SECTION 258000 – IAS FAULT DETECTION AND DIAGNOTICS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

C. Refer to Divisions 1 through 28 for project related standards pertaining to installations that shall apply to this Division.

1.2 SUMMARY OF WORK

A. Provide a fault detection and diagnostic system (FDD) that is fully integrated with the Tridium Niagara 4.0 **[Select One; Supervisor and Supporting JACE controllers; or JACE Controllers]** and directly accesses the Niagara database without API's or intermediate middleware. The FDD work shall be comprised of the following tasks and components:

1. Tagging Niagara and BACnet Points as part of the N4 basic programming that allows for Niagara N4.x Analytics to take full account of hierarchical relationships.

2. Create fault algorithms for all systems and equipment types as outlined in Article 3.4.

3. Create alerts as a response to algorithms to automatically, send a maintenance notification, sound an alarm or trigger a remedy.

4. Create algorithms that query the Niagara database to look for data trends and patterns that identify pending equipment failures, equipment and system performance degradation; etc.

5. Create data visualization graphics to present algorithm data in an intuitive manner to aid in the diagnosis of system faults and alarms. Data visualization shall include fault dashboards, charts, graphs, spectrum charts and color-coded equipment icons to visually represent equipment health.

6. Provide data roll-up and aggregation features that permit data to be combined for improved data analysis

B. Provide related system integration services to import building sub-system data into the Niagara N4 environment that exists in stand-alone installations and is listed as required for FDD in Part 3.0 Execution.

1.3 RELATED WORK SPECIFIED ELESWHERE

1. Division 01 – General Requirements
2. Division 08 – Openings (for windows and security access doors)
3. Division 11 – Equipment (for Food Service Equipment)
4. Division 12 – Furnishings (Shades and blinds)
5. Division 14 – Conveying Equipment (Elevators and Escalators)
6. Division 21 – Fire Suppression
7. Division 22 - Plumbing
8. Division 23 – Heating Ventilating and Air Conditioning
9. Division 25 – Integrated Automation
10. Division 26 – Electrical
11. Division 27 – Communication Systems
12. Division 28 – Electronic Safety and Security

1.4 DEFINITIONS

A. Alarms: An alarm is activated when a device fails or a critical set point is exceeded. This warns the user that a device has exceeded or fallen below a certain range around the set point. These usually signal a failure or a process not a performance parameter notification.

B. Alarm and Fault Classes: Alarm and Fault classification is a method for organizing alarms and faults based on common characteristics and requirements (e.g., level (minor, critical, etc.) Category (operational, environmental, etc.) and type (variable, sensor, report, function, etc).

C. AOWS: Automation Operator Work Station.

D. Closed-loop Control Systems. A Closed-loop Control System, also known as a feedback control system is a control system which uses the concept of an open loop system as its forward path but has one or more feedback loops (hence its name) or paths between its output and its input. Therefore, A closed loop control system considers the current output and alters the output based upon the desired condition directly. The control action in these systems is based on the output.

E. DALI: Digital Addressable Lighting Interface.

F. FACLAN: Facility Local Area Network

G. FDD: Fault Detection and Diagnostics.

H. Fault Diagnosis: Follows fault detection. Faults are isolated, identified and recorded. Diagnosis analyses the kind, size, location and time of the faults for the user.

I. Faults: A fault is activated when a parameter deviates from a pre-defined acceptable (usual or standard) condition for a designated period of time.

J. HTTP: HyperText Transfer Protocol. HTTP is the underlying protocol used by the World Wide Web and this protocol defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.

K. IAS: Integrated Automation System.

L. Tagging: Tagging is used to organize data points for future database analytics. Project Haystack is an open source initiative to develop “tagging” conventions and taxonomies for building equipment and operational data. The community- based effort defines standardized data models for the data points related to energy, HVAC, lighting, and other environmental systems. A simple REST API is defined to facilitate exchange of Haystack data over HTTP.

M. REST: Representational state transfer (REST) or RESTful web services are a way of providing interoperability between computer systems on the Internet.

N. SCMS: Supervisory Control and Monitoring System.

1.5 GENERAL CODE AND DIVISIONAL ADHERENCE

A. Apply to all state and local codes governing the location of this project identified to be with in the regulating body of the **[Location].**

B. Adhere to applicable local codes as called out in section 250000.

1.6 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with the applicable requirements and standards addressed within all references.

1.7 GENERAL FUNCTIONAL SPECIFICATIONS DESCRIPTION

A. Other contractors shall be responsible for providing complete, fully functional and operational systems within their respective scopes of work. They are also responsible for providing the means of integration and associated connections to the IAS. In addition, the contractors are responsible for ensuring the data and information sent to the IAS complies with the IAS tagging standards, is correctly formatted and achieves reliable and consistent data transfer.

B. The IAS contractor shall be responsible for providing all AOWS configurations, programming and graphics development the installation of the IAS and attain the functionality described herein. The IAS contractor shall provide the FACLAN infrastructure to connect to the network controllers installed through other Divisions, learn the associated data and confirm the tagging and BACnet properties are acceptable.

PART 2 - PRODUCTS

2.1 NIAGARA ANALYTICS – GENERAL

A. Provide a fault detection and analytic framework that utilizes a high- performance calculation engine. The engine shall permit real-time data to be combined with historical data using a set of wire and property sheets. The visual programming interface shall be used to define the algorithms (formulas) that analyzes the real-time and trend data collected from the following systems:

B. Sub-system data to be analyzed. **[Specifier Note – Select the sub-system data to analyzed]**

1. **[Automated Blind/Shade Sun Control]**
2. **[Automated Window Tinting Control]**
3. **[Vertical Transportation System]**
4. **[Plumbing System]**
5. **[Fire Alarm and Detection System]**
6. **[HVAC Control System]**
7. **[Lighting and Plug Control System]**
8. **[Electrical Power Monitoring (Metering)]**
9. **[Emergency Generator Monitoring]**
10. **[Access Control System]**
11. **[Video Surveillance]**
12. **[Other BAS Systems]**

C. The output from the analysis shall be able to be visualized in charts, graphs and dashboards and be used as inputs to standard Niagara logic. Faults shall be prioritized according to the associated system, location and the level of cost avoidance.

D. When applied to historical and real-time data, the framework algorithms shall provide the following analysis features:

1. An open and extensible analytical environment that can easily customized.
2. Analytic tools that apply to any data types available from building sub-systems.
3. The ability to set-up complex analysis without custom programming.
4. Support for third party API visualization application programs.

2.2 SOFTWARE HOSTING PLATFORMS

A. On- Premise Application Server:

B. Software as a Service (SaaS)

PART 3 - EXECUTION

3.1 GENERAL FDD INTEGRATION PRE-REQUISTE SERVICES

A. Provide all required system integration.

B. All fault dependencies and associated set points shall be customized according to the specific project requirements and needs of each application, as well as the project's intended operation. This process shall be conducted as part of final systems commissioning and documented accordingly.

3.2 DATA CONVENTIONS, FDD TOOLS AND APPLICATIONS

A. The fault detection and diagnostic applications shall employ standardized naming conventions and employ "semantic tagging", pattern recognition, functional rules processing and other techniques to enable advanced diagnostics and analytics for extended databases. Tags are added to data items as needed to convey definitions and associations. For example, an air handler might have tags that define its location (site, building, floor), fact that it is an electric load, manufacturer, capacity, schedule, associated control parameters, etc. Records can have as many tags as needed and new tags can be added. Solution should follow the **(Project Haystack, Niagara, Custom)** guidelines. **Project Haystack is an open source initiative to streamline working with data from the Internet of Things.** The initiative standardizes semantic data models and web services with the goal of making it easier to unlock value from the vast quantity of data being generated by the smart devices that permeate our homes, buildings, factories, and cities. Applications include automation, control, energy, HVAC, lighting, and other environmental systems.ad hoc whenever needed. Tags provide the hooks that the analytics engine uses to correlate and analyze the data.

B. The Fault Detection and Diagnostic (FDD) solution shall employ closed loop control. The closed loop control shall apply the outputs from the FDD back to the IAS as an input to supervised building sub-systems to alter the control of the devices based upon certain conditions found by the FDD analysis. An example may be that if a power meter is found to be offline, then the FDD shall notify the work order managements system to open a work order to have staff check the status of that meter and correct the issue. Another may be if a certain condition is found which may be critical, the FDD may issue a command to shut down that system to eliminate a more serious result.

C. Alarms and Faults shall be defined in multiple classes for categorization. These classes may be used for many purposes to sort faults for action. Faults shall be monetized (costs associated with each fault) as a way to categorize and compare fault priorities. This will assist the operations team on prioritizing, categorizing and organizing the faults for assignment,

D. The FDD system shall have the ability to notify and message specific types of users based upon the fault classification. Messaging shall be by text, email, phone or GUI alarm.

E. The FDD software and application shall have templates and library models to enable the user to populate standard databases using pre-configured templates and libraries for standard system and equipment.

3.3 IA BUILDING SUBSYSTEMS FUNCTIONAL SPECIFICATION REQUIREMENTS.

A. The following matrix outlines the extent of the fault detection diagnostics and demand response participation associated with each building subsystems as well as providing an indication of each system's demand response classification. See Article 3.5 through 3.13 for complete descriptions of fault rules as well as associated systems demand response functionality.

Sub-System	Fault Detection and Diagnostics (FDD)
[Automated Blind/Shade Sun Control]	**Yes**
[Automated Window Tinting Control]	**Yes**
[Vertical Transportation System]	**Yes**
[Plumbing System]	**Yes**
[Fire Alarm and Detection System]	**Yes**
[HVAC System]	**Yes**
[Lighting & Plug Control]	**Yes**
[Electrical Power Monitoring (Metering)]	**Yes**
[Emergency Generator Monitoring]	**Yes**
[Video Surveillance]	**Yes**
[Access Control System]	**Yes**
[Other BAS Systems]	**Yes**

3.4 GENERAL FAULT DETECTION AND DIAGNOSTICS.

A. All generated fault notifications shall be issued via email, text or through the work order management system

B. Faults shall be prioritized per the associated system, location and the level of cost avoidance.

C. The following matrix outlines the specific rules associated with the fault detection diagnostics of the IAS.

3.4.1 Automated Blind/Shade (Sun) Control System

Fault Rule Name	Fault Rule Short Description
Blind/Shade Closure Failure	Generates a fault when the blinds and/or shades are open and the outside light level is above a threshold as measured by the sun sensor.
Blind/Shade Opening Failure	Generates a fault when the blinds and/or shades are closed and the outside light level is within a threshold as measured by the sun sensor.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.

3.4.2 Vertical Transportation System Control

Fault Rule Name	Fault Rule Short Description
Bad Energy Data	Finds periods when data contains values outside of low and high limits or the data is Null for at least a duration of time.
Cab Recall Failure	Generates a fault if an elevator cab fails to recall to a requested floor
Cab Maintenance Failure	Generates a fault when the elevator cabs have been operating without a required maintenance shutdown as measured by an hourly timer.
Double Dipping Data	Finds periods when a point's history contains two or more data points within a lee-way of an interval for at least a duration.
Missing Data	Finds periods when a record's history contains zero data points within a leeway of an interval for at least a duration.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.

3.4.3 Plumbing System Control

Fault Rule Name	Fault Rule Short Description
Hot Water Heater Cycling	Generates a fault when the Hot Water Heater stays on or off for less than a duration.
Hot Water Temperature Setpoint Unreachable	Finds periods when any water heater is on and the HW temperature is unable to reach a pre-specified threshold of the HW supply setpoint for over a duration.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.

3.4.4 Fire Alarm and Detection System Control

Fault Rule Name	Fault Rule Short Description
Fire Pump Operation	Generates a fault when the Fire Pump Operates, indicates a leak in the system or a loss of pressure.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.

3.4.5 HVAC Control System Fault Definitions

Fault Rule Name	Fault Rule Short Description
AHU Cooling & Heating Cycling	Finds periods when the heating and cooling are cycling between each other within a threshold. This indicates that the unit is fighting back and forth between its mechanical
AHU Cooling & Heating Simultaneously	Finds periods when discharge fan is on, heating is on and cooling is on for over a duration.
AHU Cooling Failure	Finds periods when discharge fan is on, cooling is on, and discharge temperature sensor is not under mixed air sensor minus a threshold for over a duration.

AHU Cooling Valve Leaking	Generates a fault when discharge fan is on, cooling valve is closed, and discharge temperature sensor is under mixed air sensor by a threshold.
AHU Discharge Fan Failure	Generates a fault when discharge fan is on and duct static pressure is below a threshold.
AHU Discharge Pressure Setpoint Unreachable	Finds periods over a duration when discharge fan is on and discharge pressure is below or above the discharge pressure set point by a threshold.
AHU Discharge Pressure Unstable	Generates a fault when the discharge fan is on and the discharge pressure bounces above and below the discharge pressure set point by a dead band
AHU Economizing & Cooling Simultaneously	Finds periods when discharge fan is on, outdoor damper is open more than a threshold and cooling is on for over a duration.
AHU Economizing & Heating Simultaneously	Finds periods when discharge fan is on, outdoor damper is open more than a threshold and heating is on for over a duration.
AHU Heating Failure	Finds periods when discharge fan is on and discharge temperature sensor is not greater than mixed air sensor plus a threshold for over a duration.
AHU Heating Valve Leaking	Generates a fault when discharge fan is on, heating valve is closed, and discharge temperature sensor is greater than the mixed air sensor by a threshold.
AHU Outside Damper Stuck Closed	Generates a fault when discharge fan is on, outdoor damper is greater than a threshold and the calculated outdoor air percentage is lower by more than a percentage.

AHU Outside Damper Stuck Open	Generates a fault when discharge fan is on, outdoor damper is less than a threshold and the calculated outdoor air percentage is higher by more than a percentage.
AHU Low Outside Airflow	Generates a fault when the discharge fan is on and the outside airflow is below the outside airflow set point during occupancy.
AHU Unstable Outside Airflow	Generates a fault when the discharge fan is on and the outside airflow bounces above and below the outside airflow set point by a dead band.
AHU Unit On Discharge Fan Off	Generates a fault when discharge fan is off and anything is on; hot water valve is more than a threshold, any heating stage is on, chilled water valve is more than a threshold, or any cooling stage is on.
AHU Discharge Temperature Set point Unreachable	Finds periods when discharge fan is on and any discharge temperature cannot get within a threshold of discharge temperature set point for over a duration.
AHU Discharge Temperature Unstable	Finds periods when discharge fan is on and any discharge temperature bounces above and below the discharge temperature set point by a dead band.
AHU Low/High Pressure	Finds periods when the AHU supply pressure is outside of the set point (+/- 0.25”) over a duration (~15 minutes).
AHU Low/High Temperature	Finds periods when the AHU supply temperature is outside of the set point (+/- 2° F) over a duration (~15 minutes).

AHU Unit On Discharge Fan Off	Finds periods when discharge fan is off and anything is on; hot water valve is more than a threshold, any heating stage is on, chilled water valve is more than a threshold, or any cooling stage is on for over a duration.
Bad Energy Data	Finds periods when data contains values outside of low and high limits or the data is NaN for at least a duration
Heat Running During Warm Weather	Finds periods when heat is are running and the outside air temperature is above a threshold.
Building Running Too Late	Finds periods when the demand of the building does not drop off by at least a percentage or threshold for a duration after occupancy is over.
Building Starting Too Early	Finds periods when the demand increases by a percentage or threshold for a duration before building occupancy.
Boiler Cycling	Generates a fault when the boiler stays on or off for less than a duration.
Boilers Running During Warm Weather	Generates a fault when boilers are running and the outside air temperature is above a threshold.
Cabinet/Door Heater Zone Temperature Out of Range	Finds periods for longer than a duration when the space temperature is less than or greater than, the heating temperature setpoint by a threshold.
Chiller Cycling	Generates a fault when the chiller stays on or off for less than a pre-specified duration.

Chilled Water Plant Demand Peak	Finds chilled water demand peaks throughout the day, as measured against a facility benchmark.
Chilled Water Pressure set point Unreachable	Finds periods when any pump is on and the differential pressure cannot get within a threshold of differential pressure set point for over a duration(~15 minutes).
Chilled Water Pressure Unstable	Finds periods when any pump is on and the differential pressure cannot stay within a threshold of differential pressure set point for over a duration (~15 minutes).
Chilled Water Plant Temperature Setpoint Unreachable	Finds periods when any chiller is on and the leaving CHW temperature is unable to reach a pre-specified threshold of the CHW supply setpoint for over a duration.
Chilled Water Plant Leaving Temperature Unstable	Generates a fault when the leaving CHW temperature bounces above and below the supply temperature set point by a dead band.
Chilled Water Low/High Temperature	Finds periods when the chiller provides water outside of the set point (+/- 2o F) over a duration (~15 minutes).
Chilled Water Mixing	Finds periods when the chilled water return temperature is not more than 4o F above the chilled water supply temperature over a duration (~15 minutes).
Chilled Water System Failure	Finds periods when any chiller is on within the chiller plant and the chilled water leaving temperature is not within a specified range for over a duration (~15 minutes).
Chiller Running During Unoccupied Periods	Generates a Fault if the chiller plant is operating outside the normal occupancy schedule.

Cooling Set point Out of Range	Finds periods when the cooling set point is below a threshold for over a duration.
Cooling Tower Temperature Set point Unreachable	Finds periods when cooling tower leaving water temperature cannot get within a threshold of the leaving water temperature set point for over a duration.
Cooling Tower Temperature Unstable	Finds periods when cooling tower leaving water temperature bounces above and below the water temperature set point by a dead band.
Double Dipping Data	This searches the database and finds data which is duplicated (point readings being stored in separate areas) and notifies administrator to reduce duplicated points, trends or data. Finds periods when a point's history contains two or more data points within a leeway of an interval for at least a duration.
EF Not Running When Emergency Generator is Engaged	Generates a fault when any exhaust fan serving an emergency generator is not operating when the generator has been engaged
EF Not Running Under Thermostatic Control	Finds periods when any exhaust fan controlled via thermostat is not operating when space temperature.
EF Running During Unoccupied Periods	Finds periods when any exhaust fan is operating outside the normal schedule.
Floor VAV Unstable Airflow	Generates a fault when the floor VAV is active and the supply airflow bounces above and below the supply airflow set point by a dead band.
Heat Exchanger Temp Set Point Unreachable	Finds periods when the secondary leaving water temperature cannot get within a threshold of secondary leaving water temperature set point, while either a heat exchanger pump is on or a hot water system pump is on, for over a duration.

Heat Exchanger Temp Unstable	Finds periods when the secondary leaving water temperature bounces above and below the secondary leaving water temperature set point by a dead band.
Heating Set Point Out of Range	Finds periods when the heating set point is above a threshold for over a duration.
Hot Water Circ Pump Running	Generates a fault when hot water heating coil pumps are running and no secondary hot water pumps are running in the system.
Hot Water Plant Demand Peak	Finds hot water demand peaks throughout the day, as measured against a facility benchmark.
Hot Water Pressure Setpoint Unreachable	Finds periods when any pump is on and the differential pressure cannot get within a threshold of differential pressure set point for over a duration.
Hot Water Pressure Unstable	Finds periods when any pump is on and the differential pressure cannot stay within a threshold of differential pressure set point for over a duration.
Hot Water Plant Temperature Setpoint	Finds periods when any boiler is on and the leaving HW temperature is unable to reach a pre-specified threshold of the HW supply setpoint for over a duration.
Hot Water Plant Leaving Temperature Unstable	Generates a fault when the leaving HW temperature bounces above and below the supply temperature set point by a dead band.
Missing Data	Finds periods when a record's history contains zero data points within a leeway of an interval for at least a duration.
Occupied Cooling Setpoint Out of Range	Finds periods over a duration when the occupied cooling set point is below a threshold.

