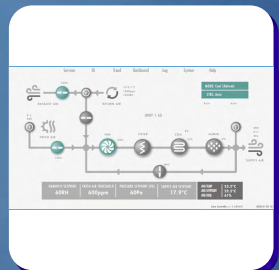
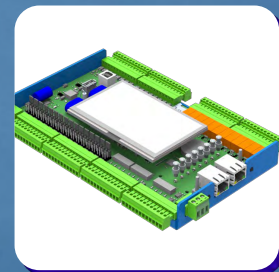


ZONE CONTROLLER

- ❄️ HIGHLY CONFIGURABLE AHU SYSTEM CONTROLLER
- ❄️ REMOVES PROGRAMMING COMPLEXITY
- ❄️ REDUCES SETUP COST
- ❄️ NO MAPPING OF RICKARD EQUIPMENT REQUIRED
- ❄️ AUTOMATICALLY GENERATES AN AHU REPRESENTATION
- ❄️ TOOLS TO MANAGE, TEST, MONITOR, DIAGNOSE & OVERRIDE
- ❄️ CONFIGURABLE TREND LOG TOOL TO MONITOR PERFORMANCE
- ❄️ BACNET TOOLS SIMPLIFY INTEGRATION



FEATURES

Rickard is proud to introduce the HVAC system controller reimagined. The Rickard Zone controller is a highly configurable AHU controller that seamlessly integrates with the Rickard diffuser network without the time-consuming programming requirement of traditional controllers.

It has been designed to make the setup, testing, monitoring, scheduling and management of an HVAC system quicker, easier and more affordable than ever.

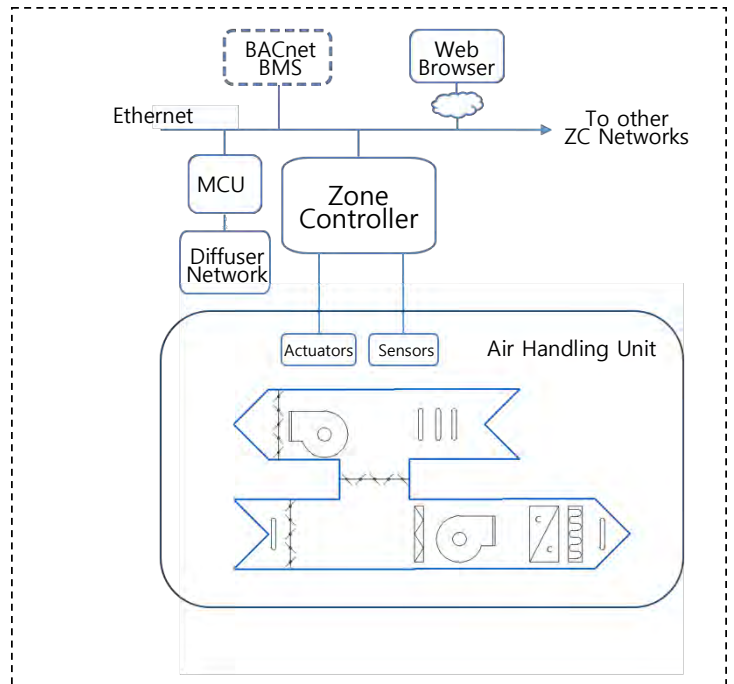
The unit contains a total of 48 configurable I/O ports, a BACnet client, server interface and a touch screen user interface. It runs on a Linux operating system powered by a state-of-the-art System on Module PCB running a 1 GHz Dual-core processor with 2GB of RAM and 8GB of Flash memory.

Configuring the system is done by selecting customisable configurations, accessible through the units' modern web interface. The built-in tools make the setup of the system faster and the results more repeatable than ever before. As the system is configured, a clean graphical representation of the AHU is automatically generated giving the user the tools to test, monitor, diagnose and manually override the system in real-time.

