The Renewable Solutions Provider

Making a World of Difference

Central Plant Solutions

Energy efficient heating, cooling, ventilation and control systems

MITSUBISHI ELECTRIC

Air Conditioning | Heating
Ventilation | Controls

Mitsubishi Electric Central Plant Solutions

Key drivers, from climate change and fuel poverty to Government legislation and increasing consumer pressure, are leading to changes in how we produce and consume energy. With our national fossil-fuel supplies dwindling, along with our energy independence, how we provide solutions to address these changes is fundamental.

UK commercial building stocks - characterised by a disproportionate number of old structures and a slow rebuild rate - remain massive consumers of energy. To reach the ambitious emission reduction targets the UK has set itself, our occupied spaces have to be made more energy-efficient, less carbon intensive and incorporate renewable energy where possible. The good news is that many of the solutions are affordable, scalable and available now.

The name Mitsubishi Electric is synonymous with excellence

Founded in 1921, Mitsubishi Electric is now a global, market leading environmental technologies manufacturer. In the UK, the Living Environment Systems Division provides pioneering solutions that heat, cool, ventilate and control our buildings in some of the most energy efficient ways possible.

We believe that global climate challenges need local solutions. Our aim is to help individuals and businesses reduce the energy consumption of their buildings and their running costs.

This brochure will guide you through the range of products Mitsubishi Electric offer that provide innovative, carbon efficient solutions for commercial buildings.

At Mitsubishi Electric, we have evolved and today we offer advanced environmental systems that really can **make a world of difference** to any building.

Central Plant Solutions for **Commercial Buildings**

Contents

e-series
Modular Chiller Range

Mitsubishi Electric's *e*-series modular chiller range comprising of Cooling Only, Heat Pump and Heating Only models, provides the perfect solution to energy efficient, cost effective, low-carbon cooling or heating.

The company has manufactured chillers for over 40 years and has now combined this extensive experience with advanced component technology from the commercial air conditioning sector to produce the *e*-series modular chiller range.

With the *e*-series modular chiller range, we have examined every single component to find ways of increasing performance, reliability and overall system efficiency.

The new products bring all of this advanced technology and know-how together in a unique package to aid design, specification, installation and on-going operation.

Key Features:

- **High Efficiency ESEER 5.66**
  The *e*-series modular chiller range uses highly efficient inverter scroll compressor technology from our City Multi VRF units, along with advanced controls to deliver exceptional, industry leading efficiency and a wide capacity operating range of between 8% ~ 100%.

- **Low Noise Levels - 65dB(A) sound pressure measured at 1m**
  By utilising inverter driven compressors and fans within a uniquely shaped chamber, the *e*-series modular chiller range offers market leading noise levels that are up to 10dB(A) lower than industry standards.

- **Unique Modular Compact System**
  Up to six individual units can be connected together to provide a system capacity from 90kW to 540kW. Each 90kW module has a small footprint of only 2.02m^2 which makes location easier than the flatbed type chillers.

- **3 Year Warranty as Standard**

You can download our latest ***e*-series Chiller Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

Mitsubishi Electric Nagoya Works

When Mitsubishi Electric was looking to build a new production facility for its range of factory automation products at the company's Nagoya Works, located in Aichi Prefecture, Japan, the need for energy efficiency was paramount to match the company's ambitious carbon reduction targets.

The production facility plays a key role in meeting the growing global demand for reliable, high-quality factory automation products and like all modern buildings, it is constructed to the highest standards of air tightness and insulation.

The 26,000 square metres of floor space throughout the six storey building needs to be comfortable for staff and visitors alike, as well as incorporating the most advanced energy-efficient measures possible.

In addition to a 50kW photovoltaic system on the roof, low voltage LED lighting and comprehensive energy management systems, the factory is also benefiting from the installation of 48 of the company's *e*-series modular chiller range - which brings a modern, low carbon update to traditional standard chiller technology.

The controls for the high-efficiency chiller units at Nagoya Works have been easily integrated into the Building Energy Management System (BEMS) so that they can operate smoothly alongside the Air Handling Units and VRF air conditioning, to maximise efficiency.

In addition to delivering **4.3MW of cooling and heating** to the building, the modular approach of the e-series modular chiller range reduced both space and weight on the rooftop and the in-built header pipes simplified the design and installation. The ability to position units as close as 900mm apart has also ensured easy access for maintenance.

NX Chiller Range

In 2015 Mitsubishi Electric purchased Climaveneta, enhancing our product line up and marking our full scale entry into the chiller market.

Climaveneta is a strong European brand supported by 45 years of customer trust and high quality production, and its range of energy-saving, low-noise and innovative chiller technology further expands the application and customisation capabilities we are now able to offer.

Chiller systems have been used for decades to deliver cooling to buildings, but with increasing pressure on energy efficiency and running costs, the Climaveneta NX range provides an efficient, cost effective option.

Consisting of the NX and NECS models, the NX range is a new generation of water chiller designed for comfort and process cooling applications. In order to maximise performance, reliability and overall system efficiency, the NX range of products bring advanced technology and know-how together in customisable packages to aid design, specification, installation and on-going operation, fully complementing the Mitsubishi Electric e-series modular chillers.

Modern multi-function buildings, shopping centres, large business centres and process cooling are just some of the examples where increased comfort and precision control are required. The NX range can deliver all of this and more through its ability to be easily integrated into ever increasingly complex building systems. Fully customisable with a range of configurations and accessories, the NX range is the perfect chiller solution.