Occupied Heating Setpoint Out of Range	Finds periods over a duration when the occupied heating set point is above a threshold.
Power Peak	Finds when power is 5% higher or 5% lower than the previous period or year (similar for day, week, month, year).
Pump Cycling	Generates a fault when the pump stays on or off for less than a specified duration.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.
Short Demand Peak	Finds short demand peaks throughout the day.
Split System A/C Unit Cooling Setpoint Out of Range	Finds periods over a duration when the room or zone temperature is unable to maintain a threshold above or below the cooling setpoint.
Terminal Unit Airflow Setpoint Unreachable	Finds periods over a duration when the discharge airflow cannot get within a threshold of discharge airflow set point (while the FCU fan is on).
Terminal Unit Airflow Unstable	Generates a fault when the discharge airflow bounces above and below the discharge airflow set point by a dead band.
Terminal Unit Heating Failure	Generates a fault when the FCU fan is on (if applicable), heating is on, and discharge temperature sensor is not greater than the discharge air sensor plus a threshold.
Terminal Unit Heating Valve Leaking	Generates a fault when FCU fan is on (if applicable), heating valve is closed, airflow is above a threshold, and the discharge temperature sensor is above discharge temperature by a threshold.

Terminal Unit Zone Temperature Out of Range	Finds periods when the zone air temperature is less than or greater than the zone set point(s) by a threshold for longer than a duration.
Underfloor Heating Space Temperature Out of Range	Finds periods when the underfloor heating space temperature is less than or greater than the setpoint(s) by a threshold for longer than a duration.
Unoccupied Cooling Setpoint Out of Range	Finds periods over a duration when the unoccupied cooling set point is below a threshold.
Unoccupied Heating Setpoint Out of Range	Finds periods over a duration when the unoccupied heating set point is above a threshold.
Zone Cooling Damper Malfunction	Finds periods when the cooling damper is open above a threshold and the zone damper discharge air temperature is not within a threshold of the cold deck discharge air temperature for over a duration.
Zone Heating Damper Malfunction	Finds periods when the heating damper is open above a threshold and the zone damper discharge air temperature is not within a threshold of the hot deck discharge air temperature for over a duration.
Zone Temperature Out of Range (Cooling)	Finds periods when the zone air temperature is less than the zone set point(s) by a threshold for longer than a duration.
Zone Temperature Out of Range (Heating)	Finds periods when the zone air temperature is greater than the zone set point(s) by a threshold for longer than a duration.
Underfloor Heating Space Temperature Out of Range	Finds periods when the underfloor heating space temperature is less than or greater than the setpoint(s) by a threshold for longer than a duration.

3.4.6 Lighting Control System

Fault Rule Name	Fault Rule Short Description
Bad Energy Data	Finds periods when data contains values outside of low and high limits or the data is NaN for at least a duration
Double Dipping Data	Finds periods when a point's history contains two or more data points within a leeway of an interval for at least a duration.
Lights Operating During Unoccupied Hours	Generates a fault when lights are running during unoccupied hours, and an associated occupancy sensor has not detected motion therein.
Lights Not Operating During Occupied Hours	Generates a fault when lights are not running during occupied hours, and an associated occupancy sensor has detected motion therein.
Lights Not Dimming During Daylight Harvesting	Finds periods when the lighting level exceeds the zone setpoint(s) by a threshold for a longer than a duration
Missing Data	Finds periods when a record's history contains zero data points within a leeway of an interval for at least a duration.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.

3.4.7 Electrical Power Monitoring (Metering) System Control

Fault Rule Name	Fault Rule Short Description
Bad Energy Data	Finds periods when data contains values outside of low and high limits or the data is null for at least a duration
Building Running Too Late	Finds periods when the demand of the building does not drop off by at least a percentage or threshold for a duration after occupancy is over.

Fault Rule Name	Fault Rule Short Description
Building Starting Too Early	Finds periods when the demand increases by a percentage or threshold for a duration before building occupancy.
Double Dipping Data	Finds periods when a point's history contains two or more data points within a leeway of an interval for at least a duration.
Excessive Energy Usage During Unoccupied Period	Generates a fault when the daily unoccupied energy usage is greater than the daily occupied energy usage by a threshold
Maximum Demand During Un-occupancy	Finds periods when the maximum demand peak for the day occurs during an unoccupied period.
Missing Data	Finds periods when a record's history contains zero data points within a leeway of an interval for at least a duration.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.
Short Demand Peak	Finds short demand peaks throughout the day.

3.4.8 Emergency Generator Monitoring System Control

Fault Rule Name	Fault Rule Short Description
Fuel level Fault	Generates a fault when the fuel level falls by a good measure with no generator operation.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.

3.4.9 Video Surveillance System Control

Fault Rule Name	Fault Rule Short Description
Unauthorized Access	Generates a fault when someone who does not have the proper credentials tries to access the CCTV system.
Camera Failure	Finds periods when a camera image does not change by a threshold for a 24-hour period.

3.4.10 Access Control System

Fault Rule Name	Fault Rule Short Description
Door Blocked Open	Generates a fault when a door is open for more than 2 minutes.
Unauthorized Access	Generates a fault when someone who does not have the proper credentials tries to access the Access Control system.
Sensor Failure	Finds periods when a sensor does not change by a threshold for a 24-hour period.

FAULT DETECTION AND DIAGNOSTICS DETAILS.

A. The following provides a summarization of the specific descriptions and requirements associated with the fault detection diagnostics of each building sub-system.

Extended Rule Descriptions and Requirements:

3.5.1 SUN CONTROL SYSTEM.

1. Blind/Shade Closure Failure
   a. Description:
      Generates a fault when the blinds and/or shades are open and the outside light level is above a threshold as measured by the sun sensor. This indicates that either the associated blind/shade motor or controller is not closing the blind/shades when the outside lighting level exceeds a set point. Fault dependencies and associated scenarios include the following;
      1) The fault rule will make sure the exterior lighting level, as measured by the associated sun sensor, is currently utilized and above the set point.
      2) The fault rule will make sure the interior lighting level, as measured by the associated daylight or multi sensor, is currently utilized and above the set point.
   b. Requirements:
      1) Blind Position Command or Shade Position Command: Blind/Shade position command is required, but status can be used as a primary reference.
      2) Exterior Lighting Level: Measured in either lumens of foot candles from the sun sensor.
      3) Interior Lighting Level: Measured in either lumens of foot candles from the ceiling mounted daylight or multi sensor.

2. Blind/Shade Opening Failure
   a. Description:
      Generates a fault when the blinds and/or shades are closed and the outside light level is within a threshold as measured by the sun sensor. This indicates that either the associated blind/shade motor or controller is not opening the blind/shades when the outside lighting level is within the setpoint. Fault dependencies and associated scenarios include the following;
      1) The fault rule will make sure the exterior lighting level, as measured by the associated sun sensor, is currently utilized and within the setpoint.
      2) The fault rule will make sure the interior lighting level, as measured by the associated daylight or multi sensor, is currently utilized and within the set point.
   b. Requirements:

1) Blind Position Command or Shade Position Command: Blind/Shade position command is required, but status can be used as a primary reference.
2) Exterior Lighting Level: Measured in either lumens of foot candles from the sun sensor.
3) Interior Lighting Level: Measured in either lumens of foot candles from the ceiling mounted daylight or multi sensor.

3. Sensor Failure
   a. Description:
      Finds periods over a duration when a sensor does not change by a threshold for a 24-hour period and equipment is running.
   b. Requirements:
      1) Sensor: Any numerical data point, including statuses and operating mode(s).

3.5.2 VERTICAL TRANSPORTATION SYSTEM

1. Bad Energy Data
   a. Description:
      Find periods for at least a duration when data contains values outside of low and high limits or the data is shown as “not a number” (NaN). Fault dependencies and associated scenarios include the following;
      1) All data will be imported into the SCMS ‘as is’ from its existing system.
   b. Requirements
      1) Consumption or Demand Point: Any point that has consumption or demand type units

2. Cab Recall Failure
   a. Description:
      Generates a fault if an elevator cab fails to recall to a requested floor. This is an indication of an internal cab fault or an error associated with the cab recall switch. Fault dependencies and associated scenarios include the following;
      1) The fault rule will ensure the specific elevator cab is not currently utilized or under a maintenance shutdown.
      2) The fault rule will ensure the recall switch, as managed by the elevator management system (EMS) is currently registering values therein.
   b. Requirements:
      1) Floor Recall Command: Floor recall command is required, but status can be used as a primary reference.
      2) Elevator Cab Status: Current operating position of the elevator cab.

3. Cab Maintenance Failure
   a. Description:

Generates a fault when the elevator cabs have been operating without a required maintenance shutdown as measured by an hourly timer. This indicates that the elevator cab has not received required maintenance and inspection and is more susceptible to operational interruptions. Fault dependencies and associated scenarios include the following;

1) The fault rule will ensure the specific elevator cab is not currently under a maintenance shutdown.
2) The elevator manufacturer's recommended maintenance procedures intervals are programmed as the hourly setpoint timer.

b. Requirements:

1) Elevator Cab Status: Current operating position of the elevator cab
2) Maintenance Hourly Timer Setpoint: Measured in hours according to manufacturer's recommendations.
3) Elevator Cab Operation: Amount of time, as measured in hours, that the elevator has been in operation since a required maintenance shutdown.

4. Double Dipping Data

a. Description

Finds periods for at least a duration when a point's history contains two or more data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;

1) All data will be imported into the SCMS 'as is' from its existing system.

b. Requirements

1) Consumption or Demand Point: Any point that has consumption or demand type units

5. Missing Data

a. Description

Finds periods for at least a duration when a record's history contains zero data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;

1) All data will be imported into the SCMS 'as is' from its existing system.

b. Requirements

1) Consumption or Demand Point: Any point that has consumption or demand type units

6. Sensor Failure

a. Description:

Finds periods over a duration when a sensor does not change by a threshold for a 24-hour period and equipment is running.

b. Requirements:

1) Sensor: Any numerical data point, including statuses and operating mode(s).

3.5.3 PLUMBING AND LIFE SAFETY SYSTEMS

1. Bad Energy Data
   a. Description:
      Find periods for at least a duration when data contains values outside of low and high limits or the data is shown as “not a number” (NaN). Fault dependencies and associated scenarios include the following;
      1) All data will be imported into the SCMS ‘as is’ from its existing system.
   b. Requirements
      1) Consumption or Demand Point: Any point that has consumption or demand type units

2. Double Dipping Data
   a. Description
      Finds periods for at least a duration when a point’s history contains two or more data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
      1) All data will be imported into the SCMS ‘as is’ from its existing system.
   b. Requirements
      1) Consumption or Demand Point: Any point that has consumption or demand type units

3. Missing Data
   a. Description
      Finds periods for at least a duration when a record’s history contains zero data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
      1) All data will be imported into the SCMS ‘as is’ from its existing system.
   b. Requirements
      1) Consumption or Demand Point: Any point that has consumption or demand type units

4. Sensor Failure
   a. Description:
      Finds periods over a duration when a sensor does not change by a threshold for a 24-hour period and equipment is running.
   b. Requirements:
      1) Sensor: Any numerical data point, including statuses and operating mode(s).

3.5.4 HVAC CONTROL SYSTEM

1. AHU Cooling and Heating Cycling
   a. Description:
      Finds periods when the heating and cooling are cycling between each other within a threshold. This indicates that the unit is fighting back and forth between its mechanical components. Fault dependencies and associated scenarios include the following;
      1) The fault rule will make sure any chilled water pump, from the chiller plant, is on if a cooling valve is utilized.
      2) Will also make sure any hot water pump, from the boiler plant, is on if a heating valve is utilized.
      3) If served by a steam plant, the rule will make sure steam pressure is over a threshold.
   b. Requirements:
      1) AHU: This rule is applied to only RTU or AHU equipment
      2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
      3) Cooling Valve or Cooling Stage: This can either be a numeric cooling valve position or a Boolean cooling stage
      4) Heating Valve or Heating Stage: This can either be a numeric heating valve position or a Boolean heating stage
      5) Chilled Water Pump (optional): Any chilled water pump command or status from the chiller plant. If Cooling stage is used, chilled water pump is not necessary.
      6) Hot Water Pump (optional): Any hot water pump command or status from the hot water plant. If heating stage is used, hot water pump is not necessary.
      7) Steam Pressure (optional): Steam pressure if served from a steam plant

2. AHU Cooling and Heating Simultaneously
   a. Description:
      Finds periods over a duration when discharge fan is on, heating is on and cooling is on. Fault dependencies and associated scenarios include the following;
      1) Heating is on when the hot water valve is greater than a threshold or any heating stage is on.
      2) Cooling is on when the chilled water valve is greater than a threshold or any cooling stage is on.
      3) Fault rule will check to see if the unit is in dehumidification mode and will not check for cooling failure periods during this time.
      4) Fault rule will ensure any chilled water pump, from the chiller plant, is on if a cooling valve is utilized.
      5) Will also make sure any hot water pump, from the boiler plant, is on if a heating valve is utilized.
      6) If served by a steam plant will make sure steam pressure is over a threshold.
   b. Requirements:
      1) AHU: This rule is applied to only RTU or AHU equipment

2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Cooling Valve or Cooling Stage: This can either be a numeric cooling valve position or a Boolean cooling stage
4) Heating Valve or Heating Stage: This can either be a numeric heating valve position or a Boolean heating stage
5) Dehumidification Mode (optional): Dehumidification mode point to know when the unit is in a dehumidification sequencing mode
6) Chilled Water Pump (optional): Any chilled water pump command or status from the chiller plant. If Cooling stage is used, chilled water pump is not necessary.
7) Hot Water Pump (optional): Any hot water pump command or status from the hot water plant. If heating stage is used, hot water pump is not necessary.
8) Steam Pressure (optional): Steam pressure if served from a steam plant

3. AHU Cooling Failure
   a. Description:
      Finds periods over a certain duration when the discharge fan is on, cooling is on, and discharge temperature sensor is not registering below the mixed air sensor level minus a threshold. Fault dependencies and associated scenarios include the following;
      1) Cooling is on when the chilled water valve is greater than a threshold or any cooling stage is on.
      2) If mixed air sensor does not exist, return air temperature can be used.
      3) If return air temperature does not exist zone temperature sensor can be used. Will also make sure any chilled water pump, from the chiller plant, is on during this period if a cooling valve is utilized.
      4) Will also check to see if the unit is in dehumidification mode and not check for cooling failure periods during this time.
      5) On a face bypass unit, when the cooling valve is in the face, the face bypass damper must be open to the face more than a threshold.
   b. Requirements:
      1) AHU: This rule is applied to only RTU or AHU equipment
      2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
      3) Cooling Valve or Cooling Stage: This can either be a numeric cooling valve position or a Boolean cooling stage
      4) Discharge Temperature: Discharge air temperature
      5) Mixed Air Temperature: Mixed air temperature. If not found will fall back to return air temperature. If not found and the unit is a 100% outside air unit will use outside air temperature. If not a 100% outside air unit will fall back to zone air temperature.

6) Chilled Water Pump: Any chilled water pump command or status from the chiller plant. If Cooling stage is used, chilled water pump is not necessary.
7) Dehumidification Mode (optional): Dehumidification mode point to know when the unit is in a dehumidification sequencing mode
8) Face Bypass Damper (optional): The face bypass damper position of the unit. Will be interpreted as percent open to the face. (Only if the cooling valve is in the face)

4. AHU Cooling Valve Leaking
   a. Description:
      Generates a fault when discharge fan is on, cooling valve is closed, and discharge temperature sensor is under mixed air sensor by a threshold.
      1) Will use multiple valves/stages if present and ensure all are closed/off.
   b. Requirements:
      1) AHU: This rule is applied to only RTU or AHU equipment
      2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
      3) Cooling Valve or Pre Cooling Valve: Numeric cooling valve position
      4) Discharge Temperature: Discharge air temperature

5. AHU Discharge Fan Failure
   a. Description:
      Generates a fault when discharge fan is on and duct static pressure is below a threshold.
   b. Requirements:
      1) AHU: This rule is applied to only RTU or AHU equipment
      2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
      3) Discharge Pressure: Duct static pressure

6. AHU Discharge Pressure Set point Unreachable
   a. Description:
      Finds periods over a duration when discharge fan is on and discharge pressure is below or above the discharge pressure set point by a threshold.
   b. Requirements:
      1) AHU: This rule is applied to only RTU or AHU equipment
      2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
      3) Discharge Pressure: Discharge pressure of the AHU
      4) Discharge Pressure set point: Discharge pressure set point of the AHU

7. AHU Discharge Pressure Unstable

a. Description:
Generates a fault when the discharge fan is on and the discharge pressure bounces above and below the discharge pressure set point by a dead band. Fault dependencies and associated scenarios include the following;
1) Periods are only found when the pressure crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.

b. Requirements
1) AHU: This rule is applied to only RTU or AHU equipment

8. AHU Economizing and Cooling Simultaneously
a. Description:
Finds periods over a duration when discharge fan is on, outdoor damper is open more than a threshold and cooling is on. Fault dependencies and associated scenarios include the following;
1) Cooling is on when the chilled water valve is greater than a threshold or any cooling stage is on.
2) This rule is not applicable in some sequences where the unit takes advantage of both free cooling and mechanical cooling at the same time.

b. Requirements:
1) AHU: This rule is applied to only RTU or AHU equipment
2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Outside Damper Status or Outside Damper Command: Outside damper position
4) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
5) Cooling Valve or Cooling Stage: This can either be a numeric cooling valve position or a Boolean cooling stage

9. AHU Economizing and Heating Simultaneously
a. Description:
Finds periods over a duration when discharge fan is on, outdoor damper is open more than a threshold and heating is on. Fault dependencies and associated scenarios include the following;
1) Heating is on when the hot water valve is greater than a threshold or any heating stage is on.
2) On a face bypass unit, the face bypass damper must be open to the face more than a threshold.
3) If the unit has outside airflow, the outside airflow must be above the set point by a threshold.
4) If the unit only has minimum outside airflow, the minimum outside airflow must be above the set point by a threshold.
5) If the unit has return co2 and return co2 set point, the return co2 must be below the return co2 set point by more than a threshold.

b. Requirements:
1) AHU: This rule is applied to only RTU or AHU equipment

2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Outside Damper Status or Outside Damper Command: Outside damper position
4) Heating Valve or Heating Stage: This can either be a numeric heating valve position or a Boolean heating stage
5) Hot Water Pump: Any hot water pump command or status from the hot water plant. If heating stage is used, hot water pump is not necessary.
6) Steam Pressure (optional): Steam pressure if served from a steam plant
7) Face Bypass Damper (optional): The face bypass damper position of the unit. Will be interpreted as percent open to the face.
8) Outside Airflow (optional): The outside airflow of the unit
9) Outside Airflow Set point (optional): The outside airflow set point of the unit
10) Minimum Outside Airflow (optional): The minimum outside airflow of the unit

10. AHU Excessive Outside Air During Unoccupied Periods
    a. Description:
       Generates a fault when the discharge fan is on and the outside damper or minimum outside damper is open during unoccupied periods. Fault dependencies and associated scenarios include the following;
       1) If the outside temperature is below a threshold, then the unit must be heating to create a fault (economizing for free cooling during un-occupancy would be acceptable).
    b. Requirements:
       1) AHU: This rule is applied to only RTU or AHU equipment that are not; 100% outside air, cold deck / hot deck units, or heat wheel units
       2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
       3) Outside Damper Status or Outside Damper Command: Outside damper position
       4) Minimum Outside Damper Status or Command (optional): Minimum outside damper position
       5) Occupancy: Occupancy of the piece of equipment
       6) Heating Valve or Heating Stage: This can either be a numeric heating valve position or a Boolean heating stage
       7) Outside Air Temperature: Outside air temperature of the AHU. If nonexistent the building outside air temperature will be used.

