The Renewable Solutions Provider

Making a World of Difference

Controls

MITSUBISHI ELECTRIC

LIVING ENVIRONMENTAL SYSTEMS

Air Conditioning | Heating

Ventilation | Controls

Taking control of your energy use

Increasing energy bills, the need to reduce carbon emissions and a raft of challenging legislation are driving the demand for increased energy efficiency in our buildings.

How you control your heating, cooling and other building services can make a real and immediate difference to your bottom line. Whether you utilise the existing controller more efficiently or upgrade to a more advanced system, taking control can lead to a dramatic reduction in running costs, cut emissions and lower your energy use.

Unsurpassed control from Mitsubishi Electric

Building controls offer excellent return on investment, and as the technology has developed, it is now much easier to retrofit new controls into existing premises. From a simple hand held controller to a centralised controller or full Building Energy Management System (BEMS) integration - **Mitsubishi Electric puts you in total control**.

The name Mitsubishi is synonymous with excellence

Founded in 1921, Mitsubishi Electric is now a global, market leading environmental technologies manufacturer.

In the UK, the Living Environmental Systems Division provides pioneering solutions that heat, cool, and ventilate 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.

Central to the efficient running of a building's services is an effective control system and at Mitsubishi Electric, we have developed a comprehensive range of control devices from simple room controllers to advanced Internet-based systems that can monitor, analyse and run entire estates across the globe.

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

Optimising performance and reducing running costs

The need for control

Operating a heating and cooling system without the right controls can prove costly to any business. It is therefore essential to make sure that every system is correctly specified and maintained to provide the exact degree of control required.

Good controls will benefit any application, large or small but with the huge choice of control systems available, careful consideration should be given to identify the correct control for each individual situation.

The ability to respond to different building requirements is particularly important for air conditioning systems. They must be able to react to a variety of factors including different room sizes, usage and occupancy levels as well as heat loads from electronic equipment and lighting. Optimum control of air conditioning systems is therefore essential to ensure a constant, comfortable environment, which is both energy and cost-efficient, whilst minimising carbon emissions.

For smaller premises, a simple control system with a remote controller and simple on/off scheduling will be sufficient to achieve the optimum combination of comfort, running costs and energy efficiency. However, in a large building, such as a hotel, a much more sophisticated control system will be needed to implement more intricate control strategies and to co-ordinate a large number of air conditioning units, all dealing with the different room requirements and changing heat loads.

Control, Monitor, Report

Improving the control, monitoring, and data reporting of our heating and cooling equipment is perhaps the single most impactful enhancement we can make. With today's increasingly predictive systems, the benefits are easy to achieve too.

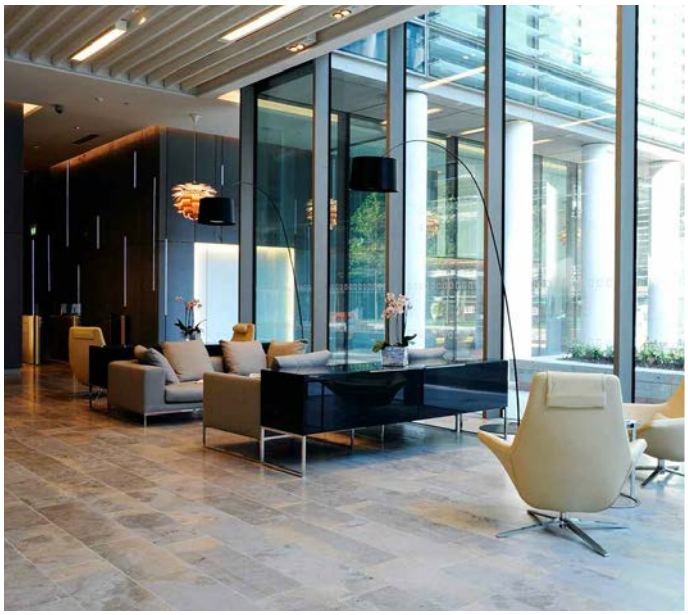
Historically, the capital costs of equipment and installation drove purchasing decisions with few giving much thought to running costs.

Now though, "fit and forget" is no longer an option if we are to deliver greener, more energy efficient and more economical buildings.

Monitoring and reporting capabilities are also increasingly requested by customers with major energy needs and required by legislation and building regulations.

Variables such as user habits, energy consumption patterns and outside temperature can now be used to inform system management and control.

Delivering the right information to the right people at the right time helps to speed-up interventions and to reduce undue energy use. Based on predictive algorithms, interventions can even be made automatically to ensure optimum performance is maintained at all times.



The need for control

Scalable & Flexible

Controls are a highly scalable technology. It is possible to specify a complex building energy management system (BEMS) that links together all building services plant in one system. Alternatively specifiers can opt for simpler solutions to suit an individual budget.

Mitsubishi Electric controls also offer a high degree of flexibility, not only in new buildings - which has seen advanced controls becoming almost standard, but also in existing premises, where they can make a real difference to energy use. With wireless technologies, retrofitting has become much simpler and older buildings can benefit enormously from better controls.

Looking to the future, more buildings will need to make use of both renewable technologies and passive design features. Effective building control systems are an absolute necessity for these systems. In a mixed mode building for example, using a combination of natural ventilation and air conditioning, the building control system has a central role to play in maintaining the balance between occupant comfort and energy use, whilst modulating the two technologies.

