APPENDIX

UNCC FMCS DDC NIAGARA AX / 4

CONTROL SYSTEM GRAPHICS

Attachments

B 1. Acronyms and Abbreviations /

B 2. Glossary of Terms

B 3. Standard for Screen Graphic Abbreviations.

B 4. Definitions of Display Names. Point Names and Facets.

B.5– Default Building Occupancy Schedule.

1.0 Introduction and Overview

These standards are intended to describe the minimum requirements for the Niagara^{AX} control system screen graphics and programming as implemented at UNC, Charlotte, North Carolina. When a change to the implementation of these standards is required (i.e., delete a program feature from the graphics) or a feature is not addressed in this standard and needs to be added, the contractor shall request written authorization from UNCC prior to making the change.

These standards shall be implemented for all graphics developed using Niagara^{AX} version 3.7 or later and shall apply to anyone implementing projects that require operator screen graphics and/or programming using Niagara^{AX}.

The Contractor shall develop the operator screen graphics and control system programming so that the look and feel of the graphics is consistent with this standard and the example screen graphic figures included in this standard.
Note all new installations to be Niagara 4.1 or better. Check with Facilities Information Systems for latest revision. All JACEs to be Vykon due to compatibility issues.

2.0 Color Pallet for Screen Graphics

2.1 Default Colors

All color selections shall be the Niagara^{AX} default standard unless specifically called out below.

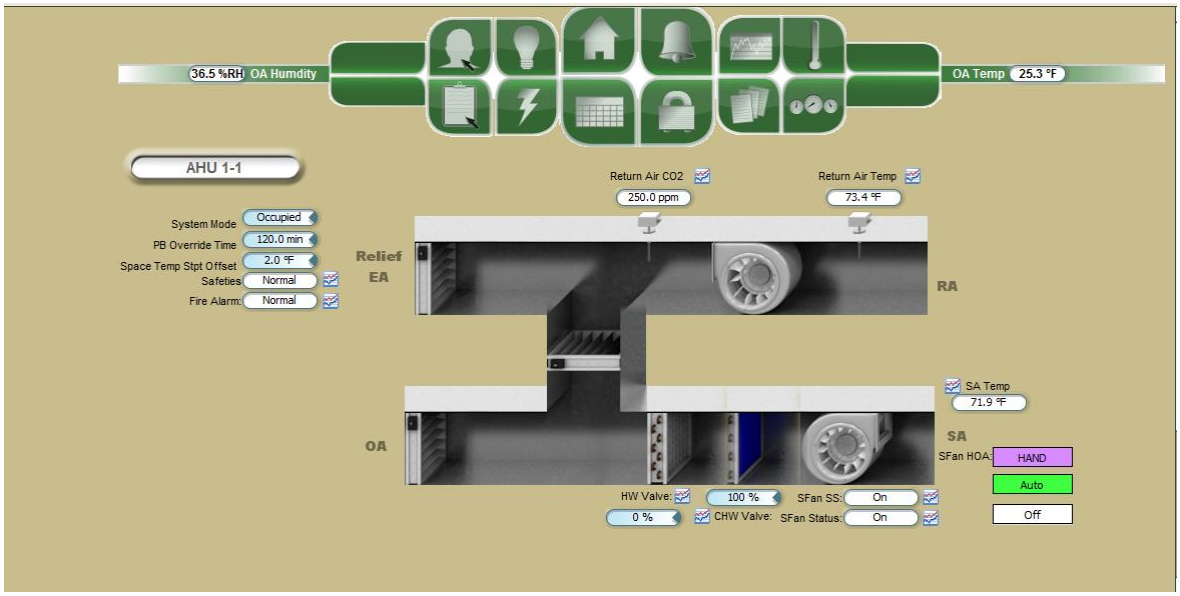
Default Background Color – Silver (Tridium color code: #cbc8c8) except for status, setpoint, alarm, and other data cells.

Default Text – Black

Alarms – Red background (Tridium color code: #ffff0000) background with black text (no flashing).

Operator Override (Active) – Burnt orange (Tridium color code: #ff8000) background with black tex
Operator Override (Not Active) – White (Tridium color code: #ffffff) background with black text

Figure 1 – Example Air Handler Screen Graphic



2.2 General Information

General information includes descriptions or names of points such as Mixed Air Temp, Cold Water Valve, Return Air CO_2, etc. This information shall be shown as back text on a gold background (Tridium color code: c 9 b d 8 d). Upper and lower case text shall be used with the first letter in each word capitalized. Examples of this are shown in Figure 1.

2.3 Process Status and Data

Process information and data includes temperatures, concentrations, status, and other process parameters that the operator cannot set or override. This process information shall be black text on a white background. The process data cells shall have a black border. All temperatures shall be reported with 1 decimal point. For example the temperature would be displayed as 72.6ºF.

All CO_2 sensor values shall be displayed with no decimal point. For example the CO_2 concentration would be displayed as 537 ppm. All percentages shall be displayed with 1 decimal point. For example, a valve would be 100.0%. All supply air pressures that are measured in inches of water column shall be displayed with 2 decimal points. For example, 3.51 iwc.

2.4 Point Status

The Niagara^{AX} colors for point status shall be the standard default for the system as listed below.

Point Status	Background Color (Tridium color code)	Foreground Color (Tridium color code)
Alarm	Red #ffff0000	Black #ff000000
Disabled	Light gray #dddddd	Coalish gray
Fault	Orange (ffaa26)	Black
Down	Yellow (ffff00)	Black
Stale	Reddish gray (d6cbae)	Black
Overridden	Purple (d88aff)	Clear
Unacknowledged alarm	Clear	Clear

2.5 Alarms

All alarms shall be shown as black text on a Red background. (Note: Red is not used in screen graphics except to designate an alarm condition.) Where the alarm box includes text, the text is black. No other colors are used for alarms. Alarms do not flash. Alarms shall be shown with a black outline. See Return Fan Command in Figure 1.=

2.6 Set points

All set points that the operator can adjust are shown as black text on a white background with a triangle in the right hand side, similar to all other process data. The border of the setpoint cell changes to blue when the mouse pointer scrolls over the cell and is right clickable. Once an override value is entered for the setpoint the background color shall change to a purple Tridium color code; d88aff) with black text. The cell containing the override value shall have a black border. See SFan HOA in Figure 1. And below

Occupancy Schedule

The button used to access the building occupancy schedule is shown as black text on a white background with a triangle in the right hand side indicating the operator can change or adjust this parameter. See AHU 1 Schedule in Figure 1.

2.7 Override Values

All fields that contain an active override value have black text on a burnt orange background. The cell shall have a black border. Examples of this are shown for the Return Fan Override and Cold Water Valve overrides in Figure 1.

2.8 Headers

The header as shown in Figure 1.is located in the px file/CustomHeader of the Sample station given to the Contactor by UNCC Controls Dept or FIS. The Alarm icon will turn red if an Alarm is present and each alarm console and alarm class will include the building name. The as builts and sequence of operation need to be in a HTML format and linked to the documents icon. The home paged is to be linked to the Home icon. Also See Figure 7 on page 20.

2.9 HOA Switch

The local hand-off-auto (HOA) switch for air handlers, fans, pumps, etc. shall be connected to the DDC to show the position of this switch. The screen graphics colors to use for the HOA switch are listed below:

Hand – Magenta (Tridium color code: #ffff00ff) background with black text, with black border.
Off – White (Tridium color code: #ffffff) background with black text, with black border.
Auto – Green (Tridium color code: #40ff40) background with black text, with black border

Examples of the possible HOA indications is shown in Figure 1 above for the Return Fan HOA Status (OFF) and for the Supply Fan HOA Status (HAND).

2.10 Air Flow Arrows

The flow direction of the air on the air handler screen graphic shall be indicated via green arrows. An example of the arrows indicating the air flow direction is provided in the Figure 1 example air handler screen graphic.

3.0 Fonts and Font Size

The fonts used to create the graphics shall be as listed below:

Main Headings – Aerial 18 point (white)

All other Text – Tahoma 12 point (black)

4.1 Standard Building Graphics Screens

The standard screen graphics for each building shall include the following (where appropriate). See Figure 1a below

Floor Plans; Mini Maps if needed (See Graphic example 2&3) and all floor plans need to hyperlink to each other. All Vavs associated with that floor are put into a sub folder for that floor.

VAV Summary; Summaries should be keep to just one particular area and not made too large so loading time is not a factor. Use additional px's instead of a large summary (See Figure 4 for example)

Chilled Water/Hot Water Equip; This page will show the building's Chilled Water and Hot Water equipment as installed in the building where applicable.

AHU/RTU; this page will show the building's AHU and RTU equipment as installed in the building where applicable.

Metering; all building Meters including but not limited to Electric, Water, Gas and BTU meters, use separate px pages as tabbedpane take a longer time to load.

This page will show the building's Chilled Water and Hot Water equipment as installed in the building where applicable.

Schedules; All Equipment schedules are to be set up according to UNCC specifications.

