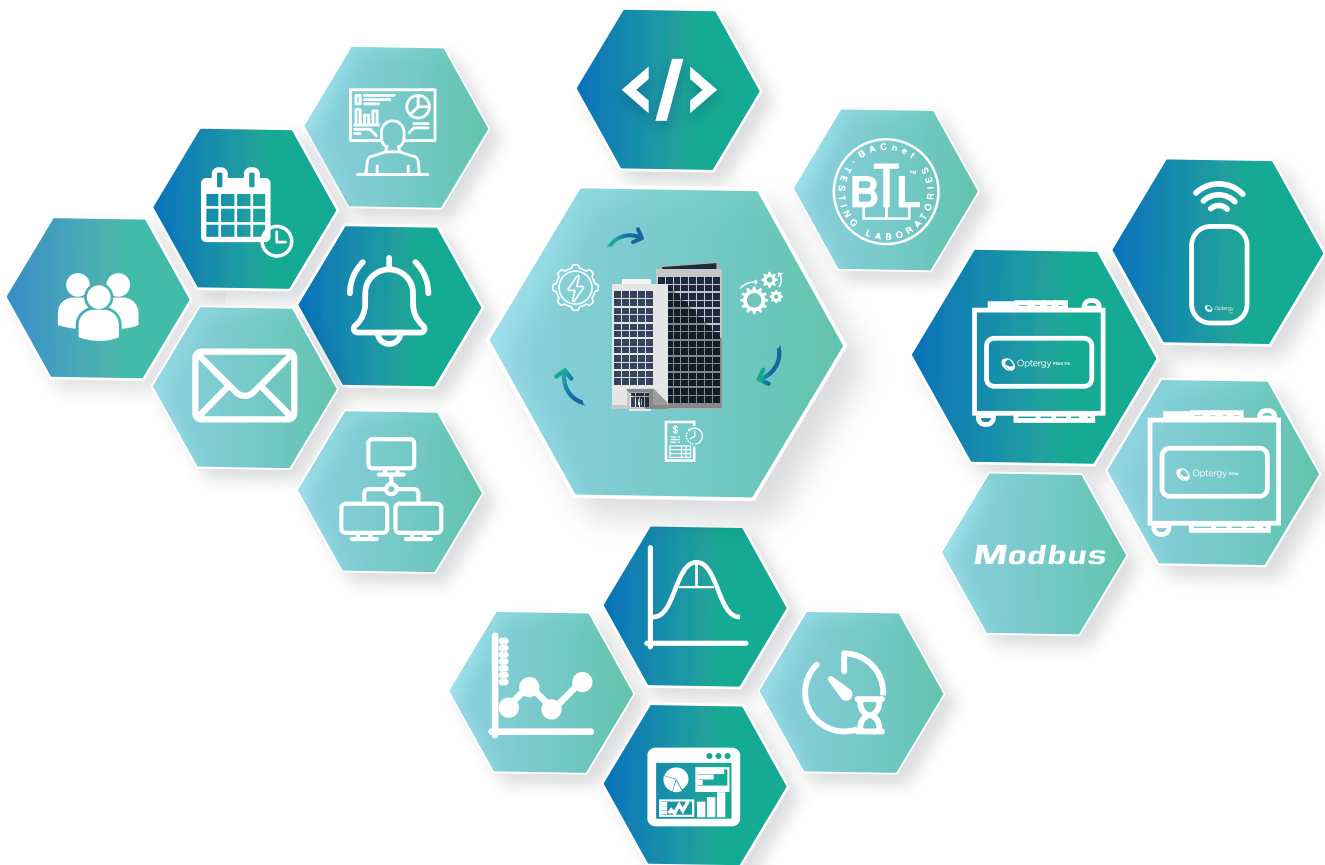


# Building Management System Application Sheet

## Optergy Enterprise + Proton



### Description

Optergy Building Management System (BMS) software allows users to monitor and control equipment within a building. A well structured and user friendly BMS ensures easy operation of buildings and allows insight into all systems. Optergy's built-in applications enable contextual displays, smart views and alarming. Optergy's interface allows integration with BACnet and Modbus protocols, the industry standards for HVAC equipment. Using a common web browser and a mobile device, users can stay connected and have full control over the building assets.

# Building Management System Application Sheet

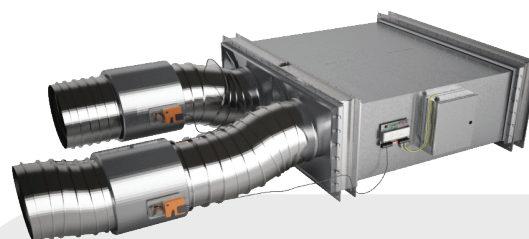
## Applications

Used to interface, control, schedule, monitor, trendlog and alarm unitary Input/Output controllers.  
Including but not limited to:

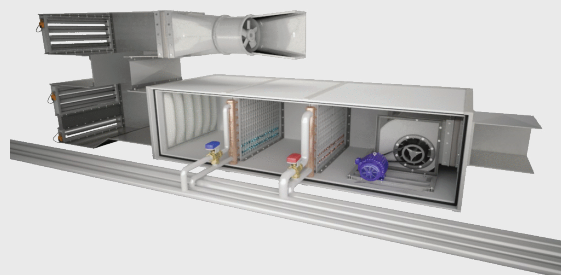


- Variable Air Volume Box's (VAV)
- Fan Coil Units (FCU)
- Packaged Unit (PAC)
- Air Handling Units (AHU)
- Lighting
- Variable Refrigerant Flow (VRF)
- Central Plant
- Chillers
- Boilers
- Pumps
- Compressors
- Cooling Towers
- Heat Pump
- Supply and Exhaust Fans
- Variable Frequency/Speed Drives (VFD, VSD)
- Computer Room Airconditioning (CRAC)
- Fume Hood Systems
- Elevators
- Escalators
- Hydraulic Systems
- Gas Detection Systems

Variable Air Volume



Air Handler



Chiller



Boiler



Variable  
Refrigerant  
Flow



Packaged Unit



# Building Management System Application Sheet

## Building Management System Tools

Optergy's base license comes with all the tools required to engineer a project. There are no extra costs or software required. All tools are built in and web-based ensuring project and service engineering can be done from any location without locking the engineering tools to one laptop or one engineer. These built-in tools allow for quick and easy project deployment.

### Display Tool

BMS displays are made through the Optergy web-based display tool. All widgets are easy to drag and drop with each having a wide range of configuration options. Optergy's user interface permits any BACnet device object to be presented on a graphic display. Optergy provides tools for integration with Modbus that automatically convert Modbus points to BACnet.

#### Tool Features:

- Toolbox with preconfigured widgets
- Template tools
- Edit common allows quick changes for all selected points on the screen
- Live data preview
- Easy menus for switching between displays
- Create display templates for easy reuse
- Align all highlighted points

#### Point Features:

- Security levels allow restrictions on viewing and overriding all points
- On click actions enabling links to internal displays as well as any web or local URL
- Ability to remove/add functionality from points



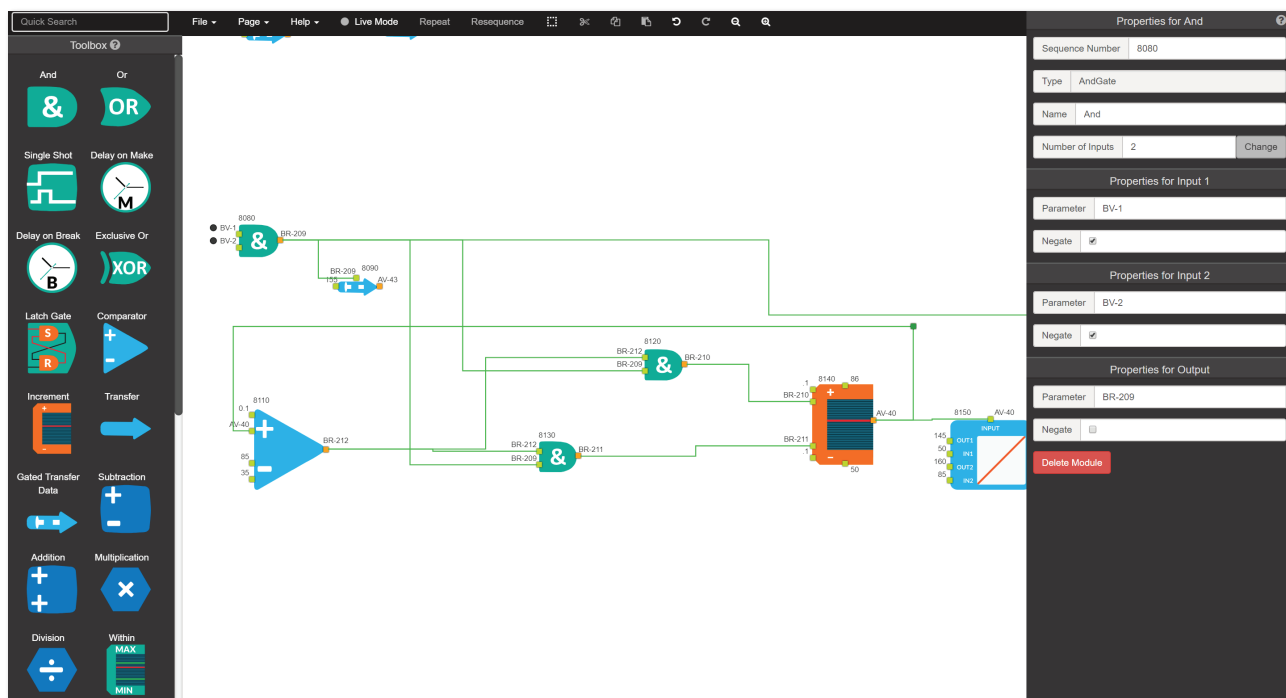
## Building Management System Tools

### Programming Tool (PROTON ONLY)

Control logic can be hosted, edited and run in the Optergy software. The programming tool comes with a set of logic blocks including the ability to define a custom function block. All logic blocks are easy drag and drop through the programming tools web interface.