Legislation

Part L of the Building Regulations states that "fixed building services shall have effective controls" and that "control strategies should be organised such that priority is given to the least carbon intensive energy source."

Building controls are being asked to moderate and minimise energy use in a building, with the regulations stating that building service systems should be provided with appropriate controls to enable the achievement of reasonable standards of energy efficiency in use.

Under normal circumstances, this legislation suggests that the following features would be appropriate for heating, ventilation and air conditioning system controls:

- The systems should be subdivided into separate control zones to correspond to each area of the building that has a significantly different solar exposure, or pattern or type of use.
- Each separate control zone should be capable of independent timing and temperature control and, where appropriate, ventilation and air recirculation rate.
- The provision of the service should respond to the requirements of the space it serves. If both heating and cooling are provided, they should be controlled so as not to operate simultaneously
- Central plant should operate only as and when the zone systems require it. The default condition should be off.

Effective control is also a key area in complying with the **Energy Performance of Buildings Directive (EPBD)**, This requires commercial air conditioning systems to be independently assessed in detail.

Since controls offer good potential for reducing energy use in a very cost effective way, the aim of the inspection is to provide building owners and managers with information on the efficiency of the air conditioning systems in their buildings, as well as advice on how the performance of these systems could be improved.

In accordance with the requirements of Part L of the Building Regulations and to comply with the EPBD, Mitsubishi Electric control systems provide the optimum control available, combined with the most efficient use of energy.


ROOM
ACCESS

Optimum control whatever the application

Mitsubishi Electric have a comprehensive range of control systems available as either 'off-the-shelf' or bespoke solutions tailored to suit individual needs. Ideal for a variety of applications, the following pages illustrate the versatility and suitability of our controls range.

Products range from the simplest remote control units through to sophisticated centralised controllers that have the ability to use the Internet to control multiple sites from a single location and offer a wealth of energy saving, reporting and monitoring features.

Air conditioning, ventilation and heating units are not the only systems in a building and to ensure they work effectively and in conjunction with other building services such as lighting, security, power and fire systems, Mitsubishi Electric's range of BEMS interfaces allow complete control and monitoring integration.

Improperly configured BEMS are believed to account for up to 20% of building energy usage, so in order to maximise the energy efficiency of a building, Mitsubishi Electric controllers are able to integrate with most major BEMS suppliers.

For companies with several premises, Mitsubishi Electric has adopted the M2M (machine-to-machine) platform to offer remote management of the air conditioning units in each of these buildings. M2M technology allows customers to integrate multiple sites into a single network and control and monitor them from one location.

Solutions for Small Offices

Small offices require their systems to operate as efficiently as possible, as well as incorporate an easy to use interface that the end user is comfortable with. It is also essential that the building services are all time clocked accordingly, a simple feature but one that is still not always applied to all buildings.

A small office installation can typically consist of:

- City Multi VRF Systems or Mr Slim Split-Systems Air Conditioning
- Mr Slim IT Room Applications

Mitsubishi Electric Controls Solution

- PAR-31MAA Wired or PAR-21PC Virtual Remote Controllers
- AG150 or AT50 Centralised Controllers
- PAC-YG66DCA / PAC-YG60MCA Interfaces

The popular PAR-31MAA is a simple and easy to use remote controller, enabling localised control. The PAR-31MAA can also be locked or have its functionality limited as necessary according to management requirements.

In some applications where an AG150 is connected to the clients network, the end user is also able to use the PAR-21PC virtual remote controller via their PC screen. The PAR-21PC is free and does not require any cabling as it utilises the IT infrastructure.

The AT50 will allow the end user to not only time clock all Mitsubishi Electric systems, but also third party equipment, for instance lighting when using the PAC-YG66DCA interface. The AG150 when using the PAC-YG60MCA interface can be used where simple energy monitoring is necessary. Emails can also be sent under fault conditions when the AG150 is connected to the Internet or to the clients network.

PACAIR Office, Hemel Hempstead

When wholesaler PACAIR moved into their offices, Mitsubishi Electric was the air conditioning manufacturer of choice.

The Mitsubishi Electric AG150 Centralised Controller was chosen as the perfect solution for PACAIR's office. It's 9" touch screen controller provides complete control of the office air conditioning and the ability to set up a weekly time schedule, as well as offering energy saving features.

The AG150 Centralised Controller has been installed in the meeting room for demonstration purposes, but can be locked to stop unapproved changes to the set profile.

The AG150 has also been connected to the office's network so that the director and technical manager can have full access to the controller and air conditioning from their desks. In addition, each staff member can access a PAR-21PC (via their local desktop machine) to change the individual settings of air conditioning in their vicinity.

A PAC-YG60MCA interface has been installed for energy monitoring purposes. "This is the best way to see how much energy we are actually using to operate our air conditioning".

Nigel Palmer - PACAIR Director.

PACAIR's TG2000 Main Screen

PAR-21PC

Solutions for Large Offices

Large offices need systems that operate as efficiently as possible, incorporate easy to use controls that end users are comfortable with, and allow for fully programmable scheduling that accommodates flexible working patterns.

