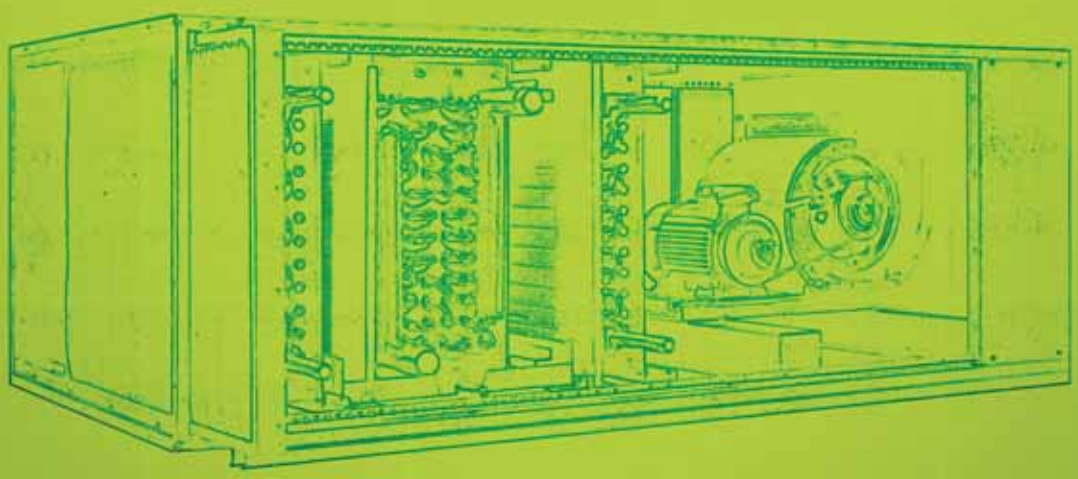
AIR HANDLING
UNIT CONTROLLER



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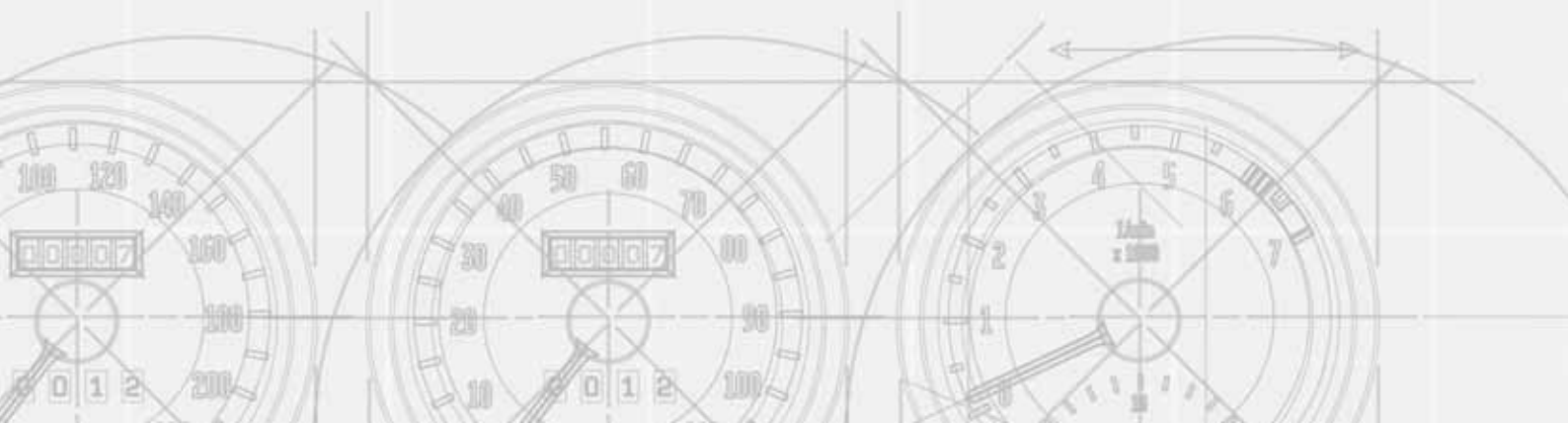