#### Tools & Features:

- **Custom Blocks:** Custom blocks enable users to create and define function blocks containing custom programming logic with defined inputs/outputs. Custom blocks can be encrypted and password protected to protect intellectual property.
- **Read/Write points from/to external systems.** Reference using the format [BACnet device number]:[Object Instance] e.g. 3001001:BV-1
- **Live Mode:** Using live mode will poll points used in programming to show the live operating data.
- **Live Override:** All points can be overridden from this interface enabling quick and easy program testing and diagnostics.
- **Point Scan:** Running a point scan will report where object points and sequence numbers have been used. Click the point for quick navigation to workspace containing the point of interest.
- **Multiple Workspaces:** Ability to categorize a project into multiple workspaces for simple organization and programming logic workflow.
- **Quick Tools:** Repeat a function by sequence number, branch number, device instance, object instance, array index, substitution number & manual input.
- **Subroutines:** Allows the user to reuse programming logic and reference multiple devices.





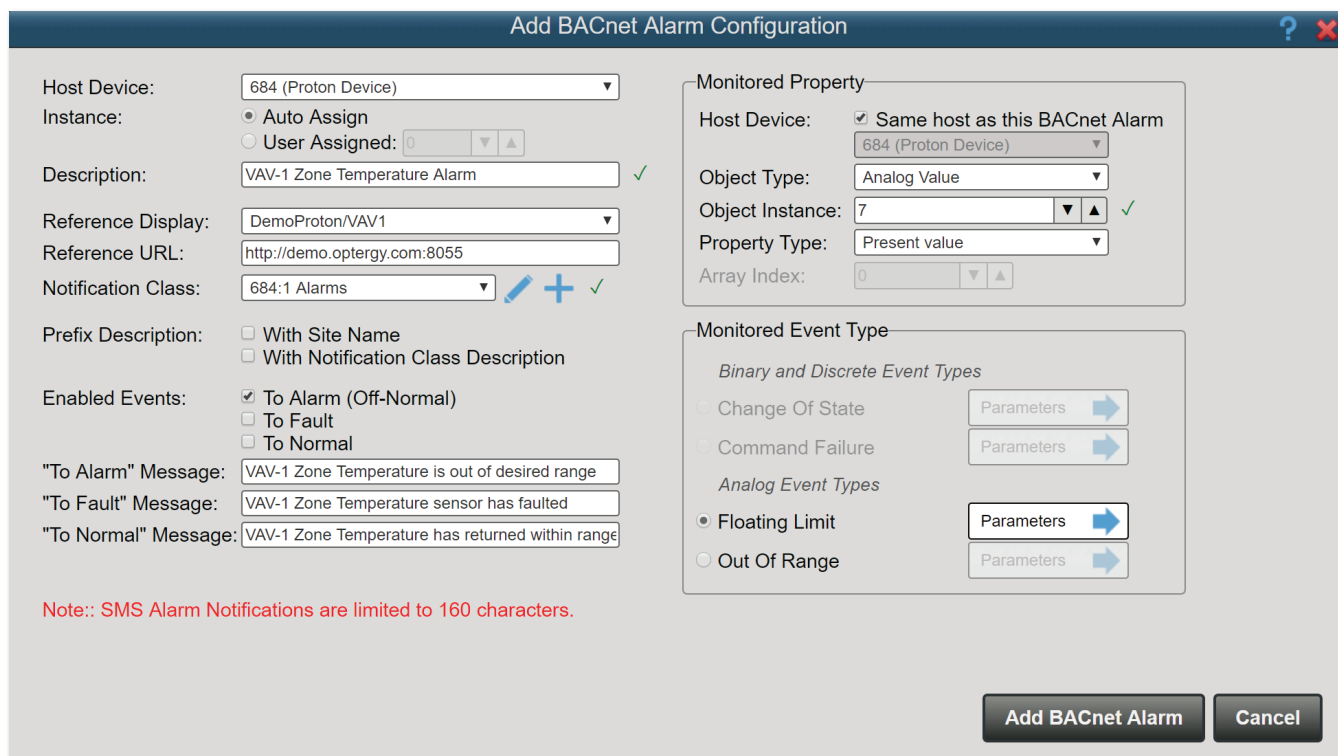
# Building Management System Application Sheet

## BACnet Alarms

Optergy uses BACnet, allowing the software to connect, communicate and interoperate with any manufacturer's BACnet device. Commonly used BACnet features include functions such as notification classes, alarms (event enrolments), trendlogs, schedules and calendars. Optergy used to create the objects locally or in third-party BACnet devices.

### Alarms:

- Create and host alarm notification classes
- Import and edit alarm notification classes from third-party devices
- Create and host alarms
- Import and edit alarms from third-party devices
- Customize destination and format of alarms
- Attach links and system displays to alarms
- Create custom messaging for alarm states
- Alarm hierarchy/escalation tool
- Alarm reports, web or PDF
- Alarm list
- Individual alarm history
- SMS, Email or web display & notification of alarms



**Add BACnet Alarm Configuration**

Host Device: 684 (Proton Device) ▾

Instance: ☒ Auto Assign  
☐ User Assigned: 0 ▾ ▲

Description: VAV-1 Zone Temperature Alarm ✓

Reference Display: DemoProton/VAV1 ▾

Reference URL: http://demo.optergy.com:8055

Notification Class: 684:1 Alarms ✎ + ✓

Prefix Description: ☐ With Site Name  
☐ With Notification Class Description

Enabled Events: ☒ To Alarm (Off-Normal)  
☐ To Fault  
☐ To Normal

"To Alarm" Message: VAV-1 Zone Temperature is out of desired range

"To Fault" Message: VAV-1 Zone Temperature sensor has faulted

"To Normal" Message: VAV-1 Zone Temperature has returned within range

Note:: SMS Alarm Notifications are limited to 160 characters.

