MULTIFUNCTIONAL
BEAM CONTROLLER

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OVERVIEW

The concept of the multi service beam is extremely popular due to the benefits it provides with it's efficiency and modular approach. The difficulty is the co-ordination of the various systems. It is not uncommon for three or four separate suppliers to be involved in creating the finished article. The automatic controls are a major culprit in this process.

It is now possible to provide a packaged system due to our pre-engineered solution. The beam can be delivered to site with both the lighting and heating & ventilation pre wired and commissioned.

According to the European standard EN15232 (energy performance in buildings) in order to extract the greatest efficiency from the heating and ventilation systems, it is vital to determine the occupancy upon the floors to operate the core plant against demand. Utilising the PIR detection found upon most lighting systems is the obvious solution. Setting back temperatures or disabling zones in conjunction with the lights can contribute towards improving buildings energy by up to 30%

Due to the lighting and heating and ventilation industry taking separate paths for their respective control systems, when the need to send data between the systems arises, it becomes very expensive due to incompatibility.

Eco-i has created the first combined HVAC and lighting control systems to seamlessly integrate both the lighting and HVAC protocols at a field level, without the need of gateway or additional engineering.
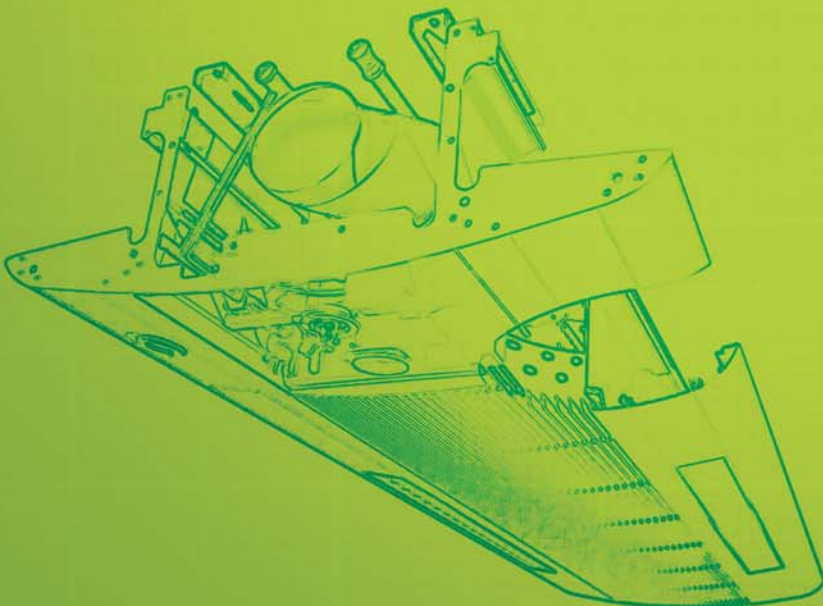
THE BENEFITS

- Reduced Installation Costs
- Improved Operational Efficiency
- Reduced Commissioning
- Open System with BACnet & DALI standards
- Proven software applications
- More Robust Infrastructure

FEATURES

- HVAC control
- Lighting Control
- Emergency light testing
- Self diagnostic software
- Alarm handling
- Energy Monitoring
- Trend logging
- Audit History
- Scheduling
- Reporting