OVERVIEW

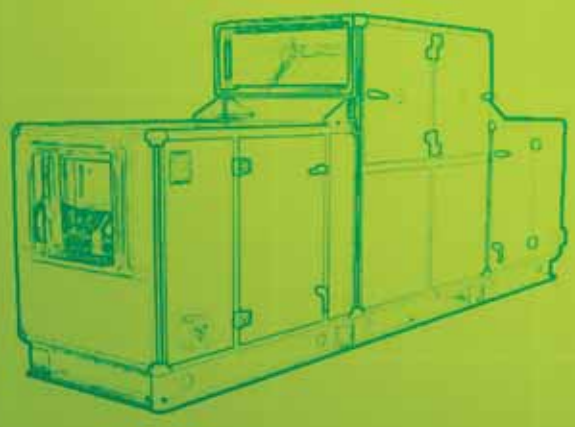
An Air Handling Unit (AHU) is an integral part to a building's operation, providing conditioned air to maintain a healthy environment for the building occupants. The operation of the AHU is traditionally via a dedicated Building Management System (BMS) controller located within a Motor Control Panel (MCP).

The supply of packaged units have become more commonplace to reduce the cost of installation and commissioning, however they still adopt the conventional approach of housing a controller within an MCP. Although a saving can be achieved by a packaged arrangement, it still provides other problems and misses the opportunity to reduce further costs.

Variable Speed Drives (VSDs) are found upon all but the very smallest of units as they offer flexibility of commissioning and energy savings. What isn't recognised, are VSDs hold many more capabilities that are often missed or ignored. Each inverter drive has an extensive array of inputs & outputs (I/O) to operate the most complicated AHU arrangements.

eco-i has developed an interface that unlocks the full capabilities of the Inverter, to control an AHU without the need of a dedicated controller or motor control panel. Our solution offers a full inherent Graphical User Interface (GUI) to run either standalone or part of a site wide BMS system. A full audit tracker is available to ensure the demarcation of responsibility is visible.

The eco-inet controller is available pre-configured to automatically connect with Inverter drives and access both their I/O capabilities and extensive range of parameters. The software is composed to BSRIA and CIBSE guideline to ensure the best performance is delivered.



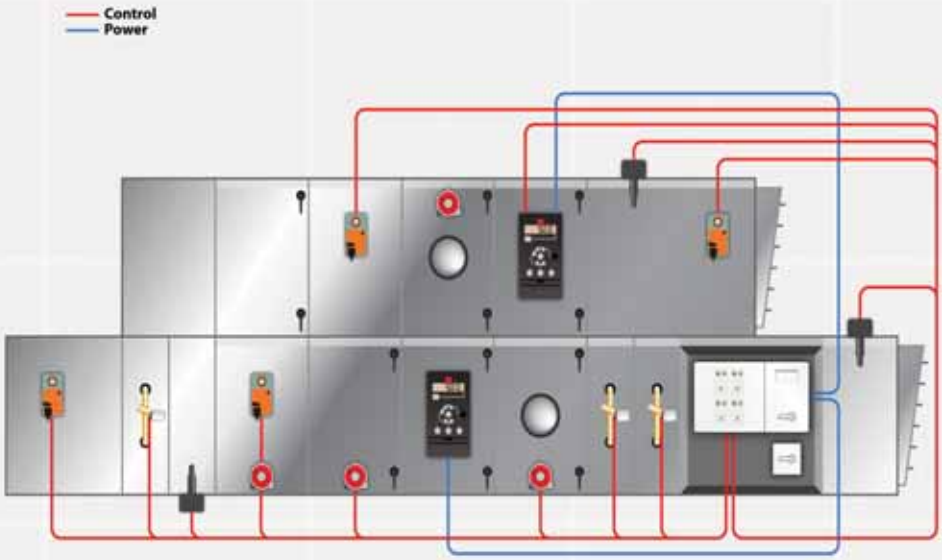
OTHER BENEFITS INCLUDE

- Reduced space & installation costs
- Graphical pages
- Web-server access
- TCP/IP router capabilities
- Open System with BACnet , Modbus & Lon
- Proven software applications
- More Robust Infrastructure

