White Paper

Mitsubishi Electric
& The Future Office

White Paper

Mitsubishi Electric & The Future Office

10%
UK rise in working from home in 2020

The COVID-19 pandemic of 2020 and 2021 resulted in a significant proportion of UK office-based employees unexpectedly 'WFH' for many months of a national lockdown.

While the scale and speed of this change was unexpected, the shift to working outside of the traditional, central office has been underway for some time. The global pandemic simply accelerated that trend and pushed it to a much larger scale.

During the past 18 months, a proportion of workers have found that working away from a large central office provides a better work-life balance, and many are now expressing a preference for working at least some of the week at home or in an office that is conveniently close to them. The future of the office has been re-shaped by the last two years. But office space will continue to provide an important venue for work, particularly for meetings with colleagues and clients. Data from the commercial property market suggests that businesses are downsizing large central offices - looking instead for smaller but high-quality workspaces that can offer a mix of open plan space as well as smaller offices.

Demand is high for spaces that offer attractive locations for employees, flexibility in terms of use and plenty of modern facilities. As a result of these changing requirements, commercial landlords have the opportunity to re-think their offering. Those who can respond to the requirements for flexibility and quality look set for a successful future.

Building services take a central role in occupant wellbeing, comfort and productivity. Selecting the right products for the building will become even more important, since usage will be less predictable, at least for the next few years.

Mitsubishi Electric has a range of products that can support these shifting requirements, while continuing to provide long-term energy-efficient and robust operation backed by excellent installers around the UK, as well as service solutions.

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Changing technologies - shifting working patterns

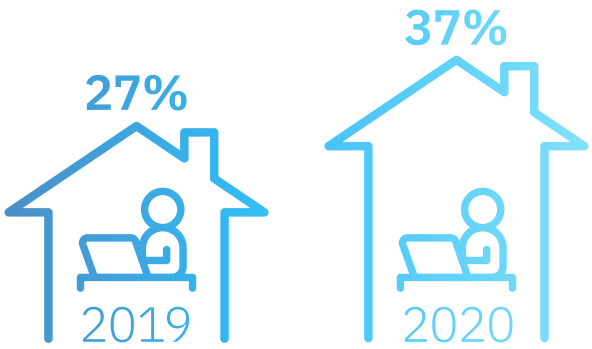
Until computers arrived on the scene to automate data management, the central office continued to be a place for multiple workers, operating in rows of desks and almost literally regarded as cogs in the corporate machine. Productivity was regarded as the result of close management and a rigid adherence to office-based culture.

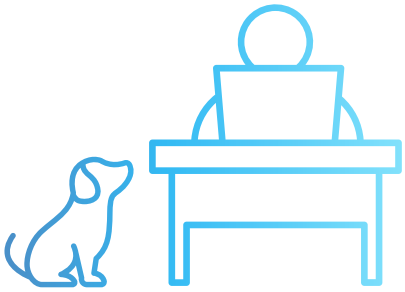
The 1980s saw the introduction of more portable computing in the form of the earliest laptops and mobile phones. These technologies were key in freeing some workers from their desks for limited tasks. But it wasn't until the 1990s and the arrival of email that office workers could aspire to go further from their desks.

Since that time, wireless communications, powerful smartphones and software-as-a-services (SAAS) have created a world in which some types of work are potentially no longer tied to a physical place at all.

The pandemic of 2020 accelerated that technology based change considerably. With government-mandated stay-at-home orders, businesses of all sizes had to organise home-working for as many of their employees as possible.

Figures from the Office of National Statistics (ONS)1 show that the proportion of adults who did 'any' work from home in the UK rose from 27% in 2019 to 37% in 2020.





Changing technologies - shifting working patterns

After more than a year of lockdown in the UK, 24% of businesses have stated that they intend to use increased remote working in the future. The ONS reports that the proportion is highest in the information and communications sector, with 49% of businesses in this sector regarding 'remote' as a key part of their future operations.

Several recent reports highlight some mixed opinions on what form 'remote working' might take. A study by Strathclyde University[2] based on a survey of 3,000 workers showed that 78% of respondents would prefer to work in the office for two days or less each week. Around a third of those surveyed did not want to spend any time at all in the office.

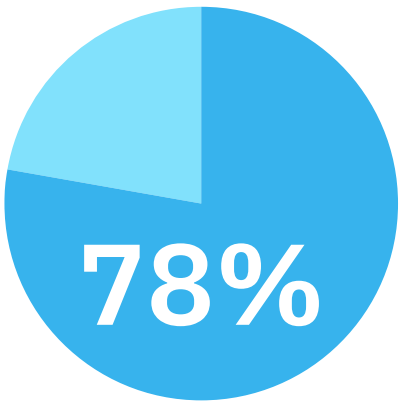
The range of preferences generally reflects the age and living circumstances of the individuals questioned. For example, many workers are happy to avoid a daily commute to a central office. However, figures from the Chartered Institute of Personnel and Development (CIPD)[3] show that it is generally workers in their late 40s and above who have the space at home for a dedicated working area.

Younger workers may be in smaller homes; sharing homes or have young children to care for. These factors make home working a less attractive option.