**Monitored Property**

Host Device: ☒ Same host as this BACnet Alarm  
684 (Proton Device) ▾

Object Type: Analog Value ▾

Object Instance: 7 ▾ ▲ ✓

Property Type: Present value ▾

Array Index: 0 ▾ ▲

**Monitored Event Type**

*Binary and Discrete Event Types*

☐ Change Of State Parameters ➡

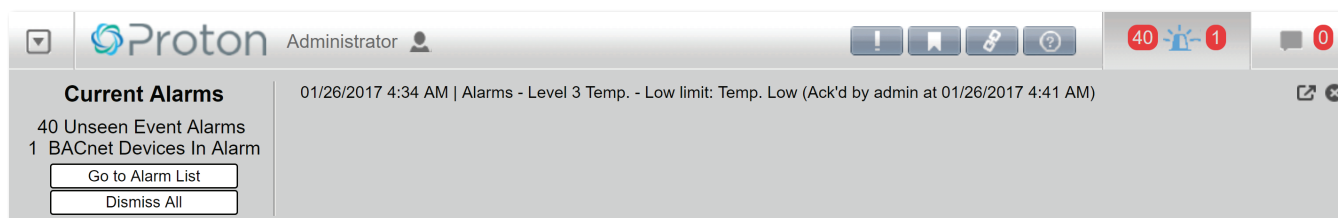
☐ Command Failure Parameters ➡

*Analog Event Types*

☒ Floating Limit Parameters ➡

☐ Out Of Range Parameters ➡

**Add BACnet Alarm** **Cancel**



**Proton Administrator**

01/26/2017 4:34 AM | Alarms - Level 3 Temp. - Low limit: Temp. Low (Ack'd by admin at 01/26/2017 4:41 AM)

**Current Alarms**

40 Unseen Event Alarms  
1 BACnet Devices In Alarm

**Go to Alarm List**  
**Dismiss All**

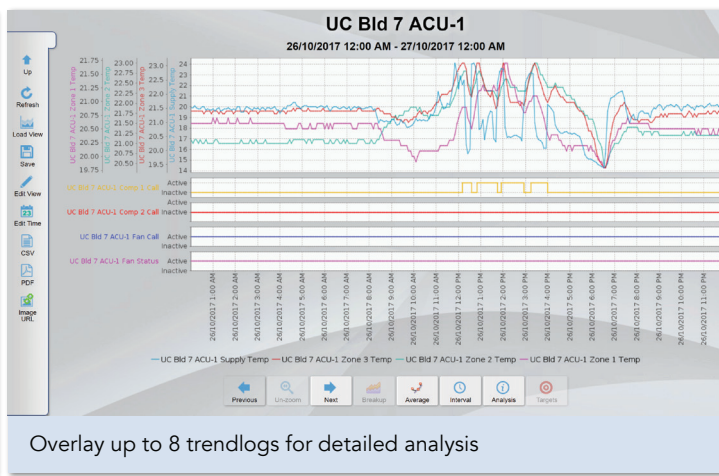
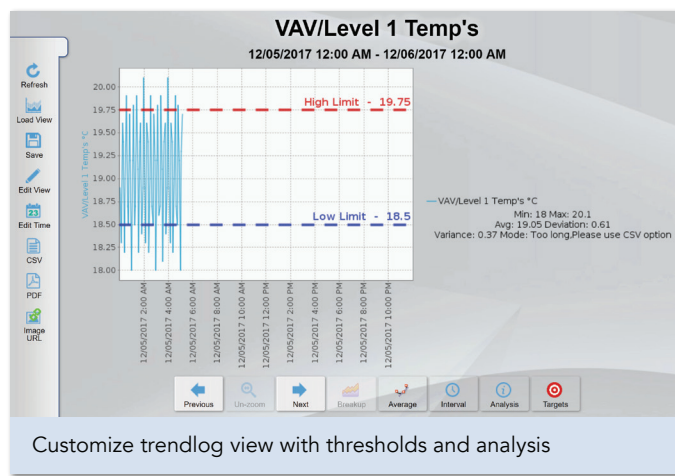
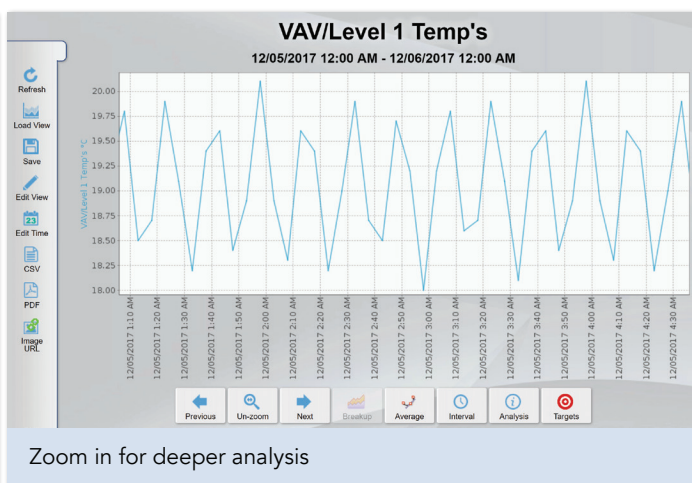
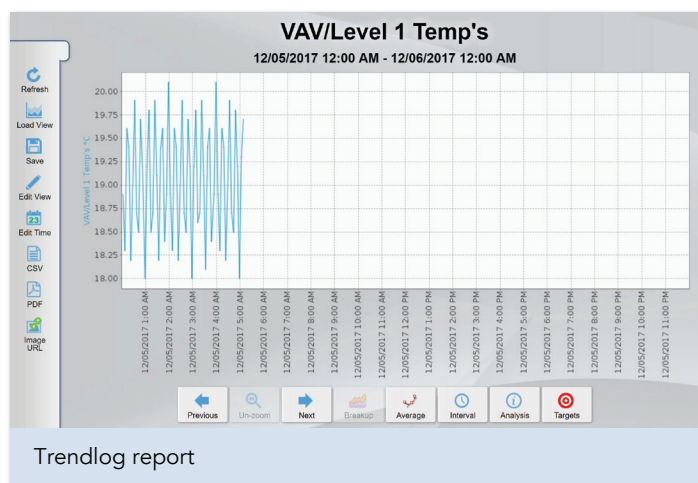
40 🔔 1 🔔 0 🔔