FEATURES

- HVAC control
- Access of 200 Inverter parameters
- Dashpot view
- Self diagnostic software
- Alarm handling
- Energy Monitoring
- Trend logging
- Audit History
- Scheduling
- Reporting

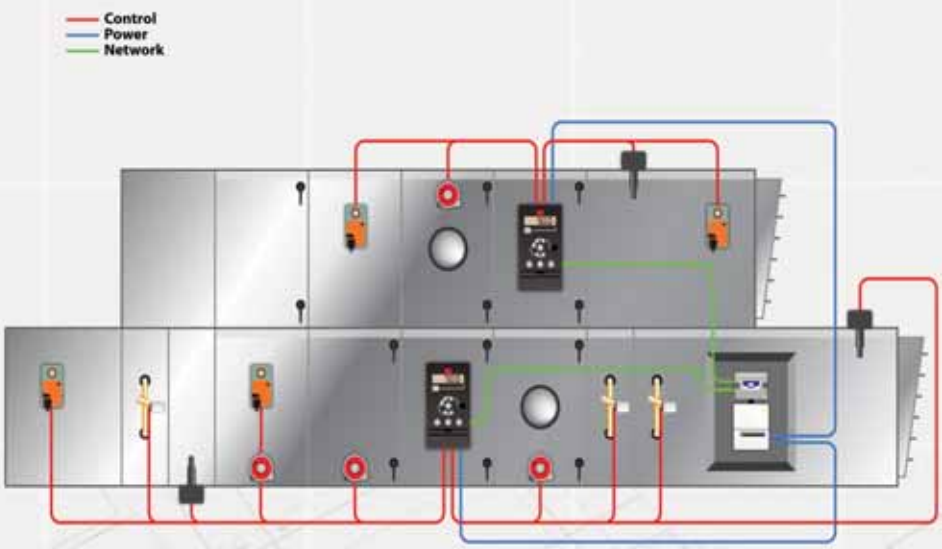
TRADITIONAL APPROACH V ALTERNATIVE APPROACH



TRADITIONAL APPROACH

- Provision of control panel including lamps and switches.
- Traditional BMS controller
- Compatibility and demarcation issues
- No graphical pages

A dedicated control panel housing a BMS controller is provided. The control signals emanate from the control section to each device. The Inverter drives are controlled and monitored using analogue and digital signals.



