

Energy control and management systems



EMAGINE

The next generation of building energy management systems



Intelligent optimised controls delivering sustainable energy & CO₂ savings

Optimised building controls and energy savings

The controls challenge

For many years so called 'intelligent building energy management systems' (BEMS) have promised end users the ability to minimise energy usage whilst maintaining good comfort conditions in their buildings. Unfortunately users are slowly discovering that the 'promised' savings and benefits they so keenly anticipated are seldom realised.

Most building designs incorporate a BEMS as a strategy to deliver optimum building energy efficiency. However, there are two fundamental reasons why this objective is rarely achieved. Firstly, no two controls specialists will program a system in exactly the same way, leaving significant deviations in the way it operates, potentially resulting in more, not less energy being used.

Secondly, even if a controls system is initially installed to deliver excellent efficiency, over time it will be tampered with by numerous users, so it no longer operates at its optimum settings, thus failing to deliver the original intention of efficiency savings.

The solution

Imagine if these problems could be resolved and there was an energy control and management system available that could actually deliver the energy efficiency levels it was originally intended to achieve – on an on-going basis.

Fortunately you no longer need to keep imagining! With the introduction of E-MAGINE - the next generation of energy management systems – it is possible to have control strategies that are consistent, repeatable and not reliant on programming skills.

E-MAGINE uses state-of-the-art technology to offer a pre-configurable, easy to install, quick to commission and tamper-proof system that can achieve sustainable building efficiency levels and cost savings.

Optimised controls

Designed and manufactured in the UK, E-MAGINE is a fully scalable, integrated solution that can be customised to provide optimum control and management of all heating, ventilation, air conditioning (HVAC) and lighting applications. The E-MAGINE product range has been

designed to integrate seamlessly with existing building control systems and third party equipment.

E-MAGINE offers a pre-engineered solution with a high level of flexibility so it can be configured to meet a wide range of applications. By defining the system prior to installation, engineers can provide fast, reliable engineering and on-site commissioning, saving time and money.

Sustainable CO₂ and cost savings

E-MAGINE offers much more than a typical BEMS. As carbon reduction remains high on Government agendas and as energy prices continue to rise, the need to manage carbon footprint and control energy costs has never been more vital.

A key feature of E-MAGINE is its fully integrated front-end energy management tool, E-VISION. Using the latest in IT and internet technology, E-VISION is an online application that controls, analyses and manages energy usage. Using its advanced analysis and reporting tools, building owners and operators can optimise a building's energy performance and achieve sustainably lower CO₂ emissions and lifetime costs.



Our pedigree

E-MAGINE has been designed, developed and manufactured for the industrial, commercial and residential markets by ENER-G Controls Limited, a fully owned subsidiary of ENER-G plc.

Our R&D teams are dedicated to providing high quality, leading-edge controls solutions that are intelligent, yet simple to engineer, install and use.

As part of the ENER-G group, ENER-G Controls offers an end-to-end energy management solution - from initial feasibility assessments, to full design, installation, commissioning and after-sales support. Finance for such projects is also available over 5 or 10 year periods.

E-MAGINE is available via accredited E-PARTNERS or directly from ENER-G Controls. Our fully trained and established network of E-PARTNERS ensures that each project is delivered to specification and budget. We liaise with M+E consultants and contractors on our customers' behalf to deliver a working solution that matches their bespoke requirements.

Financial benefits	Environmental benefits
<ul style="list-style-type: none"> • Reduces energy costs by up to 25% • Lower initial capital outlay • Qualifies for Carbon Trust Loans and Capital allowances • Private finance from ENER-G 	<ul style="list-style-type: none"> • Improved comfort through accurate sensing and optimised control • Improved indoor air quality • Reduced CO₂ emissions
Legislative and CRC benefits	Operational benefits
<ul style="list-style-type: none"> • Improved building energy certificate rating (EPC and DEC) • Meets or exceeds BREEAM criteria • Aids CRC compliance • Meets sustainability agendas 	<ul style="list-style-type: none"> • Reduced primary energy (electricity, gas, oil and coal) consumption • Accurate and consistent control strategies • Low system maintenance costs • 2 year warranty on E-MAGINE hardware

Support and maintenance

The E-MAGINE product range is backed up by ongoing support and maintenance. These are essential to delivering sustainable CO₂ and cost savings.