A large office installation can typically consist of:

- City Multi VRF Air Conditioning Systems
- City Multi Air Curtains
- City Multi IT Room Applications (PFD Close Control Systems)
- City Multi PWFY Heat Pumps (Water Heaters)

Mitsubishi Electric Controls Solution

- PAR-31MAA Wired or PAR-21PC Virtual Remote Controllers
- AG150 Centralised Controller
- TG2000 Software Package

TG2000 is the ideal solution for facilities or building managers looking after more than one system on a site. The TG2000 energy monitoring package also provides breakdowns of the energy cost applicable to each tenant or zone as necessary. Further trend logging on the TG2000 enables the facilities manager to check temperatures and to deal with potential complaints.

The AG150 features night setback and optimised start functions that will allow the air conditioning to reach the desired temperature quicker and more effectively in the morning. The energy saving function of the AG150 can also be activated within a specific part of the building if the energy consumption is too high or at a specific time, for instance if staff are away from their desks. Emails can be sent under fault conditions when the AG150 is connected to the Internet or to the client's network.

The PAR-21PC is an equivalent of the PAR-31MAA but operates 'virtually' so that staff are able to alter their own air conditioning settings from their desktop PC.

Mitsubishi Electric UK Head Office

Mitsubishi Electric's head office in Hatfield has benefitted from the use of TG2000 software for almost 5 years.

It is used to monitor and control all of the air conditioning equipment across 3 floors and 2 wings, offering total control and a variety of monitoring functionality aimed at reducing energy use.

The software enables the facilities department to monitor the energy consumption for each business unit and also to change the air conditioning settings using a single graphical interface. The scheduling is optimised for summer and winter with different set points in operation during different seasons, i.e. 21°C heating in winter and 23°C cooling in summer.

The PFD close control system in the server room is also monitored using the TG2000 and a PAC-YG63MCA interface (temperature and humidity), allowing the facilities and IT managers to be notified if the temperature or humidity fall outside of normal parameters.

Other control strategies that are in place through using the TG2000 include the Air Curtain in the reception area only being activated when required. The PWFY heat pumps serving the kitchen and the canteen are also monitored and controlled using the TG2000.

In the past five years, Mitsubishi Electric has sought to improve the energy efficiency of the building. Using off-the-shelf equipment, replaced as part of a routine maintenance regime, the company has increased the energy rating of this 1980's, three-storey, glass-fronted office block from an 'E' to a 'B'.

The TG2000 has been a primary driver in this process, tying the different technologies and systems together in one centralised controller.

In summary, the TG2000 allows the facilities manager not only to monitor and control all Mitsubishi Electric equipment (including the air conditioning, Photovoltaics and hot water) from one location, but also any third party equipment and act as a Building Energy Management System.

Using the energy monitoring data the facilities department is able to understand how much energy can be saved by using different control strategies and put into practice policies aimed at maximising the energy saving potential.

TG2000 Display Floor

Solutions for Small Retail Applications

Small retail outlets require systems that operate as efficiently as possible, providing customer comfort that maximises energy and cost saving potential. It is also essential that the building services can be time-clocked and that the company has the ability to monitor multiple retail sites remotely from a central location, if needed.

A small retail installation can typically consist of:

- Mr Slim Split-System Air Conditioning
- Mr Slim Air Curtains

Mitsubishi Electric Controls Solution

IO Interface or Mini M2M Interface

For a very small store (1 or 2 indoor units), the IO interface will configure the air conditioning to operate as efficiently as possible.

Two energy saving functions are available with the IO interface. One is to increase the deadband so that for instance, heating will only be activated when the temperature is below 19°C and cooling when the temperature is above 23°C. In between the indoor unit will continue to circulate air (fan only mode), but the compressor will be switched off which is the best way to save energy.

The second option is to only run the air conditioning for a set period of time, for instance two hours and then run in fan only mode thereafter. This is perfect for a retail application where a high percentage of the daily turnover is made in the first 3 hours of trading, i.e. a coffee shop. If temperature extremes do occur however, staff are still able to push an override button to reactivate the IO interface timer and therefore the air conditioning for a further period of time.

This IO interface solution is perfect for small shops as only one interface is required for a group of split systems, therefore minimising the capital cost. For more advanced controls within small retail applications, the Mini M2M interface would be the second option to go forward with. Further details on the Mini M2M interface can be found on page 20.

Costa Coffee

Costa Coffee have been using Mitsubishi Electric air conditioning for many years and were one of the first companies to make use of the IO Interface.

Due to the fact that the shops have a very limited number of indoor units, the control system needs to be kept within budget, however the air conditioning must still be able to run as efficiently as possible.

When Mitsubishi Electric launched the new IO Interface in May 2009, Costa Coffee undertook a trial to measure how effective the IO Interface's energy saving functions were.

The trial was mainly using the 'Dual Setpoint' energy saving feature whereby the air conditioning operates in heating mode up to 19ºC and cooling mode down to 23ºC for instance.

In between the air conditioning is running to a strict minimum (fan only) thus allowing the compressor to switch off and save energy.

The results were very impressive. Across the whole year the IO Interface was responsible for a 20% reduction in energy use, with customers and staff still very happy with the coffee shop environment.

When Costa Coffee arrange for an IO Interface to be installed into one of their shops as part of an already scheduled maintenance visit, the IO Interface payback period is less than 2 months, making it an impressive addition to the Costa Coffee controls portfolio.

Great comfort, great saving and a payback period of less than 2 months!