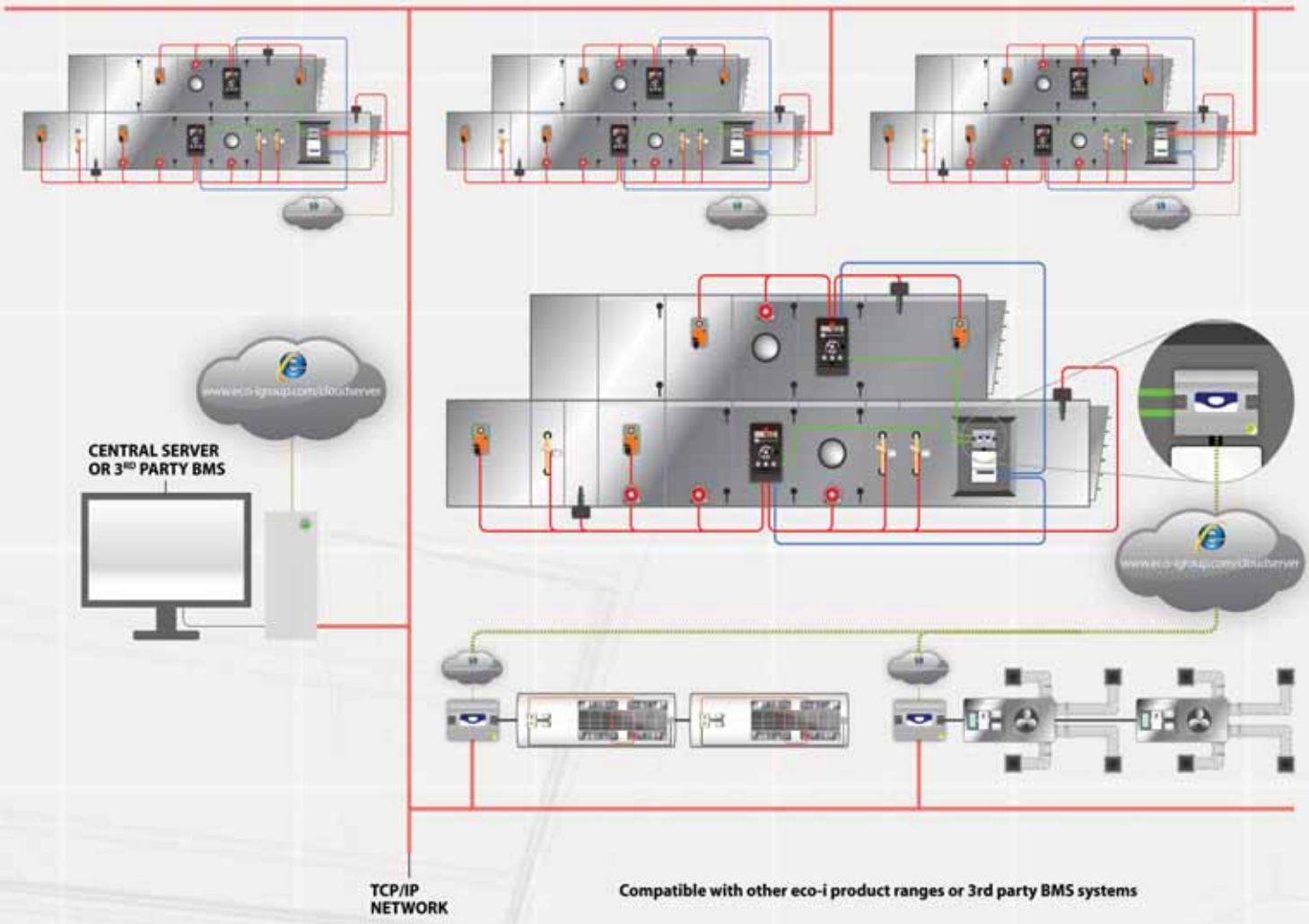
ALTERNATIVE APPROACH

- Removed MCP
- Removed BMS controller and programming
- Utilising the Inverter drive capabilities
- Self contained system with graphics
- Software to proven industry standards to ensure efficiency

The unnecessary duplication is removed and the Inverter drives are utilised to full effect. The eco-inet device hosts the Graphical User Interface (GUI) in addition to acting as the TCP/IP router. The eco-inet also offers a Web-server interface for remote access and viewing.

ARCHITECTURE

The AHU is provided with an eco-inet controller that contains the BACnet IP router. The controller is pre-programmed to provide HVAC control in accordance to the BSRIA recommendations, and conforms towards a category 'A' rating for EN15232.