11. AHU Heating Failure
    a. Description:
       Finds periods over a duration when the discharge fan is on, heating is on, and the discharge temperature sensor value is not greater than

the mixed air sensor level (plus a threshold). Fault dependencies and associated scenarios include the following;

1) Heating is on when the hot water valve is greater than a threshold or any heating stage is on.
2) If mixed air sensor does not exist, return air temperature can be used.
3) If return air temperature does not exist zone temperature sensor can be used.
4) Fault will make sure any hot water pump, from the hot water plant, is on during this period if a heating valve is utilized.
5) If served by a steam plant will make sure steam pressure is over a threshold.
6) Fault will also check to see if the unit is in dehumidification mode and not check for cooling failure periods during this time.
7) On a face bypass unit, the face bypass damper must be open to the face more than a threshold.

b. Requirements:

1) AHU: This rule is applied to only RTU or AHU equipment
2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Heating Valve or Heating Stage: This can either be a numeric heating valve position or a Boolean heating stage
4) Discharge Temperature: Discharge air temperature
5) Mixed Air Temperature: Mixed air temperature. If not found will fall back to return air temperature. If not found and the unit is a 100% outside air unit will use outside air temperature. If not a 100% outside air unit will fall back to zone air temperature.
6) Hot Water Pump: Any hot water pump command or status from the hot water plant. If heating stage is used, hot water pump is not necessary.
7) Steam Pressure (optional): Steam pressure if served from a steam plant
8) Heat Exchanger Valves (optional): Valves that control heat exchanger temperatures if needed to check when it should be operational
9) Dehumidification Mode (optional): Dehumidification mode point to know when the unit is in a dehumidification sequencing mode
10) Face Bypass Damper (optional): The face bypass damper position of the unit. Will be interpreted as percent open to the face.

12. AHU Heating Valve Leaking

a. Description:

Generates a fault when discharge fan is on, heating valve is closed, and discharge temperature sensor is above mixed air sensor by a threshold. Fault dependencies and associated scenarios include the following;

1) Will use multiple valves/stages if they exist and make sure they are all closed/off.

b. Requirements:
1) AHU: This rule is applied to only RTU or AHU equipment
2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Heating Valve, Pre Heating Valve, or Re Heating Valve: Numeric heating valve position
4) Discharge Temperature: Discharge air temperature
5) Mixed Air Temperature: Mixed air temperature. If not found and the unit is a 100% outside air unit will use outside air temperature. If unit is a 100% return air unit will use return air and if return air is not found will fall back to zone air temperature.

13. AHU Outdoor Damper Stuck Closed
a. Description:
Generates a fault when discharge fan is on, outside damper is greater than a threshold and the calculated outside air percentage is lower by more than a percentage. Fault dependencies and associated scenarios include the following;
1) The outside air percentage will be calculated using the return air temperature, mixed air temperature, and outside air temperature sensor.
2) If the mixed air temperature sensor is not available, then the discharge air temperature sensor will be used when cooling and heating are both off.
3) If the return air temperature sensor is not available, then the zone air temperature sensor will be used.
4) Will not find these periods when the outside air temperature sensor is within a threshold of the return air temperature sensor.

b. Requirements:
1) AHU: This rule is applied to only RTU or AHU equipment
2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Outside Damper Status or Outside Damper Command: Outside damper position
4) Return Air Temperature or Zone Air Temperature: Zone temperature will only be used if return air temperature is not available.
5) Mixed Air Temperature or Discharge Air Temperature: Discharge temperature will only be used if mixed air temperature is not available.
6) Outside Air Temperature: Outside air temperature of the AHU. If nonexistent the building outside air temperature will be used.

14. AHU Outdoor Damper Stuck Open
a. Description:
Generates a fault when discharge fan is on, outside damper is lower than a threshold and the calculated outside air percentage is higher

by more than a percentage. Fault dependencies and associated scenarios include the following;

1) The outside air percentage will be calculated using the return air temperature, mixed air temperature, and outside air temperature sensor.
2) If the mixed air temperature sensor is not available, then the discharge air temperature sensor will be used when cooling and heating are both off.
3) If the return air temperature sensor is not available, then the zone air temperature sensor will be used.
4) Will not find these periods when the outside air temperature sensor is within a threshold of the return air temperature sensor.
5) If a minimum outdoor damper exists, this will be added to the outside damper position, as a percentage of total outside air intake.

b. Requirements:

1) AHU: This rule is applied to only RTU or AHU equipment
2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Outside Damper Status or Outside Damper Command: Outside damper position
4) Return Air Temperature or Zone Air Temperature: Zone temperature will only be used if return air temperature is not available.
5) Mixed Air Temperature or Discharge Air Temperature: Discharge temperature will only be used if mixed air temperature is not available.

15. AHU Low Outside Airflow

a. Description

Generates a fault when the discharge fan is on and the outside airflow is below the outside airflow set point during occupancy.

b. Requirements:

1) AHU: This rule is applied to only RTU or AHU equipment
2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
3) Outside Airflow: The outside airflow of the unit
4) Outside Airflow Set point: The outside airflow set point of the unit
5) Occupancy: Occupancy of the piece of equipment

16. AHU Unstable Outside Airflow

a. Description:

Generates a fault when the discharge fan is on and the outside airflow bounces above and below the outside airflow set point by a dead band. Fault dependencies and associated scenarios include the following;

1) Periods are only found when the airflow crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.

b. Requirements:
   1) AHU: This rule is applied to only RTU or AHU equipment
   2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
   3) Outside Airflow: The outside airflow of the unit
   4) Outside Airflow Set point: The outside airflow set point of the unit

17. AHU Unit on Discharge Fan is Off
   a. Description:
      Generates a fault when discharge fan is off and anything is on; hot water valve is more than a threshold, any heating stage is on, chilled water valve is more than a threshold, or any cooling stage is on. Fault dependencies and associated scenarios include the following;
      1) Both cooling and heating are not required, but one or the other is required for this rule to run successfully.
   b. Requirements:
      1) AHU: This rule is applied to only RTU or AHU equipment
      2) Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary
      3) Cooling Valve or Cooling Stage (optional): This can either be a numeric cooling valve position or a Boolean cooling stage
      4) Heating Valve or Heating Stage (optional): This can either be a numeric heating valve position or a Boolean heating stage

18. Bad Energy Data
   a. Description:
      Find periods for at least a duration when data contains values outside of low and high limits or the data is NaN. Fault dependencies and associated scenarios include the following;
      1) All data will be imported into the SCMS ‘as is’ from its existing system.
   b. Requirements
      1) Consumption or Demand Point: Any point that has consumption or demand type units

19. Building Floor Running Too Late
   a. Description:
      Finds periods over a duration after occupancy is over, when the demand of a particular floor does not drop off by at least a percentage or threshold. Fault dependencies and associated scenarios include the following;
      1) A shutdown window can be specified for an allotted time to wait until after occupancy to check for the decrease in demand. This makes sure that a particular floor is shutting down when occupancy is over and equipment is not manually operating or overridden.
   b. Requirements:
      1) Floor Lighting Submeter: Any floor lighting submeter meter of the site

2) Floor Power Submeter: Any floor power submeter meter of the site
3) Floor Lighting Demand: The demand of the floor lighting submeter
4) Floor Power Demand: The demand of the floor power submeter
5) Occupancy: Occupancy or schedule for the building

20. Building Floor Starting Too Early
    a. Description:
       Finds periods over a duration before building occupancy when the demand of a particular floor increases by a percentage or threshold. Fault dependencies and associated scenarios include the following;
       1) A startup window can be specified for an allotted time before occupancy that demand is allowed to increase. This indicates that a particular floor is starting ahead of occupancy or too many pieces of equipment are coming on outside of normal occupancy on the associated floor.
    b. Requirements:
       1) Floor Lighting Submeter: Any floor lighting submeter meter of the site
       2) Floor Power Submeter: Any floor power submeter meter of the site
       3) Floor Lighting Demand: The demand of the floor lighting submeter
       4) Floor Power Demand: The demand of the floor power submeter
       5) Occupancy: Occupancy or schedule for the building

21. Boiler Cycling
    a. Description:
       Generates a fault when the boiler stays on or off for less than a duration.
    b. Requirements:
       1) Boiler: This rule is applied to only boiler equipment
       2) Boiler Status or Boiler Command: Boiler on/off status

22. Boilers Running During Warm Weather
    a. Description:
       Finds periods when boilers are running and the outside air temperature is above a threshold.
    b. Requirements:
       1) Boiler Plant: This rule is applied to only boiler plant equipment
       2) Boiler(s) Status or Boiler(s) Command: Boiler(s) on/off status
       3) Outside Air Temperature: Outside air temperature of the Boiler Plant. If nonexistent the building outside air temperature will be used.

23. Cabinet/Door Heater Zone Temperature Out of Range
    a. Description:

Finds periods for longer than a duration when the space temperature is less than or greater than, the heating temperature setpoint by a threshold. Fault dependencies and associated scenarios include the following;

1) If occupancy exists temperature will only be checked when occupancy is true.

b. Requirements:

1) Space Temperature: Space temperature adjacent to the cabinet/door heater
2) Heating Setpoint: Setpoint associated with the zone air temperature.
3) Occupancy (optional): Occupancy of the piece of equipment
4) Fan Status (is applicable): Fan status of the piece of equipment.

24. Chiller Cycling
    a. Description:
    Generates a fault when the chiller stays on or off for less than a pre-specified duration.
    b. Requirements:
        1) Chiller: This rule is applied to only chiller equipment
        2) Chiller Status or Chiller Command: Chiller on/off status

25. Chilled Water Plant Demand Peak
    a. Description:
    Finds chilled water demand peaks throughout the day, as measured against a facility benchmark. Fault dependencies and associated scenarios include the following;
        1) Looks for an increase in demand by a percentage or threshold and then an immediate decrease by a percentage or threshold. This increase and decrease in demand is looked at in consecutive historic data intervals to identify a short demand peak.
    b. Requirements:
        1) Chilled Water BTU Meter: Any meter, including main plant, data centers, E-rooms.
        2) Electrical Submeter: Any meter
        3) Demand: The demand of the meter (electrical only)
        4) Chilled Water Plant Benchmark: BTUs and Electrical

26. Chilled Water Plant Pressure Setpoint Unreachable
    a. Description:
    Finds periods over a duration when the differential pressure is unable to maintain within a threshold of differential pressure set point, while any chilled water pump is on. Fault dependencies and associated scenarios include the following;
        1) This will account for the pressure being too high or too low from set point.

2) If a freeze protection sequence is in place then will only Spark when any pump is over a speed threshold, but will still Spark anytime the outside air temperature is above a threshold.
3) If chilled water flows and flow min/max set points exist, then the flows must be above/below set points.

b. Requirements:
1) Chiller Plant: This rule is applied to only chiller plant systems
2) Pump Status or Pump Command: Pump on/off status. At least one pump is required to be able to check when water is flowing and trying to maintain set point.
3) Chilled Water Differential Pressure: The differential pressure of the chiller plant system
4) Chilled Water Differential Pressure Set point: The differential pressure set point of the chiller plant system
5) Outside Air Temperature (optional): Outside air temperature of the Chiller Plant. If nonexistent the building outside air temperature will be used.
6) Chilled Water Leaving Flow (optional): The secondary water leaving flow
7) Chilled Water Leaving Flow Min Set point (optional): The secondary water leaving flow minimum set point.
8) Chilled Water Leaving Flow Max Set point (optional): The secondary water leaving flow maximum set point.
9) Chiller Evaporator Leaving Flow (optional): The chiller(s) evaporator leaving flow
10) Chiller Evaporator Leaving Flow Min Set point (optional): The chiller(s) evaporator leaving flow minimum set point
11) Chiller Status (optional): The chiller(s) status or command. This is necessary if both chiller flow and chiller flow min set point is to be taken into consideration.

27. Chilled Water Plant Pressure Unstable
a. Description:
Finds periods when the secondary differential pressure bounces above and below the secondary differential pressure set point by a dead band. Fault dependencies and associated scenarios include the following;
1) Periods are only found when the differential pressure crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.
2) Must occur while any pump is on.

b. Requirements:
1) Chiller Plant: This rule is applied to only chiller plant systems
2) Pump Status or Pump Command: Pump on/off status. At least one pump is required to be able to check when water is flowing and trying to maintain set point.
3) Chilled Water Differential Pressure: The differential pressure of the chiller plant system

4) Chilled Water Differential Pressure Set point: The differential pressure set point of the chiller plant system

28. Chilled Water Plant Temperature Setpoint Unreachable
    a. Description:
       Finds periods when any chiller is on and the leaving CHW temperature is unable to reach a pre-specified threshold of the CHW supply setpoint for over a duration.
    b. Requirements:
       1) Chiller Plant: This rule is applied to only chiller plant systems
       2) Chiller Status or Chiller Command: Chiller on/off status. At least one chiller is required to be able to check when chilled water is being chilled.
       3) Chilled Water Plant Leaving Temperature: This is the chiller plant leaving water temperature that is being supplied to the building

29. Chilled Water Plant Leaving Temperature Unstable
    a. Description:
       Finds periods when the leaving CHW temperature bounces above and below the CHW supply temperature setpoint by a dead band. Fault dependencies and associated scenarios include the following;
       1) Periods are only found when the leaving CHW temperature crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.
       2) Must occur while any chiller is on.
    b. Requirements:
       1) Chiller Plant: This rule is applied to only chiller plant systems
       2) Chiller Status or Chiller Command: Chiller on/off status.
       3) Pump Status or Pump Command: Pump on/off status. At least one pump is required to be able to check when water is flowing and trying to maintain set point.
       4) Leaving (Supply) Chilled Water Temperature
       5) Chilled Water Temperature Set point: The chilled water setpoint of the chilled water plant

30. Chiller Running During Unoccupied Periods
    a. Description:
       Finds periods when any chiller is operating outside the normal occupancy schedule. Fault dependencies and associated scenarios include the following;
       1) Will only violate if no AHU's are running or if all AHU's running has Return Air Temperatures under a certain threshold (cool temperatures) or if only X AHU's are running with Return Air Temperatures above a threshold (warm temperatures).
       2) The synopsis will also include any available records to indicate authorized overtime usage.
    b. Requirements:
       1) Chiller Plant: This rule is applied to only chiller plant systems

2) Chiller Status or Chiller Command: Chiller on/off status. At least one chiller is required to be able see if it is running.
3) Occupancy or Schedule: The chiller plant or site must have a schedule point record or an occupancy point record.
4) AHU's: Air Handling Units attached to the chiller plant
5) AHU Return Air Temperature: Return Air Temperature for each of the attached AHU's. If return air temperature is not available will fall back to zone temperature. This rule will not fail if not every AHU has a return air temperature.

31. CRAC Unit Cooling Setpoint Out of Range
    a. Description:
       Finds periods over a duration when the computer room temperature is unable to maintain a threshold above or below the cooling setpoint. Fault dependencies and associated scenarios include the following;
       1) This is used to determine if the cooling set point can be maintained or whether it has been set too low and high.
    b. Requirements:
       1) Cooling Set point: A set point specifically for cooling associated with a CRAC unit.
       2) Computer Room Temperature

32. CRAC Unit Relative Humidity Setpoint Out of Range
    a. Description:
       Finds periods over a duration when the computer room relative humidity is unable to maintain a threshold above or below the relative humidity setpoint. Fault dependencies and associated scenarios include the following;
       1) This is used to determine if the relative humidity set point can be maintained.
    b. Requirements:
       1) Relative Humidity Set point: A set point specifically for cooling associated with a CRAC unit.
       2) Computer Room Relative Humidity

33. Double Dipping Data
    a. Description
       Finds periods for at least a duration when a point's history contains two or more data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
       1) All data will be imported into the SCMS 'as is' from its existing system.
    b. Requirements
       1) Consumption or Demand Point: Any point that has consumption or demand type units

34. EF Not Running When Emergency Generator is Engaged
    a. Description:

Generates a fault when any exhaust fan serving an emergency generator is not operating when the generator has been engaged. Fault dependencies and associated scenarios include the following;

1) Periods are only found when an emergency generator is operation.

b. Requirements:

1) Exhaust Fans serving Emergency Generators: This rule is applied to only EFs serving an emergency generator.
2) EF Status or EF Command: EF on/off status.
3) Emergency Generator Status or Command: On/off status

35. EF Not Running Under Thermostatic Control

a. Description:

Finds periods when any exhaust fan controlled via thermostat is not operating when space temperature. Fault dependencies and associated scenarios include the following;

1) Periods are only found when the EF operates per thermostatic command.

b. Requirements:

1) Exhaust Fans w/ Space Thermostats: This rule is applied to only EFs are thermostatically controlled.
2) EF Status or EF Command: EF on/off status.
3) Space Temperature.

36. EF Running During Unoccupied Periods

a. Description:

Finds periods when any exhaust fan is operating outside the normal schedule. Fault dependencies and associated scenarios include the following;

1) Periods are only found when the EF is not scheduled to operate or during unoccupied hours.

b. Requirements:

1) Scheduled Exhaust Fan: This rule is applied to only EFs which operate per schedule command and excludes EFs that are thermostatically controlled.
2) EF Status or EF Command: EF on/off status.
3) Occupancy or Schedule: The EF must have a schedule point record or an occupancy point record.

37. Floor VAV Unstable Airflow

a. Description:

Generates a fault when the floor VAV is active and the supply airflow bounces above and below the airflow set point by a dead band. Fault dependencies and associated scenarios include the following;

1) Periods are only found when the airflow crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.

b. Requirements:

1) Floor VAV Distribution Terminals: This rule is applied to only floor VAV distribution terminals
2) Floor VAV Status or Command: Command will suffice, but status is used as primary
3) Supply Airflow: The supply airflow of the unit
4) Supply Airflow Setpoint: The supply airflow setpoint of the unit

38. Heat Exchanger Temp Setpoint Unreachable
    a. Description:
    Finds periods over a duration when the secondary leaving water temperature cannot get within a threshold of secondary leaving water temperature set point, while either a heat exchanger pump is on or a water system pump is on. Fault dependencies and associated scenarios include the following;
        1) This will account for temperature being too high or too low from set point.
    b. Requirements:
        1) Heat Exchanger: This rule is only applied to heat exchanger equipment
        2) Pump Status: Must have at least one heat exchanger pump or hot water system pump Boolean status point in order to determine when set point should be maintained
        3) Water Temperature: Secondary leaving water temperature
        4) Water Temperature Set point: Secondary leaving water temperature set point
        5) Summer Winter Mode (optional): Point to determine when the HX is active based on season
        6) Heat Exchanger Valves (optional): Valves that control heat exchanger temperatures if needed to check when it should be operational

39. Heat Exchanger Temp Unstable
    a. Description:
    Generates a fault when the secondary leaving water temperature bounces above and below the secondary leaving water temperature set point by a dead band. Fault dependencies and associated scenarios include the following;
        1) Periods are only found when the water temperature crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.
        2) Must occur while either a heat exchanger pump is on or a water system pump is on.
    b. Requirements:
        1) Heat Exchanger: This rule is only applied to heat exchanger equipment
        2) Pump Status: Must have at least one heat exchanger pump or hot water system pump Boolean status point in order to determine when set point should be maintained

3) Water Temperature: Secondary leaving water temperature
4) Water Temperature Set point: Secondary leaving water temperature set point

40. Hot Water Circ Pump Running
    a. Description:
       Generates a fault when hot water heating coil pumps are running and no secondary hot water pumps are running in the system.
    b. Requirements:
       1) Hot Water Circ Pump: This rule is applied to only heating coil circulation pumps
       2) Hot Water Circ Pump Status or Command: Pump on/off status
       3) Secondary Pump Status or Pump Command: Pump on/off status. At least one pump is required to be able to check when water is flowing.

