bcia
the building controls industry association

Navigating Building Controls & Automation:

A Terminology Handbook

Empowering buildings for a better tomorrow

V1. 02.25

A Glossary of Terms and BEMS guide

Who is this for

This guide has been developed to support workers in the BMS/BEMS industry, in-house BEMS teams, as well as those involved in specifying, designing, commissioning or managing systems.

What will I learn:

This guide will help you to understand some of the standard terminology and definitions used in the industry.

What is the Building Controls

The Building Controls Industry Association is the UK's only association specifically for the building controls and automation sector.

What does the BCIA do?

"Empower buildings for a better tomorrow"

In addition to helping shape policy and legislation, the association drives quality standards through industry-leading training provision, raises awareness of how building controls can improve wellbeing and help building owners achieve net zero, and represents the industry's interests while supporting members and their employees.

Demystifying Building Controls

Building controls refer to a system of automated technologies and devices used to manage and regulate various aspects of a building's environment, such as heating, ventilation, air conditioning (HVAC) and lighting. By helping to integrate systems and optimise energy use in real time, they can ensure cost-effective operations by adapting to occupancy needs and environmental conditions.

BMS refers to: Building Management System
BEMS refers to: Building Energy Management System

The commercial controls and BEMS profession is a specialist discipline within the Heating, Ventilating and Air-conditioning (HVAC) sector. Modern systems incorporate computer technologies from the IT industry with wider applications than HVAC and can include fire detection, security, people transport (lifts), lighting and solar shading, for example.

A technology-led solution often with data analytics at the core, building controls and automation solutions can reduce energy consumption and operating costs; improve occupant wellbeing and productivity; and provide optimum conditions for more complex areas of production such as pharmaceuticals and printing.

The various terms used to describe Building Controls & Automation

BUILDING AUTOMATION (BACS/BAS/BAMs)

This term is a generic way of speaking about the automatic systems used in buildings for the monitoring and control of the main services, including HVAC lighting, shading, security and fire detection systems.

BUILDING CONTROL SYSTEM

A connected solution of control devices that can control the HVAC, lighting and or shading in a building by reading various sensor inputs and switching output signals or modulating actuators to regulate the mechanical plant serving the load. Modern controllers feature microprocessor technologies and custom control software logic which is configured specially for each project. Simple systems may feature a single controller for a small building, but more usually refers to multiple controllers that are networked together via serial or IP communication network(s).

BUILDING MANAGEMENT SYSTEM

Frequently abbreviated to BMS, this term is used to describe computerised control systems used in buildings for the monitoring and control of the main HVAC services, and can also refer to the management of lighting, shading, security and fire detection systems if these are integrated with the HVAC control system.

BUILDING ENERGY MANAGEMENT SYSTEM

Frequently abbreviated to BEMS, this term is used similarly to Building Management System. The word Energy denotes that the system includes functionality to monitor energy usage via multiple connected meters and is configured to optimise energy performance rather than just control the environmental conditions in the building(s).