Advanced controls

E-MAGINE

E-MAGINE is the next generation of energy management systems. As a feature-rich solution, it uses the latest in IT and internet technology to deliver a high specification, scalable and state-of-the-art energy control system. Based on recognised controls standards, it optimises HVAC and lighting systems for all types of buildings. E-MAGINE has been designed to achieve sustainable energy and CO₂ savings across an entire property portfolio.

E-MAGINE's features include:

- A fully pre-engineered but user configurable solution with tamper-proof control strategies ready for use
- Fast installation, on-site or remote commissioning and diagnostics tool
- Seamless integration with existing building equipment through the use of open protocols to deliver a complete solution for all customers
- Ability to measure and control energy usage across single and multiple buildings or an entire property portfolio.

E-VISION

E-VISION is the powerful front end, online user interface of E-MAGINE that acts as a versatile engineering, commissioning and energy management tool. It has a diverse range of configurable applications, called E-APPS, that ensure designers, engineers, installers and end users can easily and efficiently commission and manage E-MAGINE.

For designers

E-CONFIG serves as an engineering design tool that aids designers set up and configure the main control strategy via a user-friendly graphical interface.

For installers

E-SITE is the commissioning and diagnostics tool that is used by engineers either on-site, or remotely, to quickly modify and refine the control strategies for optimum operation.

For building owners and operators

E-VISION is at the heart of the energy management strategy, designed to measure, monitor and analyse energy consumption across a single building or portfolio of properties.

E-METER stores and manipulates data collected from meters, sub meters and HVAC equipment. The user can then quickly scan utility profiles to identify patterns of consumption that require further interrogation via E-ANALYSIS.

E-ANALYSIS has a comprehensive suite of analysis and budgeting tools that identify inefficiencies, measure performance (actual v target) and deliver reports to comply with energy legislation and standards. The analysis provides information for revising controls strategies to reduce consumption - ultimately leading to improved operational efficiency and cost reductions.

E-TOUCH

E-TOUCH is a slim, wall-mounted zone controller and user-interface. Consisting of an LCD touch screen with intuitive graphics, E-TOUCH allows the user to perform key functions locally to enhance comfort and energy efficiency, such as setting occupancy times and temperature set-points. E-TOUCH also provides local access to calendar scheduling, demand profile data, date and time settings, together with status indication.

E-CONTROL

E-CONTROL is central to the E-MAGINE system. It is a universal controller that offers repeatable, tamper-proof, pre-engineered control strategies for all HVAC applications, from boilers and chillers, to fan coils and AHUs.

E-XPAND

E-XPAND is a powerful input/output expansion module that simply plugs into E-CONTROL to provide extra I/O points. E-XPAND interfaces directly with E-CONTROL and seamlessly integrates input information from sensors and output commands to equipment.



E-CONFIG showing a plant diagram

Integrated network infrastructure

E-SERVE

Built around a powerful 32bit ARM processor, E-SERVE is a dual function device. Firstly, E-SERVE is a fast, secure, 2-way communication gateway between E-MAGINE and remote back office systems, using Ethernet and IP connectivity. Hardware specific 'drivers' talk automatically to control systems across a secure network, gathering data and delivering it to E-VISION, ready for analysis and presentation.

Secondly, E-SERVE acts as a resilient data storage device that can store several years of data, or send it to E-VISION where it can be stored indefinitely.

E-GATE

E-GATE uses a powerful 32bit ARM processor and also serves dual functions, firstly acting as a router to connect to third party systems, and secondly as a repeater to extend the LAN beyond its normal capacity in terms of devices, segments and domains.

Communications and networking

State-of-the-art communication architecture and technology is used to provide E-MAGINE with a versatile, secure, high-speed data network.