41. Hot Water Plant Demand Peak
    a. Description:
       Finds hot water demand peaks throughout the day, as measured against a facility benchmark. Fault dependencies and associated scenarios include the following;
       1) Looks for an increase in demand by a percentage or threshold and then an immediate decrease by a percentage or threshold. This increase and decrease in demand is looked at in consecutive historic data intervals to identify a short demand peak.
    b. Requirements:
       1) Meter: Any natural gas submeter
       2) Hot Water Plant Benchmark: Natural gas

42. Hot Water Pressure Set Point Unreachable
    a. Description:
       Finds periods over a duration where the secondary differential pressure cannot get within a threshold of secondary differential pressure set point, while any hot water pump is on. Fault dependencies and associated scenarios include the following;
       1) This will account for pressures being too high or too low from set point.
    b. Requirements:
       1) Boiler Plant: This rule is applied to only boiler plant systems
       2) Pump Status or Pump Command: Pump on/off status. At least one pump is required to be able to check when water is flowing and trying to maintain set point.
       3) Hot Water Differential Pressure: The differential pressure of the boiler plant system
       4) Hot Water Differential Pressure Set point: The differential pressure set point of the boiler plant system

43. Hot Water Pressure Unstable

a. Description:
Finds periods when the secondary differential pressure bounces above and below the secondary differential pressure set point by a dead band. Fault dependencies and associated scenarios include the following;
   1) Periods are only found when the differential pressure crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.
   2) Must occur while any pump is on.

b. Requirements:
   1) Boiler Plant: This rule is applied to only boiler plant systems
   2) Pump Status or Pump Command: Pump on/off status. At least one pump is required to be able to check when water is flowing and trying to maintain set point.
   3) Hot Water Differential Pressure: The differential pressure of the boiler plant system
   4) Hot Water Differential Pressure Set point: The differential pressure set point of the boiler plant system

44. Hot Water Plant Temperature Setpoint Unreachable
   a. Description:
   Finds periods when any boiler is on and the leaving HW temperature is unable to reach a pre-specified threshold of the HW supply setpoint for over a duration.
   b. Requirements:
      1) Boiler Plant: This rule is applied to only boiler plant systems
      2) Boiler Status or Boiler Command: Boiler on/off status. At least one boiler is required to be able to check when hot water is being conditioned.
      3) Hot Water Plant Leaving Temperature: This is the boiler plant leaving water temperature that is being supplied to the building

45. Hot Water Plant Leaving Temperature Unstable
   a. Description:
   Finds periods when the leaving HW temperature bounces above and below the HW supply temperature setpoint by a dead band. Fault dependencies and associated scenarios include the following;
      1) Periods are only found when the leaving HW temperature crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.
      2) Must occur while any boiler is on.
   b. Requirements:
      1) Boiler Plant: This rule is applied to only boiler plant systems
      2) Boiler Status or Boiler Command: Boiler on/off status.
      3) Pump Status or Pump Command: Pump on/off status. At least one pump is required to be able to check when water is flowing and trying to maintain set point.
      4) Leaving (Supply) Hot Water Temperature

5) Hot Water Temperature Set point: The hot water setpoint of the boiler plant

46. Missing Data
    a. Description
       Finds periods for at least a duration when a record's history contains zero data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
       1) All data will be imported into the SCMS 'as is' from its existing system.
    b. Requirements
       1) Consumption or Demand Point: Any point that has consumption or demand type units

47. Occupied Cooling Setpoint Out of Range
    a. Description:
       Finds periods over a duration when the occupied cooling set point is below a threshold. Fault dependencies and associated scenarios include the following;
       1) This is used to determine if the zone occupied cooling set point has been set too low.
    b. Requirements:
       1) Zone Occupied Cooling Set point: A set point specifically for occupied cooling associated with a zone air temperature

48. Occupied Heating Setpoint Out of Range
    a. Description:
       Finds periods over a duration when the occupied heating set point is above a threshold. Fault dependencies and associated scenarios include the following;
       1) This is used to determine if the zone occupied heating set point has been set too high.
    b. Requirements:
       1) Zone Occupied Heating Set point: A set point specifically for occupied heating associated with a zone air temperature

49. Pump Cycling
    a. Description:
       Finds periods when the pump stays on or off for less than a specified duration.
    b. Requirements:
       1) Pump: This rule is applied to only pump equipment
       2) Pump Status or Pump Command: Pump on/off status

50. Sensor Failure
    a. Description:
       Finds periods over a duration when a sensor does not change by a threshold for a 24-hour period and equipment is running.
    b. Requirements:

1) Sensor: Any numerical data point

51. Short Demand Peak
    a. Description:
       Finds short demand peaks throughout the day, including natural gas and electricity. Fault dependencies and associated scenarios include the following;
       1) Looks for an increase in demand by a percentage or threshold and then an immediate decrease by a percentage or threshold. This increase and decrease in demand is looked at in consecutive historic data intervals to identify a short demand peak.
    b. Requirements:
       1) Meter: Any meter
       2) Demand: The demand of the meter (electrical only)
       3) Utility Benchmark: Electrical and natural gas

52. Split System A/C Unit Cooling Setpoint Out of Range
    a. Description:
       Finds periods over a duration when the room or zone temperature is unable to maintain a threshold above or below the cooling setpoint. Fault dependencies and associated scenarios include the following;
       1) This is used to determine if the cooling set point can be maintained or whether it has been set too low and high.
    b. Requirements:
       1) Cooling Setpoint: A set point specifically for cooling associated with a split system A/C unit.
       2) Space Temperature

53. Terminal Unit Airflow Setpoint Unreachable
    a. Description:
       Finds periods over a duration when the discharge airflow cannot get within a threshold of discharge airflow set point (while the FCU fan is on).
    b. Requirements:
       1) Terminal Unit: This rule is applied to only VAV or DDT equipment
       2) AHU Discharge Fan Status or Discharge Fan Command: AHU fan command will suffice, but status is used as primary
       3) Discharge Airflow: Terminal unit discharge airflow
       4) Discharge Airflow Set point: Terminal unit discharge airflow set point
       5) Discharge Airflow Maximum Set point (optional): Terminal unit discharge airflow maximum set point. If available will be used to calculate an appropriate threshold.

54. Terminal Unit Airflow Unstable
    a. Description:

Generates a fault when the discharge airflow bounces above and below the discharge airflow set point by a dead band. Fault dependencies and associated scenarios include the following;

1) Periods are only found when the discharge airflow crosses (above and below) the set point by the dead band more than the given amount of crosses in any window period.
2) Must occur while the AHUs discharge fan is on.

b. Requirements:

1) Terminal Unit: This rule is applied to only VAV or DDT equipment
2) AHU Discharge Fan Status or Discharge Fan Command: AHU fan command will suffice, but status is used as primary
3) Discharge Airflow: Terminal unit discharge airflow
4) Discharge Airflow Set point: Terminal unit discharge airflow set point
5) Discharge Airflow Maximum Set point (optional): Terminal unit discharge airflow maximum set point. If available will be used to calculate an appropriate dead band.

55. Terminal Unit Heating Failure

a. Description:

Generates a fault when the FCU fan is on (if applicable), heating is on, and discharge temperature sensor is not greater than the discharge air sensor plus a threshold. Fault dependencies and associated scenarios include the following;

1) Heating is on when the hot water valve is greater than a threshold or any heating stage is on.
2) Will also make sure any hot water pump, from the hot water plant, is on during this period if a heating valve is utilized.
3) If no pumps are available, the rule will not fail.

b. Requirements:

1) Terminal Unit: This rule is applied to only VAV, DDT, or PIU equipment
2) AHU Discharge Fan Status or Discharge Fan Command: AHU fan command will suffice, but status is used as primary
3) AHU Discharge Temperature: AHU discharge air temperature
4) Heating Valve or Heating Stage: This can either be a numeric heating valve position or a Boolean heating stage
5) Discharge Temperature: Discharge air temperature
6) Hot Water Pump (optional): Any hot water pump command or status from the hot water plant. If none are found it will not be incorporated into the rule
7) Steam Pressure (optional): Steam pressure if served from a steam plant

56. Terminal Unit Heating Valve Leaking

a. Description:

Generates a fault when FCU fan is on (if applicable), heating valve is closed, airflow is above a threshold, and the discharge temperature

sensor is above discharge temperature by a threshold. Fault dependencies and associated scenarios include the following;
1) Will use multiple valves if they exist and make sure they are all closed.

b. Requirements:
1) Terminal Unit: This rule is applied to only VAV, DDT, or PIU equipment
2) AHU Discharge Fan Status or Discharge Fan Command: AHU fan command will suffice, but status is used as primary
3) AHU Discharge Temperature: AHU discharge air temperature
4) Heating Valve or Heating Stage: This can either be a numeric heating valve position or a Boolean heating stage

57. Terminal Unit Zone Temperature Out of Range
a. Description:
Finds periods for longer than a duration when the zone air temperature is less than or greater than, the zone set point(s) by a threshold. Fault dependencies and associated scenarios include the following;
1) If occupancy exists temperature will only be checked when occupancy is true.

b. Requirements:
1) Zone Air Temperature: Zone temperature of a piece of equipment
2) Zone Effective Set point or Zone Cooling Set point or Zone Heating Set point: Set point associated with the zone air temperature. This can either be one set point or a heating or cooling set point.
3) Occupancy (optional): Occupancy of the piece of equipment
4) Fan Status (optional): Fan status of the piece of equipment or the fan status of the AHU supply air to the piece of equipment.

58. Underfloor Heating Space Temperature Out of Range
a. Description:
Finds periods when the underfloor heating space temperature is less than or greater than the setpoint(s) by a threshold for longer than a duration. Fault dependencies and associated scenarios include the following;
1) If occupancy exists temperature will only be checked when occupancy is true.

b. Requirements:
1) Underfloor Space Temperature: Space temperature sensor serving underfloor heating system.
2) Underfloor Heating Space Temperature Setpoint: Setpoint associated with the underfloor heating system space temperatures.
3) Manifold Status or Command: Underfloor heating manifold is engaged.
4) Occupancy (optional): Occupancy of the piece of equipment

59. Unoccupied Cooling Set Point Out of Range
    a. Description:
       Finds periods over a duration when the unoccupied cooling set point is below a threshold. Fault dependencies and associated scenarios include the following;
       1) This is used to determine if the zone unoccupied cooling set point has been set too low.
    b. Requirements:
       1) Zone Unoccupied Cooling Set point: A set point specifically for unoccupied cooling associated with a zone air temperature

60. Unoccupied Heating Set Point Out of Range
    a. Description:
       Finds periods over a duration when the unoccupied heating set point is above a threshold. Fault dependencies and associated scenarios include the following;
       1) This is used to determine if the zone unoccupied heating set point has been set too high.
    b. Requirements:
       1) Zone Unoccupied Heating Set point: A set point specifically for unoccupied heating associated with a zone air temperature

61. Zone Cooling Damper Malfunction
    a. Description:
       Finds periods over a duration when the cooling damper is open above a threshold and the zone damper discharge air temperature is not within a threshold of the cold deck discharge air temperature. Fault dependencies and associated scenarios include the following;
       1) The AHU discharge fan must be on during this period too.
    b. Requirements:
       1) Zone Damper: This rule is applied to only zone damper equipment
       2) Zone Damper Discharge Temperature: Discharge temperature of the zone damper
       3) Zone Damper Position: Position of the damper in the cold deck
       4) AHU Cold Deck Discharge Temperature: Cold deck discharge temperature of the AHU serving the zone damper
       5) AHU Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary

62. Zone Heating Damper Malfunction
    a. Description:
       Finds periods over a duration when the heating damper is open above a threshold and the zone damper discharge air temperature is not within a threshold of the hot deck discharge air temperature. Fault dependencies and associated scenarios include the following;
       1) The AHU discharge fan must be on during this period too.
    b. Requirements:

1) Zone Damper: This rule is applied to only zone damper equipment
2) Zone Damper Discharge Temperature: Discharge temperature of the zone damper
3) Zone Damper Position: Position of the damper in the hot deck
4) AHU Hot Deck Discharge Temperature: Hot deck discharge temperature of the AHU serving the zone damper
5) AHU Discharge Fan Status or Discharge Fan Command: Fan command will suffice, but status is used as primary

63. Zone Temperature Out of Range (Cooling)
    a. Description:
    Finds periods when the zone air temperature is less than the zone heating set point by a threshold, and discharge air temperature is less than the zone heating set point by a threshold for more than a duration.
    b. Requirements:
        1) AHU or Terminal Unit: This rule is applied to only AHU, VAV, ATU, DDT, or FPB equipment
        2) Zone Air Temperature: Zone temperature of a piece of equipment
        3) Discharge Air Temperature: Discharge temperature of a piece of equipment
        4) Zone Effective Set point or Zone Heating Set point: Set point associated with the zone air temperature. This can either be the effective set point or the heating set point.
        5) Occupancy (optional): Occupancy of the piece of equipment
        6) Fan Status (optional): Fan status of the piece of equipment or the fan status of the AHU supply air to the piece of equipment.

64. Zone Temperature Out of Range (Heating)
    a. Description:
    Finds periods when the zone air temperature is more than the zone cooling set point by a threshold, and discharge air temperature is more than the zone cooling set point by a threshold for more than a duration.
    b. Requirements:
        1) AHU or Terminal Unit: This rule is applied to only AHU, VAV, ATU, DDT, or FPB equipment
        2) Zone Air Temperature: Zone temperature of a piece of equipment
        3) Discharge Air Temperature: Discharge temperature of a piece of equipment
        4) Zone Effective Set point or Zone Cooling Set point: Set point associated with the zone air temperature. This can either be the effective set point or the cooling set point.
        5) Occupancy (optional): Occupancy of the piece of equipment
        6) Fan Status (optional): Fan status of the piece of equipment or the fan status of the AHU supply air to the piece of equipment.

3.5.5 LIGHTING CONTROL SYSTEM

1. Bad Energy Data
   a. Description:
      Find periods for at least a duration when data contains values outside of low and high limits or the data is shown as “not a number” (NaN). Fault dependencies and associated scenarios include the following;
      1) All data will be imported into the SCMS ‘as is’ from its existing system.
   b. Requirements
      1) Consumption or Demand Point: Any point that has consumption or demand type units

2. Double Dipping Data
   a. Description
      Finds periods for at least a duration when a point’s history contains two or more data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
      1) All data will be imported into the SCMS ‘as is’ from its existing system.
   b. Requirements
      1) Consumption or Demand Point: Any point that has consumption or demand type units

3. Lights Running During Unoccupied Hours
   a. Description:
      Generates a fault when lights are running during unoccupied hours and an associated occupancy sensor has not detected motion therein. Fault dependencies and associated scenarios include the following;
      1) Periods are only found when the local occupancy sensor has not detected motion for a defined length of time.
      2) The lighting is scheduled to remain off.
   b. Requirements:
      1) Interior Lighting: This rule is applied to only interior lighting
      2) Lighting Schedule: Occupied/Unoccupied
      3) Light(s) Status or Light(s) Command: Light(s) on/off status
      4) Lighting Level: Measured via Multi-Sensor
      5) Occupancy Sensor Status: Motion Detected/Not Detected.
      6) Occupancy Sensor Timer: 30 Mins (Adj.)

4. Lights Not Running During Occupied Hours
   a. Description:
      Generates a fault when lights are not running during occupied hours and an associated occupancy sensor has detected motion therein. Fault dependencies and associated scenarios include the following;

1) Periods are only found when the local occupancy sensor has detected motion for a defined length of time.
2) The lighting is scheduled to remain on.

b. Requirements:
1) Interior Lighting: This rule is applied to only interior lighting
2) Lighting Schedule: Occupied/Unoccupied
3) Light(s) Status or Light(s) Command: Light(s) on/off status
4) Lighting Level: Measured via Multi-Sensor
5) Occupancy Sensor Status: Motion Detected/Not Detected.

5. Lights Not Dimming During Daylight Harvesting
a. Description:
Finds periods when the lighting level exceeds the zone setpoint(s) by a threshold for a longer than a duration. Fault dependencies and associated scenarios include the following;
1) Periods are only found when the daylight multi sensor initiates light harvesting.
2) The lighting is scheduled to remain on.
b. Requirements:
1) Interior Lighting: This rule is applied to only interior lighting
2) Light(s) Status or Light(s) Command: Light(s) on/off status
3) Lighting Level: Measured via Multi-Sensor
4) Lighting Level Dimming Status: Dimming status (%)
5) Lighting Schedule: Occupied/Unoccupied

6. Missing Data
a. Description
Finds periods for at least a duration when a record's history contains zero data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
1) All data will be imported into the SCMS 'as is' from its existing system.
b. Requirements
1) Consumption or Demand Point: Any point that has consumption or demand type units

7. Sensor Failure
a. Description:
Finds periods over a duration when a sensor does not change by a threshold for a 24-hour period and equipment is running.
b. Requirements:
1) Sensor: Any numerical data point from occupancy sensors, daylight sensors and fixture ballasts.

3.5.6 ELECTRICAL POWER MONITORING (METERING) AND GENERATOR CONTROL SYSTEM

1. Bad Energy Data

a. Description:
Find periods for at least a duration when data contains values outside of low and high limits or the data is shown as “not a number” (NaN). Fault dependencies and associated scenarios include the following;
1) All data will be imported into the SCMS ‘as is’ from its existing system.

b. Requirements
1) Consumption or Demand Point: Any point that has consumption or demand type units

2. Building Running Too Late
a. Description:
Finds periods over a duration after occupancy is over, when the demand of the building does not drop off by at least a percentage or threshold. Fault dependencies and associated scenarios include the following;
1) A shutdown window can be specified for an allotted time to wait until after occupancy to check for the decrease in demand. This makes sure that most equipment is shutting down when occupancy is over and equipment is not manually operating or overridden.

b. Requirements:
1) Site Meter: Any main meter of the site
2) Electrical Submeter(s): Any meter
3) Demand: The demand of the main meter
4) Occupancy: Occupancy or schedule for the building

3. Building Starting Too Early
a. Description:
Finds periods over a duration before building occupancy when the demand increases by a percentage or threshold. Fault dependencies and associated scenarios include the following;
1) A startup window can be specified for an allotted time before occupancy that demand is allowed to increase. This indicates that the building is starting ahead of occupancy or too many pieces of equipment are coming on outside of normal occupancy.

b. Requirements:
1) Site Meter: Any main meter of the site
2) Electrical Submeter(s): Any meter
3) Demand: The demand of the main meter
4) Occupancy: Occupancy or schedule for the building

4. Double Dipping Data
a. Description
Finds periods for at least a duration when a point’s history contains two or more data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;

1) All data will be imported into the SCMS 'as is' from its existing system.

b. Requirements

1) Consumption or Demand Point: Any point that has consumption or demand type units

5. Excessive Energy Usage During Unoccupied Periods

a. Description:

Generates a fault when the daily unoccupied energy usage is greater than the daily occupied energy usage by a threshold. Fault dependencies and associated scenarios include the following;

1) This fault will not generate on holidays.

b. Requirements:

1) Electric Utility Meter: Any main electric meter
2) Electrical Submeter(s): Any meter
3) Consumption: The consumption of the electric meter
4) Occupancy: Occupancy or schedule for the building

6. Maximum Peak During Un-occupancy

a. Description:

Finds periods when the maximum demand peak for the day occurs during an unoccupied period. A startup and shutdown duration can be specified so peaks slightly before or after occupancy are not included.

b. Requirements:

1) Site Meter: Any main meter of the site
2) Electrical Submeter(s): Any meter
3) Demand: The demand of the main meter
4) Occupancy: Occupancy or schedule for the building

7. Missing Data

a. Description

Finds periods for at least a duration when a record's history contains zero data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;

1) All data will be imported into the SCMS 'as is' from its existing system.

b. Requirements

1) Consumption or Demand Point: Any point that has consumption or demand type units

8. Sensor Failure

a. Description:

Finds periods over a duration when a sensor does not change by a threshold for a 24-hour period and equipment is running.

b. Requirements:

1) Sensor: Any numerical data point, including statuses and operating mode(s).