TRADITIONAL V ALTERNATIVE
APPROACH   APPROACH
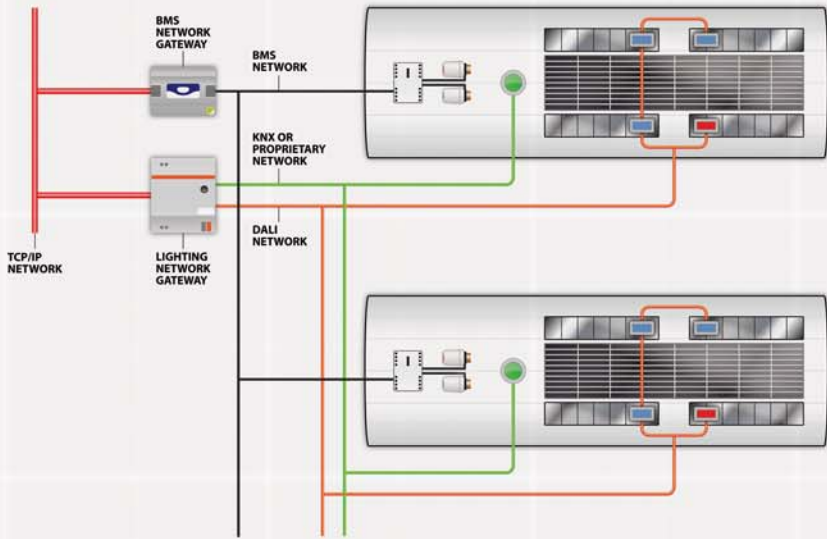
TRADITIONAL APPROACH

- Duplication of wiring and hardware
- Multiple layers of protocol
- Integration of data costly
- Single point of failure at the network device
- Systems installed independently

The two systems operate independently, with the lighting system using a network device to command the DALI via a proprietary or open system, such as KNX. Three layers of protocol exist with this arrangement.
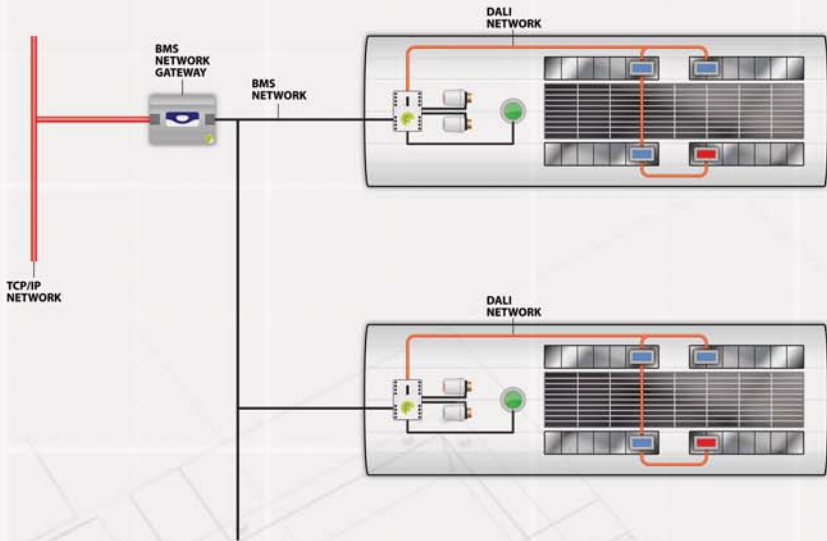
ALTERNATIVE APPROACH
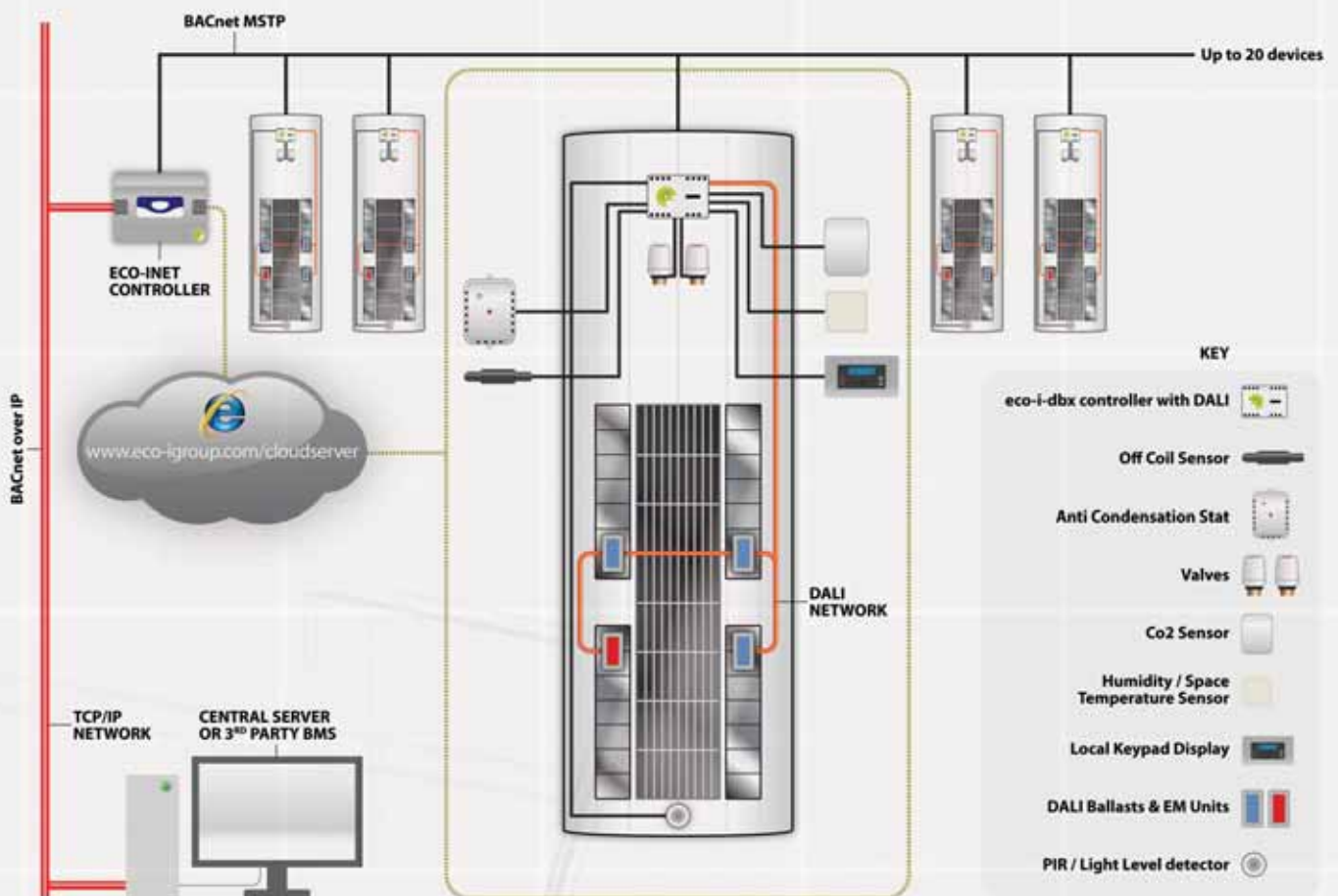
- Single layer of protocol and network wiring
- Data shared upon the beam
- Packaged solution, pre-wired and tested
- Reduced work within ceilings
- Graphics and report suite as standard
- Web-server as standard

