

Flexible, sustainable
HVAC solutions for
the Healthcare
sector





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Building services for the essential services

Today's medical facilities place differing demands on the equipment that is used to heat, cool and ventilate them, yet these essential building services can deliver far more than just a comfortable environment.

Our diverse range of energy-efficient, low-carbon systems offer complete design and installation flexibility, to deliver accurate temperature control and comfort, whilst helping the building and its operators reduce both carbon emissions and running costs.

Modular systems are available to replace or upgrade existing HVAC technology so that individual rooms, wards, floors or whole wings of a building can be modernised without disrupting day-to-day activity.

These quiet, resilient solutions are able to cope with the diverse demands of staff, patients and visitors, as well as sensitive medical equipment, to create the background comfort that is essential for our health.

Whether you are dealing with a doctor's surgery, a medical research laboratory, a care home or a complete hospital complex, you need to ensure your building is able to:

- **Improve the indoor air quality (IAQ)**
- **Filter out viruses and pollutants**
- **Keep staff comfortable and productive**
- **Comply with carbon reduction legislation**
- **Keep energy bills to a minimum**

An essential service

Whatever the size of the building, facility managers and operators need to keep running costs to a minimum, whilst making sure the facility complies fully with legislation and is staying productive and operational all year round.

You need complete flexibility of equipment design and installation, to enable accurate temperature control, alongside comfort, safety and reliability. HVAC Systems therefore need to deliver:

- **Constant, stable temperatures**
- **Energy efficient fresh air**
- **High temperature hot water production**
- **Whisper-quiet operation**
- **Remote monitoring**
- **Ease of maintenance**

The energy drivers affecting buildings

Buildings in the UK currently account for over 40% of the nation's energy consumption and carbon emissions, so if we are to achieve our ambitious carbon reduction targets, improving the level of efficiency in our buildings is of paramount importance.

By addressing the largest draw on energy - the way we heat, cool and ventilate our buildings - even the smallest improvement will have a significant effect in reducing total energy consumption for the nation.



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Safety, controls and space

Hospitals and other health facilities may need to operate 24 hours a day, whatever the weather, and the building services need to deliver reliable, energy efficient comfort all year round.

Hygiene and cleanliness is a vital consideration in the medical sector, so systems need to be easy to access for maintenance and cleaning, as well as keep viruses and pollutants away from vulnerable patients and staff. Advanced equipment control will automate both monitoring and reporting, helping facility managers and building operators to ensure that systems run as efficiently as possible.

Equipment can also be linked to other HVAC equipment or other building services, such as CO₂ sensors to ensure effective fresh air can be introduced without wasting energy. Smaller equipment can also reduce the space required in plant rooms and on roofs, freeing up space and reducing the weight load on a building.

- **Air conditioning systems** can help comply with the latest F-Gas Regulations
- **Ventilation systems** can recover up to 90% of otherwise wasted heat energy
- **Renewable heat pumps** can deliver high-temperature hot water
- **Modular chillers** are available 'off-the-shelf'
- **Systems** can even monitor room and occupant temperature to regulate energy use

The need to demonstrate sustainability

Rising energy costs are not the only consideration these days as more demand is placed on building operators to evidence the sustainability of their operations. That puts pressure on health care providers who are now examining all aspects of their operation and supply chain - throughout the medical sector.

At the same time, we have seen a 'greening' of the electricity grid and production of primary energy, which is leading to an increase in the use of renewable technologies and electrically powered equipment such as heat pumps and air conditioning.



Carbon-intensive gas and oil are now officially on the way out. There is a whole range of cost-effective electrical systems that can decarbonise healthcare estates whilst delivering the performance and comfort levels required.





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Why Mitsubishi Electric and how we can help

Working towards a better use of energy in buildings

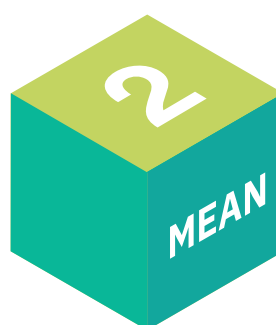
Mitsubishi Electric is a market leader in providing solutions to cool, heat, ventilate and control buildings of all sizes and ages, from new-build to retro-fit. A strong commitment to the environment remains a long-term Corporate goal under our global framework for realising a sustainable planet - **Environmental Vision 2050**.