Another factor which a number of workers are raising is the additional cost of home working. A report in Employer News[4] highlights research from environmental charity Hubbub which shows a growing concern about higher home energy costs resulting from home working.

A survey of 3,000 workers reveals that while many would like to increase the amount of time they work from home, 68% have noticed an increase in their home electricity use and 54% a rise in gas use. This was of particular concern for younger employees. The Strathclyde study also noted that respondents said working entirely from home had impacted their mental wellbeing, with 37% reporting problems 'winding down' after work.

The conclusion is that while home working offers many benefits, a mixed approach, with flexibility and choice along with access to local offices and shorter commutes, is likely to offer the most successful future for businesses and employees.



78% prefer to work in the office for two days or less each week

Hybrid working - happening now

The switch to some level of working from home was already underway long before 2020 and has been impacting the office market across the UK. This is a worldwide shift as highlighted by a 2019 report from IWG5 which includes a global survey of 15,000 office workers. Half of respondents reported working away from the 'main office location' for half the week or more. What's more, 80% of respondents said they gave preference to jobs that offer flexible working over those that do not.

In the UK, the trend is particularly benefiting office markets outside of cities such as London, and Savills also notes that the flexible office sector looks set to benefit. This reflects a trend that was already in motion: A report from workspace specialist The Instant Group[6] notes that the UK's regional office market had been one of the fastest growing in the world in the 12 months up to 2019.

Flexi-offices, which provide a range of small offices, meeting rooms and hot desking services, were also seeing rising demand before 2020. The Instant Group reports that flexible office space providers in suburban areas have continued to experience growth in occupancy which continues to rise.

Commercial property specialist Savills notes[7] that while the office will remain a necessity, a hybrid approach will 'best meet employee needs'. Another important trend that began before the pandemic is the shift away from city centre offices towards more local centres, known as the 'hub-and-spoke' approach.

Rather than bringing all staff to a large central office each day, the hub-and-spoke puts office facilities nearer to employees, offering them access to the benefits of office working but reducing their commuting time. Another benefit for businesses is that this extends their geographical reach to new potential employees who may not otherwise have considered a role that involved a long commute or change of residence.

Research by insurance broker and risk management specialist Gallagher8 shows that 45% of businesses with office space are planning to 'downsize' their floorspace by an average of 40%.

And while most businesses are planning to make that change over the next few years to 2025, Gallagher reports that 18% have already changed their office use to embrace working from home or from 'third spaces'.

Inside the office of the future - today

The office is certainly here to stay, but it will look and operate differently in the future. In its February 2021 report, commercial property specialist Knight Frank[9] highlighted that occupiers are looking for "amenity-rich spaces that support an enriched workplace experience".

Knight Frank pointed to three important factors commercial property occupiers are demanding in their office buildings:

Facilities that support mental wellbeing; cycle storage and facilities; drop and collect parcel facilities. Another important trend seen across the UK property market is the growth of retail-to-office conversions. As retail sees shopping shifting online, developers are sensing the potential in demand for flexible, local office space.

Examples include John Lewis and House of Fraser buildings being converted to office space. Changes to the planning system are also making this type of conversion easier to achieve.

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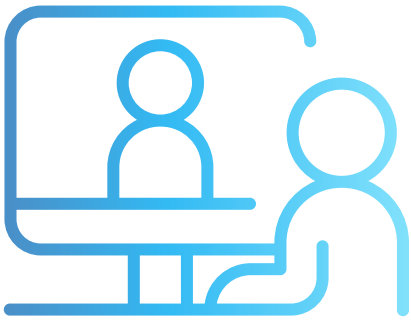

Inside the office of the future - today

As businesses look to keep their most valuable asset - the workforce - productive and engaged, there are some important characteristics that they are looking for in the future office:

Flexibility

With employees given greater choice over when and how they work, the predictability of head counts on a given day of the week is gone. Instead, it seems likely that businesses will look to make flexible arrangements for space at hub offices. For example, a certain number of desks booked across three days each week.

Access to technology

The video meeting is here to stay. With some colleagues at the office and others working from home, video conference will continue to be crucial for teamwork and communications. Facilities will have to be able to offer the latest screen-sharing technologies with private spaces for these live/remote hybrid meetings. With higher levels of working from home, the requirements for on-site servers and high-level I.T. security will continue to grow as more staff access data remotely.

Collaborative meeting spaces

If staff are working from home on their own, then it seems likely that at least some of their time in the office will be spent meeting colleagues face-to-face. Access to meeting spaces for collaborative and creative working will be highly desirable, and lower density than rows of desks. That said, the ability to provide quieter, more private working spaces will also be required.

Health and wellbeing

One of the main issues raised by workers facing a return to the office is the issue of health and wellbeing. People want to feel safe in the office. This is reinforced by forthcoming updates to Part F (Ventilation) and Part L (Conservation of Energy) of the Building Regulations. For example, there will be a requirement for systems to have the ability to deliver 50% higher ventilation rates for 'months'. Offices will also have to monitor indoor air quality (IAQ) and reduce the ingress of pollutants. Similarly, Scotland's Building Regulations also point to the importance of indoor air quality for mitigation of COVID-19, with recommendations to follow CIBSE guidance[10].