An easily configurable trend log tool is built-in to monitor the systems performance, the buildings comfort and its energy efficiency. Should the user desire to test an alternative control strategy, it is a

The Zone Controller can Interface to:

- Building Management System (BMS)
- Multiples of 60 diffusers per Master Communication Unit (MCU) using the BACnet protocol
- Other Zone Controllers
- Remote Client Workstation with a Web Browser



The Zone Controller can connect to:

- Sensors - 16 Analog Inputs
- Actuators - 16 Analog Outputs
- Digital Inputs - 16 Digital Inputs
- Digital outputs - 16 Digital Outputs

FUNCTIONAL OVERVIEW

Control

The Zone Controller controls AHU temperature, pressure, CO2 and humidity of supply air. These control functions can be individually enabled as part of the configuration. The method and parameters for the individual controllers are also configurable.



simple matter of selecting a different pre-configuration that can be evaluated through the dashboard and trend log tool.

The controller can be used to control a stand-alone AHU in any configuration or in conjunction with a Rickard MLM diffuser system. Since the controller was designed to work seamlessly with a Rickard MLM diffuser network, there are a number of benefits. Integration is easy and efficient; AHU control is stable and the buildings comfort levels and efficiency can be improved.

If you're looking for a high powered, highly configurable AHU controller without the programming hassle and associated cost of traditional controllers then Rickard has the controller for you.

Configuration

The operation of the Zone Controller is configured using a web browser. The following groups of data can be configured:

- Active controllers
- System control options for purging, fire, manual overrides from BMS, etc.
- Schedule of operation
- Control parameters for temperature, pressure, CO2 and humidity
- Simulation parameters
- Valid data points and data point properties

Points list

The points list allows the linking of sensors, actuators and digital I/O to physical I/O lines.

Log files

A log file is maintained which captures all major system operational events and their time.

Trend logs

The values of all data points are captured in a time series database both synchronously and on change of value. The web browser is then capable of displaying the trends of selected data points. The display tool is configurable and the user may define the number of graphs, the number of variables per graph and the display settings of the trend graphs.

Simulation

It is possible to simulate a number of sensor and digital input data points. The data profile can be configured as a step, square wave, etc., the frequency and amplitude are also configurable.

MLM Diffuser Interface

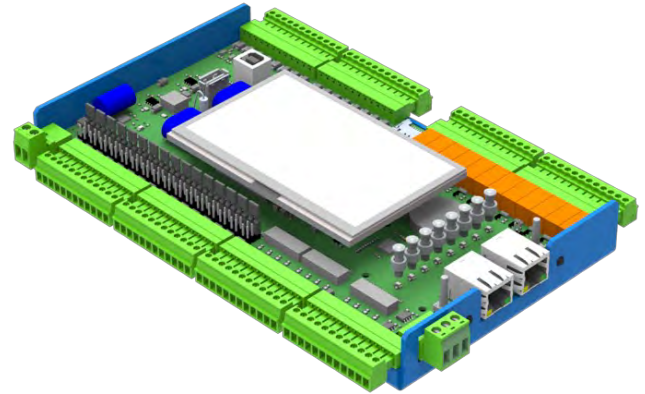
The Zone Controller implements a BACnet/IP interface to interrogate the diffuser network. The diffuser network information is accessed through a Master Communications Unit (MCU). The Zone Controller can then read and write points like temperature, disk position and occupancy status information in the Supply Area.

HARDWARE FEATURES

Feature list:

- 8 x Digital inputs, optically isolated and can be either AC or DC input.
- 8 x Digital outputs, NO, NC, and COM relay connection.
- 16 x Analog Inputs 12-bit.
- 16 x Analog Outputs 12-bit.
- Device User Interface (Local User Interface (LUI)) with 320x240 Resistive touch LCD Display
- 6 x LED's for Unit status displays
- USB-B interface.