BUILDING MANAGEMENT SOFTWARE

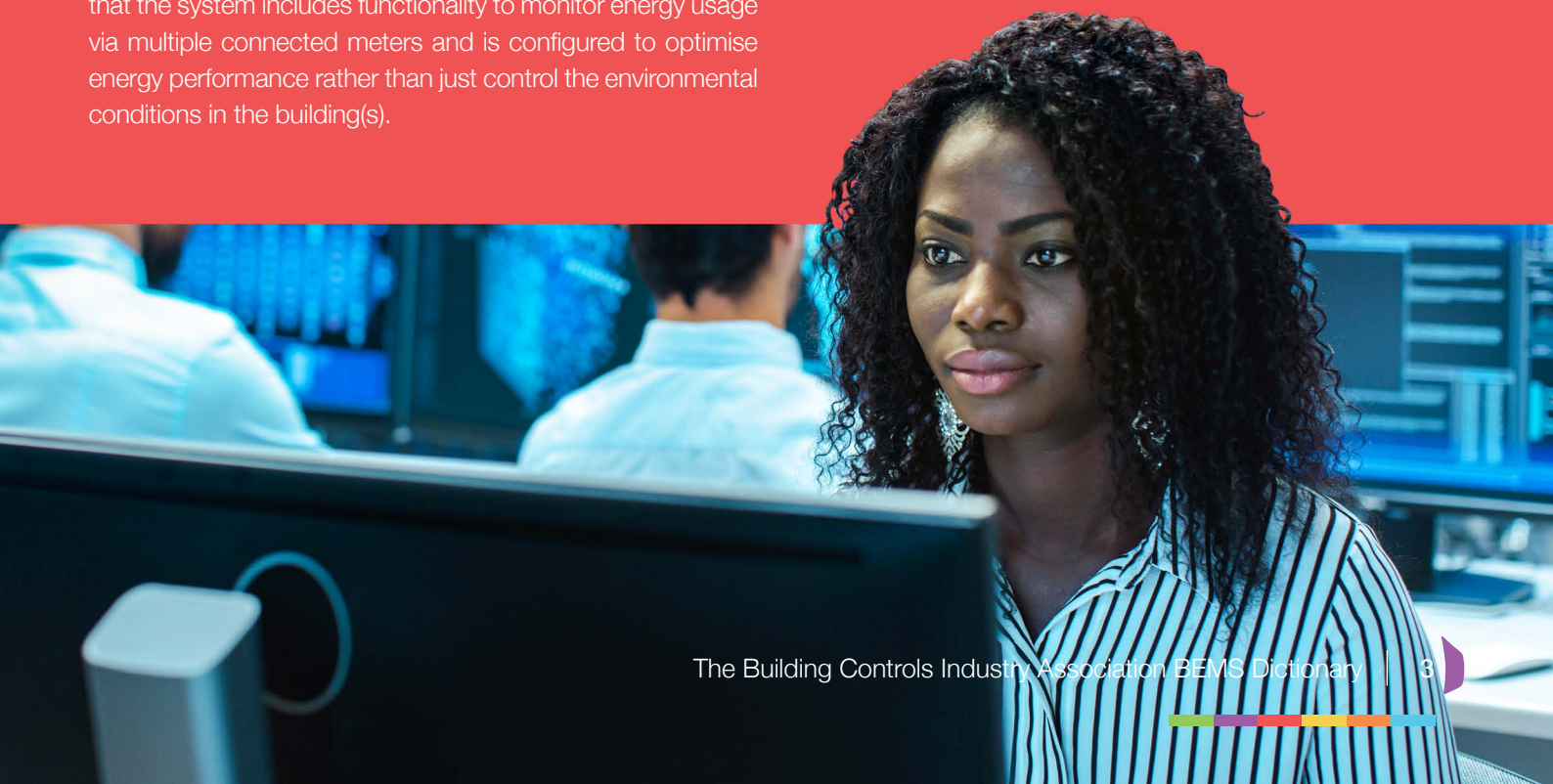
This is a generic way of referring to the application, configuration and graphical display software used to monitor and control the main services in a building. Many manufacturers off different software products for each specialist purpose. Software may be out-right purchased or licensed to the user.

SMART BUILDINGS

This term describes a building in which the various computerised control systems interact to add intelligence and dynamically respond to occupant requests or requirements. It is an umbrella term encompassing multiple technologies and software applications. Smart buildings will usually integrate HVAC, lighting control, solar shading, natural ventilation security and fire detection systems into a single intelligent control solution.

BUILDING SYSTEMS INTEGRATION

This term is used to describe the topic of how the various monitoring and control systems in buildings can be connected to exchange data and work together in a coordinated way. Integration is usually achieved using common communications protocols or conversion gateways that enable otherwise incompatible systems to exchange data. Modern open protocol standards and the use of open framework software such as the Niagara Framework or FIN Framework enables integration of multiple protocols simultaneously without requiring separate hardware devices.