Other aspects of wellbeing include provision of facilities such as showers. With hub offices in suburban areas, employees are more inclined to cycle, run or walk to work, so the ability to offer this option is an important USP for a local office. It also helps companies support low-carbon policies by encouraging staff to leave cars at home.

These sustainability drivers are impacting the office of the future alongside major corporate environmental goals.

The office of the future must therefore also be able to harness renewable or low-carbon technologies in order to meet business requirements. You can find more about the UK's roadmap to Net Zero 2050, and its impact on the built environment on our website in the **Mitsubishi Electric Guide to Net Zero:** bit.ly/3jpOuxo

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The future of building services

With the emphasis on providing high-quality, flexible workspaces it is clear that building services such as ventilation, air conditioning and hot water will have an important role to play in the future office.

Mitsubishi Electric has a range of innovative products that offer solutions for tomorrow's office needs today.

With a focus on quality and ability to deliver energy efficient cooling, heating, ventilation & filtration to a wide range of building types and the all important controls necessary, Mitsubishi Electric equipment provides answers to many design and operation challenges, with "In stock" products.

Ventilation, filtration and monitoring for health and wellbeing

Indoor air quality is a key issue for regulations and occupants. Higher ventilation rates per person and per square metre of floor area can mean greater energy use. Mitsubishi Electric's Lossnay MVHR range of units can recover up to 90% of heat energy, while delivering localised ventilation.

This is particularly important for the modern office environment, where extraction of indoor pollutants, bacteria and viruses is critical for occupant wellbeing and reassurance.

It is a technology that Mitsubishi Electric has offered for many years and has evolved to provide outstanding ventilation and filtration performance along with energy efficiency.

Lossnay: Energy efficient ventilation

Mitsubishi Electric's Lossnay uses a hyper -efficient core made from specially processed paper which fully separates the inlet and exhaust air supplies.

The corrugated core is layered in alternating directions, creating a cross airflow to maximise heat recovery - without allowing the two air flows to mix therefore ensuring there is no cross contamination of any kind between the air being removed from the building and the fresh air coming in. Independently tested and verified by the Kitasato Research Centre of Environmental Science - Kanagawa Japan

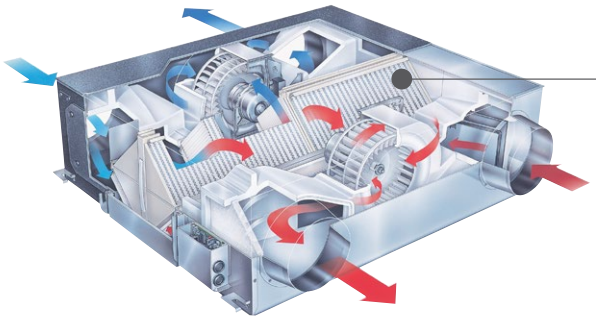
As stale air is extracted from a building, heat energy is recovered through the paper core and transferred to the incoming air. The core enables the exchange of both latent heat (humidity and moisture) and sensible heat (temperature) to maintain a comfortable internal environment with minimal energy consumption. The Lossnay range of units is available for domestic and commercial projects.

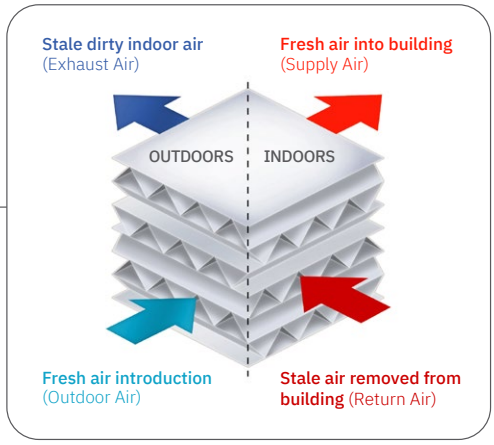
For example, Lossnay offers optional NOx (nitrogen oxide) and particulate matter (PM) filtration in filter pockets on the MVHR itself, for easy maintenance. Both of these pollutants are particularly harmful to people, so the filtration means that buildings even in the most polluted environments can benefit from clean, healthy air.

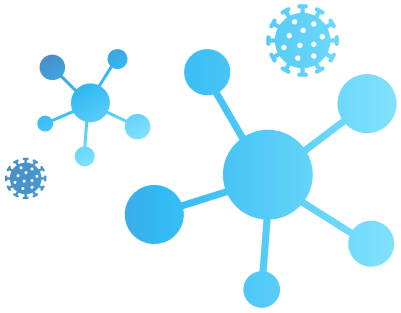
The upcoming Part F previously mentioned, requires 50% higher ventilation for months which create a challenge when selecting equipment. However, as most Lossnay systems are selected to run at the low or medium fan speed for reasons of noise and efficiency, these same units can easily be changed to high fan speed to deliver much higher air volumes achieving greater than a 50% increase but at the detriment of noise and efficiency. Also, its worth noting that connected duct work and grilles will need to be designed to accommodate these high air flows.