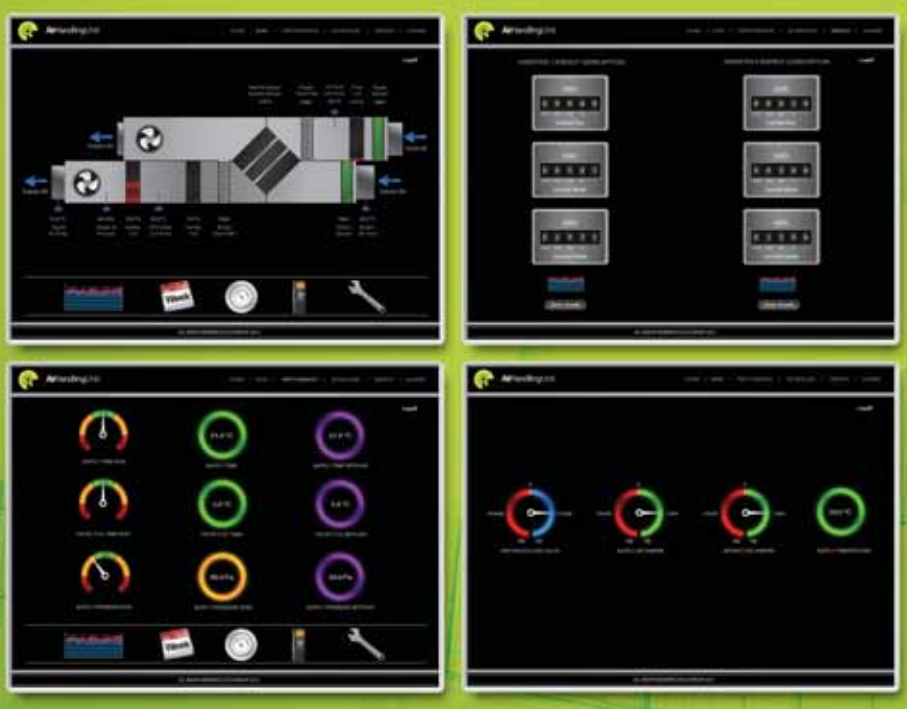
The inverter I/O is utilised to allow the most complicated of AHU arrangements to be controlled via the eco-i net. The BACnet interface exposes the full array of parameters held within the inverter device. Each unit can operate stand alone or part of a site wide BMS system.

The units can operate in conjunction with the other eco-i systems such as VAV, FCU and Chilled beams. The valve operation can also form part of the eco-i intelligent hydraulic system. PIN coded Web-server access provides commissioning adjustment without the need of a BMS engineer.

FEATURES

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

A default menu page allows the user to navigate between devices on the network and activate various functions.



FEATURES

- HVAC control
- Access of 200 Inverter parameters
- Dashpot view
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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 compiled to communicate the current performance of the AHU 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

The dashpot view simplifies the data to a laymen who may not understand the mechanical arrangement of the plant. The dashpot provides a medium that gives tangible information in a familiar non technical format.