Policy & Legislation

- Building Regulations 2023 Update
- BEMS International Standard ISO52120
- Simplified Building Energy Model (UK calculation methodology)
- Health and Safety Executive
- Health and Safety at Work Act
- Electricity at Work Regulations
- Energy Performance in Buildings Directive (EPBD)

Sustainability and Performance Schemes

- Embodied carbon calculator
- BREEAM – Building Research Establishment Environmental Assessment Method
- WELL – focused on human sustainability, health and wellness
- LEED – Leadership in Energy and Environmental Design
- NABERS
- Fitwell – designed for commercial spaces and residential buildings

Signposting

- American Society of Heating, Refrigerating and Air-Conditioning Engineers - ASHRAE
- Building Services Research and Information Association
- Chartered Institution of Building Services Engineers (CIBSE)
- Federation of European Heating, Ventilation and Air Conditioning Associations
- Construction Leadership Council
- Institute of Engineering Technology
- Joint Industry Board
- Electrotechnical Certification Scheme
- SKILLcard by BESA
- EU-BAC – European Building Automation Controls Association
- International Wellbeing Institute
- Royal Institution of Chartered Surveyors
- Royal Institute of British Architects
- Water Regulations Advisory Scheme
- NICEIC
- Approved Plumbing and Heating Contractors
- CIBSE Guide M: Maintenance engineering and management (2023) | CIBSE
- Gas Safe Register

Companies involved in the supply chain of the Controls and Building energy Management Systems (BEMS) industry

CONTROLS MANUFACTURER

The manufacturer of control equipment or sales organisation from overseas factories. Their own manufactured products may also be supplemented by third party devices to allow a rounded offering or broader product range.

May undertake some installation and maintenance services themselves

Usually sell products to third party specialist installers, distributors, OEMs and BeMS maintenance providers

ORIGINAL EQUIPMENT MANUFACTURERS (OEMS)

A customer of controls manufacturers and distributers who assemble control instruments into their own equipment and sell packaged plant (e.g. Computer Room Air Conditioners and Fan Coil Units manufacturers).

These manufacturers offer smart plant or factory fitted controls to mechanical contractors. The BeMS specialist is usually charged with commissioning or integrating this control solution onto the building BeMS.

PANEL MANUFACTURERS

A specialist supplier of control panels and instrument cabinets to the BeMS industry. They buy control and switchgear components from distributers and assembles these into custom control panels.

They usually supply the control system installer.

SYSTEMS INTEGRATOR

A specialist value adding reseller of control & BeMS solutions. They may represent one or more manufacturers and be authorised by that manufacturer for the sale and support of their product range.

Some SIs have in-house Panel Manufacture and electrical installation capability and most offer a turn-key, fully managed project solution. Many SIs have service and maintenance offerings for after sale support of installed systems.

DISTRIBUTOR AND WHOLESALER

A stockist and reseller of control equipment and other related HVAC components. They usually leverage bulk buying capabilities and offer customers a fast delivery from stock. Most distributors offer multiple brands of equipment.

They are favoured by service and maintenance organisations, because of their quick delivery capability, and system integrators.

MASTER SYSTEMS INTEGRATOR

A systems integrator, usually larger in turnover and resource, with design and contract management capability beyond traditional BeMS solutions. MSI organisations may offer diverse integration capabilities or design solutions that encompass solutions beyond HVAC such as audio-visual, window blind and effect lighting.

Many MSI companies offer design and build services to promote their solutions and offer a one-stop-shop approach.

CONTROLS CONSULTANT

A specialist company who offers clients and end-users specialist advice in the selection and application of control and BeMS technology. The controls consultant will often prepare a detailed specification of requirements to allow fair tendering and avoid value engineering (removal of features to save installation cost) by the contractual chain. The consultant will ensure the system is properly installed and witness the completed system on behalf of the client.

A controls consultant will be manufacturer and vendor impartial to ensure the best solution is selected on behalf of the client.

MEP CONSULTANT

The Mechanical, Electrical and Plumbing (or Public Health) consultant undertakes design and technical supervision responsibility for the HVAC systems. It is from their designs that the control system is engineered and systems configured.