For more on Lossnay visit: **bit.ly/3psrAt9**

The Lossnay Core







Plasma Quad Connect filtration technology

Mitsubishi Electric's latest filtration technology is the multi award winning Plasma Quad Connect which can be connected to new and existing air conditioning indoor units across RAC (Room Air Conditioning), PAC (Packaged Air Conditioning) and VRF (Variable Refrigerant Flow) systems. This includes Mitsubishi Electric's M Series, Mr Slim and City Multi ranges.

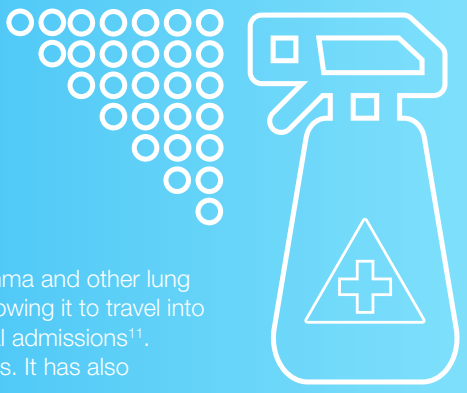
Plasma Quad Connect works like an electrical curtain to catch and neutralise even microscopic particles in the air, to significantly improve indoor air quality.

The technology has also been independently tested and inhibits 99.8%* of SARS-CoV-2, as well as being effective against bacteria, dust, viruses, mould and allergens such as pollen microscopic particles down to PM2.5.

*See references page

Particulate Matter	PM2.5

Description:
Solids and liquids present in the air in the form of particles of various sizes.



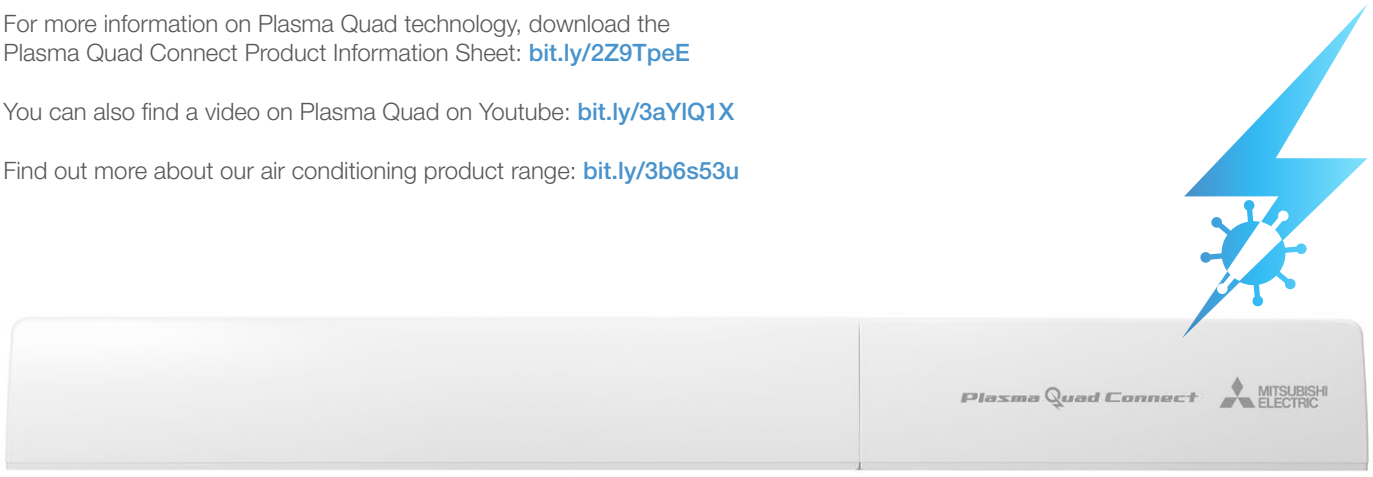
Source:
Produced indoors by activities such as cooking and cleaning; exhalation; shedding of dust from people and processes; from fixtures and fittings such as carpets and furniture.

Impact on health & wellbeing:
Particulate matter can cause irritation to the nose and throat. For people with asthma and other lung conditions, it can be particularly harmful, as this small matter cannot be filtered, allowing it to travel into parts of the lung which can then enter the blood stream and could lead to hospital admissions[11]. PM also has an adverse effect on people with heart conditions and stroke sufferers. It has also been linked to anxiety and hypertension.

For more information on Plasma Quad technology, download the Plasma Quad Connect Product Information Sheet: **bit.ly/2Z9TpeE**

You can also find a video on Plasma Quad on Youtube: **bit.ly/3aYIQ1X**

Find out more about our air conditioning product range: **bit.ly/3b6s53u**



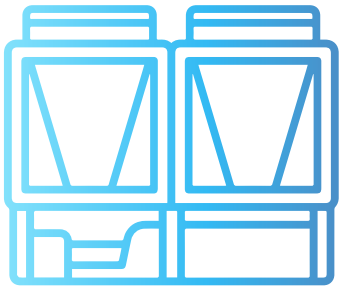
Monitoring indoor air quality (IAQ)

Monitoring indoor air quality (IAQ) is going to be a vital element of health and wellbeing in the future workplace.