The data for both systems is collected locally by the eco-i-dbx controller, which supports DALI. The data is shared using BACnet over IP to other 3rd party BMS or Lighting systems.

ARCHITECTURE

The beam is provided with an eco-db-10X controller that contains both the BACnet & DALI protocols. The controller is pre-programmed to provide HVAC control in accordance to the BSRIA recommendations, and conforms towards a category 'A' rating for EN15232

BACnet MSTP

Up to 20 devices

ECO-INET
CONTROLLER

BACnet over IP

www.eco-igroup.com/cloudserver

TCP/IP
NETWORK

CENTRAL SERVER
OR 3RD PARTY BMS

DALI
NETWORK

KEY

eco-i-dbx controller with DALI	
Off Coil Sensor	
Anti Condensation Stat	
Valves	
Co2 Sensor	
Humidity / Space Temperature Sensor	
Local Keypad Display	
DALI Ballasts & EM Units	
PIR / Light Level detector	

The eco-inet controller manages the controllers upon the beams. The eco-inet supports both BACnet MSTP and BACnet IP for the transportation of data to 3rd party systems. Up to 20 devices can reside upon one network, allowing a flexible modular approach.

The eco-inet controller also operates as the host for data collection and graphics.

FEATURES

The eco-inet controller is based upon the Niagara framework. The controller has been arranged to provide a full BMS system inherent within the field device.

The system is extremely user-friendly and provides a host of features to ensure a high degree of visibility of the condition and performance of your system.

FEATURES

- HVAC control
- Lighting Control
- Emergency light testing
- Self diagnostic software
- Alarm handling
- Energy Monitoring
- Trend logging
- Audit History
- Scheduling
- Reporting