The MEP consultant will often attempt to design the controls system and to specify the requirements without employing a specialist controls consultant. The MEP consultant forms part of the client's professional team and is outside of the contractual chain.

MECHANICAL CONTRACTOR

Mechanical contractors form part of the contractual chain in that they are often engaged by the builder or developer in a hierarchy like a family tree in structure. They are usually appointed by a tendering process.

In-turn, they may appoint a controls specialist as their sub-contractor.

The mechanical contractor is usually responsible for the supply and installation of the mechanical HVAC plant and services.

ELECTRICAL CONTRACTOR

Similar to the mechanical contractor, the electrical contractor is usually responsible for the lighting and electrical power systems within the building. Other services under their scope may include fire and security systems, IT cabling and networks and emergency escape lighting.

AIR AND WATER COMMISSIONING CONTRACTOR

These specialist companies are engaged to test and set-up the air and water distribution systems to ensure original design intent is achieved. They adjust systems to ensure even distribution and system balance.

These may be engaged by the mechanical contractor or by the builder.

Key Equipment and Terms

- **Air conditioning systems** – cooling air, heating air, humidification, filtration
- **Ductwork systems** – fans, ducting, louvres, vanes and dampers
- **Electro-technical systems** – power, data, lighting, control, appliances
- **Fire detection and suppression systems** – detectors, manual call points, annunciators, sprinklers and gas suppression
- **Gas systems** – boilers, fires, cooking appliances
- **Heating systems** – domestic, commercial, industrial generation and distribution
- **Hydraulic systems** – pipework, pumps and valves for heat distribution
- **Lighting systems** – occupant, task, emergency and signage
- **Plumbing systems** – cold water, hot water, sanitation, rainwater drainage and re-use
- **Refrigeration systems** – chilled water, cooling air
- **Security systems** – intruder alarms, surveillance systems, and access control
- **Shading systems** – automated blinds to reduce solar heating
- **Ventilation systems** – mechanical ventilation, non-mechanical ventilation

Dictionary

A		
AHU	Air Handling Unit	Units that condition and distribute air throughout a building
AI / AO	Analogue Input / Output	A physical input or output from a BMS controller that is non digital and generally a voltage between 0 and 10 volts dc
ASC	Application Specific Controller	A standalone controller with capabilities specific to the application for which it was designed e.g. heating, lighting
Analytics		The process by which data is analysed by software algorithms. Analytics generally falls into two categories: automatic fault detection and performance analysis. Most BEMS analytics uses rules-based algorithms although machine learning and AI approaches are emerging technologies.
API	Application Programme Interface	A term used to describe a software package that allows a standard interface between two or more software applications. APIs need to be well documented, so it is important to check the quality of the API documentation.

B		
BACnet	Building Automation and Control Network (protocol)	This is the most used network communications protocol used in building automation systems. It was developed by ASHRAE to enable different manufacturers' products to be used together by defining how they communicate. Compliance with the standard is managed by the BTL (Bacnet Technology Laboratories) certification process. There are various categories of products that cover all the major product groups from field controllers to management software.
BIM	Building Information Modelling	A process involving the computer generation and management of digital representations of the physical and functional characteristics of buildings and other physical assets.
BER	Building Co_2 Emission Rate	A calculation to measure the carbon emissions of a building. Measured along with the TER (Target Emission Rate) which is a legal requirement.

C		
CAD	Computer Aided Design	Software used to create precision drawings or technical illustrations including 2D and 3D models.
CDM	Construction, Design and Management Regulations	Legislation intended to ensure that health & safety issues are effectively considered during project development phases.
Control Panel		An enclosure to house the control equipment and interface devices to monitor and regulate a buildings utilities and operational services.