Solutions for Large Retail Applications

Large retail outlets require systems that operate as efficiently as possible, providing customer comfort that maximises energy and cost saving potential. Retailers with multiple sites also need to be able to monitor building services from one central location or remotely, to maintain efficiency and control.

A large retail installation can typically consist of:

- City Multi VRF Air Conditioning Systems
- City Multi Air Curtains

Mitsubishi Electric Controls Solution

Mini or Maxi M2M Interface

One of the ways for a large retail chain to save energy is to remotely take control of all of their sites. The M2M package allows this and is not only a remote device for air conditioning, but also for third party equipment.

The M2M can be used to monitor and log temperatures, energy, intruder alarms, manual / auto override switches, fire alarms, water leaks and many more building services. The M2M can also be used to control any services; for instance, time clocking of air conditioning, lighting, pumps or fresh air supply etc. A strategy can then be setup on the M2M interface to interlock the intruder alarm with the lighting, frost protection, auto and manual override switches for example.

The M2M web portal allows the end user or the facilities manager to monitor all retail sites within the chain via the Internet.

HSBC

HSBC was the first company to provide a pilot site for the system development of the M2M interface, Mitsubishi Electric's remote system.

The first site installation was in Kings Lynn with three other site installations following soon after. Acting as a mini BEMS, the M2M enables not only the metering and monitoring aspect of energy management, but also provides the added benefits of control.

By connecting the M2M to lighting, air conditioning and other energy intensive equipment within a building or site, the system can highlight areas where energy can be reduced or identify unnecessary use. Users can control equipment to reduce energy use and subsequent costs to the company.

Other quick wins from adding control through M2M was to firstly manage time-clocks, which independently run a variety of equipment within the building and which are often out of sync. Secondly setpoint control enables management of the varying temperature setpoints often caused by staff who manually increase and decrease temperatures within the building.

An average saving of 30% throughout the branch network was made by employing M2M, providing a return on investment within 6 months. M2M is over 60% cheaper to install and maintain than the average cost of a BEMS and provides a much greater return on investment.

M2M Dashboard

M2M Reports

Solutions for Small Hotels

Small hotels require systems that not only operate efficiently, but also do not compromise guest comfort. Having the air conditioning integrated with the room key card system or window sensors is often a requirement, again to maximise efficiency and reduce running costs. A simple to use room controller is also a necessity, as well as one that can be locked according to the hotels individual needs. The room controller may well also need to fit into the décor of the room accordingly, so options are required here.

A small hotel installation can typically consist of:

- City Multi VRF Air Conditioning Systems

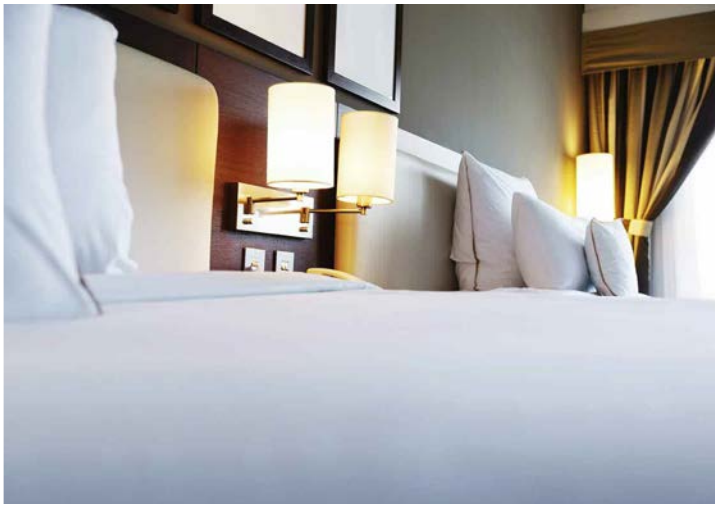
Mitsubishi Electric Controls Solution

- PAC-YT52CRA Wired Remote Controller
- AG150 Centralised Controller
- AG150 Interlock Pin Code

The PAC-YT52CRA remote controller has been specifically designed with hotel applications in mind. Very simple to use, the units super-slim design makes installation flexible and easy and the backlight function answers a need that many hoteliers have been calling for.

The AG150 will allow the hotel to monitor rooms from the 9” touch screen controller, but also from the web pages if the AG150 is linked to the reception PC for instance. Each air conditioning unit can be named for easier use (i.e. by room number) and off times can be set on the AG150 to make sure that the air conditioning switches off when the room is very likely to be unoccupied (day time for instance).

When using a key card system, the card can be connected locally to the indoor unit. When the room is occupied, the unit switches on and when the room is unoccupied, the unit goes into night setback using the AG150 interlock function.



Kingsmills Hotel, Inverness

Kingsmills Hotel is a luxury 4-star hotel in the heart of the Highlands. The well established and highly regarded hotel, just minutes from the centre of Inverness, is set in four acres of carefully kept gardens and has 83 rooms.

The team behind The Kingsclub and Spa development carried out extensive research to find out what visitors really need and want from a Spa hotel.

Designed to provide a chic and contemporary hotel choice for discerning travellers to Inverness, this latest addition to Highland hotels focuses on relaxation, revitalisation and calm.

Due to the small number of bedrooms the AG150 controller 'interlock function' offered the best solution going forward.

This allows the air conditioning to switch on at a predetermined setpoint and operating mode while the room key card is in and revert automatically to night set back when the key card is taken out.

This solution allows the hotel to offer its guests exceptional comfort while ensuring the owners maintain low running cost.