In the UK, this vision translates into our **Green Gateway philosophy** which is central to the way we do business. With this initiative, we are seeking to use our position as a manufacturer of key technologies to increase awareness and improve energy use in the built environment.

We advocate a **LEAN, MEAN, GREEN** approach to the construction and refurbishment of buildings:



Reduce the need for energy consumption right from the start



Use energy as efficiently as possible



Deliver comfort from low or zero carbon technologies



By constantly challenging everyone involved to combat the issues we all face and encourage constructive dialogue throughout the industry, we aim to help everyone address their energy use and to work towards a more sustainable future.

Here in the UK, we provide advanced solutions that cool, heat, ventilate and control buildings in the most energy efficient and cost-effective ways possible. Through technical expertise, experience and an innovative product range, we can ensure that your building delivers the highest standards of energy efficiency, low running costs and adheres to increasingly tough legislation, right from the start.

Who we are and how we work with you

Providing assistance from design to completion

We are here to help deliver cost effective solutions that answer the distinct demands of our customers' businesses. We work closely with our clients to understand their requirements and create a mutually beneficial relationship that delivers:



Bespoke solutions perfectly suited to meet the specific needs of our clients



Effective communication throughout all aspects of our business and offering



The highest level of customer service and satisfaction life of a building

Our aim is to fully understand your needs so that we can offer the innovation and solution that works best for you. We actively seek collaboration and dialogue with all parties involved in planning, designing, procuring, constructing and managing buildings, as we see this as the best way to ensure needs are translated into the right solutions.

Early engagement in the design process of both new-build and retro-fit projects, allows customers to confidently **apply and control cooling, heating and ventilation** within their individual projects.





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In-built resilience

In February 2021, Mitsubishi Electric celebrated its 100th year of operation and over the last century, we have taken our resilience as a company and encapsulated it into our products and services.

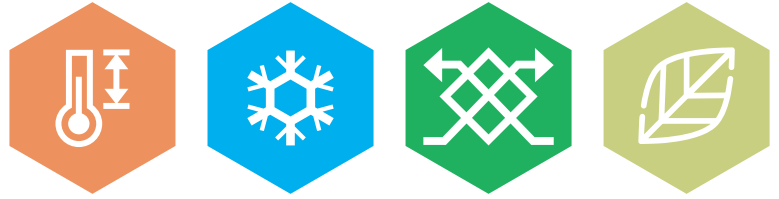
From the very beginning the company set a clear vision for the next 100 years – with the first chairman declaring that “The ‘Electric Age’ is at hand” and encouraging employees to contribute to a ‘vibrant and sustainable society’. Now, the world faces increasingly dramatic changes, but we are also on the cusp of a zero-carbon society fuelled by renewable energy and an ‘Electric Economy’. At Mitsubishi Electric, we aim to help create a sustainable and prosperous society through continuous technological innovation and ceaseless creativity.

Tried and tested

As the UK's leading manufacturer of air conditioning and renewable heating, Mitsubishi Electric's equipment is already installed in thousands of buildings in the UK. We also offer unique heat recovery solutions that utilise the latest refrigerants to future-proof new builds and bring refurbishments right up to date with legislation. Our solutions can meet all needs from small single bedrooms, offices and treatment rooms, to care homes, hospital wards right through to complete hospital campuses.

Our HVAC technology includes market-leading air conditioning systems that feature powerful filtration for bacteria and pollutants and an innovative Hybrid HVRF system that removes the need for refrigerant in occupied spaces. Thanks to these products we can not only help to reduce the carbon footprint of your hospital but create better and healthier environments for patients and staff.





A range of flexible HVAC solutions

Air conditioning

As UK market leaders, we pride ourselves in providing high performance, energy efficient air conditioning systems with low running costs. Our innovative solutions use modern refrigerants with lower global warming potential (GWP) right across the entire range, and we also offer a unique Hybrid VRF system which removes the need for any leak detection. By utilising heat pump technology, our air conditioning not only provides cooling, but also heating and often sanitary hot water which can remove the need for additional systems elsewhere in the building and is far more efficient and less carbon intensive than traditional water heating systems.

Cooling

Our advanced range of traditional and modular chillers deliver controlled, cost-effective cooling to any building and any space. These energy efficient solutions are ideal for comfort and process cooling applications.