HVAC VIEW

The user has a choice of both a standard graphical representation of the mechanical plant and the dashpot approach. This caters for both the engineer and building user. The graphic has been designed to communicate the current performance of the beam in the easiest manner. The graphics are animated to illustrate the position of the peripherals, such as valves and dampers.
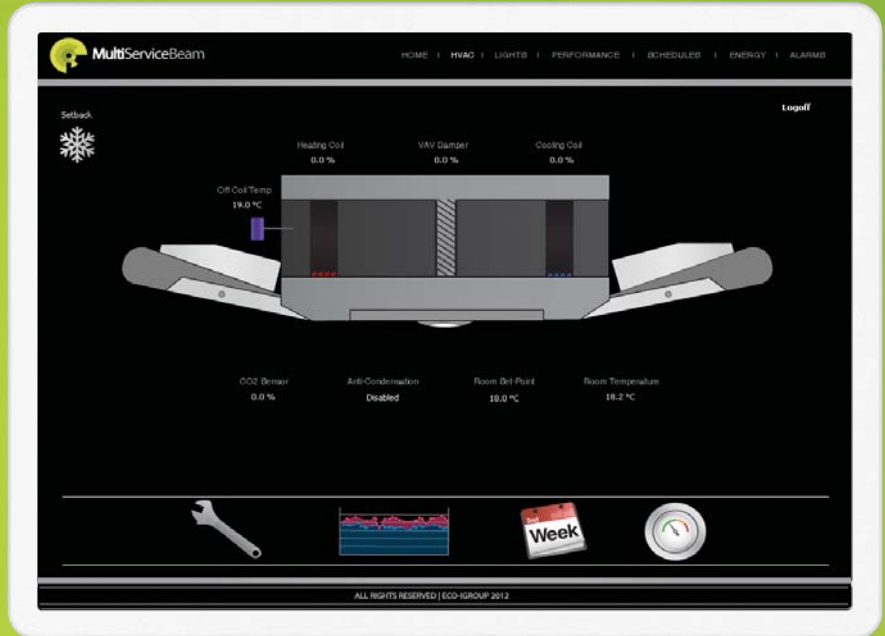
FEATURES

- Plant View
- Dashpot View
- Animated graphics
- Real time data
- Energy setback indication

LIGHTING
VIEW

A projection of the beam from the user-perspective has been provided for simplicity. The graphic is fully animated to provide a 'realtime' images of the dimming position of the tubes. Icons have been provided to illustrate the status of the PIR and schedule.
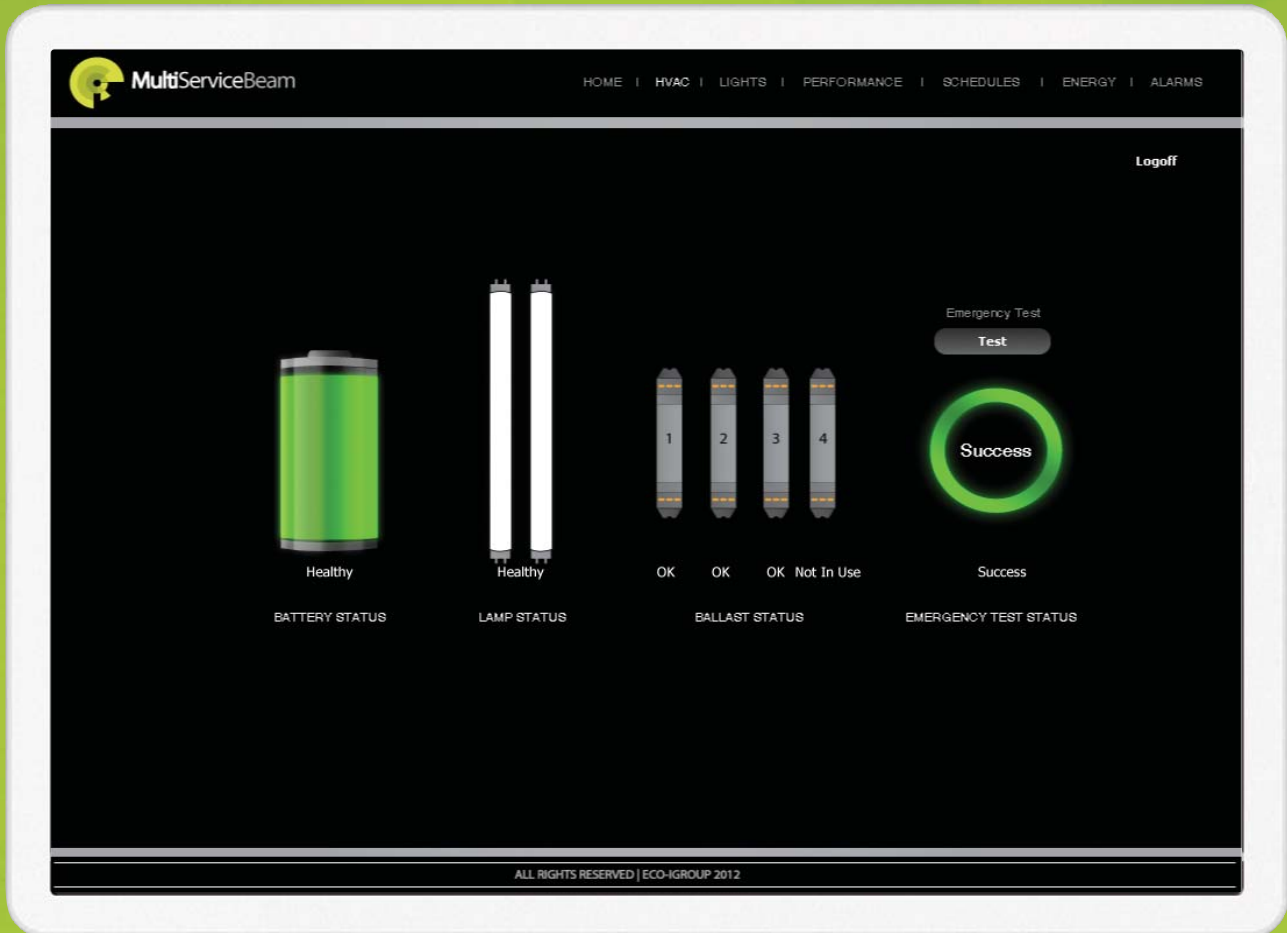

