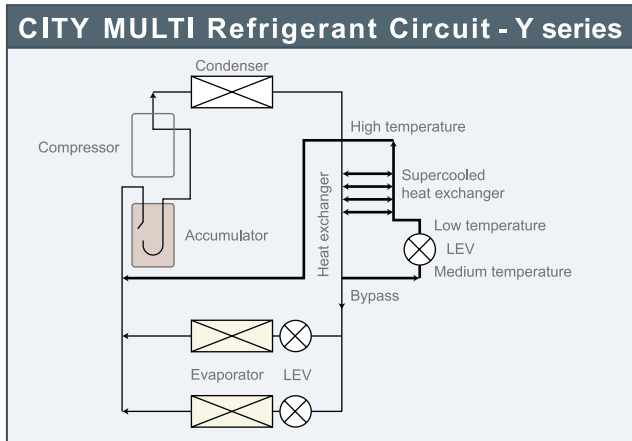


Unbeatable Efficiency



Heat Interchange Circuit

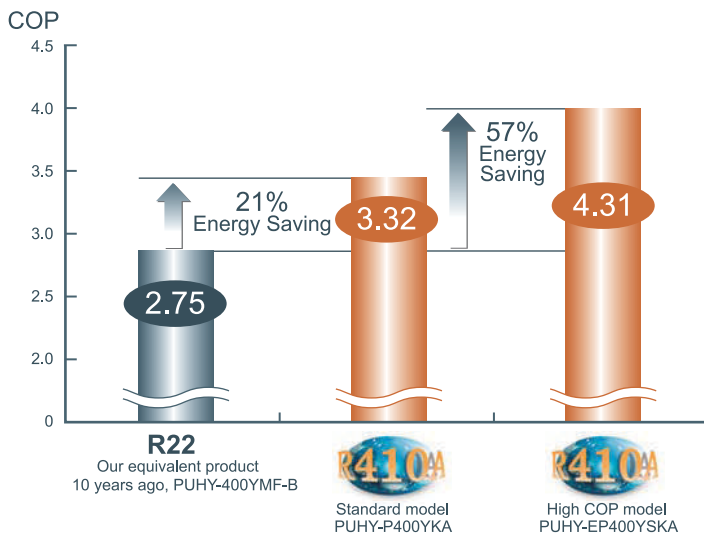
The unique Heat Interchange Circuit (HIC) enhances efficiency by providing additional sub-cooling and allows the expansion device to effectively control the refrigerant distribution, thereby increasing the operating efficiency and reducing the volume of refrigerant in each system.



Total Energy Conservation



Comparison of COP (energy efficiency) – 16HP system



High COP (Coefficient of Performance) is realized

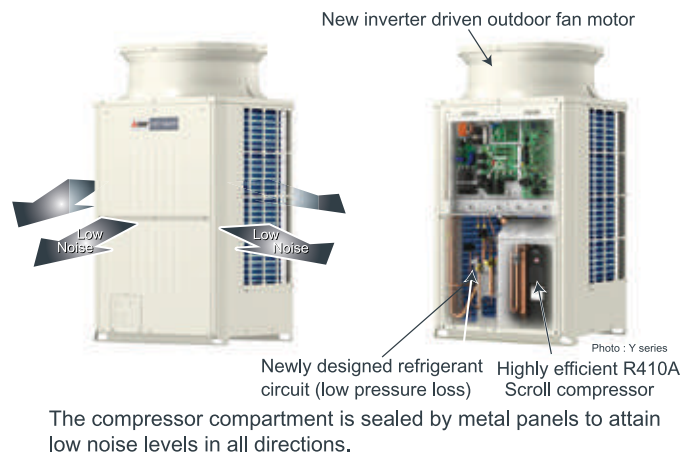
* COP of cooling
* The values were obtained under the standard conditions.

Features

Low Noise Levels New Fan Design

CITY MULTI VRF systems led the introduction of larger single fan motors some decades ago, achieving substantially lower noise levels over multiple designs.

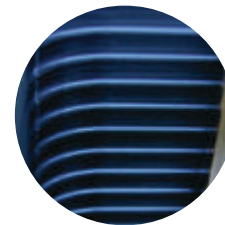
Continuing the development in the areas of blade shape and weight, Mitsubishi Electric have managed to achieve even higher performance and lower noise levels. To reduce noise levels further and comply with inner city residential noise regulations, all outdoor units include low noise mode. This function works by lowering the fan speed and compressor frequency proportionally with reduction in demand.



Blue Fin Treatment

The anti-corrosion Blue Fin treatment of the heat exchanger is especially effective in urban environments where the traffic pollutions can damage the aluminum fins reducing the capacity and life expectancy of the unit.