Alarms; there will be a minimum of 4 Alarm Classes, Each Alarm Class will have the building name and then the alarm class ie: **Friday Critical Alarms.** The 4 alarm classes will be BldgNameCriticalAlarms, BldgNameNonCriticalAlarms, BldgNameMaintanananceAlarms and BldgNameNetworkAlarms. There will be 5 Alarm consoles one for each class and one where all four alarm classes come together with corresponding names along with the building name

Figure 1a. Example Building Navigation page

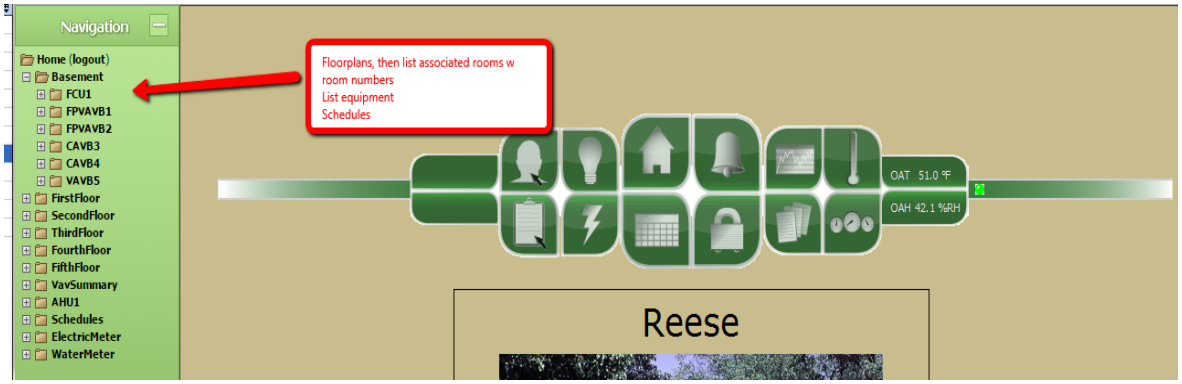


Figure 2. Example Floor Plan Screen Graphics

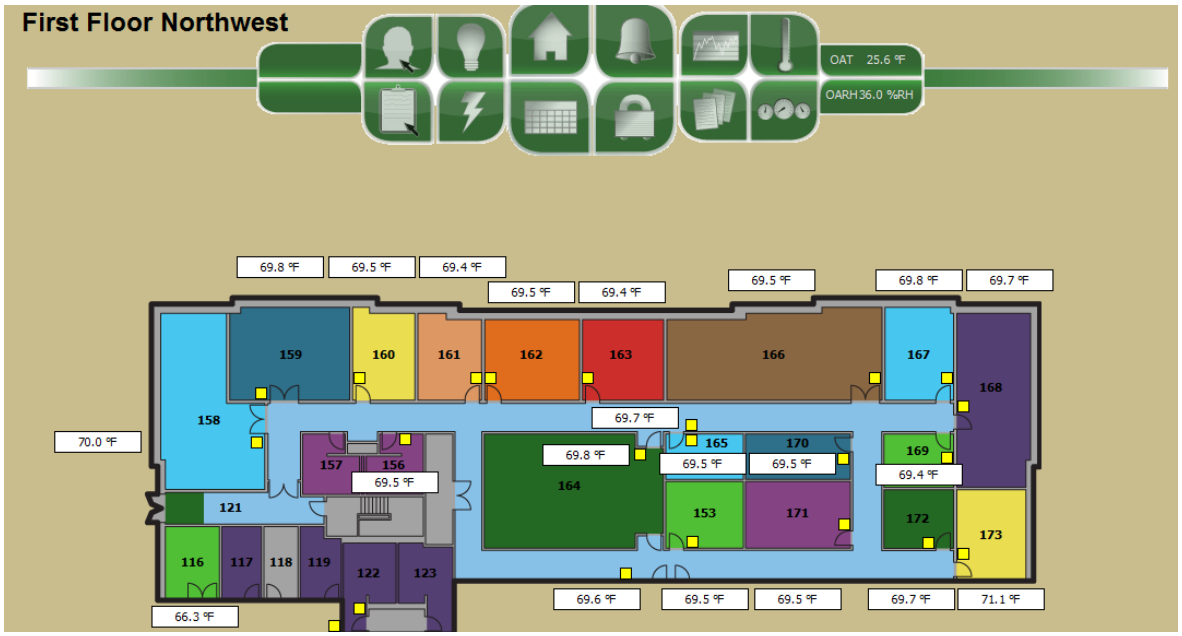
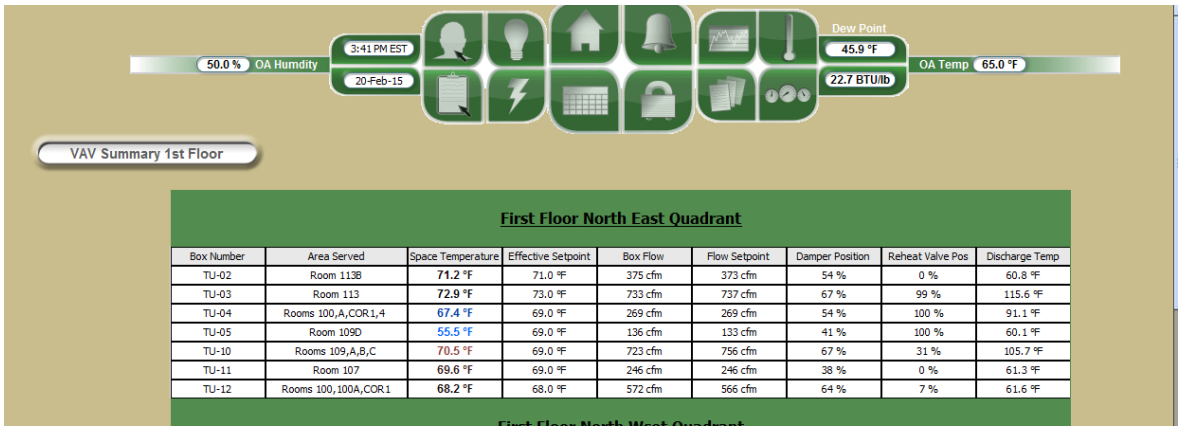


Figure 3. Example Mini Map Floor Plan Screen Graphics

Figure 4. Example VAV Summaries Plan Screen Graphics



5.0 Screen Titles - Header

Each screen graphic shall display the building number and name. It is not required to display "UNCC" on each screen graphic. Additionally the screen title should include for example the air handler and its zone. If no distinct zone is identified for the air handler it is not required to include this information in the title. An example header is shown in Figure 1 for Building 101. Also see Figure 7 on page 20.

6.0 Standard Buttons

Each screen graphic will be programmed to include "standard" buttons (where appropriate) to quickly navigate to other graphic screens associated with that building. These standard buttons shall be located in the secondary header near the top of the screen graphic.

6.1 Niagara Main Menu

This button will display a summary of all buildings that are integrated into the FMCS control system. The "Niagara Main Menu" is a summary screen that shows all of the buildings that are tied into the FMCS DDC (Building name and number) along with an icon with web link that when selected will bring up the summary page screen graphic for that building. **Note: The Niagara Main Menu will be located on the Niagara^{AX} server when available.**

Building Summary

This button will bring up the summary screen for this building. The summary screen shall include key information about the building's mechanical systems. The building summary will differ from building to building based on the mechanical systems in that building.

6.2 As Built Drawings

This button provides a link to the as-built drawings files for this building. The as-built drawings will be stored as HTML files on the NiagaraAX server. See Figure 7 on page 20.

6.3 Navigation Buttons

Navigation buttons shall be programmed into the secondary header to access other screens associated with the building such as VAVs, Boilers, Chillers, etc. See Figure 7 on page 20.

7.1 Equipment Operational Status

In general the operational status of equipment shall be displayed on the screen graphics using standard Niagara^{AX} animations. Text and text status blocks shall not be used to display the equipment status unless an operational animation is not available for the equipment. On summary screens where there are no depictions of the equipment, the operational status will be displayed as described in the summary screen section of this standard.

Animations should be used for the following equipment items to display status.

1. Fans (supply and return)
2. Pumps
3. Cooling Towers
4. Chillers
5. Dampers (Outside Air, Return Air, Exhaust/Relief, Mixed Air, Bypass/Face, Zone, Zone Hot Deck/Cold Deck)
6. Valves/Coils (Cooling, Heating, Dual Temperature, Preheat, Reheat, Hot Deck/Cold Deck)

The building summary screen will indicate via colors, the status of the air handler systems. A colored circle in front of the air handler ID indicates the operational status of that air handler.

Green – air handler is ON (not in alarm)

White – air handler is OFF (not in alarm)

Red – air handler is in Alarm (status is different from command)

8.1 Building Summary Screen

A summary screen shall be provided for each Building. Layout and content of the summary screen should be similar to the Building 101 summary screen. The order in which the information and data is to be presented on the summary screen is important and shall be as listed below and not be rearranged without approval. Items at the top of the list should appear before items beneath it. Note that not all information listed below will apply to every air handler. Note also that the actual condition (temperature, pressure, etc.) appears in the summary before the set point for that condition. Multiple summary screens may be necessary for certain buildings due to their size. Clicking on the air handler ID will bring up the screen graphic for that air handler.
Because of space limitations, the contractor shall use judgment to determine which information to show on the summary screen but the order in which the information is listed in the summary table shall be in accordance with the listing below.

- Supply Air Fan Status (colored circles)
- Air handler ID (AHU-1, AHU-2, etc.)
- HOA Status
- Freeze Stat Status
- Smoke Sensor Status
- CO_2 Concentration
- Supply Fan Command
- Supply Air Temperature
- Supply air Temperature Set Point
- Space Air Temperature
- Space Air Temperature Set Point
- Return Air Fan Command
- Return Air Fan Status
- Return Air Temperature
- Return Air Temperature Set Point
- Static Pressure
- Static Pressure Set Point
- Dual Temperature Valve Position
- Chilled Water Valve Position
- Hot Water Valve Position
- Filter Status

9.1 Occupancy Schedules

A separate occupancy schedule shall be programmed for each air handler in a building (unless otherwise directed by the UNC Charlotte Project Coordinator). A button shall be programmed in the upper right corner of the air handler screen graphic that will take the operator to the schedule input screen. The text shall be black on a white background with a black border as shown below. The rollover color for the background shall be cyan (Tridium color code #ff00ffff).

The occupancy schedules shall be programmed in accordance with the default occupancy schedule as listed in Attachment E to this standard unless otherwise directed in writing from the UNC Charlotte Project Coordinator.

10.0 Schedule Status

The occupancy schedule status of the air handler will be shown on the screen graphic for the air handler in the upper right corner of the screen, just below the "Air Handler Occupancy Schedule" button. The text shall be labeled "Occupancy Status". The schedule options text ("Occupied" or Unoccupied") shall be displayed either adjacent to or directly beneath the "Occupancy Status" as shown in Figure 1.