The UK government's Future Buildings Standard (gov.uk/government/consultations/the-future-buildings-standard) includes a proposed requirement that all new ventilation systems in offices have a 'means of monitoring the performance of the system'.

CO_2 monitoring is mentioned as a possible approach that would meet the requirements. The Sensible Lossnay from Mitsubishi Electric has an optional CO_2 sensor.

To support this development, the Building Engineering Services Association (BESA) is already working on providing guidance on approaches to monitoring IAQ in buildings, including developing a method for providing building managers with reports and certificates.



Air conditioning – the flexible approach

Modern air conditioning systems need to be straightforward to install, but also offer the flexibility to allow for modification within the building over its lifetime.

For example, as a building progresses from the shell-and-core stage through to CAT-A fit-out, the installation is likely to include air conditioning and ducting along with a suspended ceiling and lighting - a basic layout.

However, once an office space is leased the tenant will take that space to a CAT-B fit-out, adding partitions for meeting rooms, break-out areas, small offices and generally branding the space to their own requirements. During that transformation, the air conditioning layout will also be changed to suit the location of the meeting rooms, breakout areas and any specialist areas such as restaurants, for example.

Carrying out this work with a traditional 4-pipe air conditioning system is complex and costly. A direct expansion system such as VRF is far quicker and more flexibly due to its modular design but still requires breaking into the refrigerant circuit, which means the pipework has to be 'de-gassed' (i.e. the refrigerant removed) and the pipework modified to fit the new office layout. The pipework must suit the location of the system's indoor units, and usually requires brazing (and the related hot works permits). Once these changes are made, the system will be pressure tested, vacuumed and charged with refrigerant, work that is carried out by an F-gas qualified engineer.

Given that the future office is likely to require more frequent changes of use over its lifetime, it is easy to see why finding a flexible solution for air conditioning is so important.

The challenge is to find a flexible approach to air conditioning that can deliver energy efficiency, comfort and wellbeing for occupants, but which also allows for simple changes in the future.

Types of fit-out:

Shell & Core

Cat A

Cat B

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Air conditioning - the flexible approach

One approach is Mitsubishi Electric's Hybrid VRF (HVRF) system. VRF technology is well-known for its ability to deliver high quality indoor environments in an energy efficient way and Mitsubishi Electric leads the field in VRF technology.

In its HVRF system, all of the refrigerant is contained in a Hybrid Branch Controller and from there indoor units are connected via small diamater water pipes - making flexibility one of its key benefits.

For instance, when changing a fit-out from Cat-A to Cat-B there is no need to de-gas the refrigerant as this is only present in the Hybrid Branch Controller. The pipework to the indoor units is plastic or copper, since it carries water not refrigerant. This means there is no need for an F-Gas accredited installer to carry out the work; no hot works are required; and the process is cost-effective and time-efficient to complete.

What's more, since the HVRF system is decentralised, it's also easy to take a phased approach to installation and add to a building's air conditioning requirements in the future. It's also straightforward to isolate and decommission, providing for quick and smooth installation to meet changing demand. In use, Hybrid VRF provides stable temperatures, a simple control solution and easy maintenance for the FM teams.

HVRF can deliver simultaneous heating and cooling with heat recovery, offering the ideal solution for buildings that may experience a wide range of occupancy at different times of the day, adapting to the changes in office working. It also provides high sensible cooling (far less unnecessary drying of the air) and maintains a stable room temperature, to ensure occupants are comfortable.

The Mitsubishi Electric HVRF system also uses low-GWP refrigerant R32 in a Hybrid Branch Controller, this refrigerant is 60% less harmful to the environment than the standard R410a refrigerant commonly used in VRF. This is particularly useful for smaller offices, as the refrigerant is kept away from any occupied spaces, meaning no leak detection and monitoring is required.

Heat Recovery System

Provides simultaneous heating and cooling with the benefit of heat recovery

By moving energy where it's needed, input is reduced by up to 30%. Offering flexibility, operability, comfort and control.

This system is ideal for hotels, offices and leisure

For more information on the Hybrid VRF system visit: bit.ly/3m3n5mz

Download the Hybrid VRF brochure: bit.ly/2ZhZ0zO

You can also watch our Mitsubishi Electric Hybrid VRF: An Application Animation video on Youtube: bit.ly/3B9YNM6

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Air conditioning - the flexible approach

For projects where chiller technology is specified, Mitsubishi Electric has a range of options, including its e-Series Modular Chiller.

The e-Series allows for up to six individual units to connect together to provide a highly flexible system capacity from 90kW to 1080kW.

This is an ideal solution for buildings that are gradually increasing occupancy as modular chillers can be added in the future.

Mitsubishi Electric's traditional chillers, in the Climaveneta range, are a new generation of water chillers designed for comfort cooling. The range is designed to offer solutions for a range of building sizes, with features that include low noise levels.