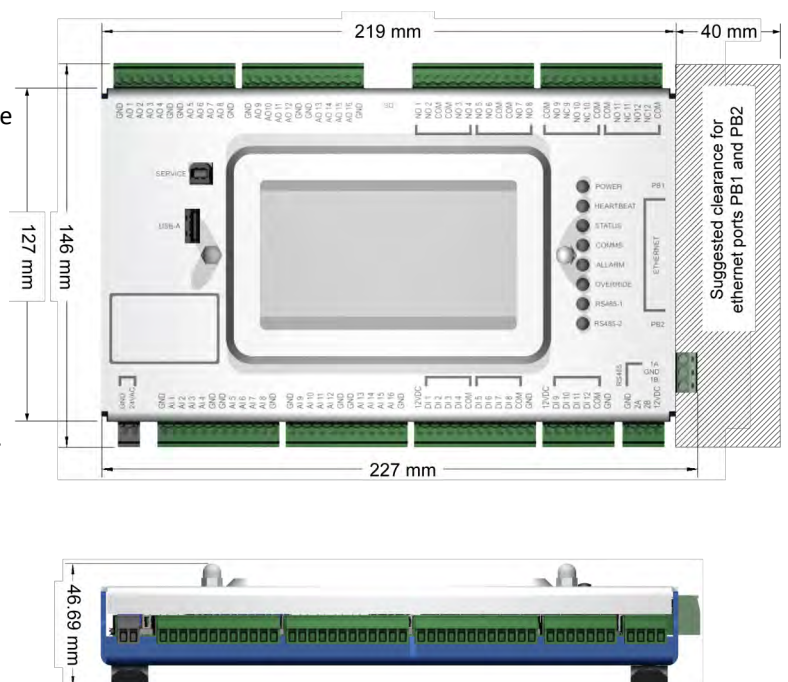
- USB-A interface.
- Micro SD Card for expandable memory up to 64GB.
- 2 x 100Mbit switch ports (Ethernet 0).
- RS485 port for Modbus or MS/TP (future release).
- Dual-band 2.4/5 GHz and 802.11 ac/a/b/g/n (Future release).
- Bluetooth/BLE (Future release).



General Specifications

Item	Description
Protection	All inputs and outputs (except for relay outputs and communication ports) are over-voltage protected up to 24 VAC and short-circuit protected.
Environmental	Operating temperature 0°C to +50°C. Storage temperature -10°C to 60°C. Relative humidity 10-95%, non-condensing.
Weight	0.5 kg

Dimensions



LED Indicators

The following indicators will be visible on the front panel:

LED #	Indicator	Status	Description
1	Power on	Solid	Power status
2	Kernel Heartbeat	Flashing	Indication that the kernel is active
3	Software Status	Flashing	Zone Controller running
4	Communications Failure	Solid	Communication failure
5	Alarm Active	Solid	If any of the Digital Input data points defined as having a type = alarm is active
6	Manual Override	Solid	If the Manual Override status is ON (switch or displays or BMS) at the BMS ZC front
3-6	Failure Status	Fast Flashing	Zone Controller failed

In addition to the LED indicators on the front panel, there will also be:

- Indicators next to each of the Ethernet (RJ45) connectors for Link and Activity.
- An indicator next to the RS485 connector to indicate 'Comms activity'.

Electromagnetic Compatibility (preliminary, to be confirmed)

Standard	Test Method	Description	Test Levels
EN 55024	EN 61000-4-2	Electrostatic Discharge	6 kV contact
EN 55024	EN 61000-4-3	Radiated Immunity	10 V/m, 80 MHz to 1 GHz
EN 55024	EN 61000-4-4	Fast Transient Burst	1 kV clamp & 2 kV direct
EN 55024	EN 61000-4-6	Conducted Immunity	10 V (rms)
EN 55022	CISPR 22	Radiated Emissions	Class A
EN 55022	CISPR 22	Conducted Emissions	Class B

COMMUNICATION

NETWORK CONNECTIONS

Protocol	Data Link and Physical Layers
Ethernet	ANSI/IEEE 802.3 10/100 Mbps Ethernet Auto-MDIX, 100m maximum segment length. Default IP address for Ethernet 0 is 192.168.0.252.

Protocol compliance	Compliance
BACnet/IP	ASHRAE 135-2016 annex J. Refer PICS statement in Appendix c.

BMS interface

The BMS interface is a BACnet/IP interface where the BMS implements a BACnet client and the ZC implements a BACnet server. The points list available to the BMS is configurable.

Diffuser interface

The ZC interfaces to the diffusers via the MCU2. Communication is via the BACnet protocol. The MCU2 implements a BACnet server whereas the ZC implements a BACnet client.

RS485

This interface allows for either Modbus or MS/TP interfacing. These are for future release.

POWER SUPPLY

The ZC requires a 24VAC/DC (nominal) 10Watt power input. It also supplies a 12V regulated power output. This 12V power source is available on two terminal connectors and is provided as an activating power source for digital inputs.

I/O WIRING DIAGRAM

This is an example Zone Controller to AHU Wiring diagram. Each installation needs to be configured individually. Please see the User Manual for detailed information.