Solutions for Large Hotels

It is essential that large hotels have highly efficient systems which optimise energy efficiency and customer comfort. An integrated air conditioning system with key card or window sensors is often a requirement. Simple to use room controllers are a necessity and help to maximise efficiency and reduce running costs. Stylish room controllers may well also be required to fit in the décor of the room.

A large hotel installation can typically consist of:

- City Multi VRF Air Conditioning Systems

Mitsubishi Electric Controls Solution

- MELCOTEL™ Interface
- AG150 Centralised Controller
- Maxi M2M Interface
- PAC-YT52CRA Wired Remote Controller

The Melcotel™ Interface allows a hotel to have more accurate control over its air conditioning and can be used to control and monitor up to 250 bedrooms. Two different options are available when using Melcotel:

Option 1: Using a key card system
The Melcotel works in conjunction with the key card system installed in each bedroom. When the room is occupied, i.e. when the key card is "in", Melcotel will switch on the unit and reset the air conditioning to predetermined settings (for instance AUTO, 21ºC). When the room is unoccupied, Melcotel will activate night setback.

Option 2: No key card system used
When the unit has been switched on by a user, the room is deemed as occupied and Melcotel resets the air conditioning to predetermined settings (for instance AUTO, 21ºC). At a preset time, Melcotel will switch OFF the unit automatically to save energy. When the room is unoccupied, Melcotel will activate night setback.

With both options, Melcotel also offers a temperature adjustment facility based on the outside temperature. The window sensor option allows the air conditioning to be switched off and controlled centrally when a window is opened. Melcotel in conjunction with the Maxi M2M Interface can also be monitored remotely via the internet. All of these functions provide a higher level of control and therefore greater energy saving and a substantial reduction in running costs.

Premier Inn, Leicester

The Premier Inn Hotel, Leicester has 135 bedrooms and occupies the first 9 floors of a 20 floor building. The hotel is located in the heart of the city close to the main railway station.

Premier Inn installed a Mitsubishi Electric high efficiency heat recovery VRF (variable refrigerant flow) air conditioning system to provide heating and cooling to the 135 bedrooms as well as the bar, restaurant and back offices. They wanted to use this site to test the Melcotel™ control interface and determine if they could reduce energy consumption, thus CO_2 emissions and running costs.

Based on the test results Premier Inn would decide whether or not to install Melcotel interfaces into more of their hotels. A Mini M2M interface was also installed to monitor the energy consumption and the Melcotel settings.

At the Leicester site various control strategies were implemented over the 24 months that the system was monitored and analysed. This resulted in a 30% decrease in average monthly system running costs and CO_2 emissions.

The monitoring and analysis of the data for this report clearly showed that the Melcotel controls interface enabled Premier Inn Leicester to benefit from reduced energy consumption and therefore reduced system running costs and CO_2 emissions. This allowed them to provide a comfortable internal environment for their customers, in a highly efficient, cost effective and environmentally friendly manner.

With clear and successful results, Melcotel is now part of the national Premier Inn controls specification. Premier Inn are now investigating their other hotel sites where this system can be utilised.

M2M Monitoring

Solutions for Small Leisure Facilities

Small leisure facilities need to provide a comfortable climate for a variety of customer needs, from early morning through to late evenings. This diversity of needs means that control of energy usage is very important, whether for single or multiple sites.

A small leisure facility installation can typically consist of:

- Mr Slim Split-System Air Conditioning
- Mr Slim Air Curtains

Mitsubishi Electric Controls Solution

Mini M2M Interface

The M2M is not only a remote device for operating the air conditioning, but also for operating third party equipment.

The M2M can be used to monitor and log temperatures, energy, intruder alarms, manual / auto override switches, fire alarms, water leaks and many more building services. The M2M can also be used to control any services; for instance, time clocking, lighting, pumps or fresh air supply etc. A strategy can then be setup on the M2M interface to interlock the intruder alarm with the lighting, frost protection, auto and manual override switches for example.

The M2M web portal then allows the end user or the facilities manager to monitor all company sites via the Internet.

St Andrews Golf Course

St Andrews Links Trust, the management organisation for the Old Course and associated golf courses, decided to build a new golf course (called the Castle Course) to cater for the increasing demand for top quality golf facilities in the area.

St Andrews Links Trust wanted to heat and cool their new build club house in the most efficient manner possible. Specialist Mechanical Services designed a new system specifying the use of a Mitsubishi Electric water cooled, ground source heat recovery system, which they then installed and commissioned.

The M2M interface was chosen to control and monitor the ground source system and make sure it was operating as efficiently as possible. Data was logged 24 hours a day, seven days a week and it was then possible to calculate the cost of the heating and cooling system - approximately 2.3 pence per square metre, heating and cooling with simultaneous heat recovery.

Further monitoring enables the system to be continuously fine tuned according to the golf clubs needs, helping to maximise their energy saving potential.

M2M Dashboard

M2M remote access reduces maintenance costs and response times, as costly site visits can be avoided by simply logging in over the internet to diagnose and resolve problems.

Solutions for Large Leisure Facilities

Large leisure facilities require systems that operate as efficiently as possible and therefore require cost effective solutions that are applied to maximise their energy saving potential.