# Building Management System Application Sheet

## BACnet Trendlogs

### Trendlogs:

- Create and host trendlog notification classes
- Import and edit trendlog notification classes from third-party devices
- Create and host trendlogs
- Import and edit trendlogs from third-party devices
- Mass trendlog template upload
- Create multiple trendlog views, using up to 8 trendlogs for fault finding and diagnostic purposes
- Configuration of trendlog views
- Save trendlog views
- Saved trendlogs library
- Individual URL link for all trendlog views
- On-demand or automatic email of trendlog views in CSV or PDF



# Building Management System Application Sheet

## BACnet Schedules & Calendars

### Schedules/Calendars:

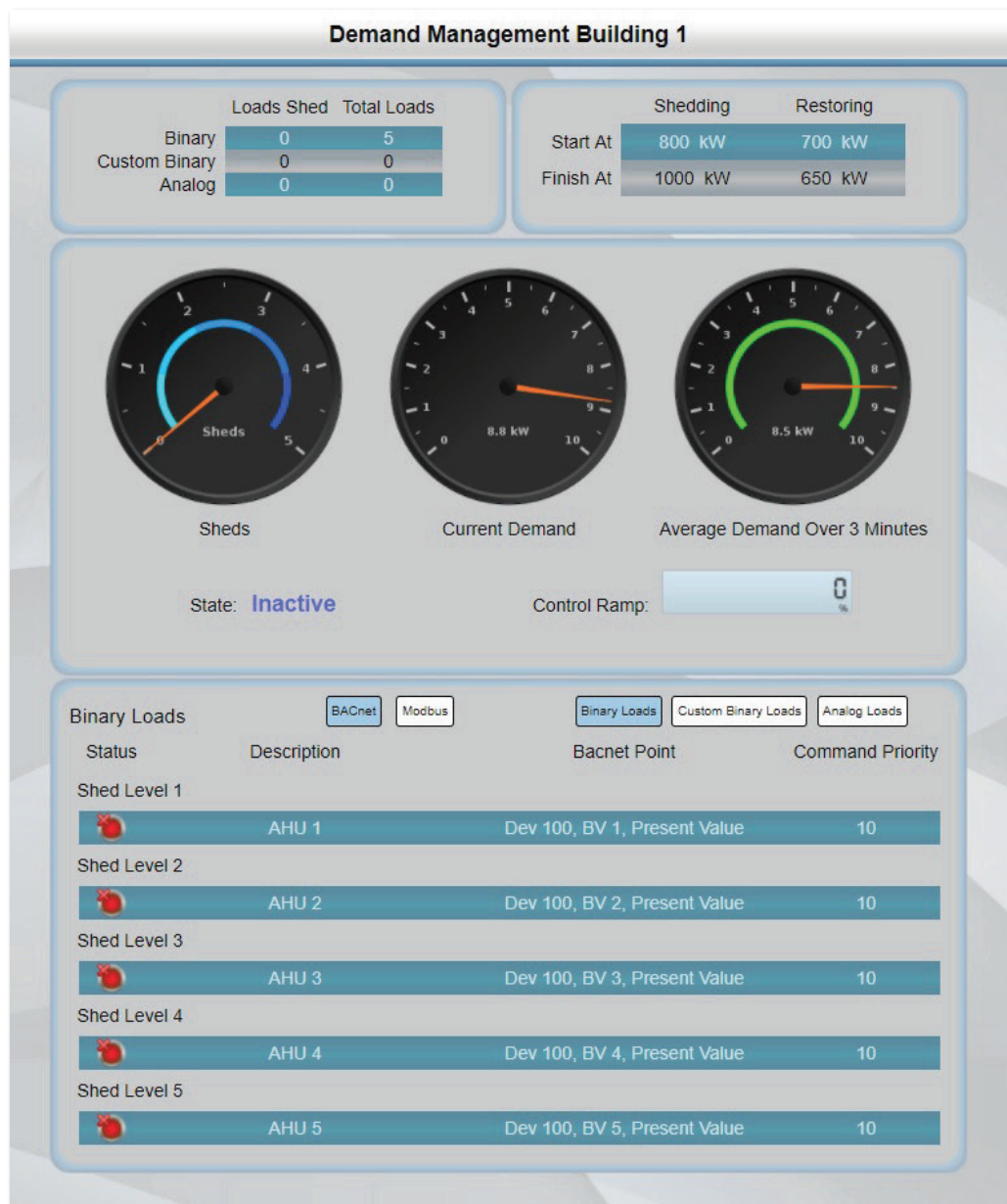
- Schedule hosting
- Hosting calendars
- Scan and edit schedules hosted on third-party devices
- Optimum start (smart start algorithm)
- Holiday scheduling
- Event scheduling
- Scan and import calendars from third-party devices
- Add future or recurring holidays