COMMISSIONING REPORT

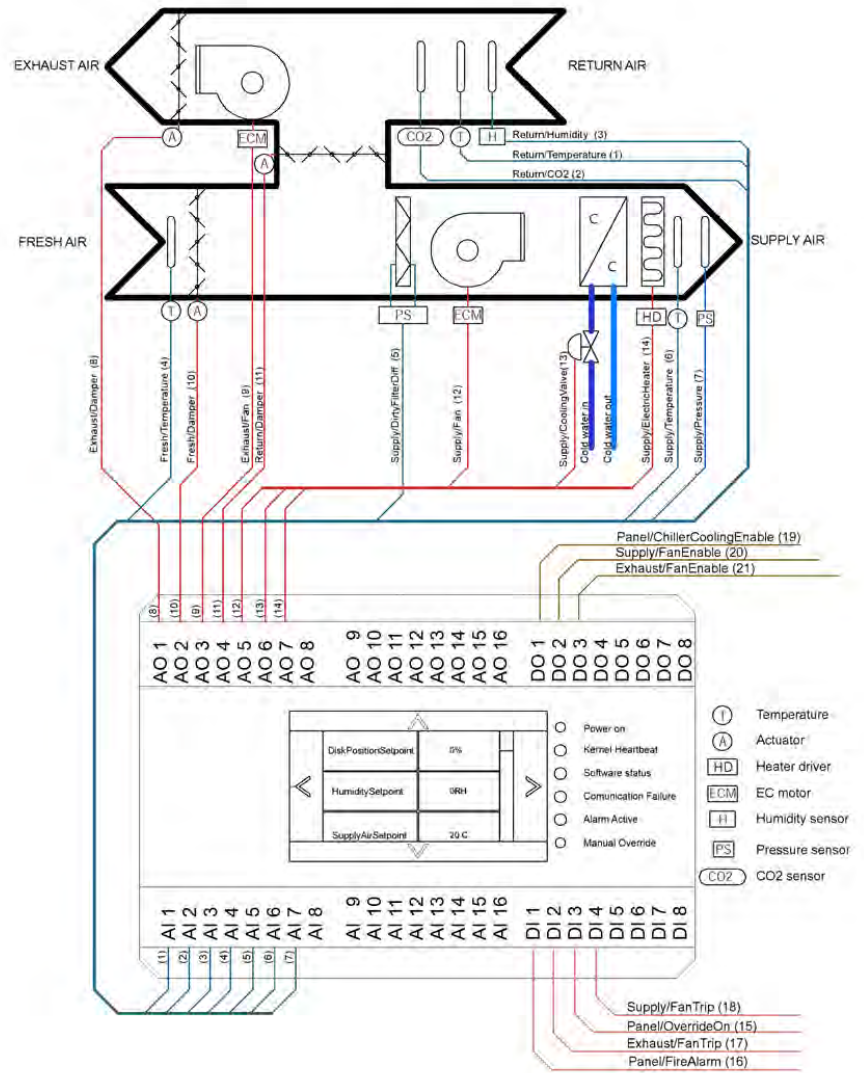
A Commissioning report will be available to allow the installer a snapshot of the configuration values at the time of the commissioning. This functionality is for future release.

A copy of the configuration parameters at the time of commissioning will be downloadable for future reference.

SYSTEM FEATURES

Power down

The system is resilient to a break in supply voltage for up to 2 seconds. If the power is removed for longer than 2 seconds, the ZC shutdown will commence and all services will shut down sequentially.



Dashboard

The graphical layout of the dashboard resembles the H-structure of an Air Handling Unit. The dashboard is the central display for monitoring and control of the ZC. Items 1 to 8 are visible on the dashboard and are described below.