Blue Fin Treatment



* Salt Spray Test Method- No unusual rust development to 480 hours (JRA9002-1991)

Back-up Function & Outdoor unit rotation

Back-up Function

(combined module systems)

The combined modular outdoor unit design ensures an exceptionally high level of reliability by utilizing a back-up function, which can be easily operated in the unlikely case of a malfunction from an indoor unit remote controller.

Back-up Function



Rotation Function



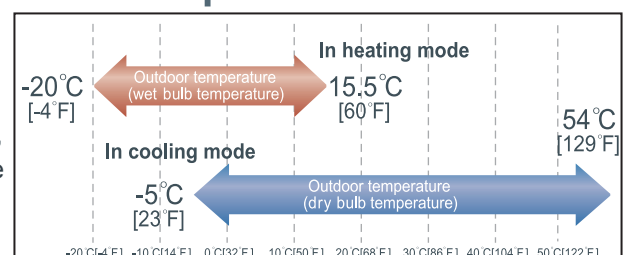
Rotation Function

(combined module systems)

Running outdoor units alternatively with the 'Rotation Function', the system is able to ensure an optimum product life cycle for both of its component units.

Operating range up to 54°C outdoor temp.

At high ambient temperature the guaranteed operating range in cooling is now raised to 54°C (129°F). Operation range in cooling is from an outdoor temperature of -5°C [23°F], while that in heating has expanded to an outdoor temperature of -20°C [-4°F]



The Strength of CITY MULTI

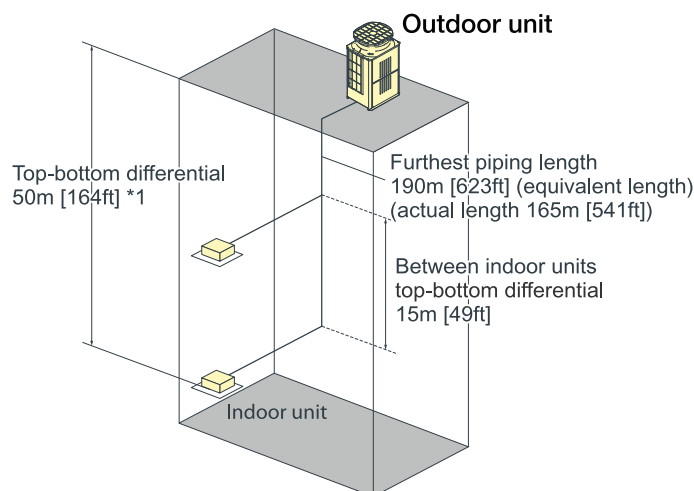


Increased Pipe Lengths

Total system pipe lengths of up to 1000m(3280ft) and furthest pipe lengths of 165m(541ft) make the CITY MULTI series system one of the most flexible VRF systems in the market.

System Pipe Lengths - Y series

[8-60HP (Heat Pump Y series)]
[16-44HP (Heat Pump High COP Y series)]



Refrigerant Piping Lengths	Maximum meters [Feet]
Total length	1,000 [3,280]
Maximum allowable length	165 (190 equivalent) [541(623)]
Farthest indoor from first branch	40 [131]*1

Vertical differentials between units	Maximum meters [Feet]
Indoor/outdoor (outdoor higher)	50 [164]*3
Indoor/outdoor (outdoor lower)	40 [131]*3, *4
Indoor/indoor	15 [49]*2

*1 90m is available. When the piping length is 40m or longer, use the one size larger liquid pipe between the indoor unit and the first branch.

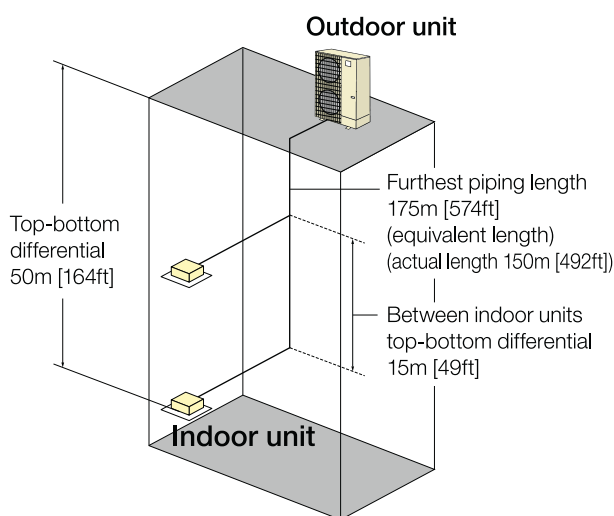
*2 30m is available. When the height difference is 15m or greater, use the one size larger liquid pipe between the indoor unit and the indoor unit.

*3 Depending on the model and installation conditions, top-bottom differential 90m [295ft] (o/u above) and 60m [196ft] (o/u below) is available. For more detailed information, please contact your nearest sales office or distributor.