Key Features:

- **Air source and water cooled chiller systems available**
- **Electronic expansion valve**
  Ideal for situations where the application is characterised by several different temperature changes, allowing the system to be independent of continuous calibrations. An electronic expansion valve also allows improved performance at partial loads and an extended operating limit even at seasonal peaks.
- **Full-Aluminium coil with optional E-coating protection**
  Microchannel aluminium condenser coils are fitted on all V-shaped structured units, meaning less refrigerant is needed compared to traditional copper coils. The coils can also be completely treated by electrolysis to create a protective layer of epoxy polymer against salt spray and UV rays.
- **Class A efficiency available**
  Represents a guaranteed performance level, ensuring the highest efficiencies in the market, backed up by Eurovent Class A EER values.
- **Optional integrated hydronic module**
  Designed to keep on-site installation time, work and costs to a minimum whilst optimising installation space, the integrated hydronic module incorporates all the hydraulic components.

CLIMAVENETA
SUSTAINABLE COMFORT
A Group Company of MITSUBISHI ELECTRIC

You can download our latest **NX Range Chiller Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

Pall Mall Medical, Manchester

Pall Mall Medical is one of the fastest growing private healthcare providers in the UK, offering both private medical and cosmetic treatments. The company now has three locations in the northwest of the country: Manchester, Liverpool and Newton-le-Willows.

The city centre location of the company's Manchester site makes it extremely convenient for people wanting to pop into the clinic on their lunch break and allows Pall Mall Medical to offer health screenings for companies within the Greater Manchester area. Pall Mall Medical offers a personal yet direct approach and delivers a wide range of services from surgery to health screening, and antenatal to aesthetics, so a comfortable environment for patients and a controllable HVAC system is essential.

In order to continually improve the service, offer comfort cooling during surgeries and optimise the clinic's energy performance, the HVAC system in Manchester therefore needed to be renewed, with a quiet, compact system that could be readily fitted into existing plant space.

Three Climaveneta NX/LN-K 1214P low noise air source chillers with hermetic rotary scroll compressors were installed. With a cooling capacity of 984kW, these units allow a compact installation, with a qualifying unit efficiency.

The NX range of chillers can be easily integrated into existing buildings and are fully customisable with a host of accessories to suit almost any situation.

The design of the retrofit system and subsequent installation was achieved with ease, the compact nature of the units offering a premium solution where reduced clearances were an issue.

Ecodan Air Source Heat Pump Systems

The Ecodan CAHV air source heat pump monobloc system can operate singularly, or form part of a multiple unit system to provide space or water heating - easily meeting heat load and renewable energy targets.

A multiple unit system has the ability to cascade available units on and off to meet the load from a building. As an example of this load diversity, a 16 unit system allows 0.5kW increments of capacity, from 18kW all the way up to 688kW.

This level of load diversity is unprecedented within the heating industry and with cascade and rotation built in as standard, the Ecodan CAHV system is typically deployable across small, medium and large scale commercial applications with a wide load variance.

For every 1kW of electricity consumed by one of our air source heat pump systems, 3.2kW of heat can be delivered, 69% of which is renewable energy.[1]

ecodan® Renewable Heating Technology

ErP A++

Qualified for Energy Technology List www.eca.gov.uk

APPROVED PRODUCT MCS

Certificate Number: MCS HP0002
Heat Pumps
Product Reference: CAHV-P500YA-HPB

Key Features:

- **Multiple unit cascade control of up to 688kW capacity**
- **Split refrigerant circuits within each CAHV provide 50% back up**
- **Ability to rotate units based on accumulated run hours**
- **Provides from 25ºC up to 70°C water flow temperatures without boost heaters**
- **Low maintenance, hermetically-sealed monobloc design**
- **Low on-site refrigerant volume**
- **HIC (Zubadan) technology delivers 43kW at -3ºC with minimal drop off down to -20ºC**

You can download our latest **Heating for Commercial Applications Brochure** at: **library.mitsubishielectric.co.uk**

1. As independently tested by BSRIA based upon BSEN14511 Part 3 standard rating conditions. Due to the method of operation, the performance of heat pumps will vary based upon the temperature of the heat source and the requirements of the heat delivered. The BSEN14511 testing relates to the heat pump performance only and not the entire heating system.

Case Study

Social Housing Community Heating Project, St Mungo's

St Mungo's, a charity which provides help and services to the homeless in London and the South of England, required a heating and hot water system that would serve the needs of tenants housed in their 24 newly built dwellings in Spring Gardens, Lewisham.

The brief received from the charity contained a challenging set of criteria; the new system had to be able to:

- Use sustainable, renewable energy in order to comply with stringent local authority planning requirements
- Cope with the different loads required by a community heating scheme
- Deal effectively with regular changes in tenancy and occupied hours
- Offer tenants the ability to alter the temperature of their individual flats, whilst giving the charity full central control of the system

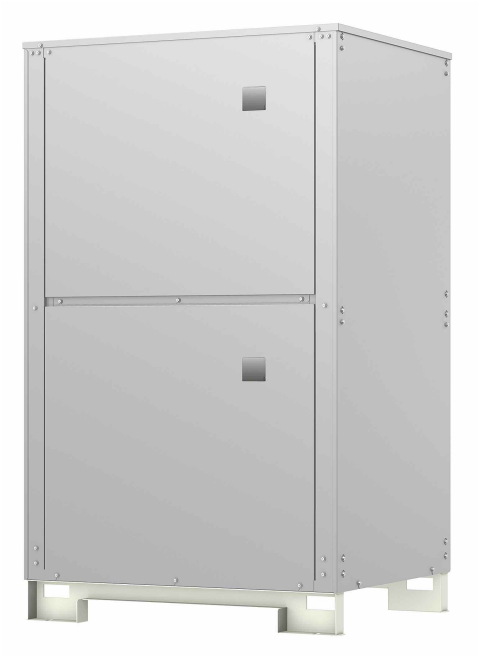
Waterstone Design specified three Ecodan CAHV monobloc air source heat pumps capable of delivering 129kW down to -7°C ambient, including defrost. These systems will provide underfloor heating for all 24 dwellings, along with their hot water requirements through a direct hot water plate heat exchanger, ensuring the heat delivery system operating temperatures can be kept as low as possible.