CT	Constant Temperature	A heating or cooling regime that uses a pre-set temperature such as used in the primary circuit of a hot water-based heating system.
CT	Current Transformer	An electro-magnetic device that measures the alternating current of an electrical load.
Commissioning (Air and water systems)		The adjustment of regulator devices to ensure design flow rates are achieved throughout the building.
Commissioning (BEMS)		The testing and setting to work of the BEMS equipment to ensure proper operation of the plant under control.
Communication Network		A system that connects communicating devices to allow the transfer of information. May be physical or wireless.
Controller(s)		The electronic module which actions the control logic. May be soft configured or ASC. Usually feature intelligent control which is fully programmable with peer-to-peer communications capability.
Controller Network		The communications medium over which the transfer of information between controllers and communications devices takes place. Often the second highest data communications level associated with a BMS.
CBM	Condition Based Maintenance	A regime where servicing is undertaken following monitoring and inspection of an asset and a comparison of its actual state with the desired condition.
CAFM	Computer Aided Facility Management	A facilities management software and systems product that collects data and information to plan, deliver and monitor all FM activities. Records and schedules reactive and planned preventative maintenance, asset management, operational facilities services, and other customer services.
Condition Monitoring		Measuring and recording data from operating parameters to verify plant and equipment condition and performance trends
CMMS	Computer Aided Maintenance Management System	A system designed to enable planning and control of forward maintenance programmes, often using data to inform the most effective maintenance strategy.
Cloud Services		A generic term for software applications running on servers located in data centres. These are usually run by specialist providers (such as Microsoft, Google and Amazon) that provide services such as data processing and analysis to improve operational efficiency. These services are typically subscription charged and described as using a “Software as a Service” (SaaS) model.
CAPEX	Capital Expenditure	Describing the finance function of investment; usually depreciated over several years. Higher Capex projects are usually justified by reducing Opex (Operating Expenditure) and risk.

D		
DI / DO	Digital Input / Output	Binary on/off input or output signals to the BEMS e.g. switch.
DPS	Differential Pressure Switch	Used to detect differences in pressure in air and water systems. Provides a signal when differential pressure (DP) rises or falls and be used for flow proving or filter status monitoring.
DCV	Demand Controlled Ventilation	An energy control regime which adjusts the ventilation settings within a building, based on the occupancy.
DDC	Direct Digital Controller	A controller in a BEMS system that may be software configured. Usually include communications capability.
DEC	Display Energy Certificates	A standard form of measuring energy efficiency that shows the performance of a building based on actual energy consumption and is required for buildings with useable floor area over 250m2.
Data Modelling		Data modelling is the process of creating a computer-generated model from information held in a database. A data model is a conceptual representation of data objects, that allows the associations between the different data objects and the rules that govern those relationships.
Display / DP	Display Panel	A user interface that displays real measured values and user settings. Examples include energy usage, weather conditions, alarm status and user settings.
DB	Dead band	Used within control logic to save energy and prevent fluctuations in temperature. A range or tolerance is set where neither heating or cooling energy is applied.
DP	Dew point	The Dew Point is the temperature at which vapour carried in airstreams condenses into water. Dew point control may be used to reduce moisture levels in air conditioning or to avoid condensation from chilled ceiling applications.
DHCP	Dynamic Host Configuration Protocol	A network management feature that automates the process of assigning IP addresses to devices on a network to simplify the configuration process.
E		
ELV	Extra Low Voltage	An electricity supply in low voltage (<50Vac) that carries a low risk of electrical shock.
EPC	Energy Performance Certificates	A rating scheme to accredit the energy efficiency of the equipment installed within buildings.
F		
FCU	Fan Coil Unit	A unitary air conditioning device consisting of one or more heat exchangers, a filter and fan arrangement. The FCU will regulate the temperature of local spaces and usually operate in conjunction with fresh air from other sources.
FM	Facilities Management	The discipline that ensures functionality, performance, comfort, safety and efficiency of a building by integrating people, place, process and technology