Ventilation

Our range of ventilation products, covering mechanical ventilation with heat recovery units (MVHR), air handling units (AHUs) and AHU control interfaces, have all been designed to deliver a fresh air supply to a building whilst simultaneously extracting stale air in the most energy efficient manner possible through utilising heat recovery technology.

Renewable heating

Our commercial heat pump range is specifically designed for large applications and can deliver the high temperature hot water that medical facilities need. The Ecodan range of air source and ground/water source heat pump monobloc systems can operate singularly, or form part of a multiple unit system.

Healthcare Sector **Case Studies**



Case Study 1

Heat pump chillers help North Tyneside cut emissions by 80 per cent

When Northumbria Healthcare NHS Foundation Trust was looking for ways to significantly reduce carbon at North Tyneside General Hospital, replacing the building's 40-year-old heating system became a priority.

The Trust provides health services to over half a million people in North Tyneside and Northumberland and delivers healthcare from several sites including the 265-bedded Hospital in North Shields. Costing up-to-£22 million, the complex upgrading scheme aims to cut emissions by a massive 80% and sees the removal of a boiler and steam distribution system installed in the 1980's.

The heating and hot water will be provided by a low-temperature hot water system from air source and water source heat pump chillers. The work started in April 2021, with phased work taking place to minimise disruption in what is a very busy, live hospital site.

The system was designed and installed by Breathe Energy with the chillers supplied by Applied Project Specialist, PACAIR, who have a long-standing relationship with Mitsubishi Electric, which manufactures the Climaveneta brand.

Two Climaveneta I-FXQ, 4-pipe heat pump chillers provide simultaneous heating and cooling to the building, and supply water at 45°C to a Climaveneta 1400kW i-FOCS-W-HFO heat pump chiller. The i-FOCS-W-HFO is a super low GWP water to water machine that then feeds 80°C to the hospital and the LPHW system. Water is returned to the I-FXQ units at around 6°C.

The M&E designers, Padd Energy, have designed the systems so that it should provide a minimum of 80% of the heat for the hospital over the whole year. If it gets really cold, or the pumps are shut down for maintenance, three new low-temperature hot water boilers have also been installed as a contingency. The overall site heat load is about 4 MW.

"The current heating and hot water system was well past its design life and was starting to cost significant amounts to maintain explained project director at Northumbria Healthcare Facilities Management, Owen Cusack.

"The new set-up will be vastly more efficient and we've been careful to complete most of the work behind the scenes where it hasn't been obvious to staff, patients, and visitors."

"It's hoped the successful implementation of this programme at North Tyneside will prove an exemplar of how a working hospital can become much more environmentally -friendly, not just for the rest of the Trust's sites, but for the NHS nationally," he said.





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The heat decarbonisation project is being funded by a £19.5m grant from Phase One of the Government's Public Sector Decarbonisation Scheme, managed by Salix. This has seen around 65 ventilation unit fans, along with thousands of metres of hot water piping, replaced. The hospital's existing high voltage sub-station has also been replaced and there have been upgrades to the power system to improve resilience.

The recently-opened Northumbria Sterile Processing Centre at the Northumbria Specialist Emergency Care Hospital site in Cramlington, which was a Net Zero development, has helped support the decarbonisation of North Tyneside General Hospital, since the sterilisation department previously located there was a major steam user.

"There have been a lot of parallel workstreams undertaken simultaneously," explained Energy and Sustainability officer, Michael Blades, "We have already spent around £3m on 'easy wins', such as modernising all the lighting at a number of our hospitals. To make further inroads, however, and in line with our latest Green Plan, we need to make significant investments, such as the one at North Tyneside."

The North Tyneside General is the Trust's largest acute hospital, and Blades and Cusack began focusing on all the areas where they could reduce its energy consumption. They looked at the building fabric as a whole, and reducing heat loss and in parallel, they invested significantly Trust-wide in energy-efficient lighting, firstly installing highly efficient fluorescent lighting, before moving to LED."

In addition to the replacement of the heating system, other carbon and energy-saving measures include the installation of around 1 MW of photovoltaic panels on the building's roof. All single-glazed windows are also being replaced with more energy-efficient double-glazing, and cavity wall insulation is being installed across the site to reduce heat loss and provide a more comfortable internal environment.

"The heat decarbonisation scheme was one of our long-term aspirations, and with the existing contract approaching renewal, we really pushed it through the Trust's Sustainability agenda," added Cusack.