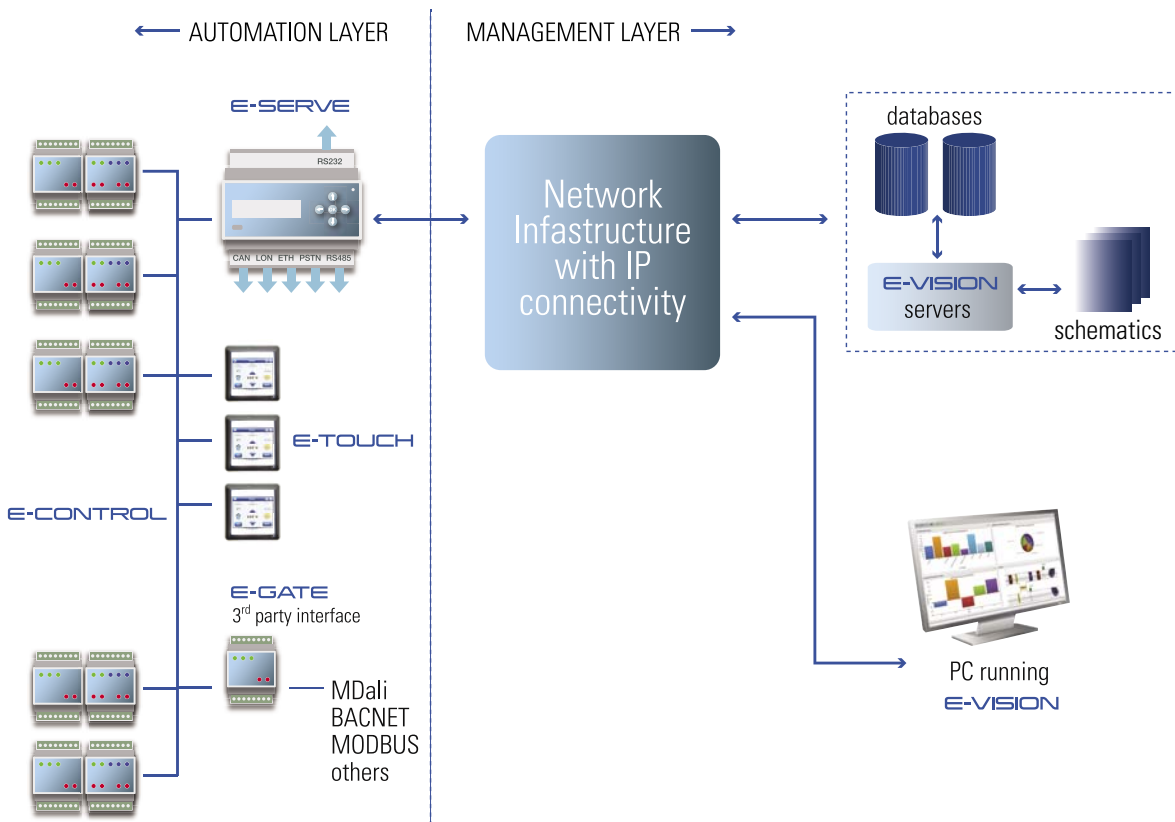
At the "management layer" (see figure below) the network provides for a standard Internet Protocol (IP) interface (10/100 Base T Ethernet). This enables the "management layer" to operate over any standard corporate network and to fully utilise existing structured cabling systems. The use of web-based technology is supported across a range of internet browsers (e.g. Internet Explorer, Mozilla Firefox, Google Chrome etc.). This provides access to all data, reports and building management functions, ensuring no specialised software or hardware is required. The interface between the "management" and "automation" layers is managed by E-SERVE, which acts as a communication hub for E-MAGINE. E-SERVE supports

a number of communication ports, including Ethernet (10/100 Base T) and industry standard bus systems, such as Controller Area Network (CAN), Local Operating Network (LON) and RS-232/RS-485.

At the "automation layer" E-MAGINE uses well-established and highly resilient networking technologies, like CAN and LON. The system's controllers and associated I/Os are connected at the "automation layer" of E-SERVE.

The E-MAGINE network supports up to 64 domains, each consisting of 440 devices, giving a single system size of approximately 28,000 devices. These domains are connected over an IT network using E-GATE as a routing device.

Data from multiple E-SERVE devices at multiple geographic locations can be seamlessly presented with E-VISION, to provide a rich protocol independent user interface.



System topology

Product overview

EMAGINE

Energy management system

- Fully scalable, integrated solution
- Optimised control for sustained energy savings
- Versatile engineering and energy management tools
- Uses the latest in IT and internet technology



E-VISION

Online energy management tool

- Web-based: no software required
- Fully-customisable dashboard
- Engineering design and configuration tools
- Graphical data presentation, analytics and reporting tools



E-SERVE

Communications hub

- Communications gateway and data storage
- Fast, 2-way communication using secure push technology
- Reliable IP connectivity for efficient data transfer
- 32bit ARM processor