Field Devices		The term used to describe sensors, actuators or controllers used as part of a building automation system that are installed local to the plant under control. These devices are often network connected or directly wired to another device. Increasingly, many sensing devices can be wirelessly connected.
FDD	Fault Detection and Diagnostics	A process for early identification and analysis of malfunctions and failures in a BEMS to ensure operational optimisation.
G		
Gateway		A device that allows communications between two separate communications channels.
GUI	Graphical User Interface	A software utility that allows user interface with the BEMS by graphical representations of the plant under control. Schematic, layout and tabular formats of data are all common presentation techniques. May also be known as front-end, human-machine interface (HMI) and visualisation system.
Global Communications		The transfer of information between controls devices on a communications network. An example of a broadcast message is outside air temperature, a value that may be used by many different controllers in a single building.
GUID	Global Unique Identification Number	Used as term by some manufacturers as an identification (ID) and usually used when a unique reference number is needed to identify information on a computer or network.
H		
HVAC	Heating, Ventilation and Air Conditioning	To describe the mechanical equipment or the systems involved in Heating, Ventilation, and Air-Conditioning.
Haystack	Project Haystack	The name of an open-source initiative that seeks to standardize the way in which metadata relating to building automation systems is defined. See ‘the Project Haystack website’ for more details.
Headend	Another term for Operators Station	A computer terminal connected to the BMS network and capable of receiving and displaying real time plant information. Usually features a graphical user interface to simplify presentation of data.
Hysteresis		The difference measured by a detector to a rising value and a falling value. May also be known as switching differential in electro-mechanical devices such as a thermostat.

I		
IoT	Internet of Things	An umbrella term used to describe the way computerised devices are able to share data with one another and connect to the internet “cloud”. Software hosted on cloud servers typically provides management information and/or automated analysis of the data collected. IoT encompasses the use of wireless technologies and also used to refer to any data that is being communicated via IP networks to the cloud.
IOM or I/O Module	Input Output Module	An auxiliary module which connects to a controller to provide the BMS with input and output signals. The module may offer features such as signal conditioning or change the state of commands.
IWMS	Integrated Workplace Management Systems	A software platform that optimises the use of workplace resources. These often allow multiple utilities to operate on a single computer station.
IT / ICT	Information Technology and Information Communications Technology	The overall term to describe software and computer systems, technologies and the industry.
IAQ	Indoor Air Quality	The measure of the quality of air within buildings and structures. Linked to and sometimes referred to as IEQ (Indoor Environment Quality).

J		
JSON	Java Script Object Orientation	A form of data exchange used with communications protocol.

L		
LAN	Local Area Network	A communication network isolated to one physical location such as a building or campus.
LoRaWAN	Long Range Wide Area Network	A Low Power, Wide Area (LPWA) networking protocol designed to wirelessly connect battery operated devices to the internet in regional, national or global networks. LoRaWAN targets key Internet of Things (IoT) standard requirements.

M		
M&E	Mechanical & Electrical	A term to describe the mechanical & electrical systems in a building.
MCB	Miniature Circuit Breaker	An electrotechnical protection device designed to automatically switch off an electrical circuit in the event of a fault being detected.
MQTT	Message Queuing Telemetry Transport (protocol)	A machine-to-machine protocol designed to connect IoT devices with the Cloud.

M-Bus	Metering	A popular protocol for collecting readings from energy meters to a control system, a widely used alternative to Modbus.
Modbus		A common open protocol for BMS communication.
Metadata		The term used to describe information relating to an item of data which includes its context or description. In BAS, an example of metadata is a real-time data point value as well as its location, plus its relationship with one or more other items of equipment.
Machine Learning		This is a subset of artificial intelligence (AI) that provides systems the ability to automatically learn and improve from experience. Machine learning focuses on the development of computer programs that can access data and use it to learn for themselves. Machine learning algorithms build a mathematical model based on sample data, known as "training data", to make predictions or decisions without being explicitly programmed to perform the task.
M&T (See also aM&T)	Automatic Monitoring & Targeting sub-metering systems	Products and systems that are designed to measure energy consumption, record, and distribute metered energy data to a platform or system automatically via a variety of communication methods. aM&T systems and service providers usually analyse and report on energy consumption.
MEES	Minimum Energy Efficiency Standard	Applicable Government policy for landlords of non-domestic privately rented property with an EPC of E and below.