"The scheme fits strongly into the Trust's long-term carbon aspirations, and will be a blueprint for the rest of our hospitals."

The pair and their team have also structured the framework so that any 'very cash-poor' Trust, without the financial ability to improve its estate, could use the process to replace all its old, inefficient equipment. The savings in energy consumption, and hence spend, would go some way towards funding a 15-25-year project that allows them to meet their Green Plan objectives.



Case Study 2

Devon hospital gets ready for a low carbon future

When a secure hospital facility in Devon needed to replace an aging heating and cooling system, the NHS Trust involved needed a reliable and sustainable, low carbon solution.

With the site located less than a mile from the sea, the existing units had become unreliable because of the high salt content in the atmosphere and the Trust needed a suitable replacement that could not only cope with a harsh environment but also had a strong emphasis on energy efficiency, reliability and in-built resilience.

They also needed it to be fitted and supported by a manufacturer that could deal with every aspect of the design in a secure, restricted facility and cope with the M&E and plumbing installation involved in the on-site works.

“The energy costs for the old chillers were increasing significantly year on year and they were becoming more unreliable so we needed to replace the system and wanted a low carbon solution” explained Collette Germon, Sustainability and Energy manager for the Trust. **“Devon Partnership Trust is working in line with the wider NHS target to meet net zero by 2040 so that means we will be reducing our carbon footprint in line with the detailed Green Plan that we’ve set out”** added Collette.

The solution involved three e-Series EAHV1500 YCL modular heat pump units for the heating and two e-Series EACV1800 YCL modular chillers for the cooling. Manufacturer, Mitsubishi Electric provided a full mechanical, electrical, and plumbing (MEP) design package and an extended 7-year warranty and full service and maintenance contract for the equipment.





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Devon Partnership NHS Trust, Langdon Hospital Dawlish is a medium secure facility located near to the seaside town of Dawlish in southwest England. The Dewnans Centre is part of the secure services located within the hospital grounds.

“In the winter months we have underfloor heating which the e-Series manages and in the summer months we have underfloor cooling from the system,” added Rod Butler, Estates Officer, Langdon Hospital.

The Centre has 60 beds spread over four wards - Ashcombe, Holcombe, Warren and Cofton. Here the Trust provides medium secure accommodation for men with mental health needs. There are also critical rooms that require 24/7 cooling and heating. Given the sensitivities of a medium security facility, special attention had to be paid to the safety of both patients and contractor staff. This meant strict site-specific rules that needed to be adhered to at all times, with special attention to how the team was to interact with patients, restrictive working activities and managing the movement of both plant and equipment.

“We were looking for a manufacturer that could offer an extended warranty and help with readily available spares should any part ever fail,” added Rod. “We’ve worked with Mitsubishi Electric for a number of years so the natural thing to do was to take their advice on the equipment that we should be installing”.

Paul Lewis, Turnkey Contracts Manager at Mitsubishi Electric visited the site to meet with Rod and together, they looked at the different available options before running a desktop exercise to demonstrate the suitability of the e-Series units.

“This was a full turnkey project for us encompassing everything including design, equipment selection, and upgrade of mechanical and electrical items associated with that plant,” explained Paul.



Paul and his Turnkey team collaborated with an M&E designer who undertook a front-end engineering review of the existing M&E infrastructure. This was to assess suitability for the e-Series chiller, and to highlight and provide solutions to any inherent issues within the existing system.

The project was carried out under CDM (Construction Design Management) where Mitsubishi Electric was appointed by the NHS Trust as Principal Contractor.

Three EAHV1500 heat pumps deliver heating to the underfloor circuit while two EACV1800 chillers provide chilled water to the circuit during summer months. To reduce both cost and installation time the units were connected together using the e-Series unique internal header, which removes the need for separate piping connections, valves and commissioning.

“The maintenance of the chillers is now only 6 monthly rather than four times a year which brings down the general running costs for maintenance”, explained Graham Martin, Maintenance Manager at Mitsubishi Electric, which is offering a 7-year warranty on the equipment. “In addition, all parts are kept in our Milton Keynes warehouse on 24 hour delivery so in the unlikely event that there was a fault we can be fixing it the next day”.