FEATURES

- Indication of occupancy
- Real time status of lights
- Emergency test activation
- Cleaner or Security schedule status

The emergency test can also be activated from this view.

LIGHTING
TEST VIEW

**The lighting control system has an automated emergency function testing system.
The controller will communicate with the DALI devices and will ascertain it's condition.**

THE FEATURES INCLUDE THE FOLLOWING TESTS:

- Battery duration test
- Ballast test
- Lamp Test

Upon detection of a fault, the emergency test icon will indicate a failure and report the fault to the alarm handling suite.

The status of the system is recorded within the report suite.

REPORT
SUITE

**The eco-inet has the emergency test report suite embedded as a standard feature.
This will allow full automation of the results of the lighting test to be compiled.
The controller has the facility to automatically email test reports upon completion.**

MultiServiceBeam

HOME | HVAC | LIGHTS | PERFORMANCE | SCHEDULES | ENERGY | ALARMS

Logoff

ALL EMERGENCY DEVICES

Device	Function Time	Function Result	Duration Time	Duration Result	Battery Charge	Battery Remaining	Total Lamp Time	
Emergency_Device	-	Pass	-	Pass	0.00	-	0.00	
T_EmergencyDevice1	-	Pass	-	Pass	0.00	-	0.00	
T_EmergencyDevice2	-	Pass	-	Pass	0.00	-	0.00	
T_EmergencyDevice	-	Faulty	-	Pass	0.00	-	0.00	
D_Office_Group_Emg_Ltg	-	Faulty	-	Pass	0.00	-	0.00	