*4 4m or less in cooling at outdoor temperature 10 °C.

System Pipe Lengths - S series

[P112~140YKM] **[P175~225(YKM)]**



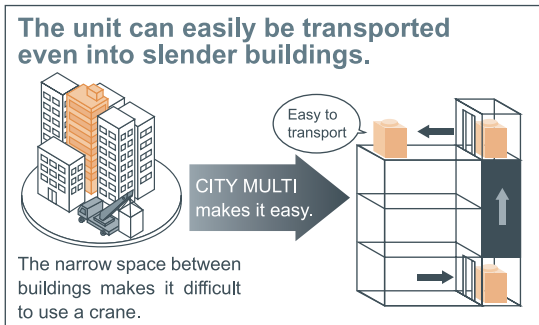
Refrigerant Piping Lengths	Maximum meters [Feet]	Maximum meters [Feet]
Total length	300 [984]	150[492]
Maximum allowable length	150 (175 equivalent) [492(574)]	80(90equivalent) [262(295)]
Farthest indoor from first branch	30 [98]	30 [98]

Vertical differentials between units	Maximum meters [Feet]	Maximum meters [Feet]
Indoor/outdoor (outdoor higher)	50 [164]	50 [164]
Indoor/outdoor (outdoor lower)	40 [131]	40 [131]
Indoor/indoor	15 [49]	15 [49]

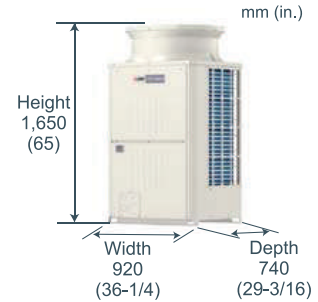
Features

Compact Design Industry leading weight saving

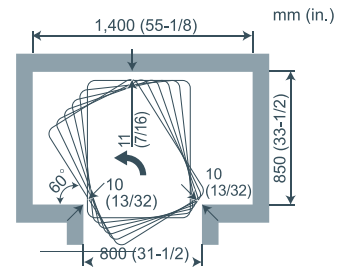
The manageability of the outdoor unit has been improved due to a drastic reduction in its weight, leading to easy transportation, installation, and reduction in withstand load.



■ 8-12HP outdoor units

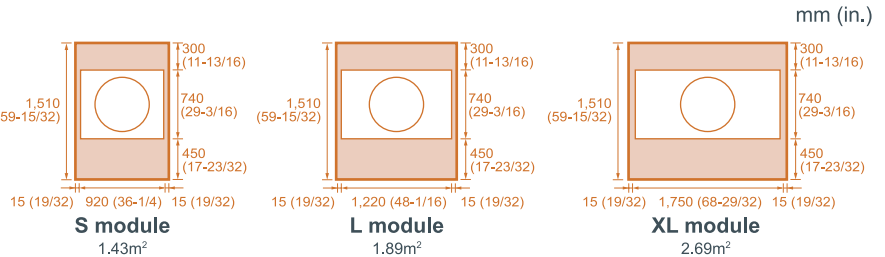


■ Example of 6-people elevator.



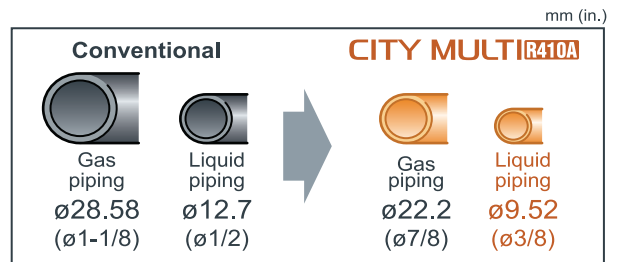
Effective Use of Space

The new models have a smaller foot print and service space requirement than previous models.



R410A Pipe Sizing

As R410A has a higher specific heat capacity than R22, the pipework is smaller. This means the pipe itself is cheaper, easier to install and less riser space is required within the building.



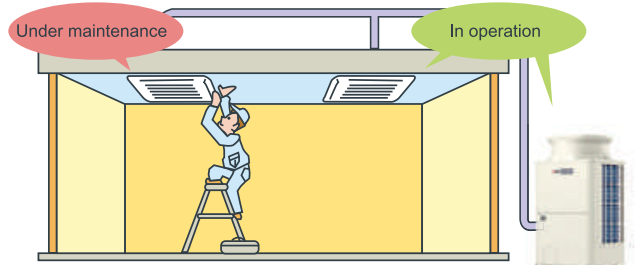
Based on 10HP model

Easy Maintenance

Even when one of the indoor units in the system is under maintenance, the other indoor unit can still operate.

* Not applicable to all situations.

* Be sure to turn off the power to the indoor unit when repairing or servicing the unit.