The e-Series units were also sent for special ‘Blygold’ treatment to the condenser coils and panels. This added extra protection against the harsh, saline atmosphere of the coastal location. The previous heat pumps had on-board pumps which had been very difficult to access due to their location. With the new design, two sets of Grundfos twin-head inverter pumps were installed in an adjacent plantroom along with local primary circuit flow and return pipework.

“It’s early days and we’ve yet to see the savings that can be made but we’ve already seen an overall reduction in energy consumption so we are very hopeful that in addition to reducing carbon emissions, we will also be reducing our running costs,” ended Collette Germon.





Flexible, sustainable HVAC solutions for **the Healthcare sector**

Mitsubishi Electric at your service...

We offer you end-to-end lifecycle support and maintenance across our entire commercial product range including air conditioning, controls, Hybrid VRF, chillers, I.T. Cooling and commercial heating products.

From commissioning to fault-finding through regular healthchecks and preventive maintenance, we offer a menu of services you can select from to address your short and long-term needs.

We can provide full service and maintenance support for all brands of chiller systems. Including turnkey solutions; working with you from the initial stages of planning, all the way through to service and maintenance regimes.

We also offer personalised warranties, letting you decide the best options for your equipment and budget needs. Our specialist team can also strip-down and reassemble equipment, providing a useful solution for maintaining inner city sites or other locations which may be difficult to access.