Heat recovery and controls are key in small and large leisure applications: cooling is required all year around in the gym, whereas heating is required in changing and reception areas. It is therefore key to control the heat recovery air conditioning system properly to ensure maximum energy savings. Many fitness centres own sites all around the UK and being able to monitor all of these from one single location is key.

A large leisure facility installation can typically consist of:

- Mr Slim Split-System Air Conditioning
- Mr Slim Air Curtains
- City Multi VRF Air Conditioning Systems
- City Multi Air Curtains

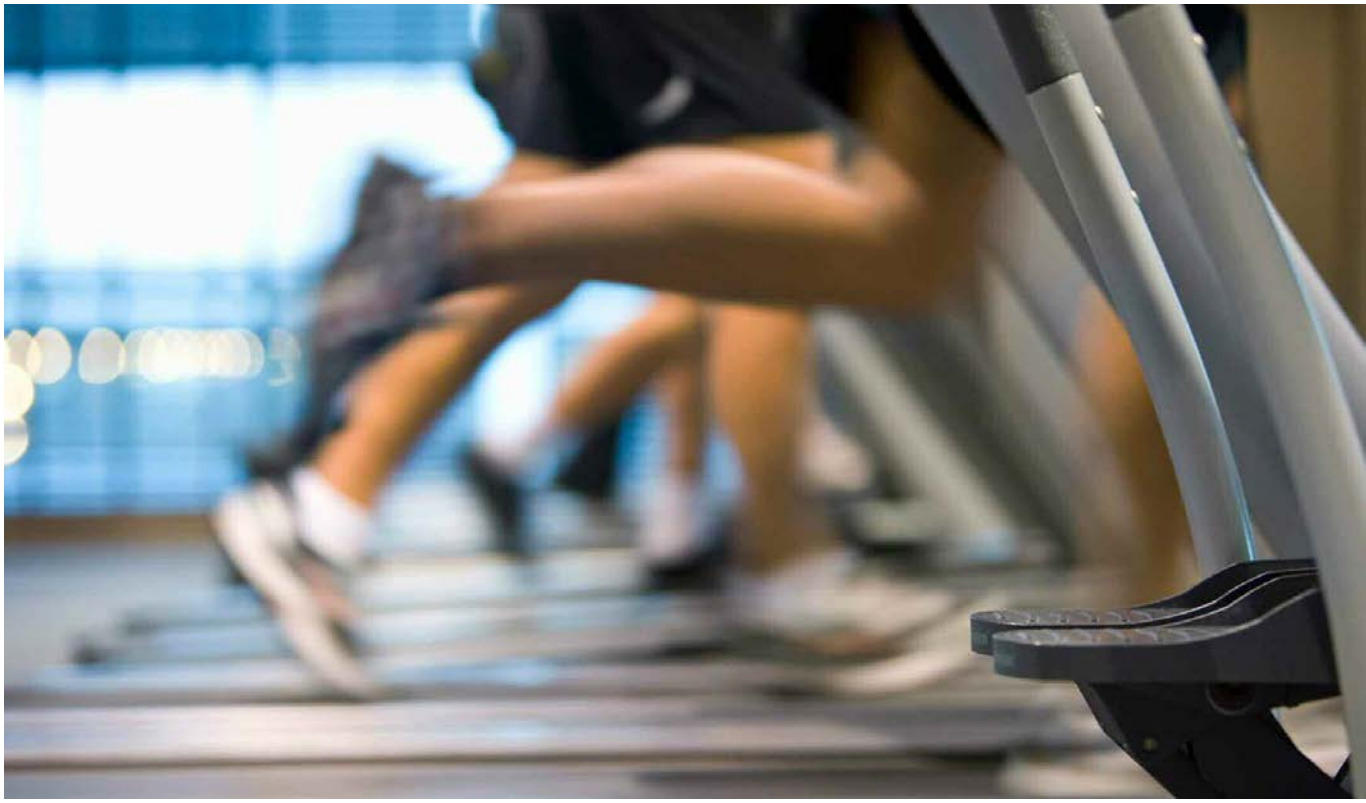
Mitsubishi Electric Controls Solution

- Maxi M2M Interface
- BEMS Interfaces

One of the ways to save energy in a leisure application is to take control of all of the leisure sites from one central location. The Maxi M2M package allows just this and acts as a Mini BEMS system.

Many leisure applications already have an existing BEMS system and when this is the case the best solution is to enable the existing BEMS to control and monitor the air conditioning. Mitsubishi Electric offer different types of BEMS interfaces such as Modbus, Trend via IQ3 Excite (from Synapsys Solutions), BACnet and LonWorks.

Fitness First



Fitness First operate over 140 health and fitness clubs throughout the UK and it is key to be able to remotely monitor and control all of them simultaneously, in turn making sure that all the building services are running efficiently.

For this reason, Fitness First chose to install monitoring BEMS into all of their sites to do just this. The BEMS system communicates with their air conditioning using Modbus. Dedicated Mitsubishi Electric Modbus Interfaces then allow complete monitoring and control of the system, including for example the option of limiting the setpoint range or locking functions on each individual remote controller.

The BEMS company is estimating a 19% energy saving and a payback of less than 18 months. This further highlights the flexibility and potential for reducing running costs that our control systems have when working in conjunction with third party BEMS.

Mitsubishi Electric Controls Range

Remote Controllers

Our air conditioning systems are supported by a multitude of remote controllers.
Each remote controller type, whilst being able to support the general control and monitoring functions for a group of indoor units, can also offer other unique operational features.