9. Short Demand Peak
    a. Description:
    Finds short demand peaks throughout the day. Fault dependencies and associated scenarios include the following;
        1) Looks for an increase in demand by a percentage or threshold and then an immediate decrease by a percentage or threshold. This increase and decrease in demand is looked at in consecutive historic data intervals to identify a short demand peak.
    b. Requirements:
        1) Meter: Any meter
        2) Demand: The demand of the meter

3.5.7 SECURITY CONTROL SYSTEM

1. Bad Energy Data
    a. Description:
    Find periods for at least a duration when data contains values outside of low and high limits or the data is shown as “not a number” (NaN). Fault dependencies and associated scenarios include the following;
        1) All data will be imported into the SCMS ‘as is’ from its existing system.
    b. Requirements
        1) Consumption or Demand Point: Any point that has consumption or demand type units

2. Double Dipping Data
    a. Description
    Finds periods for at least a duration when a point’s history contains two or more data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
        1) All data will be imported into the SCMS ‘as is’ from its existing system.
    b. Requirements
        1) Consumption or Demand Point: Any point that has consumption or demand type units

3. Missing Data
    a. Description
    Finds periods for at least a duration when a record’s history contains zero data points within a leeway of an interval. Fault dependencies and associated scenarios include the following;
        1) All data will be imported into the SCMS ‘as is’ from its existing system.
    b. Requirements
        1) Consumption or Demand Point: Any point that has consumption or demand type units

4. Sensor Failure
   a. Description:
      Finds periods over a duration when a sensor does not change by a threshold for a 24-hour period and equipment is running.
   b. Requirements:
      1) Sensor: Any numerical data point, including statuses and operating mode(s).

3.6 DIVISION 22 FUNCTIONAL SPECIFICATIONS

A. Domestic Water Booster Pump Control System:
   1. The domestic water booster pump control system shall be provided with communication capabilities to be integrated into the IAS through the FACLAN building network. Communication systems shall be non-proprietary open systems such as BACnet or Modbus. System shall share the following:
   a. Status: on/off
   b. Operating Hours.
   c. Lead/Lag assignment.
   d. System pressure (PSI).
   e. Heat detector status, temperature
   f. Status: available, not available, activated, failure, trouble, alarm, etc.
   2. In occupancy mode, the domestic water booster pump control system shall be engaged.
   3. In un-occupancy mode, the domestic water booster pump control system shall be disengaged.
   4. In emergency mode, the domestic water booster pump control system shall be disengaged.

3.7 DIVISION 23 FUNCTIONAL SPECIFICATIONS

A. The use of products and components shall be in accordance with the details specified in division 23.

B. HVAC System:
   1. The HVAC system shall be provided with communication capabilities to be integrated into the IAS through the FACLAN building network. Communication systems shall be non-proprietary open systems such as BACnet or Modbus.
   2. In occupancy mode, the HVAC system shall be engaged. In addition to the aforementioned, the following will be conducted in occupancy mode;

a. Upon the identified presence of a tenant via the occupancy sensors, the HVAC control system shall initiate a demand control ventilation (calculated OA CFM) program based on number of occupants present in a large occupied HVAC zones (non-office or large open office).
b. Optimum start times for HVAC equipment shall be utilized during occupancy mode.
c. The HVAC control system shall totalize room occupancy per OA Zone to enable demand based outside air delivery.
d. During Demand Response – Level 2, the Chiller units shall increase its leaving chilled water temperature by 2 deg F.
e. During Demand Response – Level 2, the AHU units shall increase its discharge air temperature by 2 deg F

3. In un-occupancy mode, the HVAC system shall be disengaged and placed in standby (unless optimum start programming is active or engaged). The following will be conducted in un-occupancy mode;

a. The HVAC shall be engaged during temporary occupancy and shall remain on for a pre-determined duration of time

4. In emergency mode, the HVAC system shall be partially engaged. The following will be conducted in emergency mode;

a. The AHUs and Smoke Exhaust Fans shall be sequenced per approved Smoke Control Sequence.

3.8 DIVISION 25 FUNCTIONAL SPECIFICATIONS

A. The use of products and components shall be in accordance with the details specified in division 25.

3.9 DIVISION 26 FUNCTIONAL SPECIFICATIONS

A. The use of products and components shall be in accordance with the details specified in division 26.

B. Electrical Power Meter Monitoring System:
1. The electrical power monitoring system shall be provided with communication capabilities to be integrated into the IAS through the FACLAN building network. Communication systems shall be non-proprietary open systems such as BACnet or Modbus.
2. In occupancy mode, the electrical power monitoring system shall be engaged.
3. In un-occupancy mode, the electrical power monitoring system shall be engaged.
4. In emergency mode, the electrical power monitoring system shall be engaged, unless the facility experiences a power outage.

C. Lighting Control System:

1. The lighting control system shall be provided with communication capabilities to be integrated into the IAS through the FACLAN building network. Communication systems shall be non-proprietary open systems such as BACnet or Modbus. System shall share the following data:
    a. Read device (DALI device) status
    b. Read Lamp status
    c. Read Light level
    d. Read what override is active
    e. Send override to a device
    f. Set override type (high priority, normal)
    g. Set light level
    h. Set duration
    i. Calling Preset DALI scene
    j. Set scene ID
    k. Set duration for a scene
    l. Set scene level
    m. Read lights on/off status for a group of fixtures
    n. Send override to a group of fixtures
    o. Set light level for a group of fixtures
    p. Read ballast status for a group of fixtures
    q. Read lamp status for a group of fixtures
    r. Read power consumption for a group of fixtures
    s. Set Light level for a group of fixtures via scenes
    t. Set the priority of the override command sent to a group of fixtures
    u. Read occupancy sensor status
    v. Read daylight sensor reading
2. In occupancy mode, the lighting control system shall be engaged. In addition to the aforementioned, the following will be conducted in occupancy mode;
    a. Upon the identified vacancy of a tenant, the HVAC control system shall initiate a demand control ventilation (calculated OA CFM) program based on number of occupants present in an large occupied HVAC zones (non-office or large open office).
    b. During Demand Response – Level 1, the public area, back of house and corridor lighting shall be dimmed by 15%.
    c. During Demand Response – Level 2, the public area, back of house and corridor lighting shall be dimmed by 15%.
    d. During Demand Response – Level 3, the office lighting shall be dimmed by 15%.
3. In un-occupancy mode, the lighting control system shall be disengaged and placed in standby, as only essential security offices and areas shall remain illuminated. The following will be conducted in un-occupancy mode;
    a. The lighting control shall be engaged during temporary occupancy and shall remain on for a pre-determined duration of time.
4. In emergency mode, the lighting control system shall be engaged. The following will be conducted in emergency mode;

a. All lighting levels and set points will be over-ridden and turned on at100%.

D. Plug Load Control System:
1. The plug load control system shall be provided with communication capabilities to be integrated into the IAS through the FACLAN building network. Communication systems shall be non-proprietary open systems such as BACnet or Modbus. System shall share the following data:
   a. Read device (DALI device) status
   b. Read plug status
   c. Read what override is active
   d. Send override to a device
   e. Set override type (high priority, normal)
   f. Set status (on or off)
   g. Set duration
   h. Read plug on/off status for a group of plugs
   i. Send override to a group of plugs
   j. Read status for a group of plugs
   k. Read power consumption for a group of plugs
   l. Set the priority of the override command sent to a group of plugs
2. In occupancy mode, the plug load control system shall be engaged. In addition to the aforementioned, the following will be conducted in occupancy mode;
   a. During Demand Response – Level 1, the public area plugs shall be shut off.
   b. During Demand Response – Level 2, the back of house plugs shall be shut off.
   c. During Demand Response – Level 3, the office non-critical plugs shall be shut off.
3. In un-occupancy mode, the plug load control system shall be disengaged and placed in standby, as only essential areas and critical plug loads shall be powered.
4. In emergency mode, the plug load control system shall be engaged and enabled.

E. Emergency Generator and UPS systems:
1. The emergency generator shall be provided with communication capabilities to be integrated into the IAS through the FACLAN building network. Communication systems shall be non-proprietary open systems such as BACnet or Modbus. The system shall share the following information/data with the IAS;
   a. Kwh and kW from generators time stamped in 15 minute instances.
   b. Starts and runtime.
   c. Battery voltage.
   d. Fuel tank level.
   e. Radiator and oil temperatures.
   f. Percent of full load power production.
   g. Volts, amps, hertz, power factor.

h. Alarm or fault occurrences (failure, fuel loss, power loss, communication loss).

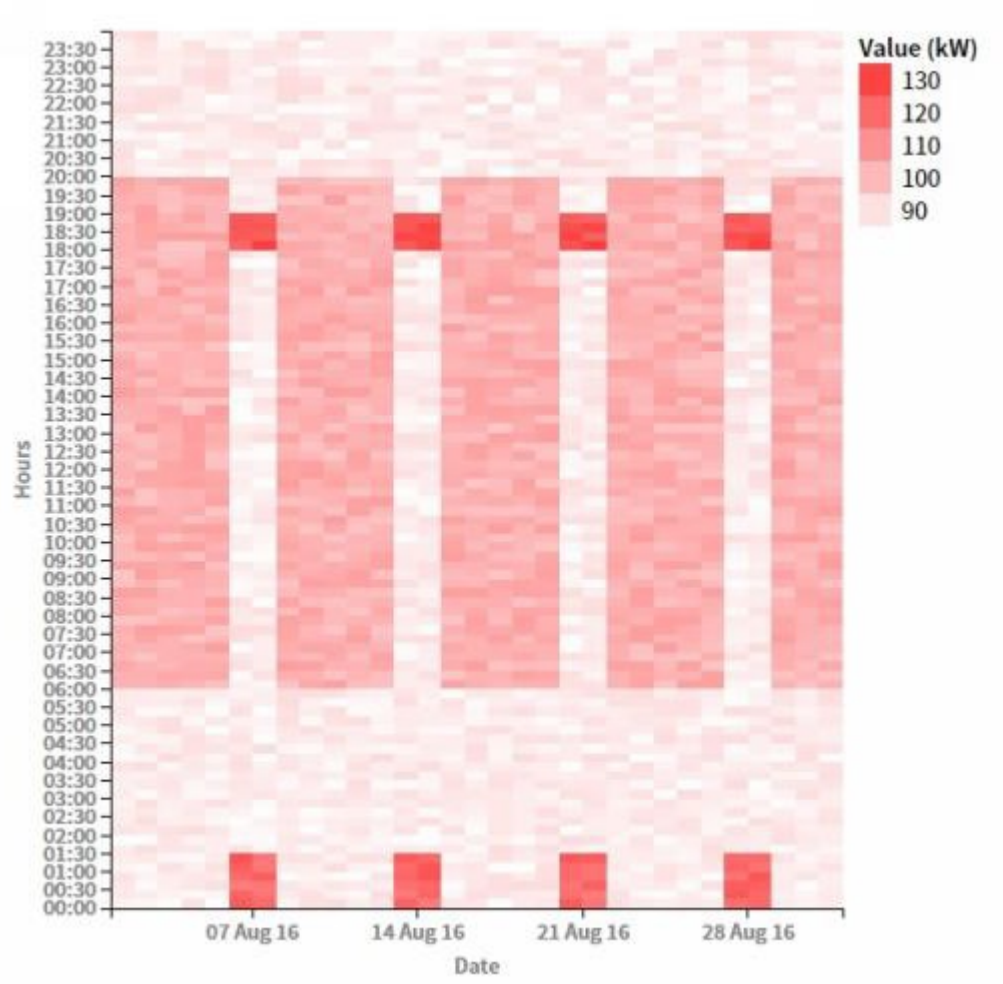
2. In occupancy mode, the emergency generator shall be disengaged unless the unit is manually operated.
3. In un-occupancy mode, the emergency generator shall be disengaged unless the unit is manually operated.
4. In emergency mode, the emergency generator shall be engaged in the event the facility experiences a power outage.

3.10 DIVISION 27 and 28 FUNCTIONAL SPECIFICATIONS

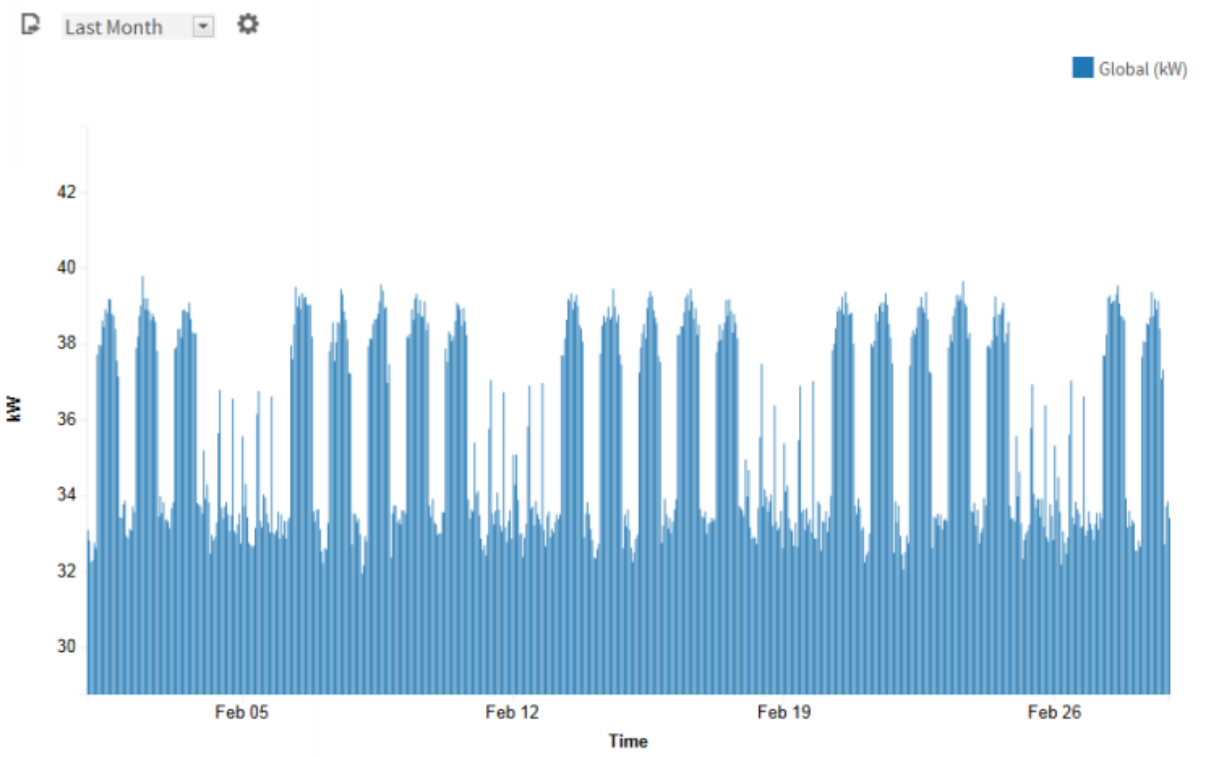
A. The use of products and components shall be in accordance with the details specified in division 27 and 28.

3.11 GRAPHICAL EXAMPLES

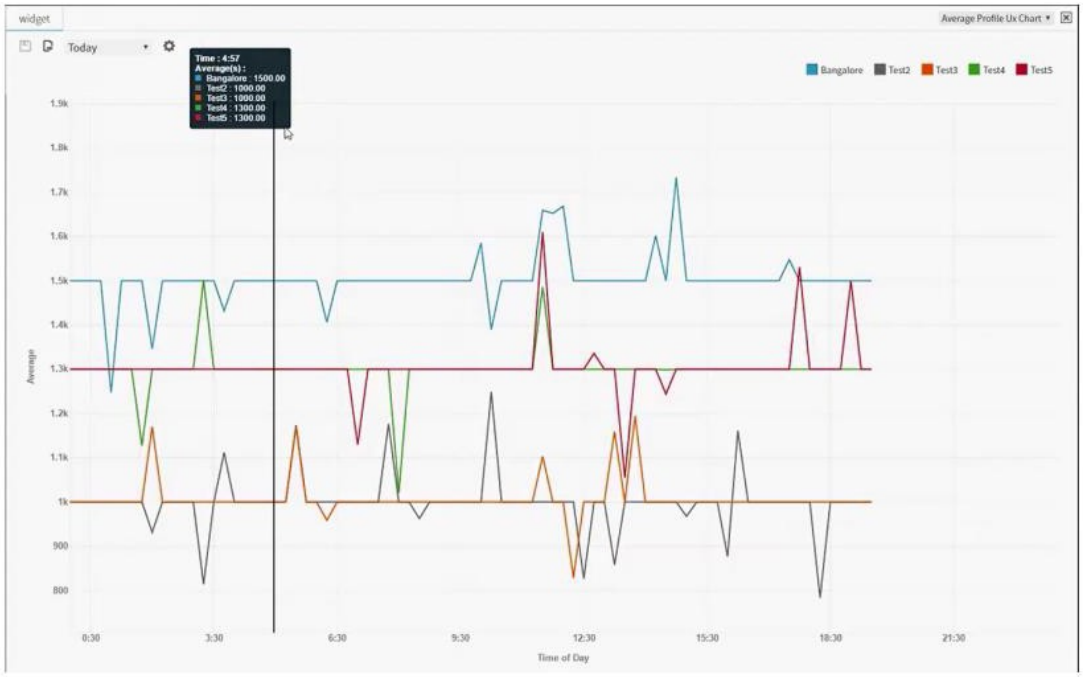
A. Provide graphical diagrams which assist with analytics such as a weekly diagram with color coded times of day to show values:



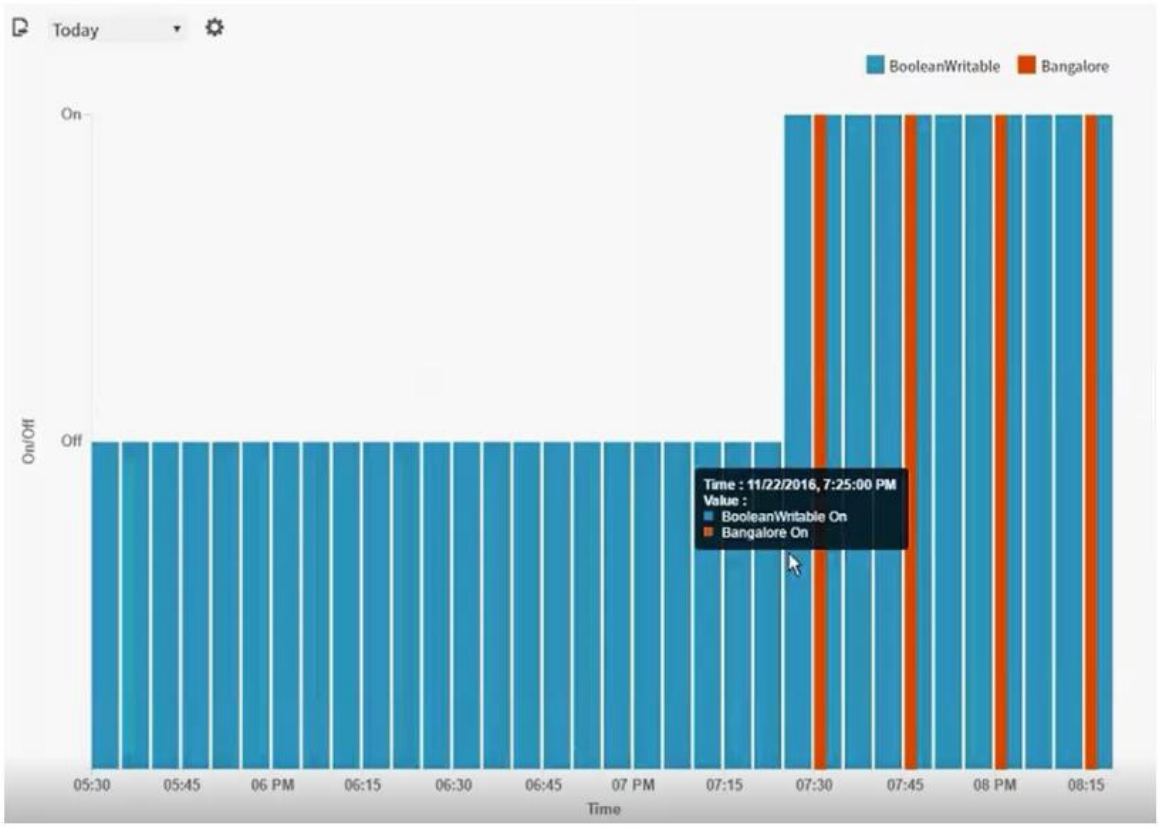
B. Software shall show power use profiles in multiple formats.