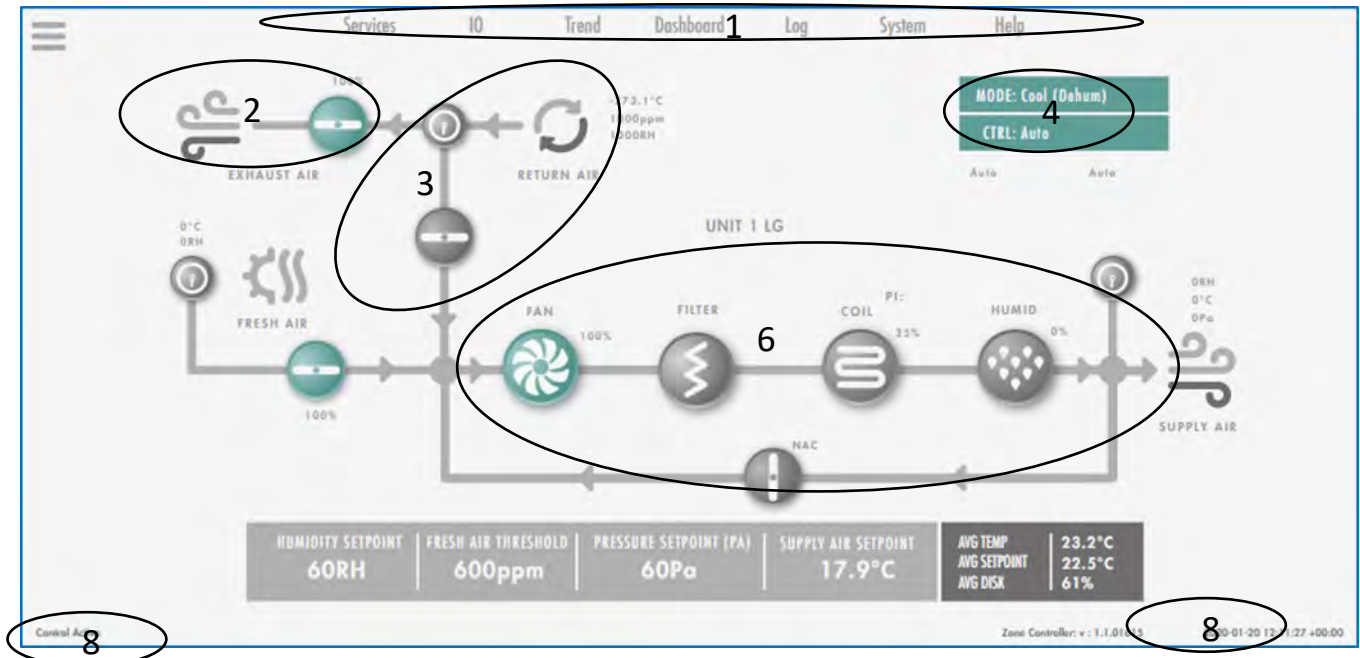


Figure 16: Typical dashboard – with functional areas encircled

1. Menu and Configuration

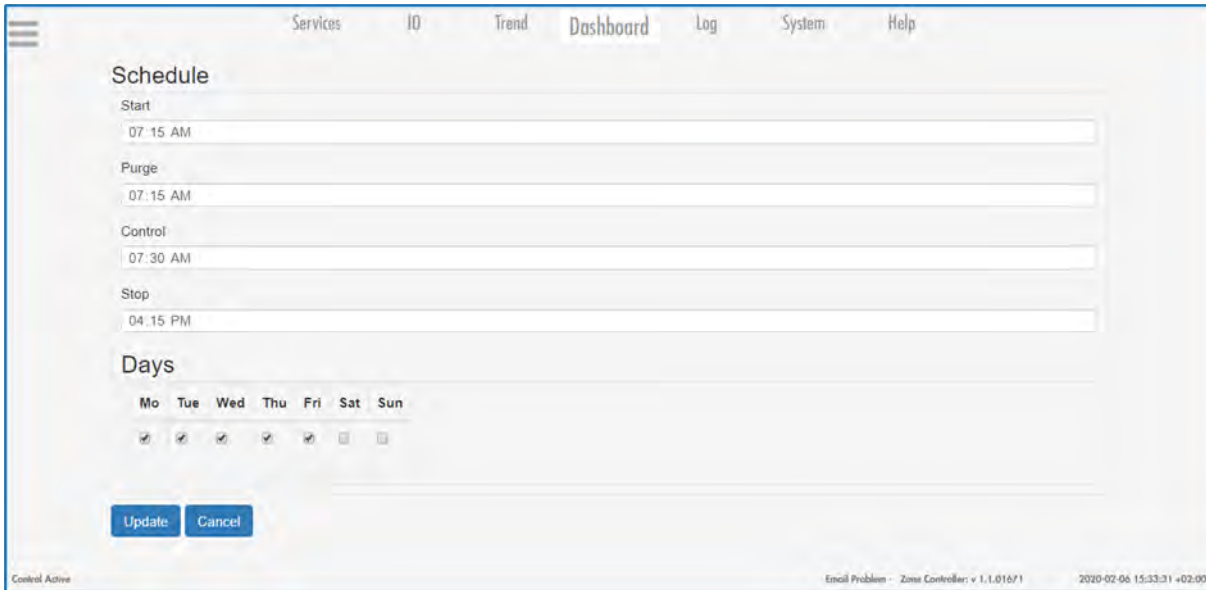
The menu has the following control items:

- Services
 - Software Upgrades
 - Configuration data
- I/O (Display of I/O data point values)



- Dashboard
This menu item encompasses the configuration of the control of the ZC. It contains the follow submenu items (Please see the User manual for more information):

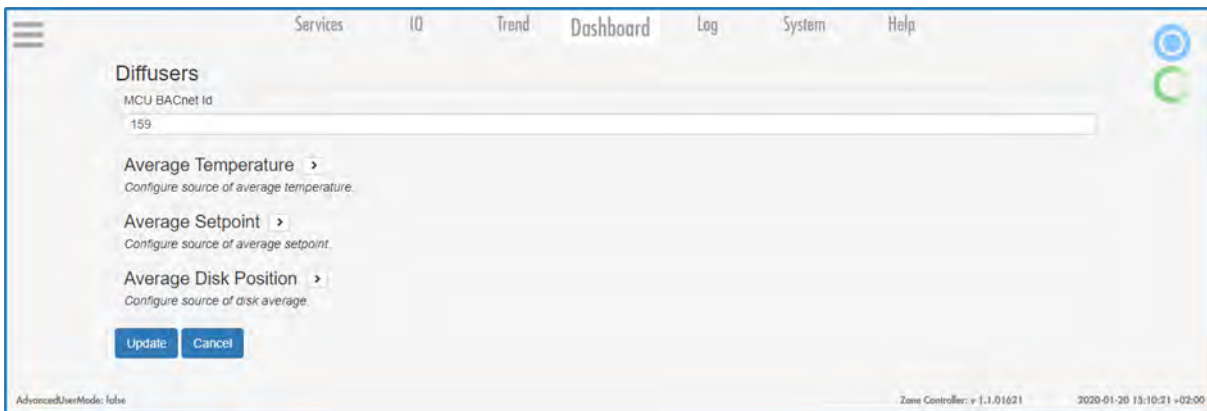
- Schedule



- Control

- Global
- Temperature
- Pressure
- Damper & Fan
- Economy
- Humidity

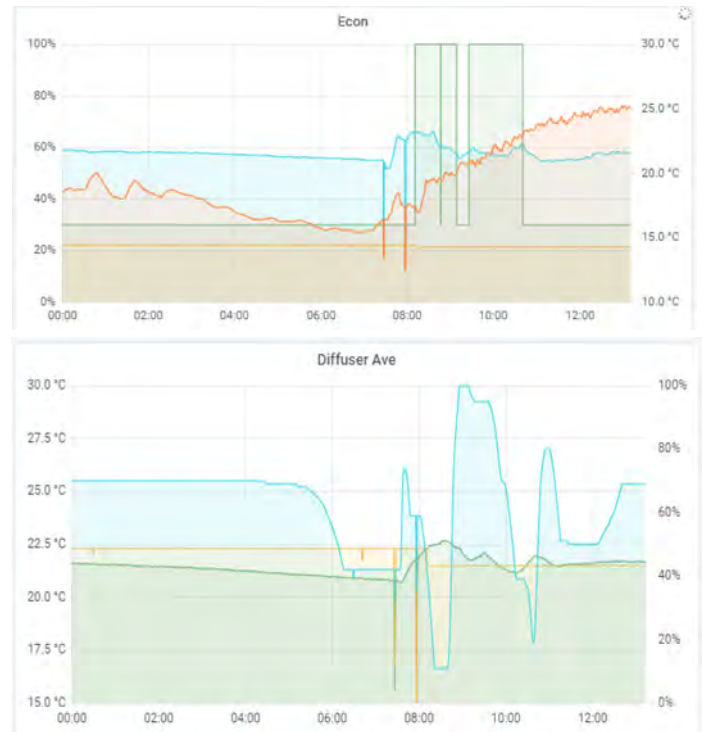
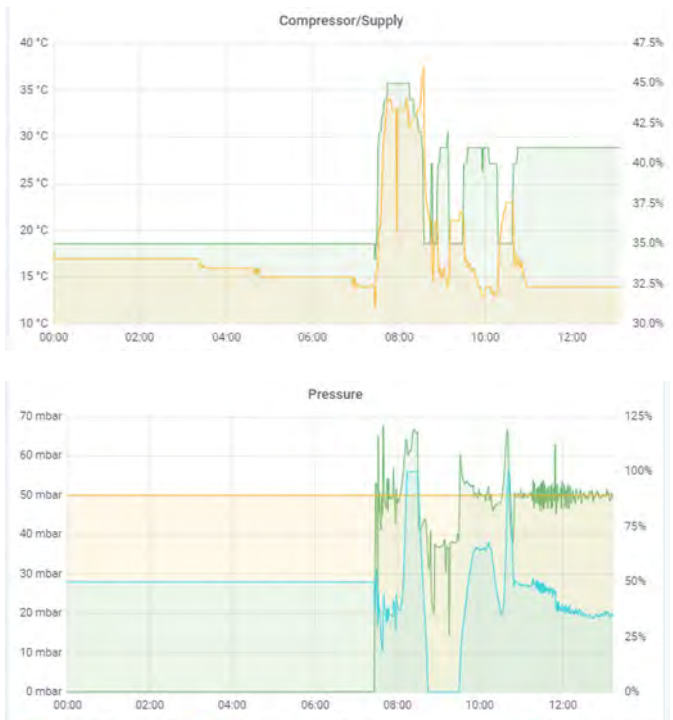
- Diffuser (Used when an MLM diffuser network is to be used for control input.)