The St Mungo's community heating systems load requirements are extremely dynamic, and our CAHV monobloc systems have been designed to cope with this by allowing the capacity to increase in 0.5kW increments, from 18kW upwards. The units cascade on and off, utilising optimisation to deliver peak efficiency, ensuring even wear and tear throughout their operating life. Each MCS certified CAHV monobloc unit is hermetically sealed and requires very little maintenance. Two separate refrigerant circuits operate within each unit guaranteeing a 50% back up, whilst offering the benefit of low on-site refrigerant volume.

"As a homelessness charity with a limited budget, we wanted a sustainable solution offering control and flexibility with no compromise on performance, whilst at the same time achieving our goal of reducing the energy costs to our clients and lowering the buildings carbon emissions."

Steve Fabian, Purchasing Manager at St Mungo's

Ecodan Ground / Water Source Heat Pump Systems



Our Ecodan CRHV ground / water source heat pump monobloc systems provide a renewable heating solution capable of delivering the highest level of COP efficiency throughout the year.

These units use the same inverter technology as our air source systems, allowing them to extract heat from the ground, aquifer or open loop system with maximum efficiency.

The scalability of a ground / water source system also helps to make larger projects more cost effective, with the Ecodan CRHV able to operate as a self-contained system with a load diversity ranging from 25 to 960kW.

ecodan® Renewable Heating Technology

ErP A++

Key Features:

- **Boreholes, slinkies, aquifers, lakes, rivers, waste heat - can all be used as a heat source**
- **Multiple unit cascade control of up to 16 units and 960kW capacity**
- **Split refrigerant circuits within each CRHV provide 50% back up**
- **Ability to rotate units based on accumulated run hours**
- **Provides up to 65°C water flow temperatures without booster heaters**
- **Low maintenance, low refrigerant volume, hermetically-sealed monobloc design**
- **Heat recovery applications can be achieved by moving heat between applications**
- **Passive cooling possible by exchanging ground / water source with a chilled water system**
- **Low pressure drop to ensure pumping power is kept to a minimum**
- **High specification touch screen controls interfacing with BEMS**

You can download our latest **Heating for Commercial Applications Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

The Glencorse Centre

A new, state-of-the-art community centre in Scotland is reaping the rewards of installing a Mitsubishi Electric Ecodan CRHV monobloc ground source heat pump.

The inverter-driven Ecodan CRHV heat pump at the Glencorse Centre in Auchendinny, just south of Edinburgh, provides a simple, renewable solution, heating the brand new, state-of-the-art community centre, which offers an inspirational space for local people. The original village hall which stood on the site was built in the 1970's, but by 2007 it had come to the end of its lifespan and health and safety regulations forced its closure, leaving the community without a vital resource.

The £1.2m replacement was funded by Midlothian Council, Scottish Rural Development Programme and Charity Bank and provides a fit-for-purpose facility which is environmentally sound and meets the changing needs of the community. The centre's hot water is supplied by a small boiler but the inclusion of the Ecodan CRHV, means it will deliver 36kW of renewable heating via an underfloor heating system, ensuring that the centre's heating bills are kept to a minimum. Efficiency and sustainability were the key requirements for this project and in addition to the inclusion of the Ecodan CRHV, a number of other energy saving initiatives were also specified. However, with the cost of heating accounting for such a large proportion of the projected energy use this was one area where efficiency was vital and this is where the Ecodan CRHV system has proved its worth.

Alan Cameron of Livingston Mechanical Services which installed the Ecodan system says: "In a community building of this type there is always a requirement for energy efficiency, but because it is in a rural, off-gas location the choices are limited. By specifying the Ecodan ground source heat pump to serve the underfloor heating throughout the building, we came up with a solution which is both simple to operate and one which will be significantly cheaper to run throughout the lifetime of the building than other traditional methods of heating."

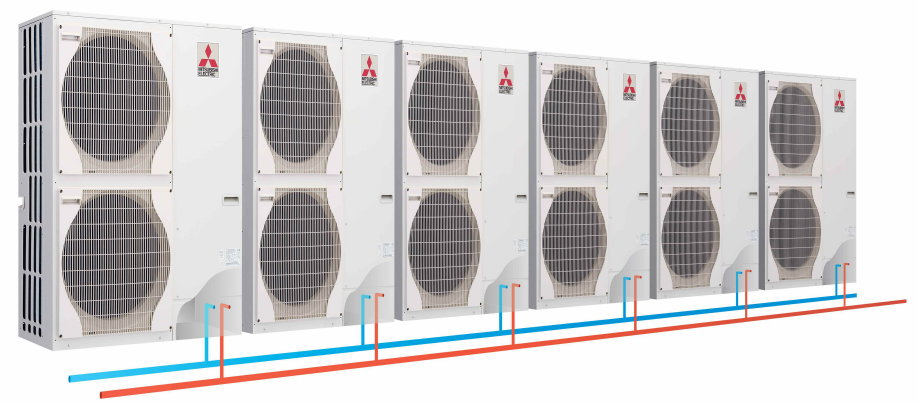
The Ecodan CRHV is a practical alternative to more traditional methods of heating and its efficiency has already been demonstrated in this installation which achieved an average Seasonal Coefficient of Performance (SCOP) of 4.08, operating at an average flow temperature of 50ºC in the first six months of operation.

Ecodan Cascade Control

Buildings with a high heat load require a proven, reliable system that is capable of delivering renewable heating and hot water all year round, whilst also ensuring the capacity required to keep your building at the desired temperature is delivered when and where you need it most.

Our Ecodan range of heat pumps can operate singularly, or form part of a multiple unit system. A multiple unit system has the ability to cascade available units on and off, or increase the output of those units in operation to meet the load from a building or a community heating scheme for example.