11.0 Outside Air Temperature

The outside air temperature shall be displayed in the UNC Charlotte approved header, in upper right hand corner of the screen graphic. The text shall be "OAT". The temperature value shall be black text on a white background with a black border.

12.0 Screen Graphic Text Descriptions

In general, abbreviations should not be used on the screen graphics. Where because of space limitations a word must be abbreviated the abbreviation must be in accordance with the approved abbreviation list. All text descriptions shall be consistent (avoid using synonyms) and in accordance with the approved list. A copy of the approved screen graphics abbreviations list is provided in Attachment D.

13.0 Air Handler Status and Controls

The air handler screen graphics should be programmed and displayed similar to the examples shown in Figure 1 for the supply air fan and return air fan.

13.1 Fan Command

The fan command text will be either "ON" or "OFF". If the fan command is different from the fan status, the Fan Command field will be in alarm (black text with red background). If not in alarm the fan command field will be black text with a white background.

13.2 Fan Status

The fan status is displayed graphically with the rotating fan wheel and the fan discharge air movement. When the fan status is off the graphic will indicate no fan movement.

13.3 Fan Override Status

The fan can be overridden to either ON or OFF. Therefore the override status will be either:

- True – indicating that the fan is in override (ON or OFF) or

- False – indicating that the fan is not in override (ON or OFF).

When the fan is in Override the background color will be burnt orange as shown for the return air fan in Figure 1.

Right clicking on the fan mode status field will bring up a pop-up window with the standard Niagara^{AX} override options.

14.0 Pump Status and Controls

All pump screen graphics should be programmed and displayed similar to an air handler (fan) with the following three fields:

- Pump Command
- Pump Override
- Pump HOA Status

14.1 Pump Command

The pump command will be either "ON" or "OFF". If the pump command is different from the pump status, the Pump Command field will be in alarm (black text with red background). If not in alarm the fan command field will be black text with a white background.

14.2 Pump Status

The pump status is displayed graphically with the rotating pump impeller. When the pump status is off the graphic will indicate no pump movement.

14.3 Pump Override

The pump can be overridden to either ON or OFF. Therefore the override status will be either:

- True – indicating that the pump is in override or
- False – indicating that the pump is not in override.

When the pump is in Override the background color will be burnt orange as shown for the return air fan in Figure 1. Right clicking on the pump mode status field will bring up a pop-up window with the standard Niagara^{AX} override options.

15.1 FMCS Operator Override Capabilities

The screen graphics will be programmed to allow the operator to override certain operating parameters. For those operating parameters where the operator can access and override, the cell background color will change to cyan (Tridium color code #ff00ffff) when the mouse pointer scrolls over the cell. Once an override value is entered for the setpoint the background color shall change to a burnt orange with black text and a black border. Those parameters that the operators may override are listed below.

1. Occupancy Schedule
2. Dampers (Outside Air, Return Air, Exhaust/Relief, Mixed Air, Bypass/Face, Zone Hot Deck/Cold Deck, Zone)

3. Damper Operating Mode (Economizer, Minimum Outside Air)
4. Supply Air Temperature Set Points
5. Return Air Temperature Set Points
6. Space Air Temperature Set Points
7. Zone Space Temperature Set Points
8. VAV Space Temperature Set Points
9. Global Zone Space Temperature Set Points
10. Global VAV Space Temperature Set Points
11. Hot Deck Temperature Set Points
12. Cold Deck Temperature Set Points
13. Boiler/Chiller Enable Set Points
14. Dual Temp Heating Set Points
15. Hot Water Return Set Points
16. Static Pressure Set Points
17. Economizer Set Points
18. Summer/Winter Change Over
19. Outside Air Flow Set Points
20. DX unit
21. Chiller System Enable Override
22. Boiler System Enable Override
23. Valves (Dual Temp, Cooling, Heating, Preheat, Reheat, Hot Deck/Cold Deck, Loop Bypass, Loop, Chiller/Boiler Flow Valves)
24. Fans (Supply, Exhaust, Return)
25. Supply/Return Fan VFD Commands
26. Domestic Hot Water Boiler Commands
27. Chiller Commands
28. Boiler Commands
29. Fan Overrides/Damper Overrides
30. Steam Boiler Commands
31. VFD/VSD Speed Commands

32. Pumps (Chilled Water, Hot Water, Dual Temperature, Domestic Hot Water, Booster, Runaround Pump)
33. Schedules (Building, Air Handler Unit, School Crossing Lights, Field Lights)
34. School Crossing Lights
35. Field Lights
36. Fan Mode/Air Handler Mode
37. Air Handler Schedule Mode (Building/AHU)
38. VAV (Min, Max, Fan Flow Set Points for Heating/Cooling)

16.0 Alarms

16.1 Summary Screen - Supply Air Fan Status Alarm

The Building Summary Screen will indicate when an air handler is in alarm. This alarm will be indicated when the fan command is different from the fan status and will be shown as a red circle in front of the AHU. See section 7.0.

16.2 Summary Screen – Sensor Alarms

The alarm is indicated for that temperature sensor on the screen graphic (black text on red background). Other colors shall also be used to indicate status conditions of the temperature sensor as provided for in Section 2.4 of this standard. These point status conditions include disabled, fault, down, stale, and null. Similar alarms and status conditions of all sensors (temperature, pressure, humidity, CO_2, etc) shall be provided on the screen graphics.

Alarms shall be provided for control loops in accordance with the following criteria unless otherwise directed by the sequence of operations or IJO Project Coordinator:

Temperature:	Greater than +/- 3.0°F from setpoint.
Air pressure:	Greater than +/- 0.30 iwc from setpoint
Water pressure:	Greater than +/- 5.0 psi from setpoint
Humidity:	Greater than +/- 10% RH from setpoint

16.3 Summary Screen Filter Alarm

The filter status will be shown on the graphics. The text label for the filter status shall be “Filter Status”. The text for the filter status will be either “Clean” or “Dirty”. An example (non-alarm) filter status is shown in Figure 1.

- Clean – Black text, white background with black border.
- Alarm – Black text, red background, black border.

16.4 Freeze Stat Alarm

The freeze stat will be shown on the graphics. The text label for this alarm shall be “Freeze Stat”. The text for the freeze stat status will be either “Normal” or “Alarm”. An example (non- alarm) freeze stat is shown in Figure 1.

- Normal – Black text, white background with black border.
- Alarm – Black text, red background, black border.

16.5 Smoke Sensor Alarm

The smoke sensor will be shown on the graphics similar to a freeze stat. The text label for this alarm shall be "Smoke Sensor". The text for the smoke sensor status will be either "Normal" or "Alarm".

- Normal – Black text, white background with black border.
- Alarm – Black text, red background, black border.

16.6 Detail Mechanical Screen Alarms (Air handlers, Chillers, Boilers)

Similar alarms and point status information shall be provided on the detail mechanical screens for the air handlers, pumps, boilers, chillers, VAVs, etc. as was described for the Building Summary Screen graphic in Section 17.2.

17.1 VAV Data

The following information shall be provided on the screen graphic for each VAV. An example VAV summary screen graphic is shown in Figure 2.

- Space Temperature
- Space Temperature Set point
- Supply Air Temp (from air handler)
- Flow Set point
- Actual Flow
- Flow Minimum
- Flow Maximum
- Damper % Open
- Reheat

18.0 Freeze Protection

All buildings integrated into the FMCS shall be programmed to prevent the building plumbing from freezing. Freeze protection shall be accomplished by the DDC using the unoccupied night setbacks preprogrammed functions in the control system. This function will turn on the air handler and maintain the space temperature to the night setback temperature setpoint which shall be no less than 55°F.

The screen graphics shall be configured to provide indication to the FMCS operator when the air handler is in the freeze protection mode. When in the freeze protection mode the screen graphics shall display the unoccupied night setback temperature set point.

19.0 Point Naming and Numbering Convention

All points that are tied into the Niagara$_{AX}$ control system shall be in accordance with the UNC Charlotte Niagara $_{AX}$ Point Naming Convention. A listing of the point names, abbreviations and facets for the points is provided in **Attachment B**.

20.0 Drawings and Documentation

The building summary screen graphic shall have a button in the header titled "As Built" that is programmed to load a HTML file of the building control schematics. The HTML files will eventually be stored on the Niagara^{AX} server but until this server is installed and operational, the as-built drawings will be stored on the Niagara R2 server.