O

OEM	Original Equipment Manufacturer	A manufacturer of goods that are used as components in the products of another company.
OAT	Outside Air Temperature	A value of the outside air temperature of the building.
OT	Operational Technology	Hardware and software that detects or causes a change, through the direct monitoring and/or control of industrial equipment, assets, processes and events. IT/OT convergence is the real time data exchange between the two systems.
Open Framework		Commonly used in the IT domain, this term refers to software which is designed in a generic way to handle multiple protocols and has APIs that enable third party developers to create applications on top of the framework.
Operators Station		A computer based colour graphics terminal. Connected to the BMS network and capable of receiving and displaying real time plant information
O&M	Operations & Maintenance	O&M Manuals must legally be provided as part of health & safety documentation following any significant building work.

P		
Plant		The generic term to describe the building services such as boiler, chiller, air conditioning and water services. Also see Plantroom where the equipment is located.
PM / PPM Schedule	Planned Maintenance / Planned Preventative Maintenance	A PM or PPM Schedule is a list of pre-planned maintenance events over a specific period, typically 52 weeks.
POE	Power Over Ethernet	Systems and devices that allow both power and network signals to be carried by the same cable and therefore save wiring and installation cost.
Protocol		The communication language used by controllers and other devices on a network. Some protocols are open to allow free access whilst others are proprietary and kept confidential by the equipment manufacturers. **Examples of BEMS Protocols:** • BACnet – The most usual BEMS protocol. • DALI – Used for lighting control. • EnOcean – A wireless communication standard. • KNX – A field level protocol from residential applications • LON – A proprietary communication protocol from Echelon Corporation. • SMI – Standard motor interface used for solar shading motor control
PIC	Pressure Independent Control	Describes control valves that regulate to provide a constant flow of water to a heat exchanger regardless of changes to the supplied pressure. These are widely used with speed-controlled pump systems.
PID Loop	Proportional Integral & Derivative	Called a three-term control function, a PID is a mathematical control technique that is widely used in industrial process control systems. HVAC applications generally do not utilise the Integral function and instead offer PI control.
Points List	Points or IO Schedule	The BMS points list is a schedule of inputs, outputs and high-level interface points that will be connected to the system.
PQQ	Pre-Qualification Questionnaire	PQQ's assess a potential service providers commercial, technical and financial capabilities to enable a method of shortlisting interested parties.
PWM	Pulse Width Modulation	A method of representing a variable signal by a series of pulses where the ratio of on to off time varies.

R		
RAMS	Risk Assessment and Method Statement	A technique to assist the evaluation of safe systems of work. Risk Assessments encourage the identification of workplace hazards and Method Statements help identify the how, with what equipment and impact on others our works may have.
RFI	Request for Information	A regime used during contract implementations to collect and record questions and responses to requests to ensure completeness.
RTD	Resistance temperature device/detector	An electronic device used to measure temperature by vy varying the resistance to electrical current. Positive and negative (PTC & NTC) coefficients describe the resistance characteristic.
RFQ/ RFP	Request for Quote or Proposal	An RFQ/P is a project brief that details the project and commercial terms and timelines along with specific information requested from the potential supplier.
RH	Relative Humidity	Relative humidity is a measurement of moisture content of air. It is displayed as a percentage of maximum saturation and will vary as the air is warmed or and pressurised.
RFI	Request for Information	A regime used during contract implementations to collect and record questions and responses to requests to ensure completeness.