Ecodan PUHZ and CAHV air source heat pumps, and CRHV ground/water source heat pumps can be applied as a cascade system, with capacities ranging from 5kW up to 960kW. This load diversity is unprecedented within the heating industry, making our Ecodan systems perfectly suited to a wide range of applications.



- Multiple control of up to **six** 14kW Ecodan PUHZ units

Ecodan Cascade Control

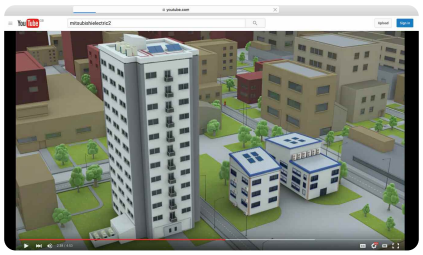
PUHZ	5 to 84kW	**CAHV**	18 to 688kW	**CRHV**	25 to 960kW

ecodan®
Renewable Heating Technology

Key Features:

- **Multiple unit cascade control of up to 960kW**
- **Inverter driven for high seasonal efficiency (SCOP)**
- **Backup and rotate functions**
- **Optimisation built in**
- **Weather and load compensation capability**
- **BEMS integration**

Watch the video



Ecodan for multi-dwelling buildings
youtube.com/mitsubishielectric2

You can download our latest **Community Heating Schemes Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

Air Source Replaces Ground Source at Sustainable Eco Centre

When the pioneering Hebburn Eco Centre, Tyneside needed to replace its 20-year-old ground source heating system, the building's owners turned to a cascade air source system from Mitsubishi Electric.

Designed and built by Groundwork South Tyneside and Newcastle (STAN) and opened in 1996, the Eco Centre was a pioneering venture to demonstrate renewable technologies and sustainable design. The Eco Centre office complex was built with a very green ethos in mind, with all materials recycled from sustainable sources and high levels of insulation included to reduce the amount of energy needed to heat the building.

"The ground source system had worked well but it was getting on a bit, so Groundwork took the decision to replace it with an air source system. What they needed though, was a new system that could work with the existing infrastructure and one that could cope with a variable demand for heating throughout the year." explains Jason Oakes, Business Development Director of installer, Oakes Energy. Oakes Energy worked with Minden Wood Consultants to find an ideal solution, which turned out to be four Ecodan 14kW air source heat pumps working together in a cascade system.

"We looked at all the available options and the Mitsubishi Electric solution combined the best performance with the complete flexibility needed for the building's multi-occupant use," said Consultant Nick Harley of Minden Wood Consultants.

Andrew Watts, Executive Director of Groundwork South Tyneside and Newcastle, said: "Groundwork is built on a foundation of creating sustainable, vibrant and 'green' communities through programmes that educate and inspire. Our Eco Centre was a landmark building when constructed and it remains so today, to ensure it continues to leave the most positive environmental footprint possible has meant an upgrade to the heating system. The added benefit of using the Ecodan system is that it offers greater control for individual offices and also qualifies for the non-domestic Renewable Heat Incentive, so this can help supplement the running costs for the next 20 years".

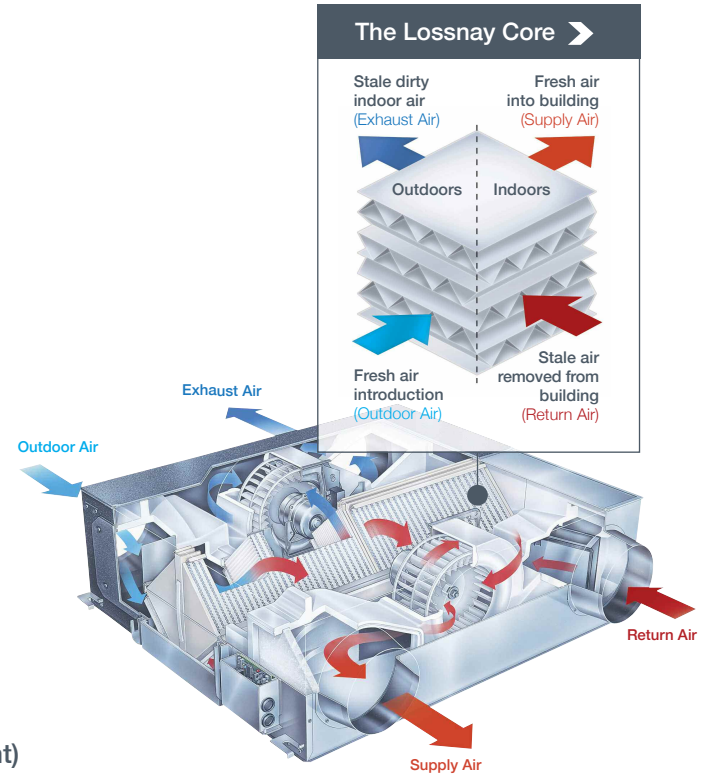
Lossnay Mechanical Ventilation with Heat Recovery Systems

Lossnay Mechanical Ventilation Heat Recovery (MVHR) systems are designed to supply fresh air into any commercial building, whilst simultaneously extracting stale air and, most importantly, recovering valuable heat energy for maximum efficiency.

The technology behind the energy efficiency of Lossnay lies in the construction of the core which enables exchange of both latent heat (humidity/moisture) and sensible heat (temperature), i.e. total heat recovery, to maintain a comfortable internal environment for minimal energy consumption.

Sensible heat is transferrable heat that causes a rise or fall in air temperature. Latent heat is transferrable heat that causes a change in the humidity level or moisture content in the air and it's this latent heat transfer that enables Lossnay to recover more heat energy than a 'sensible only' heat exchanger. This is because water has a higher specific heat capacity than air, meaning it can transfer, or recover, more heat than air.