21.1 Floor Plans

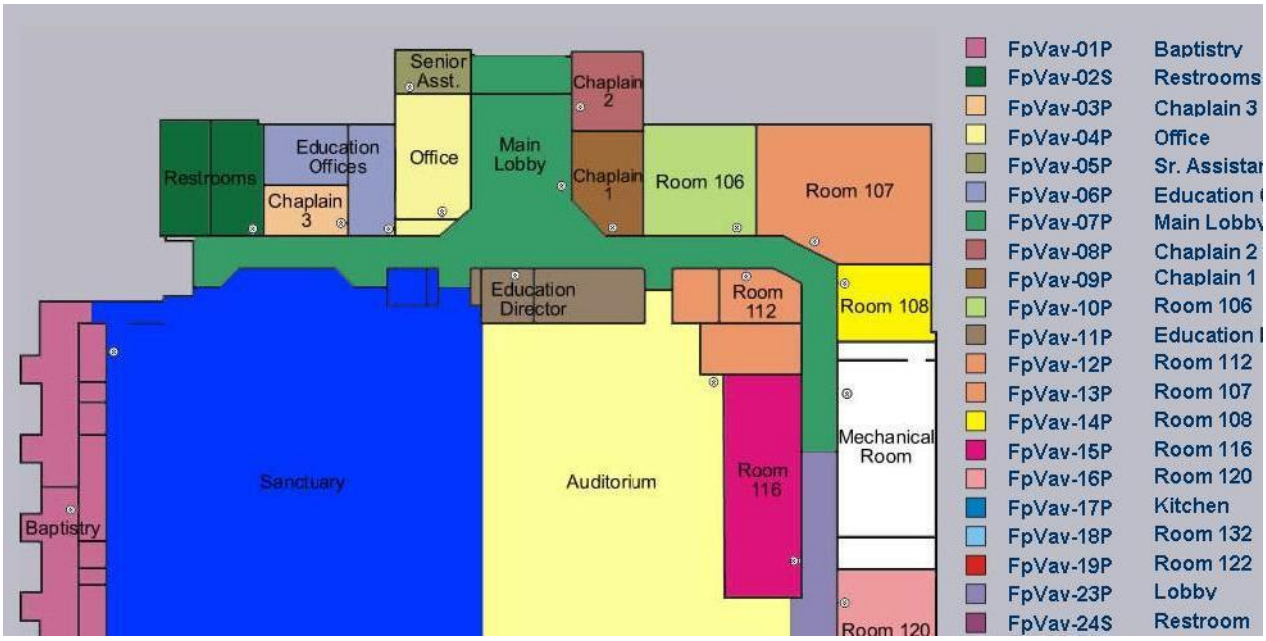
Floor plans shall be developed for each building that allows the FMCS operator to view pictorially the building floor plan. The floor plan shall be appropriate to the type building and building function. Links between the

room and it's associated air handler or VAV shall be configured into the floor plan graphic. The floor plan shall clearly depict the following information:

- Room numbers or names
- Thermostat locations
- Air handler locations
- Mechanical rooms
- IT Rooms
- Meters
- Lighting

Where the building is zone controlled, the floor plan shall indicate by colors, each zone. This includes using colors to different the zones controlled by each air handler and/or by each VAV. The intent of this requirement is to allow the operator to identify on the floor plan the location of the temperature problem and then to be able to click on the floor plan affected area which would then be linked from the floor plan graphic web page to the related VAV or AHU screen graphic web pages. An example floor plan showing the building 1680 layout along with names, room numbers, and colors representing different VAV zones is shown below. The floor plan graphic shall also show the location of all space temperature sensors (thermostats) along with the temperature being measured by the sensor.

Attachment B



Note that the floor plan screen shall have the same headers and buttons as all other screens.

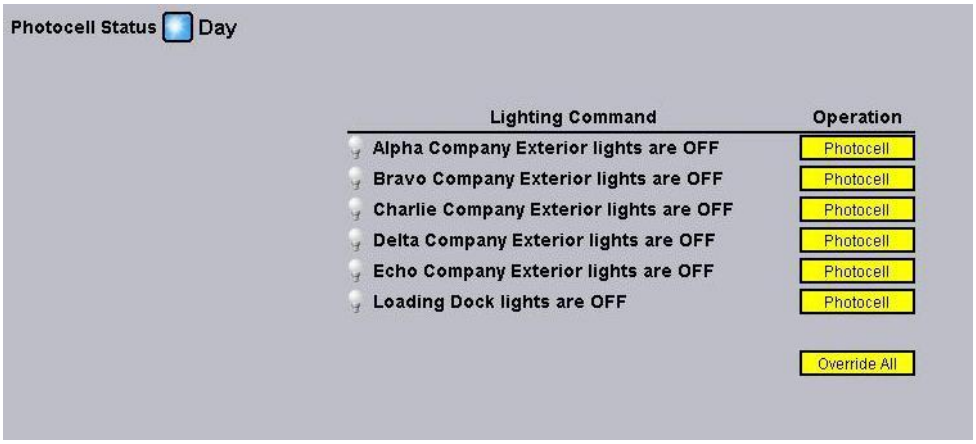
22.1 Photocell Operated Lights

Buildings that are equipped with light circuits that can be controlled from the DDC and that have local light control photocells shall have the following information displayed on the screen graphics:

- When the lights are directed to be on from the DDC the screen graphic shall show "ON".
- When the lights are directed to be off from the DDC the screen graphic shall show "OFF"

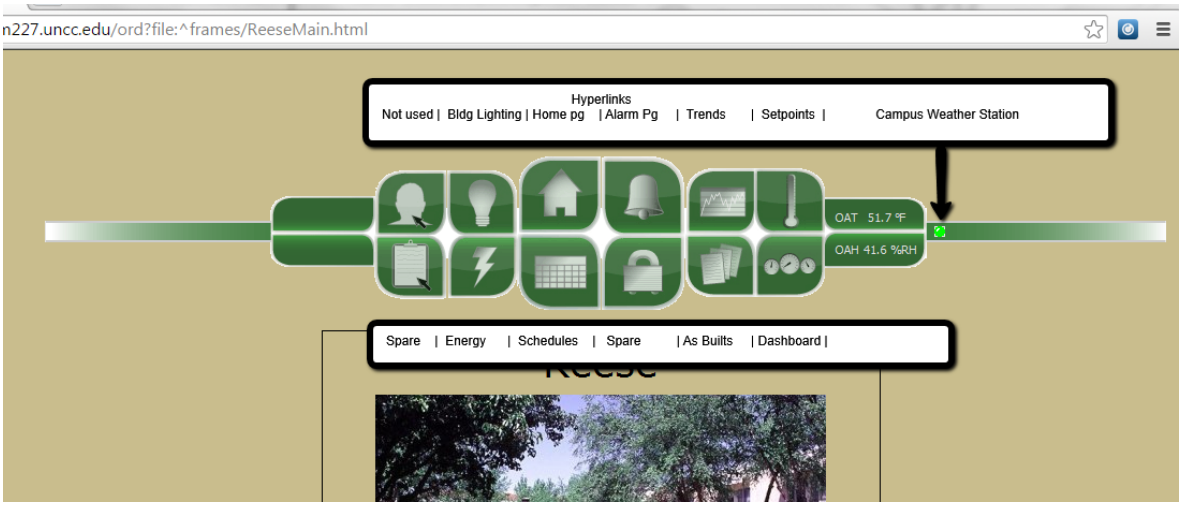
When the lights are controlled from the local photo cell the screen graphic shall show "PHOTOCELL". Each light circuit shall be identified on the screen graphic. The yellow shown in the lighting control column indicates that the operator has override capability for these fields. A burnt orange color indicates the light circuits that are in override. The status of the photocell (night or day shall also be shown on the light control screen graphic. The following is an example of how the screen graphic for light controls should be designed:

Figure 5. Example Building Photocell Lights Screen



Note that the lighting control screen shall have the same headers and buttons as all other screens.

Figure 6. Example Building Header



Attachment B

Attachment B
Programming Standards
And
Acronyms and Abbreviations

1. Acronyms and Abbreviations

A/E	Architect/Engineer
AHU	(AHU1, AHU-2, etc.) – Air handler unit
ALX	Activelogix
ANSI	American National Standards Institute
ASC	Application Specific Controller
BAS	Building Automation System
BPOC	Building Point Of Connection
CO	Carbon monoxide
CO2	Carbon dioxide
DDC	Direct Digital Control
DHCP	Dynamic Host Configuration Protocol
DITSCAP	Dod Information Technology Security Certification And Accreditation Process
ECIP	Energy Conservation Investment Program
EIA	Electronic Industries Alliance
ESPC	Energy Savings Performance Contract
FAQ	Frequently Asked Questions (Faqs)
FMC	Energy Management Control System
FMCS	Facility Management And Control System
FMD	Facilities Maintenance Division
FPC	Freely Programmable Lon Controllers
GPPC	General Purpose Programmable Controller (Gppc)
GUI	Graphical User Interface
HOA	Hand-off-auto
HTML	Hypertext Markup Language
HVAC	Heating, Ventilating, And Air Conditioning
I/O	Input/Output
IANA	Internet Assigned Numbers Authority
ID/IQ	Indefinite Delivery Indefinite Quantity
IDC	Indefinite Delivery Contract
IDC	Interoperable Digital Lon Controller
IDG	Installation Design Guide
IM	Instant Messaging
IP	Internet Protocol
IT	Information Technology
IWC	(iwc) – Inches of water column
JCI	Johnson Controls, Inc.

Attachment B

LAN	Local Area Network
LDAP	Lightweight Directory Access Protocol
LDP	Local Display Panel
LNS	Lonworks® Network Services
MAT	Mixed air temperature
MOU	Memorandum Of Understanding
MS	Microsoft®
NAC	Network Area Controller
NC	North Carolina
NCT	Network Configuration Tool
NOx	Nitrogen oxides
NTP	Notice To Proceed
O&M	Operations And Maintenance
OI	Operator Interface
OOT	Object Oriented Technology
OSI	Open Systems Interconnection
OWS	Operator Workstation
PC	Personal Computer
PDA	Personal Digital Assistant
PDF	Portable Document Format
PICS	Product Interoperability Compliance Statement
PMI	Power Measurement Interface
POC	Point Of Contact
POT	Portable Operator's Terminal
PPM	(ppm) – Parts per million
PVT	Performance Verification Test
QC	Quality Control
QV	Quality Verification
RAT	Return air temperature
RFP	Request For Proposal
SAT	Supply air temperature
Si	Systeme Internationale (The "Metric System")
SNMP	Simple Network Management Protocol
SNVT	Standard Network Variable Type
SOW	Statement Of Work
SPA	Space air temperature
TCP	Transmission Control Protocol
TCS	Temperature Control System
TP/FT	Twisted-Pair/Free Topology
TR	Technical Report
UDP	User Datagram Protocol
UMC	Utility Management Control System
UMCS	Utility Monitoring And Control System
URL	Universal Resource Locator

Attachment B

VAV	Variable air volume
VLAN	Virtual Local Area Network
VPN	Virtual Private Network
VSD	Variable speed drive
VVT	Variable volume and temperature
WAN	Wide Area Network
WBI	Web Browser Interface
WWW	World Wide Web
XIF	External Interface File
XML	Extensible Markup Language