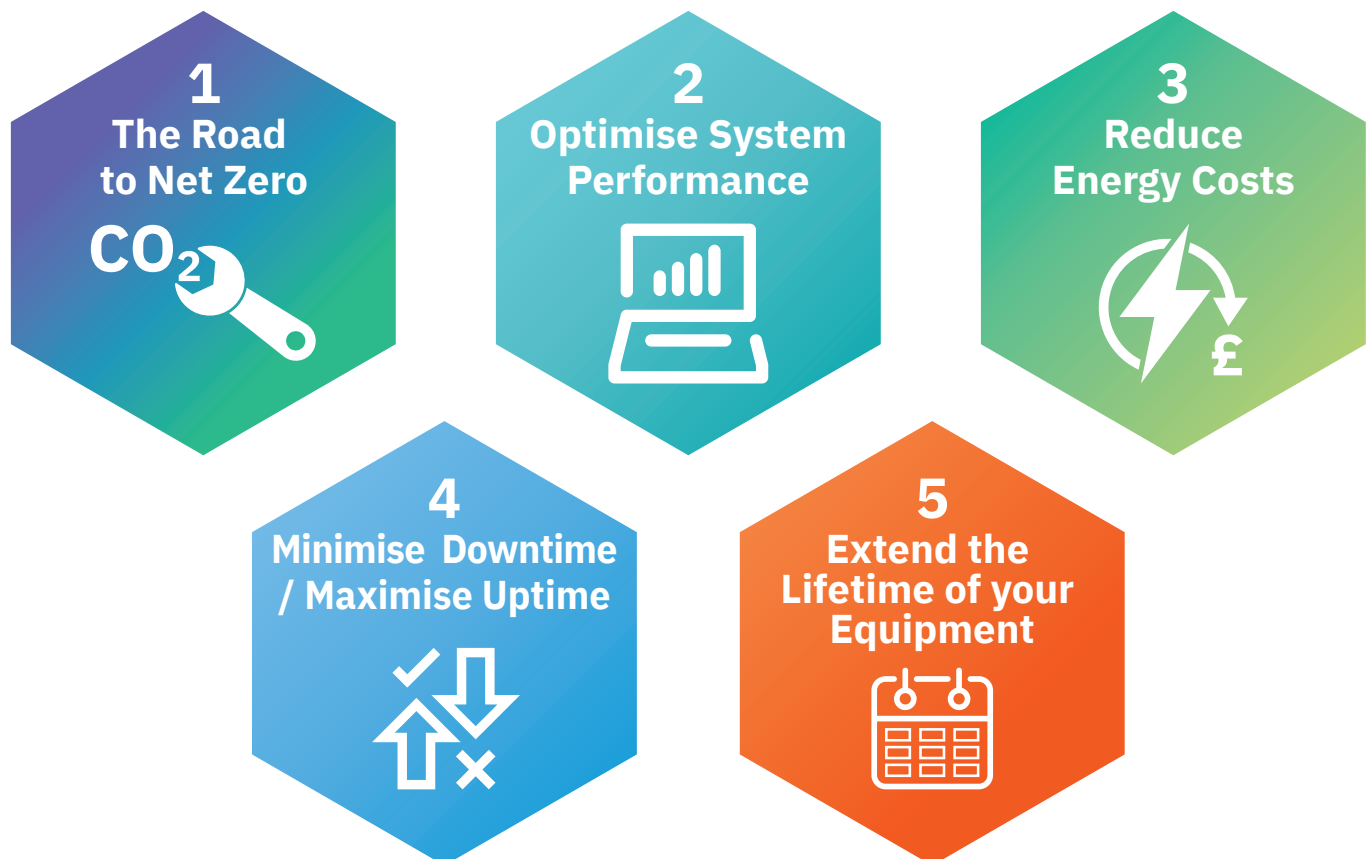
MELSERVE

By Mitsubishi Electric

Our unique **MELCloud** solution allows you to remotely monitor and check on your equipment and receive notification of any issues, whilst providing live controls and weekly seasonal timers from a single device or location.

We have teams of **REFCOM** Elite F-Gas certified engineers based nationwide, operating from our network of service offices. We also provide a 24/7/365 technical support desk available to quickly help you solve issues. Our dedicated spares department ensures the quick identification, availability, and urgent despatch of all spare parts. We pride ourselves on our ability to source parts in the quickest possible time.

Each bespoke contract with Mitsubishi Electric is built on five core pillars of value for your operations, responsibilities, and peace of mind:





Flexible, sustainable HVAC solutions
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Ideal HVAC solutions for healthcare facilities - large or small

All our solutions are supported by our world-leading reputation for quality, sustainability and customer service.

- **Our HVAC technology delivers in-built design flexibility and sustainable efficiency**
- **We have years of experience on the key design and application challenges for buildings**
- **Simple and easy maintenance** - we strive to ensure the optimum performance of your HVAC equipment
- **Easy reporting and monitoring** - remote monitoring and control of heating cooling and ventilation systems
- **Extended warranty** - different warranty packages are available depending on the chosen HVAC solution



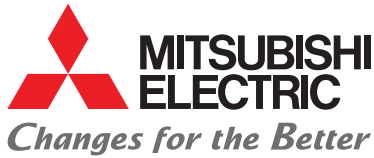
Talk to us, we know we can help

Whether you are a healthcare owner, healthcare facility manager or operator, we have a comprehensive range of solutions to match your needs.

Whether you need heat recovery ventilation that will deliver clean, energy efficient fresh air into your buildings, or need a complete heating and cooling solution, we can help. In fact, whatever your cooling, heating or ventilation need, we have the heat pump, chiller, air handling unit, air conditioner, controller, heat recovery ventilation or I.T. Cooling system to match it.

We have a diverse range of solutions which are affordable, scalable and **available right now**





Telephone: 01707 282880

email: corporatesolutions@meuk.mee.com
les.mitsubishielectric.co.uk



@meuk_les
@green_gateway



Mitsubishi Electric Living
Environmental Systems UK



Mitsubishi Electric
Cooling and Heating UK



mitsubishielectricuk_les



mitsubishielectric2



thehub.mitsubishielectric.co.uk

UNITED KINGDOM Mitsubishi Electric Europe Living Environmental Systems Division

Travellers Lane, Hatfield, Hertfordshire, AL10 8XB, England. Telephone: 01707 282880

IRELAND Mitsubishi Electric Europe

Westgate Business Park, Ballymount, Dublin 24, Ireland. Telephone: (01) 419 8800 International code: (003531)

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Note: The fuse rating is for guidance only and please refer to the relevant databook for detailed specification. It is the responsibility of a qualified electrician/electrical engineer to select the correct cable size and fuse rating based on current regulation and site specific conditions. Mitsubishi Electric's air conditioning equipment and heat pump systems contain a fluorinated greenhouse gas, R410A (GWP:2088), R290 (GWP:3), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), R454C (GWP:148), R1234ze (GWP:7) or R1234yf (GWP:4). *These GWP values are based on Regulation (EU) No 517/2014 from IPCC 4th edition. In case of Regulation (EU) No.626/2011 from IPCC 3rd edition, these are as follows. R410A (GWP:1975), R32 (GWP:550), R407C (GWP:1650) or R134a (GWP:1300).



www.greengateway.mitsubishielectric.co.uk

Mitsubishi Electric UK's commitment
to the environment

Effective as of February 2024