Total heat exchangers provide a comfortable air temperature within a room that is not characterised by the symptoms associated with dry air (dry eyes, dry throat and high static). Using a highly efficient total heat exchanger, Lossnay provides a constant supply of controlled, pre-cooled / pre-heated, fresh air for improved climate control and reduced energy bills.



Key Features:

- Clean fresh air
- Improved air quality and comfort
- Increased climate control
- Reduced energy bills
- Energy efficient heat recovery
- Low power consumption and Specific Fan Powers (SFP's)
- Free cooling function
- Total heat exchange (sensible and latent)

You can download our latest **Ventilation Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

School Aims to Score ‘Very Good’ in BREEAM Rating with Heat Recovery Technology

A new state-of-the-art primary school has opened its doors in Cheshire to offer pupils and staff a fresh, comfortable and highly energy efficient place of learning.

Chapelford Village Primary School, near Warrington is a £4.3 million building project which has relocated the existing and aging facility at nearby Sycamore Lane Primary.

The entire building has been constructed to the latest standards of thermal insulation to ensure it is energy efficient, with the local authority targeting a ‘Very Good’ BREEAM rating.

Modern buildings are almost airtight and this can lead to problems with the build-up of stale air. For Chapelford, this has been solved with the installation of eighteen LGH-100 Lossnay mechanical heat recovery ventilation units. These keep the classrooms full of fresh air, without wasting all the energy used to heat the spaces.

The LGH-100 works by extracting up to 80% of the heat energy from the outgoing air and transferring it to heat up the incoming air flow. This significantly reduces the amount of energy needed to bring the fresh outdoor air up to room temperature and keeps the classrooms fresh and airy all year round.

A bypass mode also allows cool fresh air to be introduced during the hot summer months effectively giving the classrooms free cooling during the summer term.

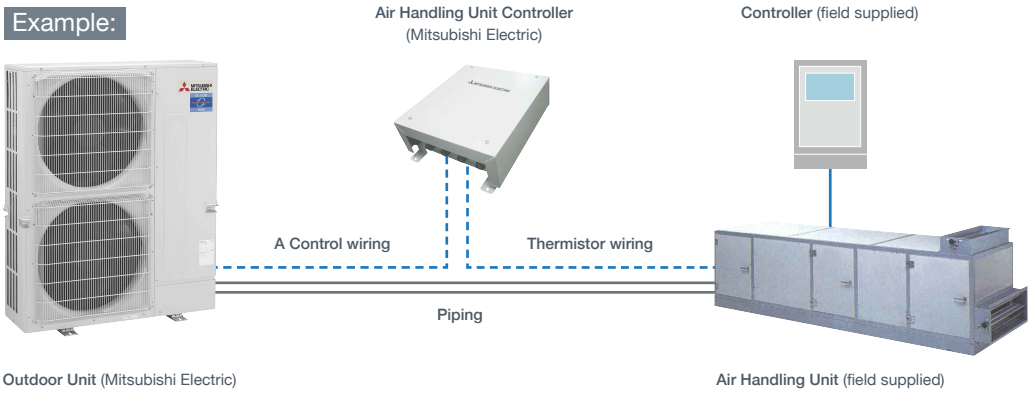
The school is also benefiting from four Ecodan CAHV heat pumps which heat the building’s underfloor heating system. Six Mr Slim air conditioning units are also installed in various hot spots throughout the school, such as the server room and the teachers’ common room.

Air Handling Units (AHU)

The PAC-IF013B-E Air Handling Unit Controller can interface Mitsubishi Electric Mr Slim outdoor units to third party air handing units.

Up to six Mr Slim outdoor units can be used on a single air handling unit providing a wide range of heating (4.1-162kW) and cooling (3.6-132kW) capacities.

Example:



New Range Available in 2017

2017 will see Mitsubishi Electric launch a new range of highly efficient packaged Air Handling Units (AHU's) that provide a tempered fresh air to commercial buildings alongside an air conditioning system. These units will allow fresh air to be heated or cooled via a DX coil or water chiller before being supplied to the internal environment as required, delivering significant savings and offering a wide range of customisable features.

Key Features:

- Simpler installation due to Mr Slim units being a single source of heating and cooling
- Automatic control by local remote controller, supplied as standard with model PAC-IF013B-E
- BEMS external monitoring and control can be achieved through direct Modbus, digital switches or analogue input
- Intelligent Multiple Outdoor Unit Control (IMOUC) of up to six Mr Slim outdoor units when operated in external manual control, this can include two different capacities or series of Mr Slim outdoor units
- Anti-cycling measures incorporated into the design to extend the life of the outdoor units
- Maximum airflow of up to five times the standard Mr Slim specification
- Capacity control of up to 11 individual steps ensures high comfort levels
- SD card installed to record history and facilitate software upgrades

You can download our latest **Ventilation Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

McDonald's Restaurants Ltd

McDonald's Restaurants Ltd are using a new heating and ventilation system that has cut running costs by over £4,500 a year for each site, whilst also significantly reducing carbon emissions and improving the indoor environment for customers.

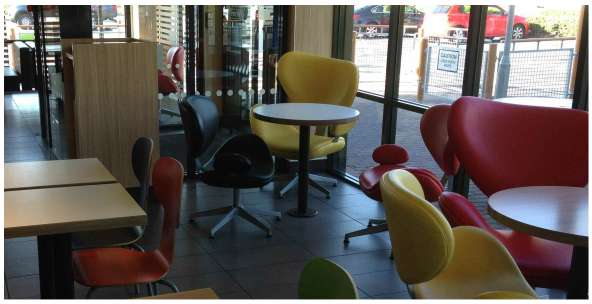
The unique Air Handling Unit (AHU) solution has been developed by manufacturers Mitsubishi Electric and Nordair Niche for McDonald's Restaurants Ltd, which has over 1,200 sites in the UK.