ENERGY VIEW

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

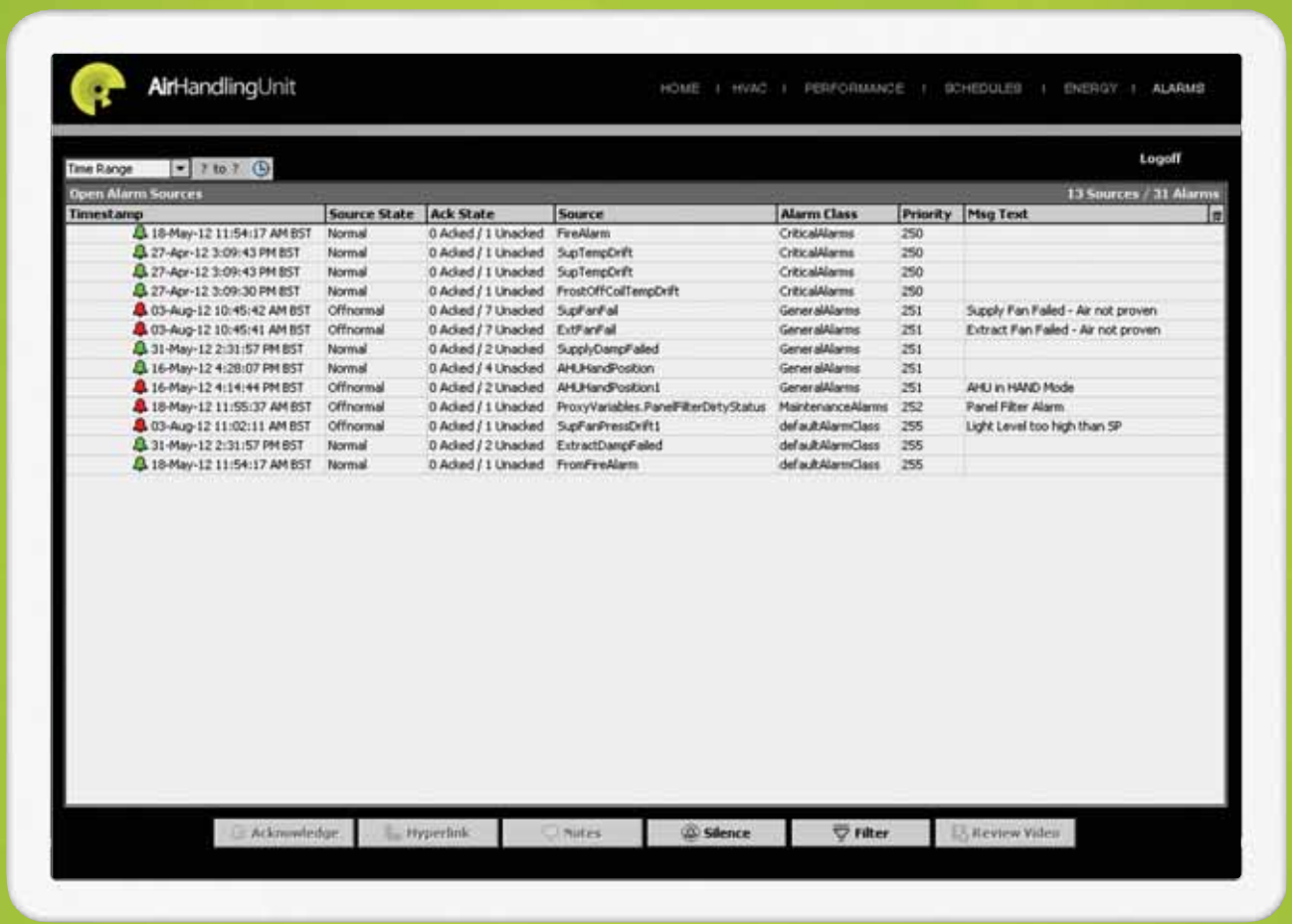
FEATURES

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

Note: The default meters monitor the motor consumption. Additional meters can be provided upon request.

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.