ALL EMERGENCY DEVICES - FUNCTION TEST FAILED

Device	Result	Time	
T_EmergencyDevice	Faulty	-	
D_Office_Group_Emg_Ltg	Faulty	-	

ALL EMERGENCY DEVICES - DURATION TEST FAILED

Device	Result	Time	

NON-EMERGENCY DEVICES - FAULTY

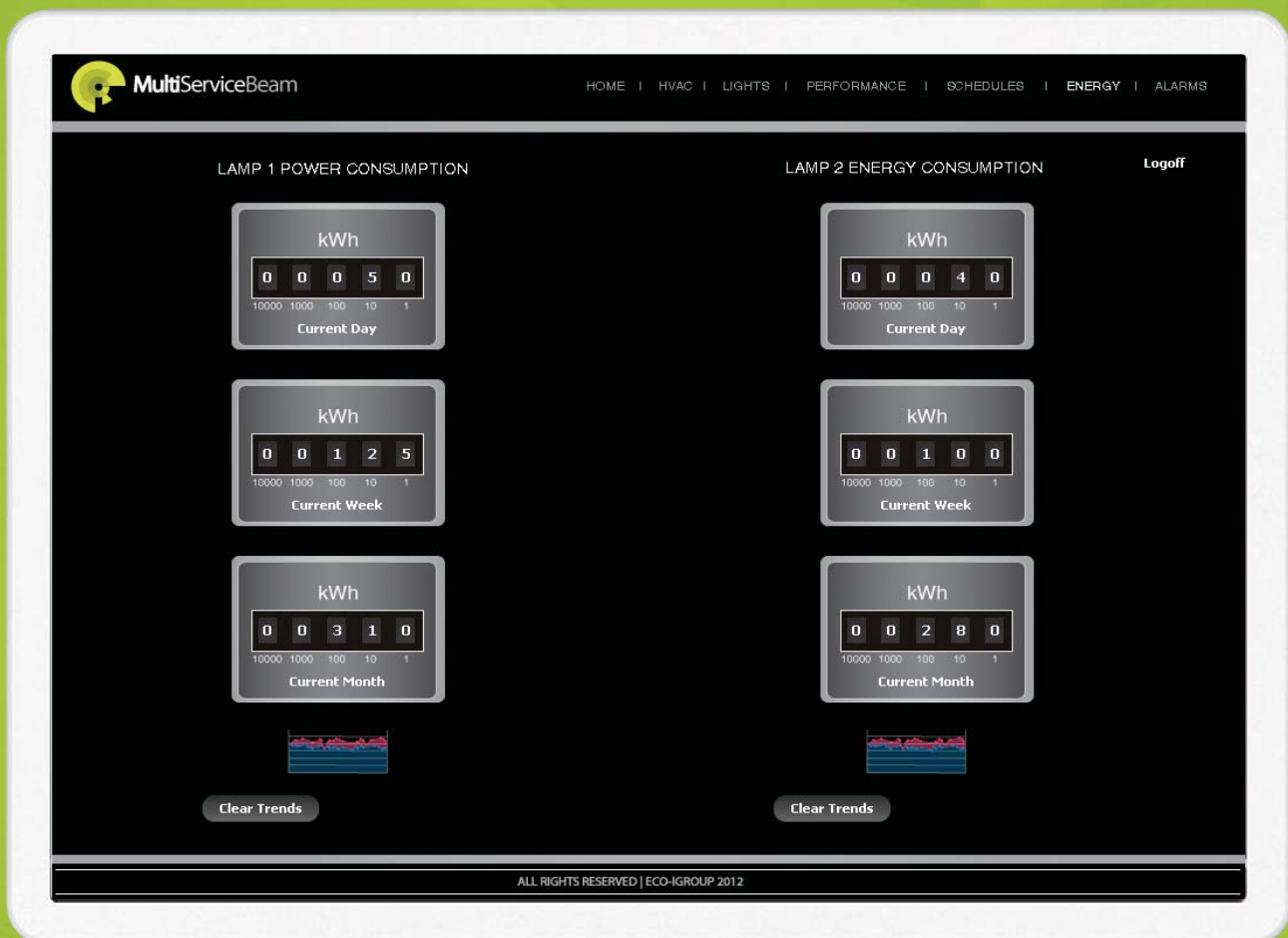| Device ID	Point ID	Current State	

FEATURES

📄 Test report historical log

📄 Email facility

📄 Audit Report

📄 PDF upload facility

📄 CSV upload facility

Bespoke reports can be
created to assist with facilities
management procedures.

The report can be
transmitted automatically
or uploaded manually.

ENERGY
VIEW

The BACnet interface provides live data of energy consumption of the tube. The energy data is captured by the eco-inet controller and stored locally to provide a daily, weekly and monthly consumption report.


MultiServiceBeam

HOME | HVAC | LIGHTS | PERFORMANCE | SCHEDULES | ENERGY | ALARMS

LAMP 1 POWER CONSUMPTION   LAMP 2 ENERGY CONSUMPTION   **Logoff**

kWh
0 0 0 5 0
10000 1000 100 10 1
Current Day

kWh
0 0 0 4 0
10000 1000 100 10 1
Current Day

kWh
0 0 1 2 5
10000 1000 100 10 1
Current Week

kWh
0 0 1 0 0
10000 1000 100 10 1
Current Week

kWh
0 0 3 1 0
10000 1000 100 10 1
Current Month

kWh
0 0 2 8 0
10000 1000 100 10 1
Current Month

Clear Trends   **Clear Trends**

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FEATURES

- Daily, Weekly, Monthly totals
- Real time energy consumption
- Graph analysis
- Export feature to CSV & other formats

Note: The default meters are two lamps per beam, this can be arranged to incorporate additional lamps or additional meters can be provided.