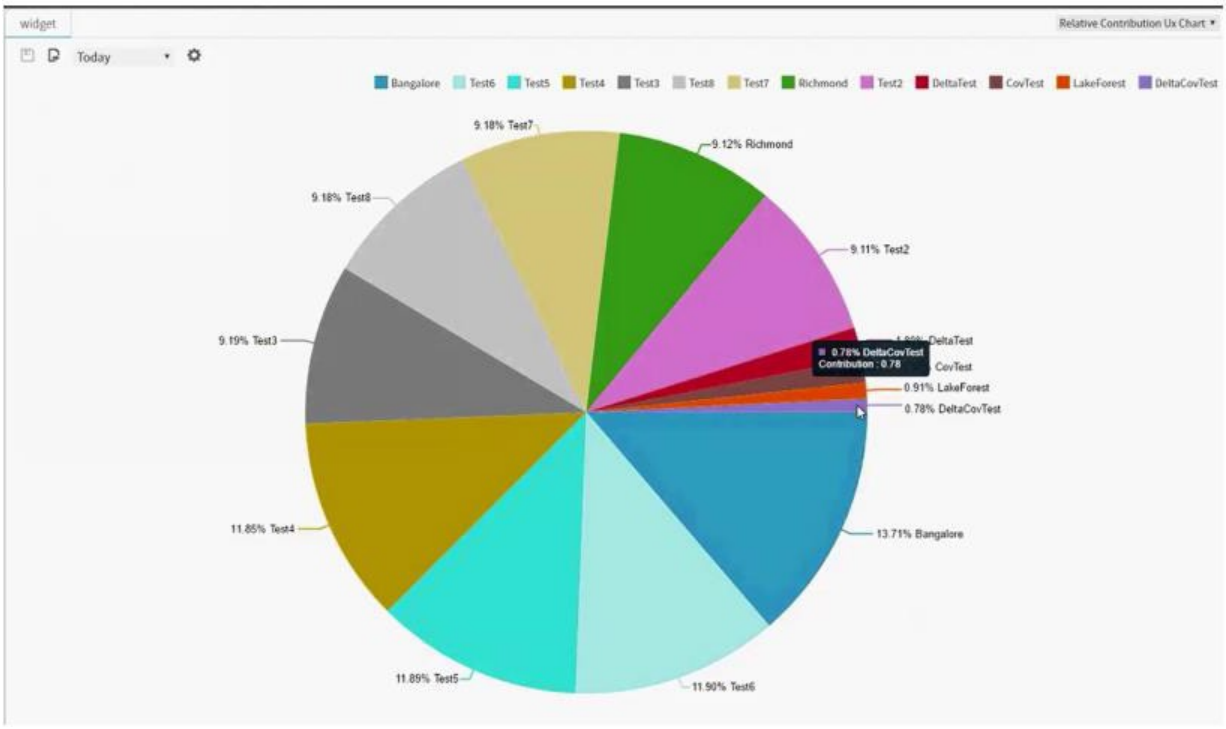
C. Multiple values can be overlaid on a graph for comparison.



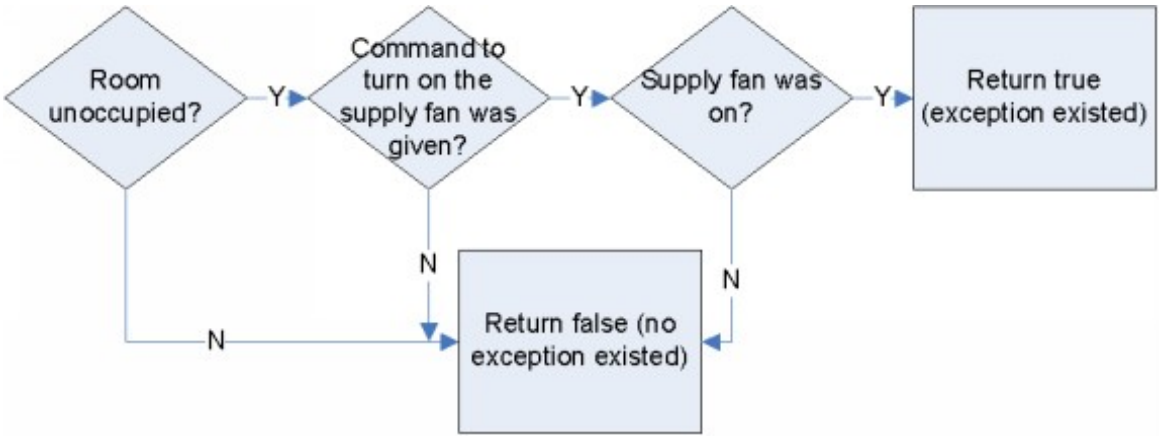
D. The software shall show equipment operation in chart form.



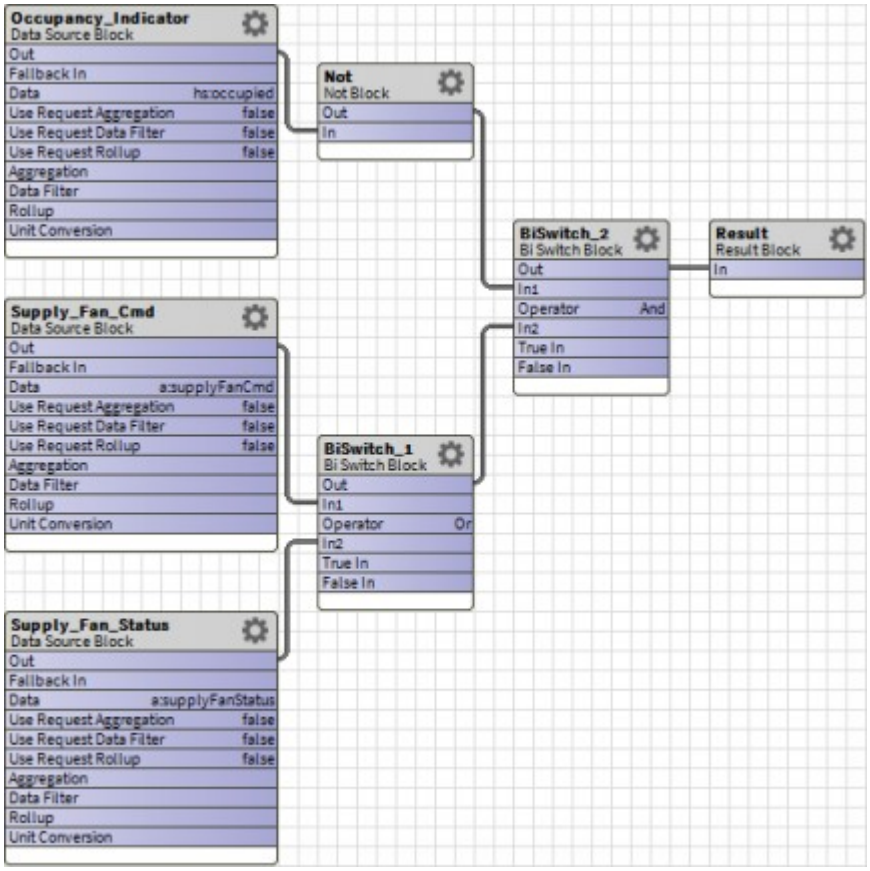
E. Software should be able to provide relative contribution charts.



F. Software shall provide flowcharts and linked programming algorithms.



G. This is an example of the graphical programming algorithms.



3.12 IAS POINTS LIST

A. The following table contains building subsystem points which will be exposed in the IAS along with the corresponding point classification and whether the point will participate in fault detection diagnostics or demand response events. The points list shown below represents the minimum threshold point requirements for each building subsystem and is segmented by each respective CSI Divisions as well as associated equipment/systems. **Please see Section 250500 – Common Work Results for Integrated Automation for the specific naming convention associated with the IAS.**

Point Name	***Description***	***Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment***	***BACnet Object Type (typ.)***	***IAS Graphic***	***FDD***	***DR***	***Trend***
Access Control System							
STS	System Status	XXXX_XXXX_XXXX_ACS#_STS	Multi-state Input (13)	x			x
MODE	System Mode (Multi-state Signal)	XXXX_XXXX_XXXX_ACS#_MODE	Multi-state Input (13)	x			x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_ACS#_ALM	Multi-state Input (13)	x			x
OVR_SP	System Override	XXXX_XXXX_XXXX_ACS#_OVR_SP	Multi-state Output (14)	x			x
OPEN	Open Individual Access	XXXX_XXXX_XXXX_ACS#_OPEN	Analog Input (0)	x			x
CLOSE	Close Individual Access	XXXX_XXXX_XXXX_ACS#_CLOSE	Analog Input (0)	x			x
DETECT_OCC	Pedestrian Detection at Turnstile duing Occupancy	XXXX_XXXX_XXXX_PAC#_DETECT_OCC	Multi-state Input (13)	x			x
DETECT_UNOCC	Pedestrian Detection at Turnstile duing Unoccupancy	XXXX_XXXX_XXXX_PAC#_DETECT_UNOCC	Multi-state Input (13)	x			x
Existing							