## Smart Demand Management

### Demand Limiting:

Optergy allows for live management of electrical demand. The ability to control and limit a building's maximum demand can provide substantial cost savings. Optergy's built-in demand limiting feature enables a building to automatically control loads as incoming electrical demand increases. This can be achieved by varying loads periodically, relaxing setpoints, deadbands, reducing VFD speeds and turning off non-critical loads. All points are configurable through the built-in application.





## Smart Startup

### Optimum Start:

Optimum Start is a smart control algorithm used to turn on a buildings HVAC systems automatically before scheduled hours. The algorithm automatically calculates the minimum operating time required for ensuring the building is at the desired temperature before occupants arrive. Optergy performs live calculations, learning how the building behaves, and adapts a spaces start time daily dependant on all inputs and learnt thermal factors.

Update Optimum Start Configuration

Base (Occupied) Schedule: 201:1 - BLD 20 Standard S...

Description:

Write Priority:

Enabled: ☒

Special Event Schedules: 0Schedule

Optimum Start References

Inside Air Temperature:

Outside Air Temperature:

Target Heating Setpoint:

Target Cooling Setpoint:

Humidity (Optional):

Warmup Command:

Cooldown Command:

Optimum Start Calculations

Re-Calculation Rate:  min

Maximum Advance:  min

Outside Air Limit:

Building Mass:

Self-Tuning Factor:

Warmup Factor:

Cooldown Factor:

Unscheduled Warmup Factor:

Unscheduled Cooldown Factor:

Optergy Enterprise nicholash

Optimum Start

Description	Occupied / Base Schedule	Enabled	Calculated Advance Time	State
Building 1 ACU-1 Optimum Start	230:0 - Demo After Hours	Enabled		

BMSARev2.0 | © 2023 Optergy

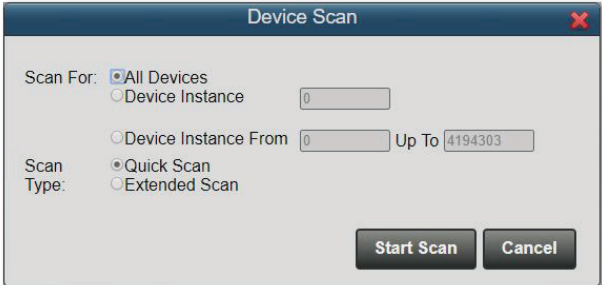
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# Building Management System Application Sheet

## Built-in Tools

### Device Scan:

- Scan for all BACnet devices on IP network and MS/TP network
- Scan for a device instance range
- Scan for a specific device
- Ping a specific device on a specified IP network
- Save any scanned devices into device manager table for reference to schedule, trends, alarms, graphics and in programming



The 'Device Scan' dialog box contains the following fields and controls:

- Scan For:** Radio buttons for 'All Devices' (selected) and 'Device Instance'. A text field next to 'Device Instance' contains '0'.
- Device Instance From:** A text field containing '0'.
- Up To:** A text field containing '4194303'.
- Scan Type:** Radio buttons for 'Quick Scan' (selected) and 'Extended Scan'.
- Buttons:** 'Start Scan' and 'Cancel'.