Nearly 250 restaurants now have the new air handling system, with each delivering an average 35 per cent reduction in energy consumption for cooling, heating and ventilation, with the added benefit of free cooling. McDonald's Restaurants Ltd is converting around 100 more sites each year as existing equipment ages.

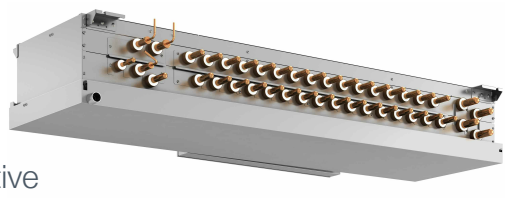
"When we started looking at replacing our air conditioning equipment we quickly realised we needed a bespoke system," explained Dave Holden, UK Quality Consultant for McDonald's Restaurants Ltd Service Department. "We were coming at this with very specific requirements and off-the-shelf systems didn't satisfy those needs." Mitsubishi Electric and Nordair Niche developed an innovative solution that would reduce running costs, be transferable across sites and improve customer experiences.

The new systems replaced expensive gas-fired or electric rooftop packages. They combined Nordair Niche's IDF air handling units with Mitsubishi Electric's air source heat pumps controlled by a Trend building energy management system to achieve maximum operating efficiency. McDonald's Restaurants Ltd conducted two trial sites before committing to the system. "Our own trial data demonstrated that the new system gave each restaurant an annual cost saving of £4,515 per year and emits on average 20 tonnes less CO_2," said Dave Holden. The solution was designed to accommodate a variety of standard sized air handling units previously installed so that the replacement solution could be rolled out across all restaurants.

> **"It is commercially critical for us to operate effectively all year round,"** said Dave Holden. **"Our customers expect McDonald's to have a comfortable internal temperature and the ability to offer that, reliably and consistently, is part of our relationship with customers."**



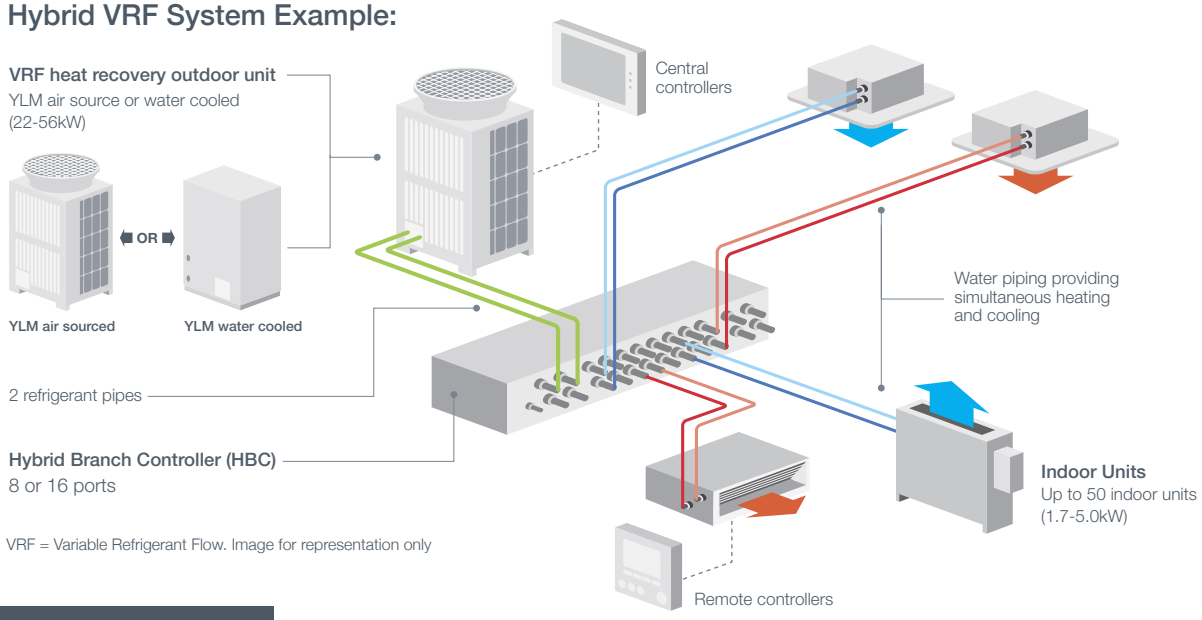
Hybrid VRF Air Conditioning Systems



Hybrid VRF is the latest addition to our City Multi family (our VRF range of air source and water cooled air conditioning units for large scale applications). Built and assembled in the same factory as our VRF units it therefore carries its distinctive DNA in terms of technology, adaptability, efficiency and reliability.

Put simply, Hybrid VRF is a 2-pipe heat recovery VRF with water between the Hybrid Branch Controller (HBC) and indoor units. You can install and design it as VRF whilst enjoying the features of a chiller system. Providing a complete modern solution for office buildings, hotels, medical centres, schools, high rise buildings, shopping centres and other commercial premises, Hybrid VRF provides a comfortable and stable air temperature control with no refrigerant in occupied spaces. **Hybrid VRF can be installed using either a YLM air sourced outdoor unit or a YLM water cooled condensing unit.**

Hybrid VRF System Example:



VRF = Variable Refrigerant Flow. Image for representation only

Key Features:

- Reduced energy consumption and lower running costs
- No refrigerant in occupied spaces - no need for leak detection
- High sensible cooling and stable room temperatures
- Provides a gradual rate of change of temperature within the air conditioned space, delivering a comfortable and stable environment
- Simplified 2-pipe design for an easy and flexible installation
- Simultaneous heating and cooling with full heat recovery
- Quiet operation through water based fan coils
- Modular system allowing for phased installation - to both new build and retrofit
- Fully packaged solution

You can download our latest **Hybrid VRF Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

Headquarters Becomes a Centre of Excellence with Water-Based Air Conditioning

When Working Environments Ltd was looking to bring together three different company locations into one, the decision was taken to modernise their existing headquarters at Monza House in Southampton to accommodate the integration.