Attachment B

2. Glossary of Terms

10Base-T 100Base-T 100Base-FX 1000Base-T 1000Base-SX 1000Base-LX 10GBase-T	Ethernet media and communication speeds. The number is communication speed in Megabits per second (Mbps) or Gigabits per second (Gbps). "T" is twisted pair wire usually Cat-6 or better), while "FX", "SX", and "LX" are fiber optic cable. Note that 10 Gigabit Ethernet is (as of 2006) an IEEE standard and 100 Gigabit Ethernet is in development.
AGC	**Application Generic Controller**. A controller that comes from the factory with a limited built-in application. It is programmed for the application (VAV box, fan coil, etc.). It can be programmed through an LNS plug-in. It can be thought of as a cross between an ASC and GPPC. These controllers should be certified by Lon Mark. An AGC has a fixed program ID.
ASC	**Application Specific Controller**. A controller that has a built-in, fixed program to execute a sequence for a specific hardware system, e.g. a VAV box controller. An ASC has a fixed program ID.
BPOC	**The Building Point of Connection** (BPOC) is the point of connection between the FMCS network backbone (an IP network) and the building control network backbone. The hardware at this location that provides the connection is referred to as the BPOC Hardware. In general, the term "BPOC Location" means the place where this connection occurs, and "BPOC Hardware" means the device that provides the connection. Sometimes the term "BPOC" is used to mean either and its actual meaning (i.e. location or hardware) is determined by the context in which it is used.
Closed	The opposite of Open. A standard/protocol/specification where important details of its implementation are not available to all interested parties. Closed standards are closely controlled by the developing party and implementation of devices based on them is generally limited to a small number of vendors.
Device	A piece of hardware. See also 'Node'
DDC	**Direct Digital Control**, defined as control consisting of microprocessor based controls with the control logic performed by software.
DDE	**Dynamic Data Exchange**, an inter-process communication (IPC) system built into the Macintosh®, Microsoft® Windows®, and OS/2® operating systems. DDE enables two running applications to share the same data.
DHCP	**Dynamic Host Configuration Protocol** is a protocol for automatically assigning IP configuration information to clients from a central server.

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FTP	**File Transfer Protocol** is a common protocol used on the Internet for sending files.
Gateway	A device (usually a combination of software and hardware) that connects networks using different communication protocols so that information can be passed from devices on one network to the other. Gateways perform protocol conversion to translate this information from one protocol to another.
GPPC	**General Purpose Programmable Controller**. A controller that can be programmed to run any (within hardware limits) sequence and can be set up as a controller for different hardware systems. Changes to the program result in a different Program ID.
GUI	**Graphical User Interface**. A program interface that takes advantage of the computer's graphics capabilities to make the program easier to use. A true GUI includes formats for representing text and graphics.
HMI	**Human-Machine Interface**. The means by which an operator interacts with an automation system, often a GUI.
HTTP	**HyperText Transfer Protocol**, is the underlying protocol used by the World Wide Web. HTTP defines how messages are formatted and transmitted, and what actions Web servers and browsers should take in response to various commands.
Interoperability	The ability to integrate products from multiple vendors into flexible, functional systems without the need to develop custom hardware, software, or tools.
Interoperable	This is closely related to Open standards and refers to the level of difficulty of integrating components (or systems) from multiple vendors into a single system. Interoperability needs to be considered from the perspective of hardware installation (will the parts physically fit and interconnect?), communications (do the devices "speak the same language"?), configuration and programming (is the same software tool used for different vendor components?), maintainability (do the components have similar maintenance procedures and requirements?), and operation (do the components have similar functionality/ sequences and utilize the same operator interface?). Open standards enhances/encourages interoperability because it allows multiple vendors to utilize a common standard. A caveat: In many (if not all cases), when vendors use the term interoperable, they do not mean *interchangeable* (in the sense of swapping out a VAV box for an identical VAV box).
IP	**Internet Protocol**. IP is a protocol on the Internet and is concerned with addressing and routing of data packets from their origin to the destination. Many other protocols are used in the Internet (TCP, HTTP, etc), but IP is the key protocol the others run on top of.
LAN	**Local Area Network**, is a network for transferring data between computers or other digital devices.

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LNS®	**LonWorks Network Service**, is the database architecture that resides on the computer attached to the LonWorks Network that is used to install and manage the Network. LNS is a database that can be accessed by any LNS-based Network Configuration Tool and by multiple users simultaneously.
LON	**Local Operating Network**. Also used as a shorthand reference to the term LonWorks.
LonTalk®	A networking protocol developed by Echelon Corporation and recognized by ANSI/CEA as ANSI/CEA-709.1-B. LonTalk implements layers 1-6 of the OSI reference model.
LonWorks®	A networking platform (created by Echelon Corporation) that provides solutions to numerous problems of designing, building, installing, and maintaining control networks.
LonWorks Router	A piece of equipment that allows ANSI/CEA-709.1-B communication and routing of network variables over an ANSI/CEA-709.1-B network. See "Router".
LonWorks LON to IP Router	A piece of equipment that allows ANSI/CEA-709.1 communication and routing of network variables over IP. Also known as an ANSI/CEA-852 router. See "Router".
Network	A group of devices (computers, controllers, or other digital units) that are connected by communication facilities, such as twisted-pair cabling, coAXial cable, fiber-optic cable, or wireless means
Network Configuration Tool	Software used to perform network management functions such as adding, removing or relocating devices and establishing communication between devices.
Neuron® C	A derivative of the C programming language specifically designed for developing applications for the Neuron chip.
Neuron® chip	A chip that implements the ANSI/CEA-709.1 protocol. This chip is used by most LonWorks devices for communication on the network. Many LonWorks devices also use this chip for control functionality.
Node	A device (such as a computer or a controller) on a network that is capable of communicating with other network devices via a networking protocol such as NSI/CEA-709.1.
Open system	An Open system is characterized by the ability for any qualified third party entity to readily modify, operate, upgrade, and perform retrofits on the system.
OWS	**Operator Work Station**, a type of computer-based GUI. An OWS is designed for use by an operator whereas a technician or maintenance worker might have a different computer and GUI with a different "look and feel".
Peer-to-Peer	A type of network where each node has equivalent capabilities and responsibilities for network communication.
Plug-in	Software used to configure an ASC that is run/executed from within a Network Configuration Tool.

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Proprietary	Privately owned and controlled. Proprietary is the opposite of public domain.
Proprietary – Government procurement	In Government procurement regulations, a proprietary product is one that requires sole source procurement.
Router	A device that connects two or more LANs. Routers are devices that provide network-independent packet filtering and forwarding. They may also include bridge functionality.
SNMP	**Simple Network Management Protocol**
SNVT	**Standard Network Variable Type**; Pronounced 'snivet'. A standard format type (maintained by LonMark International) used to define data information transmitted and received by the individual LonWorks nodes. The term SNVT is used in two ways. Technically it is the acronym for Standard Network Variable Type, and is sometimes used in this manner. However, it is often used to indicate the network variable itself (i.e. it can mean "a network variable of a standard network variable type"). In general, the intended meaning should be clear from the context.
SOAP	**Simple Object Access Protocol**: A lightweight protocol for exchange of information in a decentralized, distributed environment. It is an XML based protocol that consists of three parts: an envelope that defines a framework for describing what is in a message and how to process it, a set of encoding rules for expressing instances of application-defined data types, and a convention for representing remote procedure calls and responses.
SQL	**Structured query language**, defined as a standardized query language for requesting information from a database. There is an ANSI standard for SQL
Standard, De-facto	De-Facto standards are 'standards of fact', that is, standards that have been adopted by an industry or a market. An example of a de-facto standard is Microsoft Word. While it has not been adopted by a recognized standards organization, its market dominance makes it the de-facto standard for word processing. Gray areas arise here over market share and industry recognition.
Standard, De-jurie	De-Jurie standards (literally, 'standards of law') are those that have been adopted and approved by some recognized standards organization, such as ASHRAE, IEEE, ASTM, ISO, etc. ANSI/CEA- 709.1 is an example of a de-jurie standard. Gray areas can arise here over what constitutes a standards body.

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Standard, Proprietary	Proprietary standards are those that are owned and controlled by an organization not generally recognized as a 'legitimate' standards body (they are often owned by a for-profit organization). They frequently are considered to be, or to contain, intellectual property of value to the owning body. Proprietary standards may be Open, closed, or somewhere in between, though they tend to be more closed. The Microsoft Word document format (.doc files) is an example of a closed proprietary standard
Transceiver	A component or circuit that enables a hardware device to communicate on a network.
VLAN	**Virtual Local Area Network**. A common means of keeping different networks separate while existing on the same basewide LAN. Most modern Ethernet switches support VLANs where the different ports on the switch are divided into separate logical groupings. Ports in the same group can communicate with each other, while ports in separate groups can't. The ports in a common group form a VLAN within the larger physical network. A single physical network may support many distinct VLANs.