Find out more about our chiller range: **bit.ly/3b3D9yo**

Download the Mitsubishi Electric Chiller brochure: **bit.ly/3EawfEh**

Visit our Mitsubishi Electric Chiller range website: **mechillers.co.uk/home**

White Paper

Technology and in-house I.T. Centres

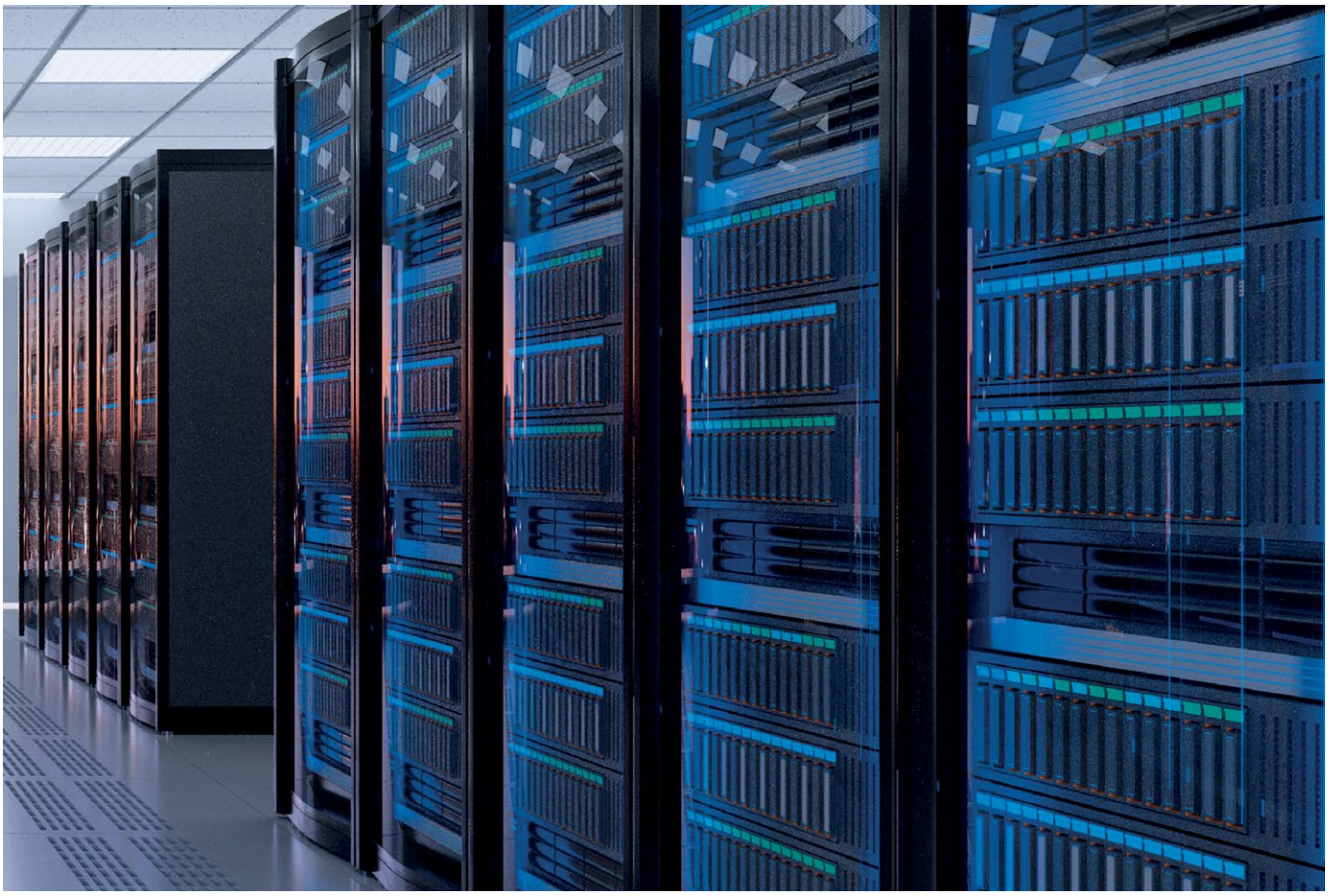
With companies investing more in technology for remote working, the need for I.T. cooling in office buildings is increasing. The future office will rely on technology for business-critical systems from internet access to VOIP calling and remote room bookings - system failure due to overheating is not an option.

Mitsubishi Electric's s-MEXT CRAC technology delivers robust and high precision IT Cooling.

An industry first - combining the s-Mext system with Mitsubishi Electrics Mr Slim power inverter outdoor unit, which is one of the UK's best selling split air conditioning systems. The units are available in capacities from 6kW to 42 kW and they are ideal for small to medium sized enterprise data rooms.

For more on Mitsubishi Electric's I.T. Cooling services see: **bit.ly/3pw2QjE**

Download our I.T. Cooling brochure: **bit.ly/3C86YK7**



Domestic hot water provision

Domestic hot water use in commercial offices has been rising for some time, as more companies offers facilities such as dedicated hand-washing areas, shower facilities or encourage their staff to run, cycle or walk to work. With the UK government encouraging a switch away from gas boilers, Mitsubishi Electric's heat pump range can provide a low-carbon and highly energy efficient alternative.