These could be for instance; Setpoint limitation and other functional control measures promoting energy saving, or Night setback to maintain a maximum and minimum temperature at night, optimising efficiency and comfort the following working day.

PAR-31MAA Remote Controller

The PAR-31MAA is compatible with our M Series and Mr Slim split systems and also VRF City Multi systems. To make sure that the end user can utilise the full potential of this controller, the PAR-31MAA has been designed to be very easy to use. The remote controller uses a full dot matrix screen, together with a blue backlight and features the following:

- Weekly schedule with night setback allowing the user to set minimum and maximum setback temperatures
- Easy-maintenance function allows installers or maintenance contractors to monitor compressor speed, run hours and all indoor/outdoor temperature sensors (Mr Slim)
- Energy Saving limits the outdoor unit capacity during preset times (Mr Slim)
- Silent mode can be activated on the outdoor unit (Mr Slim)

PAC-YT52CRA Remote Controller

The PAC-YT52CRA remote controller has been specifically designed with hotel applications in mind. Very simple to use, the units super-slim design makes installation flexible and easy and the backlight function answers a need that many hoteliers have been calling for.

Often customers, such as hotel chains for instance, desire options away from the standard white colour of controllers so this controller also comes with a silver finish option.

Mitsubishi Electric Controls Range

Centralised Controllers

Mitsubishi Electric's controls portfolio is one of the strongest on the market.
Included in this are some of the most sophisticated centralised controllers available, allowing complete control of multiple sites from one location.

AG150: The AG150 centralised controller offers a large 9 inch touch screen display for easy control of up to 50 indoor units. The controller offers features such as annual and weekly schedules, night setback, optimised start and a refrigerant status function to name but a few. An Internet connection with SSL security is also available to monitor and control the AG150 remotely and receive Email under fault conditions.

GB50ADA: The GB50ADA centralised controller offers all the functionality of the AG150 but without the LCD control pad, instead accessing all the controls from the comfort of your own PC.

AT50: The AT50 centralised controller is a simplified low cost version of the AG150 controller. With a simple and easy to use 5 inch touch screen, the AT50 can control and monitor up to 50 indoor units using the main functionality of the AG150 such as mode selection, temperature setting, scheduling operation, night setback and error indication.

TG2000: The TG2000 centralised PC based graphical software package can control and monitor up to a maximum of 2000 indoor units. This software has been designed to connect directly to an air conditioning system via the AG150 or GB50ADA controllers, allowing the operator all the required functionality to control and monitor the complete air conditioning system from a central location.

The TG2000 software also allows energy consumption data to be logged with user definable billing groups and electrical tariffs for billing purposes.

Melcotel™ Hotel Interface: The Melcotel™ Interface is a unique product which has been specifically designed for the hotel sector to control up to 250 hotel rooms, with or without the integration of a key card system. The controller offers functionality such as night setback, temperature adjustment and window contact control, all of which provide a higher level of control with more energy saving and a reduction in running costs.

Mitsubishi Electric Controls Range

BEMS Interfaces

Mitsubishi Electric offer a wide range of Building Energy Management Systems (BEMS) interfaces for both VRF and split systems. Further enhancing our complete open system network, these interfaces allow complete control and monitoring integration with our air conditioning systems.

BACnet®: Utilising the ASHRAE BACnet® standard, Mitsubishi Electric have developed a number of interfaces to allow integration with BEMS systems such as Andover Controls, York BMS, Siemens, Priva Building Intelligence and Delta Controls.

Modbus: To further complement the existing control and interface products being offered by Mitsubishi Electric, the Modbus range of interfaces has been developed to accommodate the typical end-user needs as experienced within the UK market. Modbus interfaces allow integration with Trend, Cylon, Satchwell, Crestron, Invensys, Interactive Homes, North BT, Andover and Siemens.

Lonworks®: The Mitsubishi Electric LMAP continues to strengthen the ability of our products to interface with other third party building control systems using the globally recognised and accepted open network protocol Echelon LonWorks®. Many hundreds of products utilise the LonWorks® protocol from complete systems like BEMS, lighting, power monitoring and security down to simple sensors and relay switches.

To ensure our products can connect directly and easily with other Lonworks® products, the LMAP is designed utilising Echelon MIPS technology, providing data in the LonWorks® SNVT (Standard Network Variable Type) format. The LMAP interface allows integration with BEMS systems from Honeywell, Johnson Controls, Realtime Control Systems and Smart Controls.

Trend: Mitsubishi Electric and Synapsys Solutions have been working together for many years to offer very competitive solutions for Trend users. The IQ3 Excite Interface has been modified by Synapsys Solutions to work directly in conjunction with Mitsubishi Electric air conditioning and the AG150 and GB50ADA centralised controllers.

IO Interface: The IO interface has been developed to allow third party equipment systems to easily control and monitor our air conditioning systems using simple volt free contacts and 0 to 10VDC signals. To avoid wasting energy the IO interface can also be used to interlock third party heating systems to Mitsubishi Electric air conditioning.

Mitsubishi Electric Controls Range

M2M Interfaces

To offer remote management of its air conditioning units to companies with large numbers of dispersed offices, Mitsubishi Electric has adopted the Machine to Machine (M2M) platform. The machine-to-machine (M2M) technology platform allows customers to integrate multiple sites into one network. The air conditioning units as well as third party equipment, such as lighting, boilers, air handling units, alarms etc are then wirelessly connected to the M2M server and use the GPRS network to communicate and enable remote monitoring via the Internet.