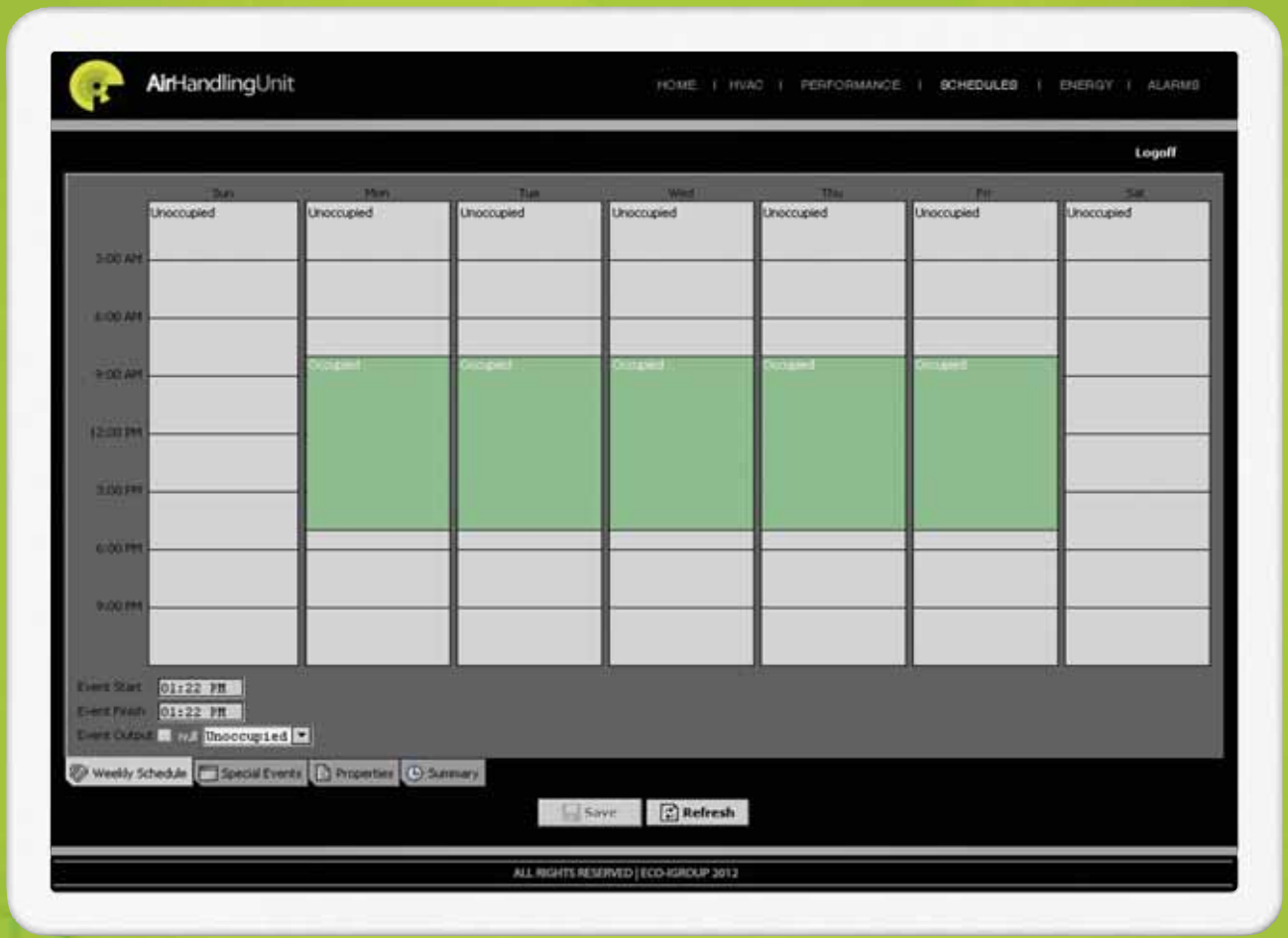
FEATURES

- 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 AHU. The schedules have been created using a familiar 'Outlook' format for ease of use. Expectation 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 AHU has pre-programmed schedules that will allow the unit to operate stand alone. The BACnet architecture allows integration with third party BMS systems.

PERFORMANCE VIEW

A unique feature of the eco-i-net is to provide 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's above or below its set-point and by how much.

FEATURES

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

INVERTER INTEGRATION

The inverter drives communicate using BACnet, this allows a full list of parameters to be utilised by the BMS including energy consumption, Phase Voltages and Phase Current. The BMS can interact with the drive using the graphical keypad buttons, it is possible to adjust speed, manually override and switch between display views.

FEATURES

- Access to the full drive parameters
- Real-time viewing
- Remote adjustment
- PIN Coded access

Over 200 parameters can be accessed using the BACnet interface that are traditionally ignored by most other BMS systems.

The graphic has functionality to allow control and adjustment using the buttons upon the screen.

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 CO2 emissions

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