Ecodan QUHZ and QAHV are designed for the purpose of heating domestic hot water as efficiently as possible, uses the lowest GWP possible and comes with low-noise operation. (ideal for city centre or multi-use locations near residential areas). Energy monitoring is provided as standard.

With the QUHZ there is no stored water in the system, ensuring that there is no risk of legionella, as hot water is instantly heated. This is useful for buildings where occupancy levels may vary widely. This also suitable for smaller offices (up to 4 showers), but for the larger offices QAHV is the ideal solution, with a far larger capacity and a modular design.

The QAHV Monobloc air source heat pump can produce water up to 90ºC. Not only does this heat pump system provide high efficiency at high flow temperatures, but it also uses CO_2 as a refrigerant - with a Global Warming Potential (GWP) of just 1. With super-low noise levels, the Ecodan QAHV is also an excellent low-carbon heating solution for office buildings close to residential areas.

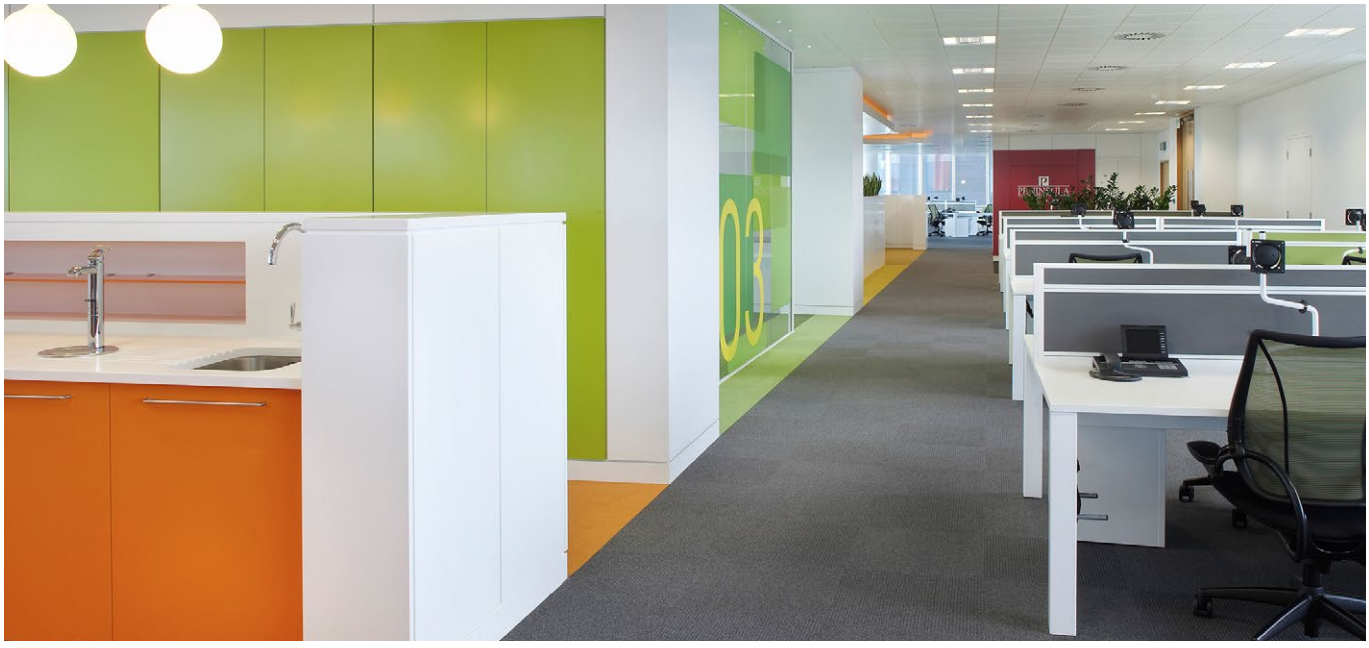
For more information on Ecodan QUHZ visit: **bit.ly/3B6D08f**

Download the QUHZ PI Sheet: **bit.ly/3psOAs4**

For details on Ecodan QAHV: **bit.ly/3jppfew**

Download our Ecodan QAHV PI Sheet: **bit.ly/3ptAma7**

You can also watch our Ecodan QAHV video on Youtube: **bit.ly/3psJLic**



Monitoring and controls

Control technology is vital to optimise HVAC systems, not only for energy efficient operation but also to support occupant comfort and facilities management.

Control technology such as PIR (passive infra-red) room sensors can switch systems such as cooling, lighting and ventilation on or off based on room occupancy sensor feedback. This reduces the need for occupants to touch control panels (helping to maintain hygiene), while also saving energy by switching services in unoccupied spaces.

For example, Mitsubishi Electric's PAR-U02MEDA is a backlit touch screen remote controller, that has a built-in PIR sensor which allows the air conditioning to be switched on or off automatically according to room occupancy. The controller is compatible with City Multi, M Series and Mr Slim ranges and can be used to control other equipment such as lighting and ventilation.

Mitsubishi Electric also offers the 3D i-see Sensor Grille. This is a 360°, highly accurate sensor. It detects human body temperature, providing monitoring of room occupancy as well as position detection.