Mitsubishi Electric offer three M2M Interfaces:

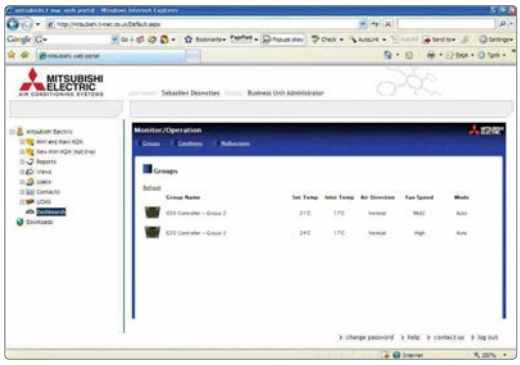
Procon™ Maxi M2M-IP/50: This interface is suitable for the City Multi, Mr Slim and M Series air conditioning ranges. Offering the ability to control up to 50 indoor units, the Maxi M2M interface has 22 configurable inputs and 12 outputs.

Procon™ Mini M2M-A/16: This interface is suitable for the Mr Slim and M Series air conditioning ranges. Offering the ability to control up to 16 indoor units, the Mini M2M interface has 8 configurable inputs and 4 digital outputs.

Procon™ Micro M2M-SMS-A/08: This interface is suitable for the Mr Slim and M Series air conditioning ranges. Offering the ability to control up to 8 indoor units, the Micro M2M interface is not connected to the M2M server, but instead air conditioning systems can be monitored and controlled using SMS text messages. The Micro M2M also offers backup and rotate functions for split systems, making it the ideal controls solution for server rooms.

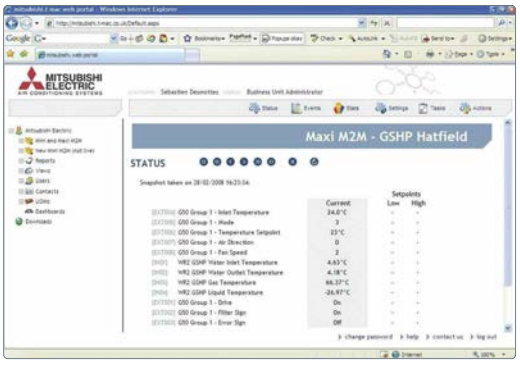
M2M - Machine 2 Machine Web Screenshots:

Dashboard



AG150/GB50 web pages are available for the air conditioning units.

Status



A site can be selected to monitor each system.

Summary

Buildings in all their forms account for 44% of the UK's CO_2 emissions*. Effective control of a building's heating, ventilation and air conditioning systems is therefore essential in today's energy-conscious business environment.

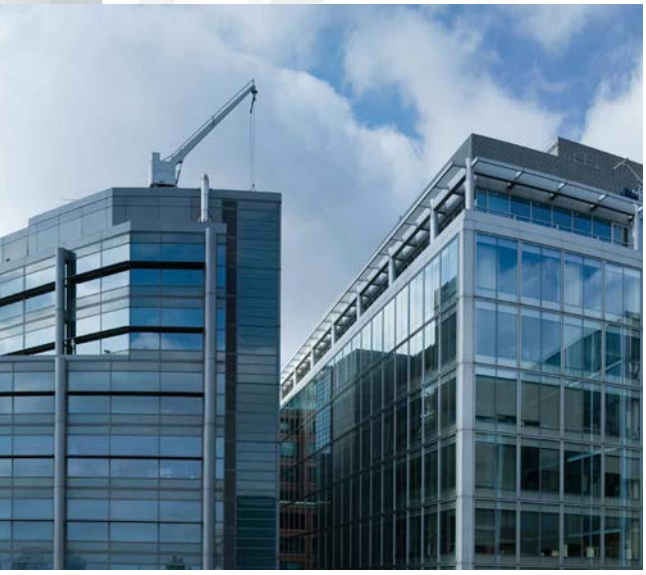
Operating any energy-consuming equipment without having the correct control system in place is wasteful, expensive and will increase emissions levels. This is why it is important to Control, Monitor and Report to ensure we maximise energy efficiency and minimise emissions levels.

Many situations will benefit from good controls solutions as outlined in this brochure, but other applications, such as hospitals, retail parks, education facilities and luxury hotels for example, can also benefit from the implementation of correctly specified controls.

Solutions for hotels might be energy monitoring or simplified remote controllers. Hospitals on the other hand might require the control system to interlink with fresh air ventilation or to have a greater degree of centralised control using TG2000 or BEMS interfaces.

For retail, the ability to control and monitor nationwide premises from one central point could be the solution to managing energy costs and emissions. The list is endless - everything needs some element of control.

Mitsubishi Electric has lead the way when it comes to complying with legislation demands and remains a pioneer in developing systems that minimise maintenance requirements, while delivering efficient, precise and cost-effective systems that are fully compatible with a range of Building Energy Management Systems.



Mitsubishi Electric has evolved to offer a range of advanced environmental building solutions including comprehensive controls that really can make a world of difference.

*BRE Digest of UK Energy Statistics

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Current as of 1st February 2013

FSC www.fsc.org MIX Paper from responsible sources FSC® C023471

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