3. Screen Graphic Abbreviations

The following abbreviation convention should be used for all screen graphics where appropriate.

a. Supply Air Temperature – SAT
b. Supply Air Temperature Set Point – SAT SP
c. Supply Air Flow - SAF
d. Space Air Temperature – SPAT
e. Space Air Temperature Set Point – SPAT SP
f. Set Point – SP
g. Occupancy Status – OS
h. Air Handler Unit – AHU
i. Outside Air – OA
j. Outside Air Temperature – OAT
k. Direct Expansion – DX
l. Domestic Hot Water – DHW
m. Boiler – BLR
n. Hot Water – HW
o. Hot Water Valve – HWV
p. Chilled Water – CHW
q. Chilled Water Valve – CHWV
r. Fan Command – FAN CMD
s. Fan Status – FAN STAT
t. Fan Override – FAN OVRD
u. Set Point Override – SP OVRD
v. Freeze Protection – FREZ PROT
w. Hot Water Supply Temperature – HWST
x. Hot Water Return Temperature – HWRT
y. Chilled Water Supply Temperature – CHWST
z. Chilled Water Return Temperature – CHWRT
aa. Command – CMD
bb. Status – STS
cc. Fan Start/Stop Control Switch – FAN S/S
dd. Temperature – Temp

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4. Definition of Display Names, Point Name and Facets

Display Name	Point Name	Facets
Actual Cooling Setpnt	ACSP	units=˚F precision=1
Actual Htg Setpnt	AHSP	units=˚F precision=1
Air Handling Unit	AHU	units=null precision=0
Air Quality	AirQ	units=ppm,precision=2,min=0.0,max=5000.0
Air Quality Flag	AirQStatus	truetext=On falsetext=Off
Airflow	AirFlw	units=cfm precision=1
Airflow Setpoint	AirSet	units=cfm precision=1
Alarm	Alm	truetext=true falsetext=false
Auxillary Space Temp	AuxSpaceT	units=˚F precision=1
Auxillary Temp	AuxTemp	units=˚F precision=1
Auxillary Temp	AuxT	units=˚F precision=1
Average Temperature	AvgT	units=˚F precision=1
Average Zone Temperature	AvgZnT	units=˚F precision=1
Bearing Oil Return Temp (# if needed)	BrngOilRT(#)	units=˚F precision=1
Bearing Oil Supply Temp	BrngOilST	units=˚F precision=1
Bldg	Bldg	units=null precision=0
Bldg Diff Press	BDP	units=psi precision=1
Bldg Flow (#)	BldgFlow (# if needed)	units=gpm precision=1
Bldg Static Press	BStcPr	units=in/wc precision=2
Bldg Static Press Setpoint	BldStatPrSp	units=in/wc precision=2
Boiler	Blr	units=null precision=0
Boiler Alarm	BlrAlm	truetext=ALARM falsetext=Normal

Boiler Command	BlrCmd	truetext=On falsetext=Off

Display Name	Point Name	Facets
Boiler Flame Fail	BlrFlameFail	truetext=ALARM falsetext=Normal
Boiler Flow Switch	BlrFlowStat	truetext=Flow falsetext=NoFlow
Boiler Modulating Valve	BlrVlv	units=% precision=0
Boiler Plant Enable	BlrPlantEna	truetext=Enabled falsetext=Disable
Boiler Pump Status	BlrPStatus	truetext=Running falsetext=Stopped
Boiler Status	BlrStatus	truetext=On falsetext=Off
Boiler Supply Temp	BlrST	units=˚F precision=1
Boiler Valve	BlrVlv	truetext=Open falsetext=Closed
Boiler Water Temp	BlrWT	units=˚F precision=1
Boilers Enabled Status	BlrPlantStat	truetext=Enabled falsetext=Disable
Booster Pump Speed	BostrPO	units=% precision=0
Booster Pump Status	BostrPStatus	truetext=Running falsetext=Stopped
Box Supply Temp	DAT	units=˚F precision=1
Building Differential Pressure	BDP	units=in/wc precision=2
Building Differential Pressure Low Limit	BDPLL	units=^in/wc precision=2
Building Pump # (number) Status	BP#Status	truetext=Running falsetext=Stopped
Building Pump Flow Switch	BFlwStat	truetext=Flow falsetext=NoFlow
Building Water Return Temp	BldgRT	units=˚F precision=1
Building Water Supply Temp	BldgST	units=˚F precision=1
Bypass Valve Command	BypVlv	truetext=Open falsetext=Closed; units=% precision=0
Calculated Cooling Setpoint	ClgStPnt	units=˚F precision=1

Charge GPM	ChrgFlow	

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Display Name	Point Name	Facets
Chemical Treatment # Alarm	ChemTrt#Alm	
Chilled Water	CHW	units=% precision=0
Chilled Water Bypass Valve	CHWBypVlv	units=% precision=0
Chilled Water Bypass Valve Output	CHWBypVlvO	units=% precision=0
Chilled Water Differential Pressure	CHWDP	units=psi precision=0
Chilled Water Differential Pressure Average	CHWDPAvg	units=psi precision=0
Chilled Water Differential Pressure Setpoint	CHWDPSetP	units=psi precision=0
Chilled Water Pump # VFD	CHWP#VFDO	units=% precision=0
Chilled Water Pump Cmd	CHWPCmd	truetext=On falsetext=Off
Chilled Water Pump Status	CHWPStat	truetext=Running falsetext=Stopped
Chilled Water Return Flow	CHWRFl	units=gal/min precision=1
Chilled Water Return Temp	CHWRT	units=˚F precision=1
Chilled Water Setpnt	CHWSP	units=˚F precision=1
Chilled Water Setpnt (Leaving)	LvCHWSetP	units=˚F precision=1
Chilled Water Supply Flow	CHWSFl	units=gal/min precision=1
Chilled Water Supply Temp	CHWST	units=˚F precision=1
Chilled Water Valve	CHWVlv	units=% precision=0
Chiller	CH	truetext=Enabled falsetext=Disabled
Chiller # Chilled Water Differential Pressure	CH#CHWDP	units=psi precision=0
Chiller # Chilled Water Differential Pressure Switch	CH#CHWDPSw	truetext=Closed falsetext=Open
Chiller Alarm	CHAlm	truetext=ALARM falsetext=Normal
Chiller Amps	CHAmps	units=ampere (A) precision=2

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Display Name	Point Name	Facets
Chiller Cmd	CHCmd	truetext=Enabled falsetext=Disabled
Chiller Cond Press	CHCndPr	units=psi precision=1
Chiller Enable	CHEna	truetext=Enabled falsetext=Disabled
Chiller KW	CHKW	units=kW precision=1
Chiller Plant Enable	CHPlantEna	truetext=Enabled falsetext=Disabled
Chiller Setpoint Reset	CHWStPntRst	units=null precision=0
Chiller Status	CHStatus	truetext=Running falsetext=Stopped
Chiller Volts	CHVolts	units=volt (V) precision=2
CO Level	COLvl	units=ppm precision=1
CO2 Alarm	CO2Alm	units=ppm precision=1
CO2 Level	CO2Lvl	units=ppm precision=1
Cold Deck	ColdDeck	
Cold Deck Humidity	ColdDeckHum	units=%RH precision=0
Cold Deck Temp	ColdDeckT	units=˚F precision=1
Coldest Zone Temp	ColdestZnT	units=˚F precision=1
Common Setpoint (Base)	CmnStPnt	units=null precision=0
Communication Lost Alarm	CommLostAlm	truetext = Comm Lost falsetext=Comm Normal
Communication Lost Alarm	CommAlm	truetext=Comm Lost falsetext=Comm Normal
Communication Status	CommStatus	truetext=Normal falsetext=No Comm
Compressor	Comp#Status(#=Stage number)	truetext=On falsetext=Off
Compressor # Safety	Comp#Safety (#=Stage number)	truetext=ALARM falsetext=Normal
Compressor Command	Comp#Cmd(#=Stage number)	truetext=Run falsetext=Off

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Display Name	Point Name	Facets
Compressor Lockout	CompLckOut	truetext=LockedOut falsetext=Normal
Compressor Protection Circuit	CompProtCrt	truetext=Normal falsetext=Alarm
Condensate Switch Status	CondensateStat	truetext=true falsetext=false
Condenser Water	CW	
Condenser Water Pressure	CWPress	units=psi precision=1
Condenser Water Pump # Alarm	CWP#Alm	truetext=ALARM falsetext=Normal
Condenser Water Pump # Cmd	CWP#Cmd	truetext=On falsetext=Off
Condenser Water Pump # Runtime	CWP#RunT	units=nullprecision=1
Condenser Water Pump # Status	CWP#Stat	truetext=On falsetext=Off
Condenser Water Pump # VFD	CWP#VFDO	units=% precision=0
Condenser Water Pump Cmd	CWPCmd	truetext=On falsetext=Off
Condenser Water Pump Status	CWPStat	truetext=On falsetext=Off
Condenser Water Pump VFD	CWPVFDO	units=% precision=0
Condenser Water Return Flow	CWRetFl	units=gal/min precision=1
Condenser Water Return Temp	CWRT	units=˚F precision=1
Condenser Water Setpnt	CWStPnt	units=˚F precision=1
Condenser Water Supply Flow	CWSFl	units=gal/min precision=1
Condenser Water Supply Temp	CWST	units=˚F precision=1
Condenser Water Valve	CWVlv	units=% precision=0
Control Setpoint	CtrlSp	units=˚F precision=1
Control Temp	CtrlTemp	units=˚F precision=1
Controller Alarm	CtrlAlm	truetext=Alarm falsetext=Normal
Controller Status	CtrlStat	truetext=Online falsetext=Offline

Cool Switch	ClgSw	truetext=Auto falsetext=Off

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Display Name	Point Name	Facets
Cooling	Clg	truetext=Clg falsetext=Off OR units=% precision=1
Cooling # Command	Clg#Cmd (#=Stage number)	truetext=On falsetext=Off
Cooling Capacity (%)	ClgCap	units=% precision=1
Cooling Cmd	ClgCmd	truetext=On falsetext=Off
Cooling Face & Bypass	CCByp	units=% precision=0
Cool Flag	ClgStatus	truetext=On falsetext=Off
Cooling Lockout Setpoint	ClgLckSp	units=˚F precision=1
Cooling Master Reference	ClgMstrRef	
Cooling Mode	ClgMode	truetext=On falsetext=Off
Cooling Request	ClgReq	truetext=ClgReq falsetext=NoClgReq
Cooling Setpoint - Unoccupied	UnoccClgSp	units=˚F precision=1
Cooling Setpoint Offset	ClgSetPOff	
Cooling Stages	ClgStgs	units=null precision=0
Cooling Tower	ClgTwr	truetext=On falsetext=Off
Cooling Tower # Fan Cmd	ClgTwr#FCmd	truetext=On falsetext=Off
Cooling Tower # Fan Status	ClgTwr#FStat	truetext=On falsetext=Off
Cooling Tower # Isolation Valve Command	ClgTwr#IsoVlvCmd	truetext=Open falsetext=Closed
Cooling Tower # VFD	ClgTwr#VFDO	units=% precision=0
Cooling Tower Bypass Valve Output	ClgTwrBypVlvO	units=% precision=0
Cooling Tower Damper	ClgTwrDpr	units=% precision=0
Cooling Tower Hi Speed	ClgTwrHiSpd	truetext=HiSpeedOn falsetext=HiSpeedOff
Cooling Tower Lo Speed	ClgTwrLoSpd	truetext=LoSpeedOn falsetext=LoSpeedOff