The building now uses a Hybrid VRF system which was selected because it operates without using refrigerant in occupied spaces, for its ability to deliver simultaneous heating and cooling in a simplified 2-pipe design and also its delivery of high sensible cooling and stable room temperatures for maximum comfort.

As a Business Solutions Partner for Mitsubishi Electric, Working Environments has a very close relationship with the manufacturer and when they first heard of the innovative new air conditioning system, Working Environments wanted to be one of the first to check out its capabilities.

The company's executive management objective was to provide a modern, comfortable environment for staff and customers and turn the interior of the building into a 'Centre of Excellence' that could act as a showcase for Working Environment's expertise and services.

The existing 1st floor offices were modernised and the new Hybrid VRF air conditioning installed, along with new lighting, power and data infrastructure. The use of water in the majority of the piping removed the need for leak detection equipment and allowed for a more flexible installation, with the system also still able to deliver simultaneous heating and cooling in a simplified two-pipe design.

> **"Feedback from staff has been fantastic, with everyone noticing how balanced the internal temperatures have been with fewer draughts"**

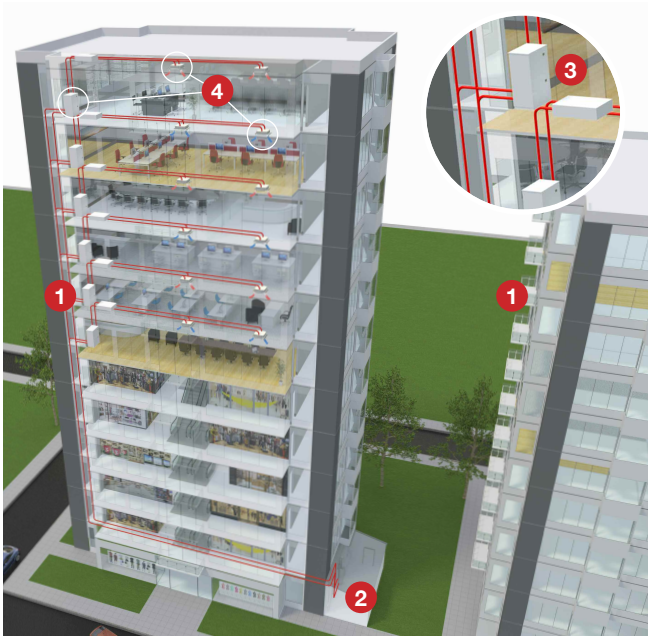
City Multi Water Cooled VRF Systems

Ideal where outdoor space is limited, building heat recovery and efficiency is demanded and a water loop is available, City Multi water cooled models provide the ultimate solution and are suitable for projects both large and small.

First developed 15 years ago, the City Multi water cooled system utilises water instead of air as an energy transfer medium, but benefits from all the same technology and flexibility of an air sourced VRF. **Systems are available as both heat pump (WY) and heat recovery (WR2) units.**

A Sustainable and Flexible Solution for Buildings:

1. Apply and network the energy through a water loop, within the building and between buildings - optimising efficiency
2. Utilise geothermal, rivers or lakes, landlord loops, waste heat from server cooling or other processes
3. Units are located indoors on each floor, ensuring pipework design flexibility. Compact and quiet, minimising outdoor plant space and maximising occupied space
4. City Multi water cooled models offer double heat recovery through refrigerant and water, no defrost and a refrigerant cooled inverter with no heat rejection to the internal space



Key Features:

- High COP's / EER's possible thanks to increased efficiency and 100% inverter control, allowing the largest operational water circuit temperature band ever
- Unique 2-pipe refrigerant circuit allows simultaneous heating and cooling plus heat recovery between up to 50 indoor units (WR2)
- Total building heat recovery made possible by exchanging energy in both refrigerant and water circuits (WR2)
- Combining waste heat energy provides unique application solutions
- High Sensible Cooling Function - by raising the off coil temperature, a 10% increase in SHF over standard operation is achievable, the result being greater comfort for occupants
- Able to operate with closed loop and open loop ground source water temperatures, bore hole and slinky applications are possible
- Easy maintenance - front panel access to all PCB's and major components

You can download our latest **Air Conditioning Brochure** at: **library.mitsubishielectric.co.uk**

Case Study

Salmon Lake Centre, Isle of Man

The Salmon Lake Centre and Ballacregga Tea Rooms secured the "Private Sector: Best Innovation" award at the Isle of Man's Energy Awards 2015 for its sustainability following the installation of a system that capitalises on a nearby river and lake.

The site now benefits from a self-sufficient hydro-electric, central heating, air conditioning and hot water system which can all be controlled either centrally from a PC or remotely, by smartphone or tablet.

Specialist building contractor, SCS Ltd used ingenious technologies and methodology to create the award winning project. "Initially, we decided we could install a turbine in the nearby Laxey river, to provide free electric to heat the premises but then it occurred to us that we really should also be able to heat and cool", explains SCS Ltd Managing Director, Stewart Clague. SCS Ltd called upon the expertise of HVAC specialist Kooltech Ltd, and a subsequent site visit determined that if the client was to use the natural resource of the adjacent Salmon Lake, far more benefits could be gained.

A Mitsubishi Electric City Multi WR2 heat pump system was installed to provide heating and cooling by using a closed loop slinky sitting at the bottom of the lake. The WR2 can harvest low grade heat from the lake and upgrade it to provide heating, or can take excess heat from cooling requirements and reject it safely into the lake. The WR2 system also uses inverter-driven control to modulate performance and energy consumption to suit the time of year and local conditions. When coupled with wall mounted air conditioning units to heat or cool the open plan areas and the café, the first phase of the project was complete.