Metering of dimmable lamps available upon the provision of the manufacturer tube characteristics

ALARM
VIEW

The BMS has a full alarm monitoring system; This allows the condition of the unit to log incidents or faults for remote diagnostics. The alarm handling has been created with three separate categories of alarm, General, Maintenance & Critical. The controller has the capacity to escalate alarms to other devices based upon the severity.
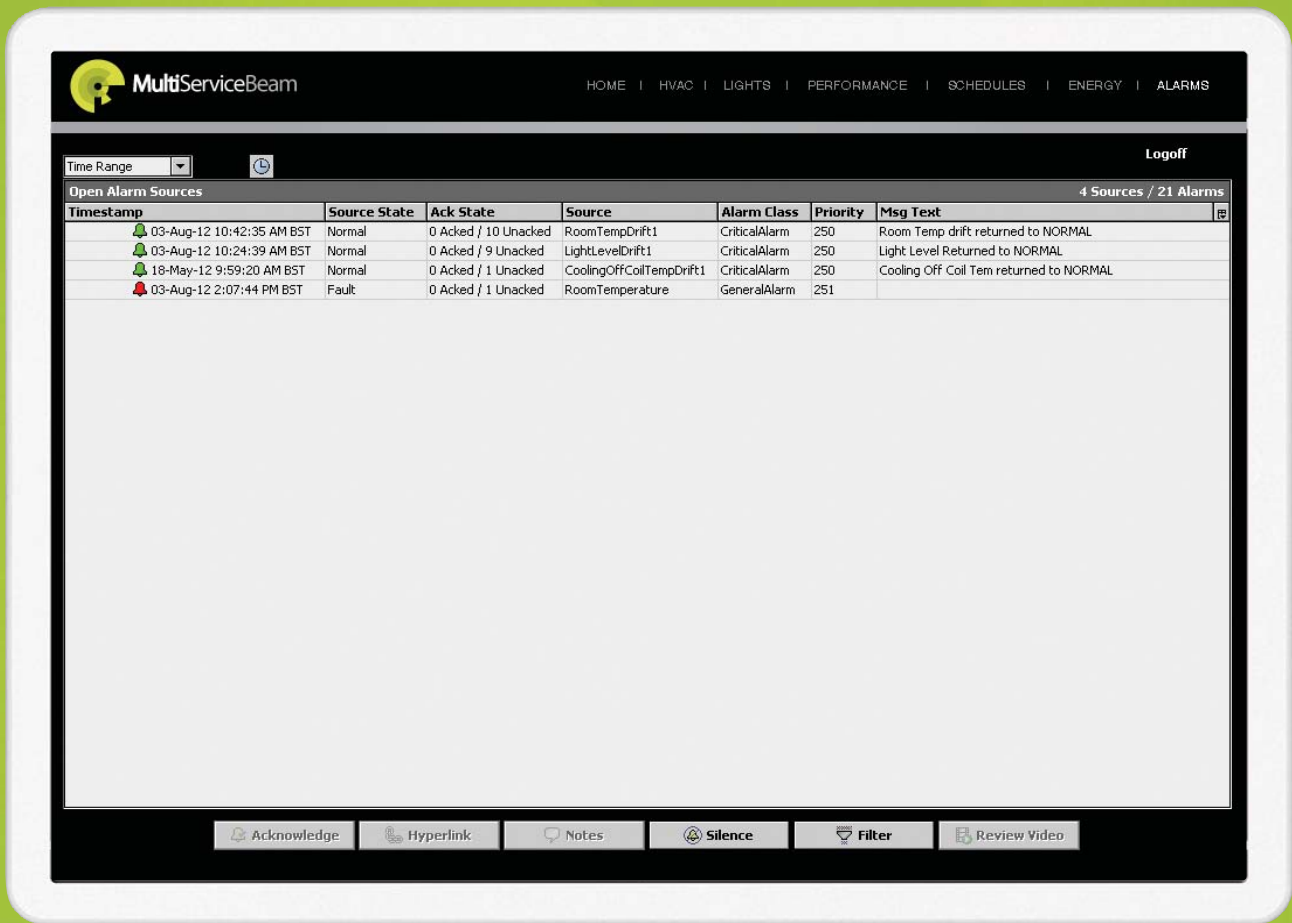
FEATURES

- Three categories of alarm
- Alarm Escalation
- SMS & Email facility
- Filtering and search facility
- Engineers notebook feature
- Category group feature

A full report suite allows the user to acknowledge and clear alarms, plus add notes against the incident to record vital information.