- PI loop configuration
 - PI Temperature
 - PI Pressure
 - PI Co2
 - PI Humidity
- Simulate (To simulate a data point, analog or digital I/O)
- Data points
 - Analog Sensors
 - Analog Actuators
 - Binary Sensors
 - Binary Actuators
 - Software Enumerators
 - Software Numeric
 - Software Binary
 - MLM BACnet

- Trend log

This menu item activates the visualisation of trend logs



- Log

An event log is created on the server and all major events are appended to the event log with a date and time stamp. The events that are logged include service problems, system state and mode changes, alarm occurrences, out-of-scope error checks and any other events that may assist in identifying the sequence of operation of the ZC.

- System

- Network settings
- BACnet configuration
- Time and Date set-up
- Local User Interface (LUI) [LCD Screen] configuration
- E-mail configuration. To receive emails when events occur.

- Help

2. Exhaust Air Control

e.g.

- Exhaust Air Temperature sensor
- Exhaust Air Damper
- Exhaust Air Fan

3. Return Air Control

e.g.

- Return Air Temperature sensor
- Return Air Pressure sensor
- Return Air Humidity sensor
- Return Air Damper
- Return Air Fan

4. Mode and Control

Mode indicates the current state of the ZC operation:

- Startup:
- Idle:
- Purge:
- AntiFlutter:
- RunDown:
- Heat:
- FanOnly:
- Cool:
- Emergency:
- IncorrectTime:
- Shutdown:

Control indicates is a high-level command input indicating the required operation of the AHU:

- Auto:
- On:
- Off:

5. Fresh Air Control

e.g.

- Fresh Air Temperature sensor
- Fresh Air Differential Pressure sensor
- Fresh Air damper
- Fresh Air fan

6. Supply Air Control

e.g.

- Supply Air Temperature sensor
- Supply Air Pressure sensor
- Supply Air (bypass) damper
- Filter dirty switch or Differential pressure switch
- Supply Air fan
- Heating / Cooling coil(s)
- Electric heating

7. Setpoint and Diffuser data

e.g.

- Humidity Setpoint
- CO2 Setpoint
- Pressure setpoint
- Supply Air Temperature setpoint
- Average Diffuser Temperature, Setpoint and Disk Position

8. ZC Status information

- Latest event
- Not used
- Problem area:
 - BACnet interface
 - MQTT (I/O publish and subscribe service)
 - I/O (Analog / Digital Input / Output data service)
 - Grafana (Trend log display service)
 - InfluxDB (Time series database service for trend logs)
 - Node-red (Data point visualisation)
 - E-mail
- ZC version
- Date and time