The 3D i-See sensor allows for accurate demand control of air conditioning in a space - automatically providing excellent comfort levels for occupants while ensuring that the equipment only operates when required. Again, this reduces the need for occupants to touch control panels. The i-See Sensor Grille is available for Mitsubishi Electric's Mr Slim and City Multi VRF ranges.

Today's control technology also allows for remote monitoring of systems, giving facilities managers an overview of building performance, and the ability to compare factors such as energy use across a portfolio of offices.

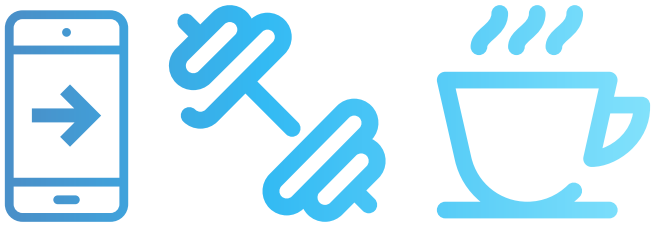
With multiple occupants in a building at one time, tracking energy use will be vital for landlords to keep control of operational costs, particularly as old building usage patterns change. Also, with multiple commercial occupants, it is important to be able to apportion energy use for accurate billing.

Mitsubishi Electric's MELCloud Commercial system enables remote monitoring and control of air conditioning systems, heat pumps and ventilation systems. MELCloud has been designed to simplify day-to-day system operation such as easy adjustment of target temperatures, switching between operational modes and historic trend analysis. Energy monitoring and apportioning capabilities are also being added to the MELCloud system, providing an all-round solution for commercial landlords.

The Mitsubishi Electric AE-200 Centralised Controller offers centralised web-based control of up to 50 units, including third-party equipment. Features include scheduling and night setback as well as energy monitoring of multiple air conditioning systems. It is also possible to set energy consumption targets directly onto a touch screen or remotely.

For more details on PAR-U02MEDA see: **bit.ly/2ZabDwz**
For more details on the i-See Sensor Grille: **bit.ly/3m7Clz7**
You can watch our 3D i-See Sensor video on Youtube: **bit.ly/3b83viJ**
Find more information on the MELCloud system here: **bit.ly/3prYM3P**
For more information on our AE-200 Centralised Controller see: **bit.ly/3GaPJKK**

The office of the future - here today



The technology to deliver high quality offices that can help to attract and retain staff, while supporting wellbeing and productivity is already available and being applied today. One example is the recently-opened 22 Bishopsgate building in London.

This building exemplifies many of the features of the 'office of the future', offering occupants a gymnasium, restaurants, event space and facilities for those who cycle to the office including bike storage and showers.

Occupants can download an app for the building to their smartphone and use it for contactless building entry, as well as booking gym classes and dry-cleaning pickups.

Another example is Bloc in Manchester. Launched by workspace and leisure specialist Bruntwood Works, Bloc aims to provide 'an urban oasis' in the city centre. It is a 16-storey building that offers office space, co-working options and facilities for fitness and wellbeing, as well as event facilities and a restaurant.

The building also includes systems designed to optimise air quality, and building controls to ensure energy efficient operation. Mitsubishi Electric has supplied equipment to many office development projects - new-build and refurbishments, you can find our case studies here: bit.ly/3Gct5la

We believe that with technology available today, the office of the future can be achieved now, and not only meet the requirements of discerning corporate tenants, but also achieve long-term energy efficient and trouble-free operation.

References

1. Office for National Statistics on evolving attitudes to working from home (UK April to May 2021): bit.ly/3b1MHtV

2. Strathclyde University, Covid-19 and Working from Home Survey: bit.ly/3m2riXU

3. CIPD Report, April 2020: Megatrends Working from home: What's driving the rise in remote working?: bit.ly/3nmShNh

4. Employer News, Employees call for help to reduce cost and environmental impact of working from home (24th March, 2021): bit.ly/2ZkbYgD

5. IWG 2019 Global Workspace Survey: bit.ly/2Z6Qx29

6. The Instant Group, Research report 2019: bit.ly/30SGXAX

7. Savills, Office FiT Survey results: bit.ly/3ndvHqe

8. Research from Gallagher: bit.ly/3Gn4nyL

9. Knight Frank, The Occupier Mindset: bit.ly/3jrTVMa

10. Scottish Government COVID-19 ventilation guidance updated 10th August 2021: bit.ly/3E9ys2u

11. Zhang, X., Kang, J., Chen, H., Yao, M. and Wang, J. (2018). PM2.5 Meets Blood: In vivo Damages and Immune Defense. Aerosol Air Qual. Res. 18: 456-470. bit.ly/3Gslkrr

*Plasma Quad Connect - Derived from and subject to test results, for and on behalf of Mitsubishi Electric, conducted at the Microbial Testing Laboratory, Japan Textile Quality and Technology Centre, Kobe, Japan.

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Note: The fuse rating is for guidance only. 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), R32 (GWP:675), R407C (GWP:1774), R134a (GWP:1430), R513A (GWP:631), R454B (GWP:466), 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).

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