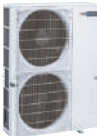



System Check

Ensuring simple and easy maintenance, system tests are available to check wiring, sensors and the refrigerant amount.

60Pa High Static Pressure as standard

Y series corresponds to high static pressure of 60Pa, ideal and flexible for any type of application.

Wide Selection of Outdoor Units

HP		4	4.5	5	6	7	8	9	8	10	12	14	16	18	20	
Model Name																
S-Series	PUMY-CP100YKM	4														
	PUMY-P112YKM		4.5													
	PUMY-(C)P125YKM *2			5												
	PUMY-(C)P140YKM *2				6											
	PUMY-P175YKM					7										
	PUMY-P200YKM						8									
	PUMY-P225YKM							9								
Y-Series	PUCY / PUHY-P200YKA							8								
	PUCY / PUHY-P250YKA								10							
	PUCY / PUHY-P300YKA									12						
	PUCY / PUHY-P350YKA										14					
	PUCY / PUHY-P400YKA											16				
	PUCY / PUHY-P450YKA												18			
	PUCY / PUHY-P500YKA													20		
	PUCY / PUHY-P550YKA								10	12						
	PUCY / PUHY-P600YKA								10		14					
	PUCY / PUHY-P650YKA								10			16				
	PUCY / PUHY-P700YKA								10				18			
	PUCY / PUHY-P750YKA									12				18		
	PUCY / PUHY-P800YKA											16	16			
	PUCY / PUHY-P850YKA											16		18		
	PUCY / PUHY-P900YKA												18	18		
	PUCY / PUHY-P950YKA												18		20	
	PUCY / PUHY-P1000YKA														20	20
	PUCY / PUHY-P1050YKA										12	12			18	
	PUCY / PUHY-P1100YKA										12		14		18	
	PUCY / PUHY-P1150YKA											14	16	16		
	PUCY / PUHY-P1200YKA												16	16		
	PUCY / PUHY-P1250YKA												16	16	18	
	PUCY / PUHY-P1300YKA												16		18	18
PUCY / PUHY-P1350YKA													18	18	18	
PUCY / PUHY-P1400YKA													18	18	20	
PUCY / PUHY-P1450YKA													18		20 20	
PUCY / PUHY-P1500YKA															20 20 20	
Y-Series (High CoP)	PUCY / PUHY-EP400YKA							8	8							
	PUCY / PUHY-EP450YKA							8		10						
	PUCY / PUHY-EP500YKA								10	10						
	PUCY / PUHY-EP650YKA										12	14				
	PUCY / PUHY-EP700YKA											14	14			
	PUCY / PUHY-EP750YKA							8	8				14			
	PUCY / PUHY-EP800YKA							8		10			14			
	PUCY / PUHY-EP850YKA								10	10			14			
	PUCY / PUHY-EP900YKA								10		12	14				
	PUCY / PUHY-EP950YKA									12	12	14				
	PUCY / PUHY-EP1000YKA									12		14	14			
	PUCY / PUHY-EP1050YKA											14	14			
	PUCY / PUHY-EP1100YKA											14	14	16		

*1. The circled numbers in the table indicate the horse power, and the combination of S, L, and XL modules.
 *2. PUMY-P***YKM - Heat Pump, PUMY-CP***YKM - Cooling Only



for a greener tomorrow

Eco Changes is the Mitsubishi Electric Group's environmental statement, and expresses the Group's stance on environmental management. Through a wide range of businesses, we are helping contribute to the realization of a sustainable society.



FM33568 / ISO 9001;2008

The Air Conditioning & Refrigeration Systems Works acquired ISO 9001 certification under Series 9000 of the International Standard Organization (ISO) based on a review of Quality management for the production of refrigeration and air conditioning equipment.

ISO Authorization System

The ISO 9000 series is a plant authorization system relating to quality management as stipulated by the ISO. ISO 9001 certifies quality management based on the "design, development, production, installation and auxiliary services" for products built at an authorized plant.



The Air Conditioning & Refrigeration Systems Works acquired environmental management system standard ISO 14001 certification.

The ISO 14000 series is a set of standards applying to environmental protection set by the International Standard Organization (ISO). Registered on March 10, 1998.

⚠ Warning

- Do not use refrigerant other than the type indicated in the manuals provided with the unit and on the nameplate.
 - Doing so may cause the unit or pipes to burst, or result in explosion or fire during use, during repair, or at the time of disposal of the unit.
 - It may also be in violation of applicable laws.
 - MITSUBISHI ELECTRIC CORPORATION cannot be held responsible for malfunctions or accidents resulting from the use of the wrong type of refrigerant.

 **MITSUBISHI ELECTRIC CORPORATION**

<http://Global.MitsubishiElectric.com>