E-GATE

Router / Network expander

- Ensures network expansion / repeater
- Provides access to other on-site BEMS and third party equipment
- 32bit ARM processor
- System drivers include CAN, LON, BACnet, Dali, MADli, MODbus and Mbus



E-TOUCH

Zone controller

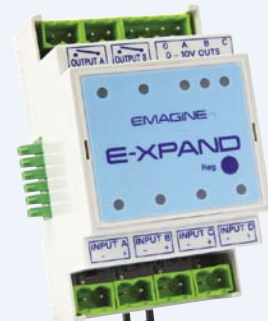
- 3.5 inch full colour touchscreen
- Gives local users ability to review and temporarily change temperature set points
- Easy to operate functions
- Intuitive graphics



E-CONTROL

Universal controller

- Loaded with pre-programmable control strategies
- Configurable to operate all HVAC equipment
- Tamper-proof
- Fast configuration using E-VISION



E-XPAND

I/O expansion module

- Input/output expansion module
- Plugs into E-CONTROL to provide extra I/O points
- Interfaces directly with E-CONTROL, seamlessly integrating all information

Applications and finance options

Applications

The adaptability of the E-MAGINE product range makes it suitable for a broad range of control applications (see table below), from primary energy sources, such as boilers, chillers and dehumidification systems, through to secondary systems, such as HVAC, domestic hot water and fan coils.

ENER-G Controls has vast experience delivering energy management solutions across a wide range of sectors, including industrial, retail, hospitality, residential and the public sector. E-MAGINE is ideal for use in all buildings with a requirement for achieving sustainably low CO₂ emissions and energy costs, including hospitals, schools, factories, offices and leisure centres.

Our service

Our comprehensive service includes:

- Free initial consultation and cost benefit assessment
- Detailed technical study and economic appraisal
- Bespoke system design and specification
- Installation and commissioning
- Remote system monitoring
- After-sales support
- Service and maintenance
- Finance options

Finance options

At ENER-G we appreciate that energy efficiency savings solutions often compete for capital funds with other equally important projects. We can therefore design bespoke funding solutions to meet each customer's needs, such as:

- DEP – Discount Energy Purchase
- ESA – Energy Savings Agreement
- FPF – Flexible Purchase Financing over 3 years
- REN – Rental 5 or 10 years
- CAP – Capital Purchase

End user	Humidity control	Temperature control	Fresh air control	Boilers	Chillers	Fan coil units	HVAC units	Air filter management	Radiant & warm air heaters	Domestic HW
Commercial buildings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Food - retail & supermarkets	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Food processing	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hospitals	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Hotels & fast food restaurants	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Industrial buildings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Laboratories & clean rooms	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Leisure centres	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Museums & art galleries	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Pharmaceutical	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Public buildings	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Schools	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Universities & colleges	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

✓ = Key user requirements

Table of applications

About ENER-G

ENER-G delivers sustainable energy solutions and technologies on a business-to-business basis worldwide. Established in Salford, Greater Manchester in the 1980s, the company offers complete solutions for all commercial and industrial energy requirements, ranging from the efficient generation of energy, to the management and control of consumption.

ENER-G Controls is part of the Energy Management Division of the ENER-G group. Together we provide holistic energy management solutions, including energy procurement, independent energy consultancy, metering and data management, bureau services and energy-saving technologies, such as high efficiency lighting, air conditioning and building energy management systems.

Across the ENER-G group our services include sustainable technologies, such as heat pumps, cogeneration, energy from biogas and energy from waste. We can also offer flexible finance models, offering access to our energy solutions without the up-front capital expenditure normally required.

ENER-G is 100% dedicated to the development of its products and markets and over the years has seen rapid growth, both organically and through acquisition, to achieve a strong global presence within the energy industry. Currently ENER-G operates in the UK, the Netherlands, Norway, Poland, Hungary, Lithuania, Spain, Italy, Romania, Mexico and South Africa, with partners across the globe.



NORTH WEST OFFICE

ENER-G House
Daniel Adamson Road
Salford
Manchester
M50 1DT

Tel: +44 (0) 844 225 1300
Fax: +44 (0) 844 225 1151
E-mail: em@energ.co.uk
www.emagine-controls.com

MIDLANDS OFFICE

Studley Point
88 Birmingham Road
Studley
Warwickshire
B80 7AS

Tel: +44 (0) 844 225 1150
Fax: +44 (0) 844 225 1151
E-mail: em@energ.co.uk
www.emagine-controls.com