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
Elevator/Escalator							
STS	System Status	XXXX_XXXX_XXXX_ELV#_STS	Multi-state Input (13)	x			x
MODE	System Mode (Multi-state Signal)	XXXX_XXXX_XXXX_ELV#_MODE	Multi-state Input (13)	x			x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_ELV#_ALM	Multi-state Input (13)	x			x
OVR_SP	System Override	XXXX_XXXX_XXXX_ELV#_OVR_SP	Multi-state Output (14)	x			x
MODE	Mode	XXXX_XXXX_XXXX_ELV#_MODE	Analog Input (0)	x			x
AMP	Amperage	XXXX_XXXX_XXXX_ELV#_AMP	Analog Input (0)	x	x		x
KW	Kilowatts	XXXX_XXXX_XXXX_ELV#_KW	Analog Input (0)	x	x		x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_ELV#_KWH	Analog Input (0)	x		x	x
LOCATION	Floor Location	XXXX_XXXX_XXXX_ELV#_FLR	Analog Input (0)	x			x
RUNTIME	Runtime Hours	XXXX_XXXX_XXXX_ELV#_HOURS	Analog Input (0)	x			x
Division 22							
	Booster Pump status	Same as HVAC Pump					
Division 23							
AHUs:							
AMP	Amperage	XXXX_XXXX_XXXX_AHU#_AMP	Analog Input (0)				x
CDT	Cold Deck Temperature	XXXX_XXXX_XXXX_AHU#_CDT	Analog Input (0)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
CLT	Cooling (Coil) Leaving Temperature	XXXX_XXXX_XXXX_AHU#_CLT	Analog Input (0)	x	x		x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_AHU#_CO2	Analog Input (0)	x	x		x
DASP	Discharge Air Static Pressure	XXXX_XXXX_XXXX_AHU#_DASP	Analog Input (0)	x	x		x
DAT	Discharge Air Temperature	XXXX_XXXX_XXXX_AHU#_DAT	Analog Input (0)	x		x	x
EAT	Exhaust Air Temperature	XXXX_XXXX_XXXX_AHU#_EAT	Analog Input (0)	x	x		x
KW	Kilowatts	XXXX_XXXX_XXXX_AHU#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_AHU#_KWH	Analog Input (0)				x
MAT	Mixed Air Temperature	XXXX_XXXX_XXXX_AHU#_MAT	Analog Input (0)	x	x		x
OAF	Outside Airflow	XXXX_XXXX_XXXX_AHU#_OAF	Analog Input (0)	x			x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_AHU#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humidity	XXXX_XXXX_XXXX_AHU#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_AHU#_OAT	Analog Input (0)	x	x		x
PHT	Pre-Heat Temperature	XXXX_XXXX_XXXX_AHU#_PHT	Analog Input (0)	x			x
PCWDP	Process Chilled Water Differential Pressure	XXXX_XXXX_XXXX_AHU#_PCWDP	Analog Input (0)	x			x
PCWR	Process Chilled Water Return Temperature	XXXX_XXXX_XXXX_AHU#_PCWR	Analog Input (0)	x	x		x
PCWS	Process Chilled Water Supply Temperature	XXXX_XXXX_XXXX_AHU#_PCWS	Analog Input (0)	x	x		x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
RARH	Return Air (Relative) Humidity	XXXX_XXXX_XXXX_AHU#_RARH	Analog Input (0)	x	x		x
RACO2	Return Air Carbon-Dioxide	XXXX_XXXX_XXXX_AHU#_RACO2	Analog Input (0)	x	x		x
RAF	Return Airflow	XXXX_XXXX_XXXX_AHU#_RAF	Analog Input (0)	x			x
RAT	Return air Temperature	XXXX_XXXX_XXXX_AHU#_RAT	Analog Input (0)	x	x		x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_AHU#_RH	Analog Input (0)	x			x
RSP	Remote Static Pressure	XXXX_XXXX_XXXX_AHU#_RSP	Analog Input (0)	x			x
SAF	Supply Airflow	XXXX_XXXX_XXXX_AHU#_SAF	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_AHU#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_AHU#_ZNT	Analog Input (0)	x	x	x	x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_AHU#_ALM	Binary Input (3)	x	x		x
FLTR	Dirty Filter Alarm (via Differen-tial Pressure Switch)	XXXX_XXXX_XXXX_AHU#_FLTR	Binary Input (3)		x		x
FZ	Freezestat	XXXX_XXXX_XXXX_AHU#_FZ	Binary Input (3)		x		x
RFST	Return Fan Status	XXXX_XXXX_XXXX_AHU#_RFST	Binary Input (3)	x			x
SFST	Supply Fan Status	XXXX_XXXX_XXXX_AHU#_SFST	Binary Input (3)	x			x
VIB	Vibration Switch Alarm	XXXX_XXXX_XXXX_AHU#_VIB	Binary Input (3)		x		x
CLG	Cooling Coil Valve (0-100 per-cent open control signal)	XXXX_XXXX_XXXX_AHU#_CLG	Analog Out-put (1)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
HTG	Heating Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_AHU#_HTG	Analog Output (1)	x			x
HUM	Humidifier Control Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_AHU#_HUM	Analog Output (1)	x			x
MAD	Mixed Air Dampers (0-100 percent open control signal relative to OAD)	XXXX_XXXX_XXXX_AHU#_MAD	Analog Output (1)	x			x
OAD	Outside Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_AHU#_OAD	Analog Output (1)	x			x
RAD	Return Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_AHU#_RAD	Analog Output (1)	x			x
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_AHU#_SPD	Analog Output (1)	x			x
VLV	Modulating Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_AHU#_VLV	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_AHU#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_AHU#_ENABLE	Binary Output (4)	x			x
DAT_STPT	Discharge Air Temperature Set point	XXXX_XXXX_XXXX_AHU#_DAT_STPT	Analog Value (2)	x		x	x
EFF_CLG	Effective Cooling Set point	XXXX_XXXX_XXXX_AHU#_EFF_CLG	Analog Value (2)	x		x	x
EFF_HTG	Effective Heating Set point	XXXX_XXXX_XXXX_AHU#_EFF_HTG	Analog Value (2)	x		x	x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_AHU#_HLALM	Analog Value (2)		x		x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_AHU#_HLSTPT	Analog Value (2)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
HUM_STPT	Humidity Set point	XXXX_XXXX_XXXX_AHU#_HUM_STPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_AHU#_LLALM	Analog Value (2)		x		x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_AHU#_LLSTPT	Analog Value (2)	x			x
OCC	Occupied Mode	XXXX_XXXX_XXXX_AHU#_OCC	Multi-state Value (19)	x			x
RAH_STPT	Return Air (Relative) Humidity Set point	XXXX_XXXX_XXXX_AHU#_RAH_STPT	Analog Value (2)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_AHU#_STPT	Analog Value (2)	x	x	x	x
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_AHU#_UNOCC	Multi-state Value (19)	x			x
ACs:							
AMP	Amperage	XXXX_XXXX_XXXX_RTU#_AMP	Analog Input (0)				x
CDT	Cold Deck Temperature	XXXX_XXXX_XXXX_RTU#_CDT	Analog Input (0)	x			x
CLT	Cooling (Coil) Leaving Temperature	XXXX_XXXX_XXXX_RTU#_CLT	Analog Input (0)	x	x		x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_RTU#_CO2	Analog Input (0)	x	x		x
DASP	Discharge Air Static Pressure	XXXX_XXXX_XXXX_RTU#_DASP	Analog Input (0)	x	x		x
DAT	Discharge Air Temperature	XXXX_XXXX_XXXX_RTU#_DAT	Analog Input (0)	x		x	x
EAT	Exhaust Air Temperature	XXXX_XXXX_XXXX_RTU#_EAT	Analog Input (0)	x	x		x
KW	Kilowatts	XXXX_XXXX_XXXX_RTU#_KW	Analog Input (0)				x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_RTU#_KWH	Analog Input (0)				x
MAT	Mixed Air Temperature	XXXX_XXXX_XXXX_RTU#_MAT	Analog Input (0)	x	x		x
OAF	Outside Airflow	XXXX_XXXX_XXXX_RTU#_OAF	Analog Input (0)	x			x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_RTU#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humidity	XXXX_XXXX_XXXX_RTU#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_RTU#_OAT	Analog Input (0)	x	x		x
PHT	Pre-Heat Temperature	XXXX_XXXX_XXXX_RTU#_PHT	Analog Input (0)	x			x
RARH	Return Air (Relative) Humidity	XXXX_XXXX_XXXX_RTU#_RARH	Analog Input (0)	x			x
RACO2	Return Air Carbon-Dioxide	XXXX_XXXX_XXXX_RTU#_RACO2	Analog Input (0)	x	x		x
RAF	Return Airflow	XXXX_XXXX_XXXX_RTU#_RAF	Analog Input (0)	x	x		x
RAT	Return air Temperature	XXXX_XXXX_XXXX_RTU#_RAT	Analog Input (0)	x	x		x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_RTU#_RH	Analog Input (0)	x	x		x
RSP	Remote Static Pressure	XXXX_XXXX_XXXX_RTU#_RSP	Analog Input (0)	x			x
SAF	Supply Airflow	XXXX_XXXX_XXXX_RTU#_SAF	Analog Input (0)	x	x		x
VLT	Voltage	XXXX_XXXX_XXXX_RTU#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_RTU#_ZNT	Analog Input (0)	x		x	x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_RTU#_ALM	Binary Input (3)	x			x
FLTR	Dirty Filter Alarm (via Differential Pressure Switch)	XXXX_XXXX_XXXX_RTU#_FLTR	Binary Input (3)				x
FZ	Freezestat	XXXX_XXXX_XXXX_RTU#_FZ	Binary Input (3)		X		x
RFST	Return Fan Status	XXXX_XXXX_XXXX_RTU#_RFST	Binary Input (3)	x	X		x
SFST	Supply Fan Status	XXXX_XXXX_XXXX_RTU#_SFST	Binary Input (3)	x	X		x
VIB	Vibration Switch Alarm	XXXX_XXXX_XXXX_RTU#_VIB	Binary Input (3)		X		x
CLG	Cooling Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_RTU#_CLG	Analog Output (1)	x			x
HTG	Heating Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_RTU#_HTG	Analog Output (1)	x			x
MAD	Mixed Air Dampers (0-100 percent open control signal relative to OAD)	XXXX_XXXX_XXXX_RTU#_MAD	Analog Output (1)	x	x		x
OAD	Outside Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_RTU#_OAD	Analog Output (1)	x			x
RAD	Return Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_RTU#_RAD	Analog Output (1)	x			x
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_RTU#_SPD	Analog Output (1)	x			x
VLV	Modulating Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_RTU#_VLV	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_RTU#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_RTU#_ENABLE	Binary Output (4)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
DAT_STPT	Discharge Air Temperature Set point	XXXX_XXXX_XXXX_RTU#_DAT_STPT	Analog Value (2)	x		x	x
EFF_CLG	Effective Cooling Set point	XXXX_XXXX_XXXX_RTU#_EFF_CLG	Analog Value (2)	x		x	x
EFF_HTG	Effective Heating Set point	XXXX_XXXX_XXXX_RTU#_EFF_HTG	Analog Value (2)	x		x	x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_RTU#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_RTU#_HLSTPT	Analog Value (2)	x			x
HUM_STPT	Humidity Set point	XXXX_XXXX_XXXX_RTU#_HUM_STPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_RTU#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_RTU#_LLSTPT	Analog Value (2)	x	x		x
OCC	Occupied Mode	XXXX_XXXX_XXXX_RTU#_OCC	Multi-state Value (19)	x			x
RAH_STPT	Return Air (Relative) Humidity Set point	XXXX_XXXX_XXXX_RTU#_RAH_STPT	Analog Value (2)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_RTU#_STPT	Analog Value (2)	x	X	x	x
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_RTU#_UNOCC	Multi-state Value (19)	x			x
FCUs:							
AMP	Amperage	XXXX_XXXX_XXXX_FCU#_AMP	Analog Input (0)				x
CLT	Cooling (Coil) Leaving Tem-perature	XXXX_XXXX_XXXX_FCU#_CLT	Analog Input (0)	x			x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_FCU#_CO2	Analog Input (0)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
DAT	Discharge Air Temperature	XXXX_XXXX_XXXX_FCU#_DAT	Analog Input (0)	x		x	x
KW	Kilowatts	XXXX_XXXX_XXXX_FCU#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_FCU#_KWH	Analog Input (0)				x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_FCU#_RH	Analog Input (0)	x	X		x
VLT	Voltage	XXXX_XXXX_XXXX_FCU#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_FCU#_ZNT	Analog Input (0)	x	X	x	x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_FCU#_ALM	Binary Input (3)	x	X		x
FLTR	Dirty Filter Alarm (via Differential Pressure Switch)	XXXX_XXXX_XXXX_FCU#_FLTR	Binary Input (3)		X		x
SFST	Supply Fan Status	XXXX_XXXX_XXXX_FCU#_SFST	Binary Input (3)	x			x
VIB	Vibration Switch Alarm	XXXX_XXXX_XXXX_FCU#_VIB	Binary Input (3)		X		x
CLG	Cooling Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_FCU#_CLG	Analog Output (1)	x			x
HTG	Heating Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_FCU#_HTG	Analog Output (1)	x			x
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_FCU#_SPD	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_FCU#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_FCU#_ENABLE	Binary Output (4)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
DAT_STPT	Discharge Air Temperature Set point	XXXX_XXXX_XXXX_FCU#_DAT_STPT	Analog Value (2)	x		x	x
EFF_CLG	Effective Cooling Set point	XXXX_XXXX_XXXX_FCU#_EFF_CLG	Analog Value (2)	x		x	x
EFF_HTG	Effective Heating Set point	XXXX_XXXX_XXXX_FCU#_EFF_HTG	Analog Value (2)	x		x	x
OCC	Occupied Mode	XXXX_XXXX_XXXX_FCU#_OCC	Multi-state Value (19)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_FCU#_STPT	Analog Value (2)	x		x	x
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_FCU#_UNOCC	Multi-state Value (19)	x			x
VAVs:							
AMP	Amperage	XXXX_XXXX_XXXX_VAV#_AMP	Analog Input (0)				x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_VAV#_CO2	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_VAV#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_VAV#_KWH	Analog Input (0)				x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_VAV#_RH	Analog Input (0)	x			x
RSP	Remote Static Pressure	XXXX_XXXX_XXXX_VAV#_RSP	Analog Input (0)	x			x
SAF	Supply Airflow	XXXX_XXXX_XXXX_VAV#_SAF	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_VAV#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_VAV#_ZNT	Analog Input (0)	x	X	x	x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_VAV#_ALM	Binary Input (3)	x	X		x
HTG	Heating Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_VAV#_HTG	Analog Output (1)	x	X		x
MAD	Mixed Air Dampers (0-100 percent open control signal relative to OAD)	XXXX_XXXX_XXXX_VAV#_MAD	Analog Output (1)	x			x
OCC	Occupied Mode	XXXX_XXXX_XXXX_VAV#_OCC	Multi-state Value (19)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_VAV#_STPT	Analog Value (2)	x	X	x	x
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_VAV#_UNOCC	Multi-state Value (19)	x			x
FPVAVs:							
AMP	Amperage	XXXX_XXXX_XXXX_FPVAV#_AMP	Analog Input (0)				x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_FPVAV#_CO2	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_FPVAV#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_FPVAV#_KWH	Analog Input (0)				x
RARH	Return Air (Relative) Humidity	XXXX_XXXX_XXXX_FPVAV#_RARH	Analog Input (0)	x			x
RACO2	Return Air Carbon-Dioxide	XXXX_XXXX_XXXX_FPVAV#_RACO2	Analog Input (0)	x			x
RAF	Return Airflow	XXXX_XXXX_XXXX_FPVAV#_RAF	Analog Input (0)	x			x
RAT	Return air Temperature	XXXX_XXXX_XXXX_FPVAV#_RAT	Analog Input (0)	x			x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_FPVAV#_RH	Analog Input (0)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
RSP	Remote Static Pressure	XXXX_XXXX_XXXX_FPVAV#_RSP	Analog Input (0)	x			x
SAF	Supply Airflow	XXXX_XXXX_XXXX_FPVAV#_SAF	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_FPVAV#_VLT	Analog Input (0)	x			x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_FPVAV#_ZNT	Analog Input (0)	x	X	x	x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_FPVAV#_ALM	Binary Input (3)		X		x
ST	Status for Pump or Fan (when only fan for system)	XXXX_XXXX_XXXX_FPVAV#_ST	Binary Input (3)	x			x
HTG	Heating Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_FPVAV#_HTG	Analog Output (1)	x			x
MAD	Mixed Air Dampers (0-100 percent open control signal relative to OAD)	XXXX_XXXX_XXXX_FPVAV#_MAD	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_FPVAV#_CMD	Binary Output (4)	x			x
OCC	Occupied Mode	XXXX_XXXX_XXXX_FPVAV#_OCC	Multi-state Value (19)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_FPVAV#_STPT	Analog Value (2)	x	X	x	x
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_FPVAV#_UNOCC	Multi-state Value (19)	x			x
<u>DX Unit:</u>							
AMP	Amperage	XXXX_XXXX_XXXX_AC#_AMP	Analog Input (0)				x
CLT	Cooling (Coil) Leaving Temperature	XXXX_XXXX_XXXX_AC#_CLT	Analog Input (0)	x			x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_AC#_CO2	Analog Input (0)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
DAT	Discharge Air Temperature	XXXX_XXXX_XXXX_AC#_DAT	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_AC#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_AC#_KWH	Analog Input (0)				x
MAT	Mixed Air Temperature	XXXX_XXXX_XXXX_AC#_MAT	Analog Input (0)	x			x
OAF	Outside Airflow	XXXX_XXXX_XXXX_AC#_OAF	Analog Input (0)				x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_AC#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humid-ity	XXXX_XXXX_XXXX_AC#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_AC#_OAT	Analog Input (0)	x			x
RARH	Return Air (Relative) Humidity	XXXX_XXXX_XXXX_AC#_RARH	Analog Input (0)	x			x
RACO2	Return Air Carbon-Dioxide	XXXX_XXXX_XXXX_AC#_RACO2	Analog Input (0)	x			x
RAF	Return Airflow	XXXX_XXXX_XXXX_AC#_RAF	Analog Input (0)	x			x
RAT	Return air Temperature	XXXX_XXXX_XXXX_AC#_RAT	Analog Input (0)	x			x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_AC#_RH	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_AC#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_AC#_ZNT	Analog Input (0)	x	X	x	x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_AC#_ALM	Binary Input (3)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
FLTR	Dirty Filter Alarm (via Differen-tial Pressure Switch)	XXXX_XXXX_XXXX_AC#_FLTR	Binary Input (3)				x
ST	Status for Pump or Fan (when only fan for system)	XXXX_XXXX_XXXX_AC#_ST	Binary Input (3)				x
CLG	Cooling Coil Valve (0-100 per-cent open control signal)	XXXX_XXXX_XXXX_AC#_CLG	Analog Out-put (1)	x			x
OAD	Outside Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_AC#_OAD	Analog Out-put (1)	x			x
RAD	Return Air Damper (0-100 per-cent open control signal)	XXXX_XXXX_XXXX_AC#_RAD	Analog Out-put (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_AC#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_AC#_ENABLE	Binary Output (4)	x			x
EFF_CLG	Effective Cooling Set point	XXXX_XXXX_XXXX_AC#_EFF_CLG	Analog Value (2)	x		x	x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_AC#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_AC#_HLSTPT	Analog Value (2)	x			x
HUM_STPT	Humidity Set point	XXXX_XXXX_XXXX_AC#_HUM_STPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_AC#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_AC#_LLSTPT	Analog Value (2)	x			x
OCC	Occupied Mode	XXXX_XXXX_XXXX_AC#_OCC	Multi-state Value (19)	x			x
RAH_STPT	Return Air (Relative) Humidity Set point	XXXX_XXXX_XXXX_AC#_RAH_STPT	Analog Value (2)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_AC#_STPT	Analog Value (2)	x		x	x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_AC#_UNOCC	Multi-state Value (19)	x			x
Heat Pump:							
AMP	Amperage	XXXX_XXXX_XXXX_HP#_AMP	Analog Input (0)				x
CLT	Cooling (Coil) Leaving Tem-perature	XXXX_XXXX_XXXX_HP#_CLT	Analog Input (0)	x			x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_HP#_CO2	Analog Input (0)	x			x
DAT	Discharge Air Temperature	XXXX_XXXX_XXXX_HP#_DAT	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_HP#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_HP#_KWH	Analog Input (0)				x
MAT	Mixed Air Temperature	XXXX_XXXX_XXXX_HP#_MAT	Analog Input (0)	x			x
OAF	Outside Airflow	XXXX_XXXX_XXXX_HP#_OAF	Analog Input (0)				x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_HP#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humid-ity	XXXX_XXXX_XXXX_HP#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_HP#_OAT	Analog Input (0)	x			x
RARH	Return Air (Relative) Humidity	XXXX_XXXX_XXXX_HP#_RARH	Analog Input (0)	x			x
RACO2	Return Air Carbon-Dioxide	XXXX_XXXX_XXXX_HP#_RACO2	Analog Input (0)	x			x
RAF	Return Airflow	XXXX_XXXX_XXXX_HP#_RAF	Analog Input (0)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
RAT	Return air Temperature	XXXX_XXXX_XXXX_HP#_RAT	Analog Input (0)	x			x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_HP#_RH	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_HP#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_HP#_ZNT	Analog Input (0)	x	X	x	x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_HP#_ALM	Binary Input (3)	x			x
FLTR	Dirty Filter Alarm (via Differential Pressure Switch)	XXXX_XXXX_XXXX_HP#_FLTR	Binary Input (3)	x			x
ST	Status for Pump or Fan (when only fan for system)	XXXX_XXXX_XXXX_HP#_ST	Binary Input (3)	x			x
CLG	Cooling Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_HP#_CLG	Analog Output (1)	x			x
HTG	Heating Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_HP#_HTG	Analog Output (1)	x			x
OAD	Outside Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_HP#_OAD	Analog Output (1)	x			x
RAD	Return Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_HP#_RAD	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_HP#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_HP#_ENABLE	Binary Output (4)	x			x
EFF_CLG	Effective Cooling Set point	XXXX_XXXX_XXXX_HP#_EFF_CLG	Analog Value (2)	x			x
EFF_HTG	Effective Heating Set point	XXXX_XXXX_XXXX_HP#_EFF_HTG	Analog Value (2)	x		x	x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_HP#_HLALM	Analog Value (2)				x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_HP#_HLSTPT	Analog Value (2)	x			x
HUM_STPT	Humidity Set point	XXXX_XXXX_XXXX_HP#_HUM_STPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_HP#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_HP#_LLSTPT	Analog Value (2)	x			x
OCC	Occupied Mode	XXXX_XXXX_XXXX_HP#_OCC	Multi-state Value (19)	x			x
RAH_STPT	Return Air (Relative) Humidity Set point	XXXX_XXXX_XXXX_HP#_RAH_STPT	Analog Value (2)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_HP#_STPT	Analog Value (2)	x		x	x
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_HP#_UNOCC	Multi-state Value (19)	x			x
Unit Heaters:							
AMP	Amperage	XXXX_XXXX_XXXX_UH#_AMP	Analog Input (0)				x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_UH#_CO2	Analog Input (0)	x			x
DAT	Discharge Air Temperature	XXXX_XXXX_XXXX_UH#_DAT	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_UH#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_UH#_KWH	Analog Input (0)				x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_UH#_RH	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_UH#_VLT	Analog Input (0)				x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_UH#_ZNT	Analog Input (0)	x	X	x	x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_UH#_ALM	Binary Input (3)	x			x
ST	Status for Pump or Fan (when only fan for system)	XXXX_XXXX_XXXX_UH#_ST	Binary Input (3)	x			x
HTG	Heating Coil Valve (0-100 per-cent open control signal)	XXXX_XXXX_XXXX_UH#_HTG	Analog Out-put (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_UH#_CMD	Binary Output (4)	x			x
EFF_HTG	Effective Heating Set point	XXXX_XXXX_XXXX_UH#_EFF_HTG	Analog Value (2)	x			x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_UH#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_UH#_HLSTPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_UH#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_UH#_LLSTPT	Analog Value (2)	x			x
OCC	Occupied Mode	XXXX_XXXX_XXXX_UH#_OCC	Multi-state Value (19)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_UH#_STPT	Analog Value (2)	x	X	x	x
UNOCC	Unoccupied Mode	XXXX_XXXX_XXXX_UH#_UNOCC	Multi-state Value (19)	x			x
Exhaust Fans:							
AMP	Amperage	XXXX_XXXX_XXXX_EF#_AMP	Analog Input (0)				x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_EF#_CO2	Analog Input (0)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
EAT	Exhaust Air Temperature	XXXX_XXXX_XXXX_EF#_EAT	Analog Input (0)	x	X		x
KW	Kilowatts	XXXX_XXXX_XXXX_EF#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_EF#_KWH	Analog Input (0)				x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_EF#_RH	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_EF#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_EF#_ZNT	Analog Input (0)	x	X		x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_EF#_ALM	Binary Input (3)	x			x
EFST	Exhaust (Relief) Fan Status	XXXX_XXXX_XXXX_EF#_EFST	Binary Input (3)	x			x
EAD	Exhaust (or Relief) Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_EF#_EAD	Analog Out-put (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_EF#_CMD	Binary Output (4)	x			x
HSPD	High Speed	XXXX_XXXX_XXXX_EF#_HSPD	Binary Output (4)	x			x
LSPD	Low Speed	XXXX_XXXX_XXXX_EF#_LSPD	Binary Output (4)	x			x
MSPD	Medium Speed	XXXX_XXXX_XXXX_EF#_MSPD	Binary Output (4)	x			x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_EF#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_EF#_HLSTPT	Analog Value (2)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_EF#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_EF#_LLSTPT	Analog Value (2)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_EF#_STPT	Analog Value (2)	x	X	x	x
Kitchen Ex-haust Fans:							
AMP	Amperage	XXXX_XXXX_XXXX_KEF#_AMP	Analog Input (0)				x
CO2	(Space) Carbon-Dioxide	XXXX_XXXX_XXXX_KEF#_CO2	Analog Input (0)	x			x
EAT	Exhaust Air Temperature	XXXX_XXXX_XXXX_KEF#_EAT	Analog Input (0)	x	X		x
KW	Kilowatts	XXXX_XXXX_XXXX_KEF#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_KEF#_KWH	Analog Input (0)				x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_KEF#_RH	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_KEF#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_KEF#_ZNT	Analog Input (0)	x	X		x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_KEF#_ALM	Binary Input (3)	x			x
EFST	Exhaust (Relief) Fan Status	XXXX_XXXX_XXXX_KEF#_EFST	Binary Input (3)	x			x
EAD	Exhaust (or Relief) Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_KEF#_EAD	Analog Out-put (1)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_KEF#_CMD	Binary Output (4)	x			x
HSPD	High Speed	XXXX_XXXX_XXXX_KEF#_HSPD	Binary Output (4)	x			x
LSPD	Low Speed	XXXX_XXXX_XXXX_KEF#_LSPD	Binary Output (4)	x			x
MSPD	Medium Speed	XXXX_XXXX_XXXX_KEF#_MSPD	Binary Output (4)	x			x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_KEF#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_KEF#_HLSTPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_KEF#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_KEF#_LLSTPT	Analog Value (2)	x			x
STPT	Set point (Zone Temperature Set point)	XXXX_XXXX_XXXX_KEF#_STPT	Analog Value (2)	x	X		x
DMPR_POS	Hood Damper Position	XXXX_XXXX_XXXX_KEF#_DMPR_POS	Analog Input (0)	x	X		x
SUP_PRESS	Suppression System Pressure	XXXX_XXXX_XXXX_KEF#_SUP_PRESS	Analog Input (0)	x	X		x
<u>Make-up Air Units:</u>							
AMP	Amperage	XXXX_XXXX_XXXX_MAU#_AMP	Analog Input (0)				x
EAT	Exhaust Air Temperature	XXXX_XXXX_XXXX_MAU#_EAT	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_MAU#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_MAU#_KWH	Analog Input (0)				x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
MAT	Mixed Air Temperature	XXXX_XXXX_XXXX_MAU#_MAT	Analog Input (0)	x	X		x
OAF	Outside Airflow	XXXX_XXXX_XXXX_MAU#_OAF	Analog Input (0)				x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_MAU#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humid-ity	XXXX_XXXX_XXXX_MAU#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_MAU#_OAT	Analog Input (0)	x			x
PHT	Pre-Heat Temperature	XXXX_XXXX_XXXX_MAU#_PHT	Analog Input (0)	x			x
RARH	Return Air (Relative) Humidity	XXXX_XXXX_XXXX_MAU#_RARH	Analog Input (0)	x			x
RACO2	Return Air Carbon-Dioxide	XXXX_XXXX_XXXX_MAU#_RACO2	Analog Input (0)	x			x
RAT	Return air Temperature	XXXX_XXXX_XXXX_MAU#_RAT	Analog Input (0)	x			x
RH	(Space) Relative Humidity	XXXX_XXXX_XXXX_MAU#_RH	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_MAU#_VLT	Analog Input (0)				x
ZNT	Zone or Space Temperature	XXXX_XXXX_XXXX_MAU#_ZNT	Analog Input (0)	x			x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_MAU#_ALM	Binary Input (3)	x	X		x
FLTR	Dirty Filter Alarm (via Differen-tial Pressure Switch)	XXXX_XXXX_XXXX_MAU#_FLTR	Binary Input (3)		X		x
FZ	Freezestat	XXXX_XXXX_XXXX_MAU#_FZ	Binary Input (3)		X		x
ST	Status for Pump or Fan (when only fan for system)	XXXX_XXXX_XXXX_MAU#_ST	Binary Input (3)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
VIB	Vibration Switch Alarm	XXXX_XXXX_XXXX_MAU#_VIB	Binary Input (3)		X		x
HTG	Heating Coil Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_MAU#_HTG	Analog Output (1)	x			x
MAD	Mixed Air Dampers (0-100 percent open control signal relative to OAD)	XXXX_XXXX_XXXX_MAU#_MAD	Analog Output (1)	x			x
OAD	Outside Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_MAU#_OAD	Analog Output (1)	x			x
RAD	Return Air Damper (0-100 percent open control signal)	XXXX_XXXX_XXXX_MAU#_RAD	Analog Output (1)	x			x
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_MAU#_SPD	Analog Output (1)	x			x
VLV	Modulating Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_MAU#_VLV	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_MAU#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_MAU#_ENABLE	Binary Output (4)	x			x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_MAU#_HLALM	Analog Value (2)		X		x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_MAU#_HLSTPT	Analog Value (2)	x			x
HUM_STPT	Humidity Set point	XXXX_XXXX_XXXX_MAU#_HUM_STPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_MAU#_LLALM	Analog Value (2)		X		x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_MAU#_LLSTPT	Analog Value (2)	x			x
RAH_STPT	Return Air (Relative) Humidity Set point	XXXX_XXXX_XXXX_MAU#_RAH_STPT	Analog Value (2)	x		x	x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
Chillers:							
AMP	Amperage	XXXX_XXXX_XXXX_CH#_AMP	Analog Input (0)				x
CHWDP	Chilled Water Differential Pressure	XXXX_XXXX_XXXX_CH#_CHWDP	Analog Input (0)	x	X		x
CHWR	Chilled Water Return Temperature	XXXX_XXXX_XXXX_CH#_CHWR	Analog Input (0)	x	X		x
CHWS	Chilled Water Supply Temperature	XXXX_XXXX_XXXX_CH#_CHWS	Analog Input (0)	x	X		x
CWR	Condenser Water Return	XXXX_XXXX_XXXX_CH#_CWR	Analog Input (0)	x	X		x
CWS	Condenser Water Supply	XXXX_XXXX_XXXX_CH#_CWS	Analog Input (0)	x	X		x
KW	Kilowatts	XXXX_XXXX_XXXX_CH#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_CH#_KWH	Analog Input (0)				x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_CH#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humidity	XXXX_XXXX_XXXX_CH#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_CH#_OAT	Analog Input (0)	x			x
PRESS	Pressure	XXXX_XXXX_XXXX_CH#_PRESS	Analog Input (0)	x			x
PCWDP	Process Chilled Water Differential Pressure	XXXX_XXXX_XXXX_CH#_PCWDP	Analog Input (0)	x	X		x
PCWR	Process Chilled Water Return Temperature	XXXX_XXXX_XXXX_CH#_PCWR	Analog Input (0)	x	X		x
PCWS	Process Chilled Water Supply Temperature	XXXX_XXXX_XXXX_CH#_PCWS	Analog Input (0)	x	X		x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
VLT	Voltage	XXXX_XXXX_XXXX_CH#_VLT	Analog Input (0)				x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_CH#_ALM	Binary Input (3)	x			x
CWR	Condenser Water Return	XXXX_XXXX_XXXX_CH#_CWR	Binary Input (3)	x	X		x
VIB	Vibration Switch Alarm	XXXX_XXXX_XXXX_CH#_VIB	Binary Input (3)				x
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_CH#_SPD	Analog Output (1)	x			x
VLV	Modulating Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_CH#_VLV	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_CH#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_CH#_ENABLE	Binary Output (4)	x	X		x
ISOL	Isolation Valve(s) for entire system	XXXX_XXXX_XXXX_CH#_ISOL	Binary Output (4)	x	X		x
HISOL	Humidifier Isolation Valve	XXXX_XXXX_XXXX_CH#_HISOL	Binary Output (4)	x	X		x
RISOL	Return Isolation Valve	XXXX_XXXX_XXXX_CH#_RISOL	Binary Output (4)	x	X		x
SISOL	Supply Isolation Valve	XXXX_XXXX_XXXX_CH#_SISOL	Binary Output (4)	x	X		x
CHWS_STPT	Chilled Water Supply Temperature Set point	XXXX_XXXX_XXXX_CH#_CHWS_STPT	Analog Value (2)	x	X	x	x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_CH#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_CH#_HLSTPT	Analog Value (2)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_CH#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_CH#_LLSTPT	Analog Value (2)	x			x
Cooling Towers:							
AMP	Amperage	XXXX_XXXX_XXXX_CT#_AMP	Analog Input (0)				x
CWR	Condenser Water Return	XXXX_XXXX_XXXX_CT#_CWR	Analog Input (0)	x	X		x
CWS	Condenser Water Supply	XXXX_XXXX_XXXX_CT#_CWS	Analog Input (0)	x	X		x
KW	Kilowatts	XXXX_XXXX_XXXX_CT#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_CT#_KWH	Analog Input (0)				x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_CT#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humidity	XXXX_XXXX_XXXX_CT#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_CT#_OAT	Analog Input (0)	x			x
PRESS	Pressure	XXXX_XXXX_XXXX_CT#_PRESS	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_CT#_VLT	Analog Input (0)				x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_CT#_ALM	Binary Input (3)	x			x
CWS_SP	Condenser Water Supply Set point	XXXX_XXXX_XXXX_CT#_CWS_SP	Analog Output (1)	x	X	x	x
VIB	Vibration Switch Alarm	XXXX_XXXX_XXXX_CT#_VIB	Binary Input (3)				x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_CT#_SPD	Analog Output (1)	x	X		x
VLV	Modulating Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_CT#_VLV	Analog Output (1)	x			x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_CT#_CMD	Binary Output (4)	x	X		x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_CT#_ENABLE	Binary Output (4)	x			x
ISOL	Isolation Valve(s) for entire system	XXXX_XXXX_XXXX_CT#_ISOL	Binary Output (4)	x			x
HISOL	Humidifier Isolation Valve	XXXX_XXXX_XXXX_CT#_HISOL	Binary Output (4)	x			x
RISOL	Return Isolation Valve	XXXX_XXXX_XXXX_CT#_RISOL	Binary Output (4)	x	X		x
SISOL	Supply Isolation Valve	XXXX_XXXX_XXXX_CT#_SISOL	Binary Output (4)	x	x		x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_CT#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_CT#_HLSTPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_CT#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_CT#_LLSTPT	Analog Value (2)	x			x
<u>Heat Exchangers:</u>							
AMP	Amperage	XXXX_XXXX_XXXX_HX#_AMP	Analog Input (0)				x
CHWR	Chilled Water Return Temperature	XXXX_XXXX_XXXX_HX#_CHWR	Analog Input (0)	x	X		x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
CHWS	Chilled Water Supply Temperature	XXXX_XXXX_XXXX_HX#_CHWS	Analog Input (0)	x	X		x
CWR	Condenser Water Return	XXXX_XXXX_XXXX_HX#_CWR	Analog Input (0)	x	X		x
CWS	Condenser Water Supply	XXXX_XXXX_XXXX_HX#_CWS	Analog Input (0)	x	X		x
KW	Kilowatts	XXXX_XXXX_XXXX_HX#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_HX#_KWH	Analog Input (0)				x
OAENTH	Outdoor Air Enthalpy	XXXX_XXXX_XXXX_HX#_OAENTH	Analog Input (0)	x			x
OAH	Outdoor Air (Relative) Humidity	XXXX_XXXX_XXXX_HX#_OAH	Analog Input (0)	x			x
OAT	Outdoor Air Temperature	XXXX_XXXX_XXXX_HX#_OAT	Analog Input (0)	x			x
PRESS	Pressure	XXXX_XXXX_XXXX_HX#_PRESS	Analog Input (0)	x			x
PCWR	Process Chilled Water Return Temperature	XXXX_XXXX_XXXX_HX#_PCWR	Analog Input (0)	x	X		x
PCWS	Process Chilled Water Supply Temperature	XXXX_XXXX_XXXX_HX#_PCWS	Analog Input (0)	x	X		x
VLT	Voltage	XXXX_XXXX_XXXX_HX#_VLT	Analog Input (0)				x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_HX#_ALM	Binary Input (3)	x			x
VIB	Vibration Switch Alarm	XXXX_XXXX_XXXX_HX#_VIB	Binary Input (3)				x
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_HX#_SPD	Analog Output (1)	x	X		x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
VLV	Modulating Valve (0-100 percent open control signal)	XXXX_XXXX_XXXX_HX#_VLV	Analog Output (1)	x	X	x	x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_HX#_CMD	Binary Output (4)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_HX#_ENABLE	Binary Output (4)	x			x
ISOL	Isolation Valve(s) for entire system	XXXX_XXXX_XXXX_HX#_ISOL	Binary Output (4)	x	X		x
RISOL	Return Isolation Valve	XXXX_XXXX_XXXX_HX#_RISOL	Binary Output (4)	x	X		x
SISOL	Supply Isolation Valve	XXXX_XXXX_XXXX_HX#_SISOL	Binary Output (4)	x	X		x
HLALM	High Limit Alarm	XXXX_XXXX_XXXX_HX#_HLALM	Analog Value (2)				x
HLSTPT	High Limit Set point	XXXX_XXXX_XXXX_HX#_HLSTPT	Analog Value (2)	x			x
LLALM	Low Limit Alarm	XXXX_XXXX_XXXX_HX#_LLALM	Analog Value (2)				x
LLSTPT	Low Limit Set point	XXXX_XXXX_XXXX_HX#_LLSTPT	Analog Value (2)	x			x
<u>Pumps:</u>							
AMP	Amperage	XXXX_XXXX_XXXX_P#_AMP	Analog Input (0)				x
CHWDP	Chilled Water Differential Pressure	XXXX_XXXX_XXXX_P#_CHWDP	Analog Input (0)	x	X		x
CHWR	Chilled Water Return Temperature	XXXX_XXXX_XXXX_P#_CHWR	Analog Input (0)	x	X		x
CHWS	Chilled Water Supply Temperature	XXXX_XXXX_XXXX_P#_CHWS	Analog Input (0)	x	X		x
CWR	Condenser Water Return	XXXX_XXXX_XXXX_P#_CWR	Analog Input (0)	x	X		x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
CWS	Condenser Water Supply	XXXX_XXXX_XXXX_P#_CWS	Analog Input (0)	x	X		x
HWHDP	Hot Water Heating Differential Pressure	XXXX_XXXX_XXXX_P#_HWHDP	Analog Input (0)	x			x
HWHR	Hot Water Heating Return Temperature	XXXX_XXXX_XXXX_P#_HWHR	Analog Input (0)	x			x
HWHS	Hot Water Heating Supply Temperature	XXXX_XXXX_XXXX_P#_HWHS	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_P#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_P#_KWH	Analog Input (0)				x
PRESS	Pressure	XXXX_XXXX_XXXX_P#_PRESS	Analog Input (0)	x			x
PCWDP	Process Chilled Water Differential Pressure	XXXX_XXXX_XXXX_P#_PCWDP	Analog Input (0)	x	X		x
PCWR	Process Chilled Water Return Temperature	XXXX_XXXX_XXXX_P#_PCWR	Analog Input (0)	x	X		x
PCWS	Process Chilled Water Supply Temperature	XXXX_XXXX_XXXX_P#_PCWS	Analog Input (0)	x	X		x
VLT	Voltage	XXXX_XXXX_XXXX_P#_VLT	Analog Input (0)	x			x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_P#_ALM	Binary Input (3)	x			x
ST	Status for Pump or Fan (when only fan for system)	XXXX_XXXX_XXXX_P#_ST	Binary Input (3)	x	X		x
SPD	Speed for Fan or Pump Variable Frequency Drive (0-100 percent control signal)	XXXX_XXXX_XXXX_P#_SPD	Analog Output (1)	x	X	x	x
CMD	Command for Fan or Pump Start/Stop	XXXX_XXXX_XXXX_P#_CMD	Binary Output (4)	x	X	x	x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_P#_ENABLE	Binary Output (4)	x			x
Division 26							
Meters:							
AMP	Amperage	XXXX_XXXX_XXXX_M#_AMP	Analog Input (0)	x	X		x
KW	Kilowatts	XXXX_XXXX_XXXX_M#_KW	Analog Input (0)	x	X		x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_M#_KWH	Analog Input (0)	x		x	x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_M#_ALM	Binary Input (3)	x	X		x
VLT	Voltage	XXXX_XXXX_XXXX_M#_VLT	Analog Input (0)	x	X		x
HTZ	Hertz (Frequency)	XXXX_XXXX_XXXX_M#_HTZ	Analog Input (0)	x			x
PF	Power Factor	XXXX_XXXX_XXXX_M#_PF	Analog Input (0)	x	x		x
Lighting Control Sys-tem:							
KW	Kilowatts	XXXX_XXXX_XXXX_LCS#_KW	Analog Input (0)				x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_LCS#_KWH	Analog Input (0)				x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_LCS#_ALM	Multi-state In-put (13)	x	x		x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_LCS#_ENABLE	Binary Output (4)	x			x
STS_LAMP	Lamp Status	XXXX_XXXX_XXXX_LCS#_STS_LAMP	Analog Input (0)	x	x		x