SCHEDULE
VIEW

The eco-inet can operate in conjunction with other BMS systems or as a 'standalone' device. The controller has a real time clock and full scheduler to control the MSB. The schedules have been created using a familiar 'Outlook' format for ease of use. Acceptation days and multiple stop / start times provide a comprehensive solution for 'standalone' operation.

FEATURES

- Inbuilt real time clock
- Familiar easy use format
- Exception day feature
- Multiple stop/start times
- Cleaner & security schedules

The lighting control systems is pre-programmed to accept different lighting schedules, such as cleaning mode or security mode. When activated the lights will operate to a pre-determined arrangement to satisfy user.

PERFORMANCE
VIEW

A unique feature of eco-i is that it provides a self analysing feature to the software. The device monitors the condition between the set-point and the actual value. If the performance drifts due to a failure or overridden state, the BMS will detect the difference and provide an indication if it is above or below it's set-point and by how much.

MultiServiceBeam

HOME | HVAC | LIGHTS | **PERFORMANCE** | SCHEDULES | ENERGY | ALARMS

Logoff

ROOM TEMP EVAL   20.8 ℃   21.0 ℃
ROOM TEMP   ROOM TEMP SETPOINT

OFF COIL TEMP EVAL   19.0 ℃   21.0 ℃
OFF COIL TEMP   OFF COIL SETPOINT

LIGHT LEVEL EVAL   0.0 %   0.0 %
LIGHT LEVEL   LIGHT LEVEL SETPOINT

Week

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FEATURES

- Self analysis of performance
- Traffic Light status indication
- Automatic indication of mechanical failure
- Detects manual override
- Reduces commissioning and ceiling work

The performance feature will ignore the transition between setback modes and occupancy start-up. It has the intelligence to provide sufficient time to allow the conditions to synchronise and thus eliminate false alarms. The feature provides assistance with onsite commissioning and reduces ceiling work

GLOSSARY

BACnet

BACnet is "a data communication protocol for building automation and control networks." A data communication protocol is a set of rules governing the exchange of data over a computer network. The rules take the form of a written specification that spells out what is required to conform to the protocol.

The trick is that BACnet provides a standard way of representing the functions of any device, as long as it has these functions. Examples are analog and binary inputs and outputs, schedules, control loops, and alarms. This standardized model of a device represents these common functions as collections of related information called "objects," each of which has a set of "properties", that further describe it. Each analog input, for instance, is represented by a BACnet "analog input object" which has a set of standard properties like present value, sensor type, location, alarm limits, and so on. Some of these properties are required, while others are optional. One of the object's most important properties is it's identifier, a sort of numerical name that allows BACnet to unambiguously access it. Once devices have common "appearances" on the network in terms of their objects and properties, it is easy to envision messages that can manipulate this information in a standard way.

DALI

DALI is an acronym and stands for "Digital Addressable Lighting Interface". It is an international standard that guarantees the exchangeability of dimmable ballasts from different manufacturers. This gives planners, luminaire manufacturers, building owners, installers and end-users the security of supply from many sources.

All intelligent components communicate in a local system in a way that is both simple and free of interference. There are no special requirements for the wiring of data cables. DALI has been designed in a joint effort by all leading control equipment manufacturers with the idea of offering a standard to the lighting market that complies with all requirements.

EN15232

The European Standard EN 15232 ("Energy performance of buildings – Impact of Building Automation, Controls and Building Management") was compiled in conjunction with the Europe-wide implementation of the directive for energy efficiency in buildings (Energy Performance of Buildings Directive EPBD) 2002/91/EG. The standard describes methods for evaluating the influence of building automation and technical building management on the energy consumption of buildings.

Building automation and control functions should be selected based on their impact on a building's efficiency. The purpose of the EN15232 is to promote higher energy efficiency in buildings as well as the use of energy-efficient building automation and control functions, this saves building operating costs, existing energy resources and lowers CO_2 emissions

w. www.eco-igroup.com

e. info@eco-igroup.com

t. 01565 759 850