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Display Name	Point Name	Facets
Cooling Tower Pump Cmd	ClgTwrPCmd	truetext=On falsetext=Off
Cooling Tower Pump Status	ClgTwrPStat	truetext=On falsetext=Off
Cooling Tower Return Temp	ClgTwrRetT	units=˚F precision=1
Cooling Tower Sump High Limit	ClgTwrSmpHL	truetext=HL-ALARM falsetext=Normal
Cooling Tower Sump Low Limit	ClgTwrSmpLL	truetext=LL-ALARM falsetext=Normal
Cooling Tower Sump Temp	ClgTwrSmpT	units=˚F precision=1
Cooling Tower Supply Temp	ClgTwrSupT	units=˚F precision=1
Cooling Tower Vibration Alarm	CT#VibeAlm	truetext=VIB-ALARM falsetext=Normal
Cooling Valve	ClgVlv	units=% precision=0
Cooling Valve Command	ClgVlvOut	units=% precision=0
Current Limit	CurrLim	units=non precision=1
Damper	Dpr	
Damper Cmd	DprCmd	truetext=On falsetext=Off
Damper Command	DprCmd	truetext=On falsetext=Off
Damper Enable	DprEna	truetext=On falsetext=Off
Damper Manual Pos	DprManPos	units=% precision=0
Damper Mode (Manual Auto)	DprMode	1=Manual 2=Auto
Damper Pos (VAV)	DprPos	units=% precision=0
Damper Status	DprStat	truetext=On falsetext=Off
Day Night Mode	DayNtMode	truetext=NIGHT falsetext=DAY
Deadband	Db	units=null precision=0
Differencial Pressure	DiffPr	units=psi precision=1
Differencial Pressure Setpoint	DiffPrSp	units=psi precision=1

Disch Air	DA	

Display Name	Point Name	Facets
Disch Air Dew Pnt	DADewPnt	units=°F precision=1
Disch Air Flow	DAFlow	units=cfm precision=1
Disch Air Humidity	DAHum	units=%RH precision=0
Disch Air Static Press	DAStaticPr	units=in/wc precision=2
Disch Air Vel Press	DAVelPr	units=in/wc precision=2
Discharge Air Cooling Setpoint	DaClgSp	units=°F precision=1
Discharge Air Duct Pressure Setpoint	DADPSp	units=in/wc precision=2
Discharge Air Heating Setpoint	DaHtgSp	units=°F precision=1
Discharge Air Setpoint	DATSp	units=°F precision=1
Discharge Air Smoke Detector Status	DASmkDetStat	truetext=Alarm falsetext=Normal
Discharge Air Temp	DAT	units=°F precision=1
Discharge Air Temp Low Limit	DATLL	units=°F precision=1
Dom Water Press	DomWtrPr	units=psi precision=1
Dom Water Pump Status	DomWtrPStat	truetext=On falsetext=Off
Drain Valve	DrainVlv	truetext=Open falsetext=Closed
Duct Smoke Det	DuctSmokeDet	truetext=ALARM falsetext=Normal
Duct Static Press	DSPr	units=in/wc precision=2
Economizer	Econ	truetext=Open falsetext=Closed
Economizer Status	EconStat	truetext=Enabled falsetext=Disabled
Economizer Switchover Setpoint	EconSwSp	units=°F precision=1
Effective Setpoint	EffSetP	units=null precision=0
Element Communication Status	ElemtCommStatus	truetext=No falsetext=Yes

Emergency Lighting	EMLTG	truetext=On falsetext=Off
Emergency Shutdown	EMShutdown	truetext=ALARM falsetext=Normal

Display Name	Point Name	Facets
Emergency Stop	EMStop	truetext=Alarm falsetext=Normal
Enable	Ena	truetext=true falsetext=false
Energy Recovery Unit Command	ERecovCmd	truetext=Enables falsetext=Disabled
Energy Recovery Unit Command	HRecovVlv	truetext=Open falsetext=Closed
Enthalpy	Enth	units=btu/pound (BTU/lb)
Enthalpy Switch	EnthSw	truetext=true falsetext=false
Exh Air Damper	ExAirDpr	units=% precision=0
Exh Air Flow	ExAirFlow	units=cfm precision=1
Exh Fan	ExF	truetext=On falsetext=Off
Exh Fan Cmd	ExFCmd	truetext=true falsetext=false
Exh Fan Status	ExFStatus	truetext=true falsetext=false
Exhaust Fan Control **	ExFCmd	truetext=On falsetext=Off
Exhaust Fan Status **	ExFStatus	truetext=On falsetext=Off
Exhaust Fan VFD Speed Output	ExFVFDO	units=% precision=0
Face & Bypass Damper	FaceBypDpr	units=% precision=0
Failure	Fail	truetext=ALARM falsetext=Normal
Fan	Fan	truetext=On falsetext=Off

Fan # Cmd	Fan#Cmd	truetext=On falsetext=Off
Fan # VFD Alarm	Fan#VFDAlm	truetext=ALARM falsetext=Normal
Fan Cmd	FanCmd	truetext=On falsetext=Off

Display Name	Point Name	Facets
Fan Coil Unit	FCU	truetext=On falsetext=Off
Fan Control Offset	FanCntOffst	units=none precision=1
Fan Mode	FanMode	truetext=On falsetext=Off
Fan Occupied Mode Select	FanOccModeSlt	truetext=On falsetext=Off
Fan Speed	FanSpd	units=% precision=1
Fan Speed High	FanSpdHi	truetext=On falsetext=Off
Fan Speed Low	FanSpdLo	truetext=On falsetext=Off
Fan Status	FanStatus	truetext=On falsetext=Off
Fan Switch	FanSw	truetext=Auto falsetext=On
Fan Unoccupied Mode Select	FanUnoccModeSlt	truetext=On falsetext=Off
Fan VFD	FanVFDO	units=% precision=0
Filter Runtime	FilterRunT	units=hrs
Filter Status	FilterStat	truetext=true falsetext=false
Final Filter Status	FinFilterStat	truetext=true falsetext=false
Fire Alarm	FireAlm	truetext=true falsetext=false
Flow Override	FlowOvrd	Enum range(AUTO=1,OPEN=2,CLOSED=3,MIN-4,Max=5)
Fluid Cooler Tower Fan 1 Command	ClgTwrF1Cmd	truetext=On falsetext=Off
Fluid Cooler Tower Fan 1 VFD Output	ClgTwrVFD1O	units=% precision=0
Fluid Cooler Tower Fan 2 Command	ClgTwrF2Cmd	truetext=On falsetext=Off

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Fluid Cooler Tower Fan 2 VFD Output	ClgTwrVFD2O	units=% precision=0
Fluid Cooler V-2 Isolation Valve	ClgTwr1Vlv	units=% precision=0
Fluid Cooler V-2 Isolation Valve	ClgTwr1Vlv	units=% precision=0
Fluid Cooling Tower Fan 1 Status	ClgTwrF1Stat	truetext=On falsetext=Off

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Display Name	Point Name	Facets
Fluid Cooling Tower Fan 2 Status	ClgTwrF2Stat	truetext=On falsetext=Off
Freeze Protection Circuit	FrzProtCrt	truetext=Alarm falsetext=Normal
Freeze Stat	FrzStat	truetext=Alarm falsetext=Normal
Frequency	Frq	
General Element Alarm	GenlAlm	truetext=Alarm falsetext=Normal
GPM	Flow	
Group Fan Occ Mode Sel	GrpModeOccMode	trueText=Auto,falseText=On
Group Mode Select	GrpModeSel	units=null,precision=2,min=0.0,max=4.0
Group Name	GrpName	
Group Number	GrpNumber	
Group Occupied Schedule	GrpOccSched	
Hand	Hnd	range=<0=Off, 1=InHand/Manual, 2=Auto>
Heat Ex	HX	truetext=On falsetext=Off
Heat Ex Bypass Valve	HXBypVlv	truetext=Open falsetext=Closed
Heat Ex Valve	HXVlv	units=% precision=0
Heat Flag	HtgStatus	truetext=On falsetext=Off
Heat Switch	HtgSw	truetext=Auto falsetext=Off
Heating	Htg	truetext=true falsetext=false or units=% precision=1
Heating Capacity (%)	HtgCap	units=% precision=1
Heating Command	Htg#Cmd (#=Stage number)	truetext=On falsetext=Off
Heating Enable	HtgEna	truetext=On falsetext=Off
Heating Lockout Setpoint	HtgLckSp	units=˚F precision=1

Heating Master Reference	HtgMstrRef	

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Display Name	Point Name	Facets
Heating Mode	HtgMode	truetext=HtgReq falsetext=NoHtgReq
Heating Request	HtgReq	truetext=HtgReq falsetext=NoHtgReq
Heating Setpoint	HtgStPnt	units=˚F precision=1
Heating Setpoint Offset	HtgSetPOff	
Heating Stages	HtgStgs	units=null precision=0
Heating Stages In Total	HtgStgsTot	units=null precision=0
High DA Temperature Alarm	HiDaTempAlm	Normal,Alarm
High Zone	HiZone	
Hot Deck Humidity	HDeckHum	units=%RH precision=0
Hot Deck Temp	HDeckT	units=˚F precision=1
Hot Water Diff Press	HWDiffPr	units=psi precision=1
Hot Water Flow	HWFlow	units=gal/min precision=1
Hot Water Pump Status	HWPStat	truetext=On falsetext=Off
Hot Water Pump VFD Output	HWPVFDO	units=% precision=0
Hot Water Return Flow	HWRFl	units=% precision=0
Hot Water Return Temp	HWRT	units=˚F precision=1
Hot Water Supply Flow	HWSFl	units=gal/min precision=1
Hot Water Supply Temp	HWST	units=˚F precision=1
Htg Valve	HtgVlv	units
Htg/Clg Valve	HtgClgVlv	units=% precision=0
Humidifier Cmd	HumCmd	truetext=On falsetext=Off
Humidity Setpnt	HumStPnt	units=%RH precision=0
HVAC Mode	HvacMode	Enumerated point