S		
Supervisory Network		The highest data communications level in a BEMS/BMS system. It allows the transfer of information between controllers & operator's station and between operator's stations.
SQL	Structured Query Language	A standard computer programming language for storing, manipulating, retrieving and analysing data in databases.
SNMP	Simple Network Management Protocol	A computer communications protocol often is used to monitor the network, detect network faults, and sometimes used to configure remote devices.
SaaS	Software as a Service	A method of charging for software by subscription instead of outright purchase. It can help customers avoid investment costs, shorten approval processes and therefore be deployed more quickly. The fee may include ongoing support, software maintenance and updates.
Sensors		Sensors, detectors and transducers collect real-time data on various parameters such as temperature, humidity, occupancy, and lighting levels. This data enables decisions for optimising the BEMS system and in planning maintenance activities.
SP	Set Point	The target parameter a controlled variable is seeking to achieve. The desired value.
Schematic Displays		Graphical description of plant and equipment layout, together with real time information/data when displayed on the operators' station.

Shading		A system of automated devices such as blinds, louvres or façade shades that reduce the effects of sunshine and thereby reduce solar heat gains and glare. They contribute to occupant comfort and energy efficiency.
Strategy		The control logic installed within each controller for the plant/equipment it is controlling. This configuration software is usually compiled using software tools supplied by each manufacturer.

T

TCP/IP	Transmission Control Protocol/Internet Protocol	A communications network standard that enables application programs and computing devices to exchange messages over a network.
Trend log		A stored collection of historical data samples taken at time intervals that allow system operations to see historical and compare values and events.
Tagging		This is the term used when naming software points within the BEMS. Points can be physical values or virtual points (such as calculations) and Tagging describes assigning a name to a data point that details its context and relationship(s). A form of Metadata for BEMS that is particularly useful when systems exchange data with other smart equipment.
Thermistor	Thermal-Resistor	An electronic temperature measuring device with a variable electrical resistance to temperature changes. May be negative or positive (NTC or PTC) resistance characteristic. Common characteristics in BEMS include PT100 and 10Kohm.
Thermocouple		T simple temperature measuring device that emits a voltage when heated. Used for flame proving (pilot light) in gas valve systems.
TVOC	Total Volatile organic compounds	Used in air quality measurement
Topology		Can also be described as system architecture and is a way of describing connections in a BMS.

U

UIO	Universal Inputs/Outputs	Controller hardware channels that can be configured to either analogue or digital
UI	User Interface	Platform by which the user can access, adjust and control the BEMS system. May take the form of a local display, touch-screen panel, or computer terminal.
UPS	Uninterruptible power Supply	A continual power system that provides automated backup electric power to a load when the input power source or mains power fails.
Unitary Controller		Any controller assigned to control local plant such as FCU, VAV, reheater batteries, etc.

Unitary Communications		Lowest level BEMS data communications associated with a controller network. Allows the transfer of information between unitary controllers and/or their associated sensors or communications controller.
UP	Universal Point	A controller channel that may be used as input or output

V

VFD	Variable Frequency Drive	A device that controls the speed of an electric motor by varying the power and frequency of the electricity supplied. When used with HVAC fans and pumps, considerable energy savings may be seen.
VSD	Variable Speed Drive	The generic term for a device that controls the speed of an electric motor.
VLAN	Virtual Local Area Network	A wide area network may be 'ring-fenced' by security (such as password protection) to allow only authorised access to data transfer. VLAN's allow the network to be segmented into different domains improving security, performance and resilience.
Virtual Point		Software point that may or may not be linked to a physical I/O point, used for the internal transfer of information or display by a controller
VFC	Volt Free Contact	Also known as dry contacts these are switch signals used to collect status data in a BEMS.
VT	Variable Temperature	A variable temperature heating circuit may use valves to regulate the water temperature, often inversely proportional to outside air temperatures.
VOC	Volatile organic compounds	VOC is the term used to describe a wide range of compounds that are emitted into the air from activities. Commonly in BEMS: rotting foods, cleaning solvents, air fresheners and body odours. Used in air quality measurement for DBV.
VPN	Virtual Private Network	A secure network over the internet to connect to a remote server. A VPN allows users to connect to work systems and files from a remote location.

W

WAN	Wide Area Network	A communications network that extends over a large area.
WEE	Waste Electrical Equipment	Legislation that governs the disposal of electrical equipment.

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