Phase two involved the installation of a Mitsubishi Electric PWFY heat pump boiler as a primary heat source to meet the sanitary hot water, under floor and central heating requirements. The PWFY works seamlessly with the WR2 using the excess heat from the air conditioning to provide a constant supply of hot water for the kitchen.

An advanced TG-2000 control software system was also installed on a central computer connected to a bespoke "K-Con" control panel developed by Kooltech Ltd. This gives the client ultimate control over the energy consumption in each zone and means they can keep an eye on running costs, whilst also receiving alerts for any faults that may occur.

"Although the site is connected to the grid, the turbine generates 10KW of electricity, so this means that, other than the original capital, there are no other costs involved in the whole project" proclaims Alan Clague of SCS Ltd.

Advanced Controls

The need for control is paramount in order to optimise the performance of any air conditioning, heating or ventilation system and minimise its running costs and the emissions generated.

Mitsubishi Electric offers a wide range of control options designed to do just this.

Operating an air conditioning, heating or ventilation system without the right control can prove costly. It's therefore important to ensure that every system is correctly specified and integrated within the building to the degree of control it requires. Mitsubishi Electric has a wide range of controls available 'off-the-shelf' and where needed, individual control systems can be specifically designed to suit.

AE-200E Centralised Controller

The AE-200E is a large 10.4" touch screen centralised controller with simple intuitive operation and control over M-NET network.

- **Monitor and control up to 50 indoor units**
  (or up to 200 indoor units using EW-50E expansion adapters)
- **Monitor and control general equipment**
- **Energy monitoring, load shedding**
- **Web based controller**

MELCOBEMS BEMS Interface

The MELCOBEMS interface provides M-NET centralised controller connections (AE-200E/EW-50E) to a third party BEMS via either RS485 or TCP/IP. It does this via a Modbus RTU or a BACnet interface.

- **Monitor and control up to 50 indoor units**
- **Modbus and BACnet interface**
- **Energy monitoring**

MELCORETAIL(2G) Solution Interface

MELCORETAIL is a dedicated retail interface designed for energy efficient monitoring and control of up to 8 M Series and Mr Slim indoor units, and 50 City Multi indoor units, including Lossnay.

It is preconfigured with standard inputs and outputs to suit the needs of any small to medium sized retail outlet.

- **Dedicated Retail Interface**
- **Control third party equipment**
- **Advanced energy saving and energy metering**
- **Ethernet or GPRS remote connectivity to MELCOREMOTE Web PC, Smartphone / Tablet App (5 years web hosting included)**

You can download our latest **Controls Brochure** at: **library.mitsubishielectric.co.uk**

Responsible, sustainable manufacturing

As a leading provider of environmental technologies, Mitsubishi Electric prides itself on using responsible, sustainable manufacturing processes that take energy use, efficiency and the impact on the environment very seriously.

Our production facilities are committed to sustainable business practices such as energy and resource efficiency, minimising ecological impacts and reducing greenhouse gas emissions.

In line with our aim to improve all round performance and energy efficiency throughout all our operations, we set and adhere to the highest environmental standards to protect the world in which we live and the way in which our products are applied in the built environment.

Global Environmental Vision 2021

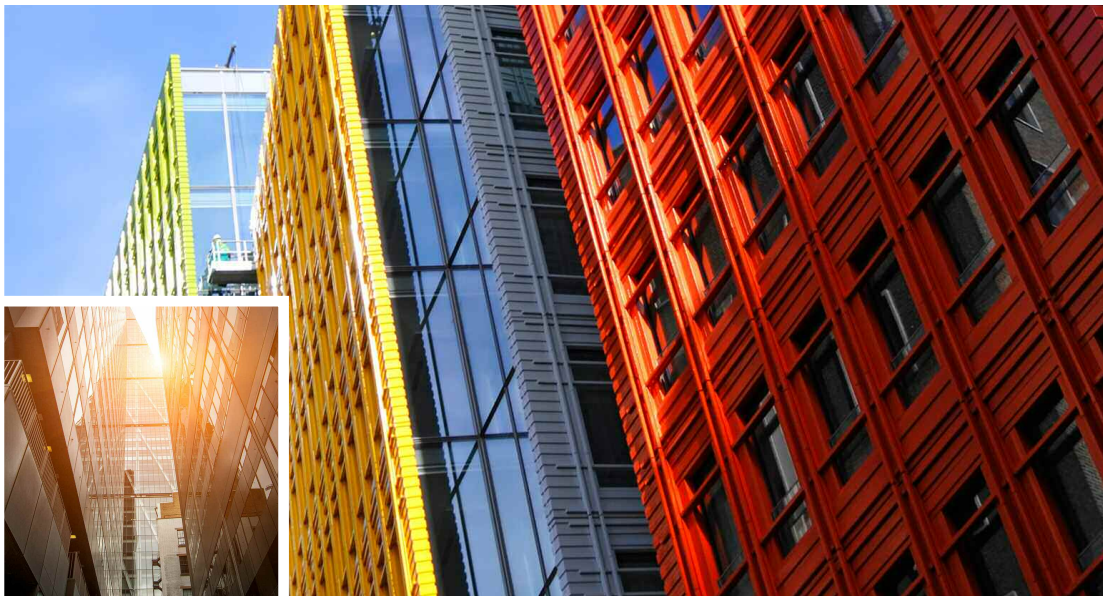
Mitsubishi Electric's Global Environmental Vision 2021 sets a goal for a lower emission future that influences all our policy decisions.

mitsubishielectric.com/eco

Green Gateway

Green Gateway is Mitsubishi Electric UK Living Environment System's commitment to the environment. It strives to instill positive changes in Mitsubishi Electric's own operations as well as seeking to influence those of its customers.

greengateway.mitsubishielectric.co.uk



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