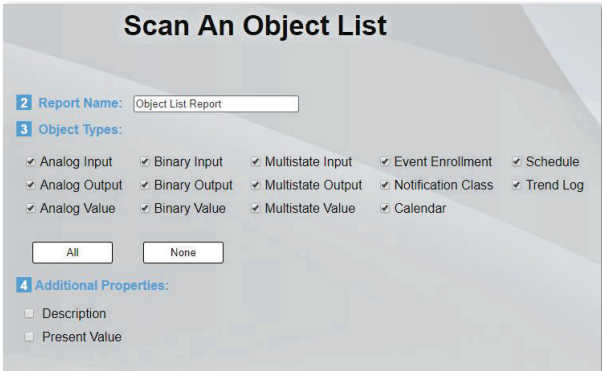
### BACnet Object List Scan:

- Scan any device object list saved into device manager table
- Select all devices or specific devices to scan
- Filter scan for specific BACnet criteria
- Scan for object description and present value
- Download scan as CSV, PDF or Excel spreadsheet



The '1 Devices' window shows a list of scanned devices:

Devices (0)	Filter:
684 (Proton Device)	
9999 (Nick)	



The 'Scan An Object List' dialog box contains the following fields and controls:

- Report Name:** A text field containing 'Object List Report'.
- Object Types:** A grid of checkboxes for various BACnet object types: Analog Input, Binary Input, Multistate Input, Event Enrollment, Schedule, Analog Output, Binary Output, Multistate Output, Notification Class, Trend Log, Analog Value, Binary Value, Multistate Value, and Calendar. All are checked.
- Buttons:** 'All' and 'None'.
- Additional Properties:** Checkboxes for 'Description' and 'Present Value'.

### Read BACnet Object:

- Quickly read BACnet properties out of any device

### Report Wizard:

- Run reports on all BACnet point activities i.e. points overridden
- Reports automated for distribution to specific users/groups

### Diagnostic BACnet Templates:

- Used to quickly view BACnet objects before custom displays are created

### Backup/Restore of Whole Project:

- Manually run as needed
- Automatically run and saved on host
- Automatically FTP/SFTP to remote server

### Documentation Hosting:

- Ability to reference PDF, video content within displays
- Quick download of documents i.e. Operation and maintenance manuals

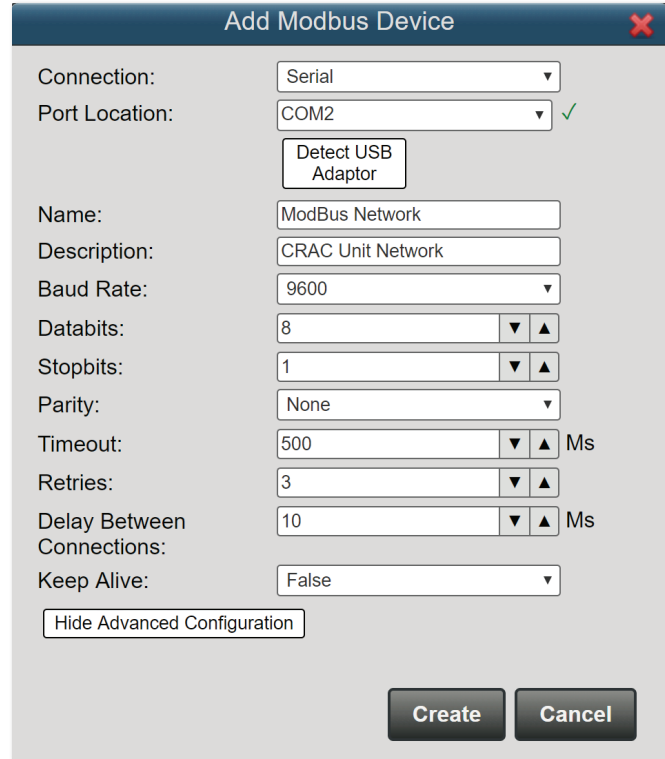
# Building Management System Application Sheet

## Modbus Tools

Included in the software are the necessary tools to connect, interface and troubleshoot Modbus communication. Optergy automatically converts any interfaced Modbus points into BACnet.

### Modbus RTU Interface (Proton Only):

An RTU Modbus communication device can be wired directly into one of Protons four communication ports, removing the need for third-party IP integration hardware.

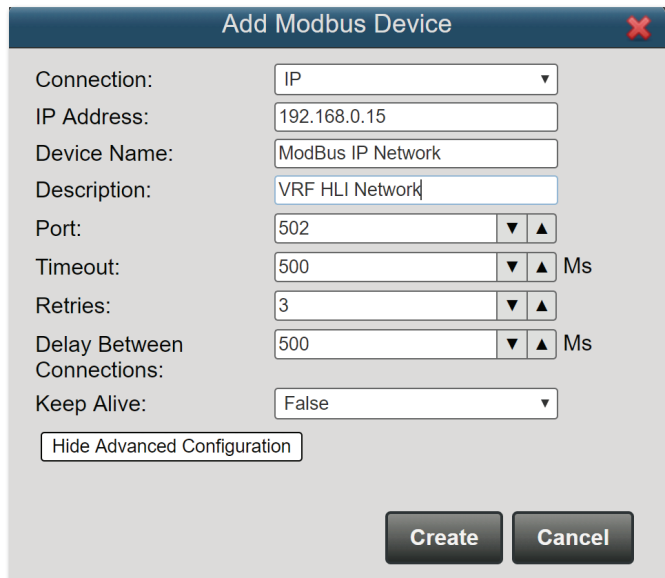


The 'Add Modbus Device' dialog box for the RTU interface contains the following fields and controls:

- Connection:** Dropdown menu set to 'Serial'.
- Port Location:** Dropdown menu set to 'COM2' with a green checkmark icon to its right.
- Detect USB Adaptor:** A button located below the Port Location dropdown.
- Name:** Text input field containing 'ModBus Network'.
- Description:** Text input field containing 'CRAC Unit Network'.
- Baud Rate:** Dropdown menu set to '9600'.
- Databits:** Spin box set to '8'.
- Stopbits:** Spin box set to '1'.
- Parity:** Dropdown menu set to 'None'.
- Timeout:** Spin box set to '500' with a unit of 'Ms'.
- Retries:** Spin box set to '3'.
- Delay Between Connections:** Spin box set to '10' with a unit of 'Ms'.
- Keep Alive:** Dropdown menu set to 'False'.
- Hide Advanced Configuration:** A button at the bottom left.
- Create** and **Cancel** buttons at the bottom right.

### Modbus IP Interface:

Optergy can communicate directly to Modbus IP devices.



The 'Add Modbus Device' dialog box for the IP interface contains the following fields and controls:

- Connection:** Dropdown menu set to 'IP'.
- IP Address:** Text input field containing '192.168.0.15'.
- Device Name:** Text input field containing 'ModBus IP Network'.
- Description:** Text input field containing 'VRF HLI Network'.
- Port:** Spin box set to '502'.
- Timeout:** Spin box set to '500' with a unit of 'Ms'.
- Retries:** Spin box set to '3'.
- Delay Between Connections:** Spin box set to '500' with a unit of 'Ms'.
- Keep Alive:** Dropdown menu set to 'False'.
- Hide Advanced Configuration:** A button at the bottom left.
- Create** and **Cancel** buttons at the bottom right.

# Building Management System Application Sheet

## Modbus Tools

### Modbus Point Addition:

Modbus communications, unlike BACnet, the user cannot simply perform an object scan on a Modbus device and read all properties of that device. Modbus communication work as an individual query. The built-in Modbus client allows the user to test communications with a Modbus point and then ensure that the point is read correctly.

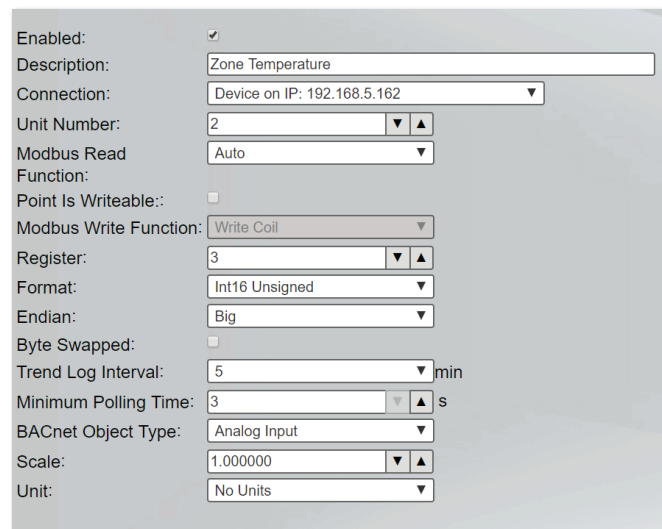
Modbus points can be expressed as server points, BACnet virtual device points, or meter points.

#### Modbus Single Points

- Add individual Modbus points for interface within Optergy and 3rd party BACnet devices.

#### BACnet Virtual Devices

- Links Modbus points to BACnet points.
- Create templates for Modbus devices.
- Use templates to add all Modbus points from one device.
- Reuse templates for future jobs.
- Makes fast and easy Modbus device integration.



The screenshot shows a configuration window for adding a Modbus point. The fields are as follows:

Enabled:	<input checked="" type="checkbox"/>
Description:	Zone Temperature
Connection:	Device on IP: 192.168.5.162
Unit Number:	2
Modbus Read Function:	Auto
Point Is Writeable::	<input type="checkbox"/>
Modbus Write Function:	Write Coil
Register:	3
Format:	Int16 Unsigned
Endian:	Big
Byte Swapped:	<input type="checkbox"/>
Trend Log Interval:	5 min
Minimum Polling Time:	3 s
BACnet Object Type:	Analog Input
Scale:	1.000000
Unit:	No Units

## Networking:

#### BACnet IP

- Optergy resides on the same IP subnet network to communicate with the intended IP Device.
- BACnet Broadcast Message Device (BBMD) Tables can be used to link between different subnets on the same IP network.
- BACnet IP for both Proton and Optergy Enterprise. Only limited to 3rd Party IP Gateway Parameters.
- BACnet MS/TP on Proton only.
- Each port can handle up to 100 devices.
- Accepted Baud Rates of MS/TP: 9.6k, 19.2k, 38.4k, 76.8k, 115.2k.

#### Modbus

- Modbus IP for both Proton and Optergy Enterprise. Only limited to 3rd Party IP Gateway Parameters.
- Modbus RTU on Proton only.
- Each RTU port can handle a maximum 128 devices at quarter load devices and 64 devices for half load devices.
- Accepted Baud Rates for serial Ports: 4.8k , 9.6k, 14.4k, 19.2k, 28.8k, 38.4k, 57.6k, 115.2k, 230.4k.