Point Name	*Description*	*Actual IAS Point Name (typ.) - SiteName_Building#._BuildingWing_Floor_Equipment*	*BACnet Object Type (typ.)*	*IAS Graphic*	*FDD*	*DR*	*Trend*
STS_BAL	Ballast Status	XXXX_XXXX_XXXX_LCS#_STS_BAL	Analog Input (0)	x	x		x
STS_LIGHT	Status of Lighting Level	XXXX_XXXX_XXXX_LCS#_STS_LIGHT	Analog Input (0)	x		x	x
STS_GROUP	Status of Lighting Groups	XXXX_XXXX_XXXX_LCS#_STS_GROUP	Binary Input (3)	x		x	x
STS_GROUP_LAMP	Status of Lighting Groups Lamps	XXXX_XXXX_XXXX_LCS#_STS_GROUP_LAMP	Analog Input (0)	x	x		
STS_GROUP_BAL	Status of Lighting Groups Ballasts	XXXX_XXXX_XXXX_LCS#_STS_GROUP_BAL	Analog Input (0)	x	x		
STS_OCC_SEN	Status of Occupancy Sensor	XXXX_XXXX_XXXX_LCS#_STS_OCC_SEN	Binary Input (3)	x			x
STS_DAY_SEN	Status of Daylight Sensor	XXXX_XXXX_XXXX_LCS#_STS_DAY_SEN	Analog Input (0)	x			x
SP_LIGHT	Light Level Set point	XXXX_XXXX_XXXX_LCS#_SP_LIGHT	Analog Output (1)	x		x	x
SP_GROUP_LIGHT	Group Light Level Set point	XXXX_XXXX_XXXX_LCS#_SP_GROUP_LIGHT	Analog Output (1)	x		x	x
SP_LIGHT_TIME	Lighting Level Duration Set point	XXXX_XXXX_XXXX_LCS#_SP_LIGHT_TIME	Analog Output (1)	x		x	x
SP_SCENE	Lighting Scene Set point	XXXX_XXXX_XXXX_LCS#_SP_SCENE	Multi-state Output (14)	x		x	x
STS_SCENE	Lighting Scene Status	XXXX_XXXX_XXXX_LCS#_STS_SCENE	Multi-state Input (13)	x			x
SP_SCENE_LIGHT	Lighting Level Scene Set point	XXXX_XXXX_XXXX_LCS#_SP_SCENE_LIGHT	Analog Output (1)	x		x	x
SP_SCENE_LIGHT_TIME	Lighting Level Scene Duration Set point	XXXX_XXXX_XXXX_LCS#_SP_SCENE_LIGHT_TIME	Analog Output (1)	x		x	x
OVR_SP_GROUP_LIGHT	Override Group Light Level Set point	XXXX_XXXX_XXXX_LCS#_OVR_SP_GROUP_LIGHT	Analog Output (1)	x			x
OVR_LIGHT	Override Light Level Set point	XXXX_XXXX_XXXX_LCS#_OVR_LIGHT	Analog Output (1)	x			x

Point Name	*Description*	*Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment*	*BACnet Ob-ject Type (typ.)*	*IAS Gra phic*	*F D D*	*D R*	*Trend*
PRIOR_OVR_ GROUP	Set point of Priority Override Command for Group of Lights	XXXX_XXXX_XXXX_LCS#_PRIOR_OVR _GROUP	Analog Out-put (1)	x			x
Emergency Generator:							
AMP	Amperage	XXXX_XXXX_XXXX_GEN#_AMP	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_GEN#_KW	Analog Input (0)	x			x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_GEN#_KWH	Analog Input (0)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_GEN#_VLT	Analog Input (0)	x			x
HTZ	Hertz (Frequency)	XXXX_XXXX_XXXX_GEN#_HTZ	Analog Input (0)	x			x
PF	Power Factor	XXXX_XXXX_XXXX_GEN#_PF	Analog Input (0)	x			x
LVL	Fuel Tank Level	XXXX_XXXX_XXXX_GEN#_LVL	Analog Input (0)	x	x		x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_GEN#_ALM	Binary Input (3)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_GEN#_ENABLE	Binary Output (4)	x		x	x
STARTS	Number of Operational Starts	XXXX_XXXX_XXXX_GEN#_STARTS	Analog Input (0)	x			x
RUNTIME	Number of Total Operating Hours	XXXX_XXXX_XXXX_GEN#_RUNTIME	Analog Input (0)	x	x		x
TEMP_OIL	Temperature of Oil	XXXX_XXXX_XXXX_GEN#_TEMP_OIL	Analog Input (0)	x			x
TEMP_RAD	Temperature of Radiator	XXXX_XXXX_XXXX_GEN#_TEMP_RAD	Analog Input (0)	x			x
STS_LOAD	Percent of Full Load Power Production	XXXX_XXXX_XXXX_GEN#_STS_LOAD	Analog Input (0)	x	x		x

Point Name	***Description***	***Actual IAS Point Name (typ.) - Site-Name_Building#._Build-ingWing_Floor_Equipment***	***BACnet Ob-ject Type (typ.)***	***IAS Gra phic***	***F D D***	***D R***	***Trend***
Electric Panels/Plug Load Control							
AMP	Amperage	XXXX_XXXX_XXXX_EP#_AMP	Analog Input (0)	x			x
KW	Kilowatts	XXXX_XXXX_XXXX_EP#_KW	Analog Input (0)	x			x
KWH	Kilowatt Hour	XXXX_XXXX_XXXX_EP#_KWH	Analog Input (0)	x			x
ALM	Alarm - General Alarm or Fault	XXXX_XXXX_XXXX_EP#_ALM	Binary Input (3)	x			x
ENABLE	Enable/Disable Command for System or Equipment Stage	XXXX_XXXX_XXXX_EP#_ENABLE	Binary Output (4)	x			x
VLT	Voltage	XXXX_XXXX_XXXX_EP#_VLT	Analog Input (0)	x			x
STS_OUTLET	Status of Recepticle Outlet	XXXX_XXXX_XXXX_EP#_STS_OUTLET	Analog Input (0)	x		x	x
SP_OUTLET	Set point of Recepticle Outlet	XXXX_XXXX_XXXX_EP#_SP_OUTLET	Analog Out-put (1)	x		x	x
Fire Alarm Systems:							
STS	System Status	XXXX_XXXX_XXXX_FAS_STS	Multi-state In-put (13)	x			x
ZONE_STS	Adressable Zone Status	XXXX_XXXX_XXXX_ FAS _ZONE_STS	Multi-state In-put (13)	x			x
ALM	Alarm – General Alarm or Fault	XXXX_XXXX_XXXX_ FAS _ALM	Multi-state In-put (13)	x	x		x
PRESS	System Pressure	XXXX_XXXX_XXXX_ FAS _PRESS	Analog Input (0)	x	x		x

END OF SECTION 258000