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Isolation Valve	IsoVlv	units=% precision=0

Display Name	Point Name	Facets
Kilowatt Hours	KWH	units=kWh precision=1
KW Demand	KW	units=kW precision=1
Leaving Water Temperature	LeavWtrTemp	units=˚F precision=1
Lighting	LTG	units=˚F precision=1

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Display Name	Point Name	Facets
Make Up Air Unit	MAU	truetext=On falsetext=Off
Make Up Air Unit 1 Command	MAU1Cmd	truetext=On falsetext=Off
Make Up Air Unit 1 Status	MAU1Stat	truetext=On falsetext=Off
Make Up Air Unit 2 Command	MAU2Cmd	truetext=On falsetext=Off
Make Up Air Unit 2 Status	MAU2Stat	truetext=On falsetext=Off
Max Clg Setpnt	MaxClgSp	units=˚F precision=1
Max Flow Setpoint	MaxFlowSp	units=none precision=1
Max Htg Setpnt	MaxHtgSp	units=˚F precision=1
Max Zone Temp	MaxZnT	units=null,precision=2,min=-inf,Max=+inf
Mechanical Cooling Setpoint	ClgStPnt	units=˚F precision=1
Min Clg Setpnt	MinClgSp	units=˚F precision=1
Min Flow Setpoint	MinFlowSp	units=none precision=1
Min Heating Flow Setpoint	MinHtgFlow	units=none precision=1
Min Htg Setpnt	MinHtgSp	units=˚F precision=1
Min Zone Temp	MinZnT	units+null,precision=1,min=-inf,Max=+inf
Mixed Air Damper	MaDprOut	units=% precision=0
Mixed Air Damper Positional	MaDprPos	units=% precision=0
Mixed Air Damper Setpoint	MADMinPos	units=% precision=0
Mixed Air Dew Pnt	MaDewPnt	units=˚F precision=1
Mixed Air Enthalpy	MaEnth	units=btu/pound (BTU/lb)

Mixed Air Humidity	MaHum	units=%RH precision=0

Display Name	Point Name	Facets
Mixed Air Smoke Detector	MASmodeDetStatus	units=˚F precision=1
Mixed Air Temp	MAT	units=˚F precision=1
Mixed Air Temp Low Limit Setpoint	MATLL	units=˚F precision=1
Mixed Air Temp Setpoint	MATSp	units=˚F precision=1
Modular Small Cabinet Fan	MSCF	truetext=On falsetext=Off
Morning Warmup Differential	MrngWrmupDiff	units=˚F precision=1
Morning Warmup Set Point	MrngWrmupSetP	units=˚F precision=1
Morning Warmup Temperature	MrngWrmupT	units=˚F precision=1
Motor Winding Temperature (#)	MotWinT#	units=˚F precision=1
Net Sensor Temperature	NetSensorT	units=˚F precision=1
Night Setback Setpnt	NightSetback	units=˚F precision=1
Night Setup Setpnt	NightSetupSp	units=˚F precision=1
Occup Mode/Status	OccStatus	occupied, unoccupied, standby *varies with manufacturer
Occupancy Command	OccCmd	occupied, unoccupied, standby *varies with manufacturer
Occupied Clg Setpnt	OccClgSp	units=˚F precision=1
Occupied High Humidity	OccHiHum	units=% precision=0
Occupied Htg Setpnt	OccHtgSp	units=˚F precision=1
OK to Economize	EconEna	truetext=Enabled falsetext=Disabled
On/Off	OnOff	truetext=true falsetext=false
Operational Mode (i.e. Cool/Heat)	OpMode	occupied, unoccupied, standby *varies with manufacturer

Outdoor Air Damper Position	OADmpPos	units=% precision=0

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Display Name	Point Name	Facets
Outdoor Air Temperature	OAT	units=˚F precision=1
Outside Air Damper (2 Position)	OADmpCmd	truetext=Open falsetext=Closed
Outside Air Damper Minimum Position	OADMinPos	units=% precision=0
Outside Air Dew Pnt	OADewPnt	units=˚F precision=1
Outside Air Enthalpy	OAEnth	units=btu/pound (BTU/lb)
Outside Air Fan Start Stop	OAFanCmd	truetext=true falsetext=false
Outside Air Flow	OAFlow	units=cfm precision=1
Outside Air Flow Setpoint	OAFlowSp	units=cfm precision=1
Outside Air Humidity	OAHum	units=%RH precision=0
Outside Air Lockout Setpnt	OATLckOut	units=˚F precision=1
Outside Air Minimum Flow Setpoint	OAMinFlowSp	units=cfm precision=1
Override Command	OvrCmd	occupied, unoccupied, standby *varies with manufacturer
Override Duration (User Defined Time)	OvrDuration	units=min precision=1
Override Status	OvrStat	truetext=On falsetext=Off
Override Time Remaining	OvrTmRemain	units=min precision=1
Phase # Run Load Amps	Phase#RLA	units=amps precision=2
Photo Cell	PTC	truetext=true falsetext=false
Power Fail Status	PwrFailStat	truetext=PF falsetext=Normal
Pre Filter Status	PreFilterStat	truetext=Dirty falsetext=Clean
Pressure	Press	units=psi precision=1
Pri/Primary	Pri	units=null precision=0
Primary Air Flow	PriAirFlw	units=cfm precision=1
Primary Air Temperature	PriAT	units=˚F precision=1

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Display Name	Point Name	Facets
Primary Pump Start Stop	PPmp#Cmd	truetext=On falsetext=Off
Pump # (number) Control	P#Cmd	truetext=On falsetext=Off
Pump # (number) Status	P#Status	truetext=On falsetext=Off
Pump # (number) VFD Output	P#VFDO	units=% precision=0
Refrig Exhaust Fan	RefExFan	truetext=On falsetext=Off
Refrig Monitor Alarm	RefMonAlm	truetext=ALARM falsetext=Normal
Refrig Shutdown	RefShutdown	
Reheat Temp	RhtT	units=°F precision=1
Relative Humidity	RH	units=%RH precision=0
Relative Humidity Flag	RHStatus	truetext=ON falsetext=Off
Reliability of Inputs/Network	Reliable	truetext=Ok falsetext=Error
Relief Fan Command	RLFCmd	truetext=On falsetext=Off
Relief Fan Status	RLFStat	truetext=On falsetext=Off
Remote Adjust	RemAdj	truetext=On falsetext=Off
Remote Command	RemCmd	truetext=ON falsetext=Off
Return Air Damper	RADpr	units=% precision=0
Return Air Dew Pnt	RADewPnt	units=°F precision=1
Return Air Enthalpy	RAEnth	units=btu/pound (BTU/lb)
Return Air Flow	RAFlow	units=cfm precision=1
Return Air Humidity	RAHum	units=%RH precision=0
Return Air Temp	RAT	units=°F precision=1
Return Air Vel Press	RAVelPr	units=psi precision=1
Return Fan	RetF	truetext=On falsetext=Off

Return Fan Cmd	RetFCmd	truetext=On falsetext=Off

Display Name	Point Name	Facets
Return Fan Damper	RetFDpr	units=% precision=0
Return Fan Inlet Vanes	RetFInletVn	units=% precision=0
Return Fan Inlet Vanes Pos	RetFInletVnPos	units=% precision=0
Return Fan Smoke Det	RASmokeDet	truetext=ALARM falsetext=Normal
Return Fan Status	RFStatus	truetext=On falsetext=Off
Return Fan VFD	RFVFDOut	units=% precision=0
Return Valve	RetVCmd	truetext=On falsetext=Off
Reversing Valve	RevVlv	units=% precision=0
Reversing Valve Command	RevVlv	units=% precision=0
Reversing Valve Command	RevVlv	units=% precision=0
Roof Top Unit	RTU	truetext=On falsetext=Off
Room	Rm	units=null precision=0
Room Dew Pnt	RmDewPnt	units=˚F precision=1
Room Dew Pnt	ZnDewPnt	units=˚F precision=1
Room Humidity	RmH	units=%RH precision=0
Room Humidity	ZnHum	units=%RH precision=0
Room Static Press	RmStPr	units=in/wc precision=2
Room Static Press	ZnStaticPr	units=in/wc precision=2
Room Temp	RmT	units=˚F precision=1
Room Temp Alarm	RmTAlm	truetext=ALARM falsetext=Normal
Room Temperature	RmT	units=˚F precision=1
Room TemperatureSetpoint	RmTSp	units=˚F precision=1

Secondary Chilled Water Diff Press	SCHWDiffPr	units=psi precision=1
Secondary Chilled Water Flow	SCHWFlow	units=gal/min precision=1

Display Name	Point Name	Facets
Secondary Chilled Water Pump Status	SCHWPStat	truetext=On falsetext=Off
Secondary Chilled Water Return Temp	SCHWRT	units=˚F precision=1
Secondary Chilled Water Supply Temp	SCHWST	units=˚F precision=1
Secondary Condensor Pump Speed	SCWP#Sp (#=pump #)	units=Hz precision=1
Secondary Condensor Pump Speed Out	SCWP#SO (#=pump #)	units=Hz precision=1
Secondary Condensor Water Return Temp	SCWRT	units=˚F precision=1
Secondary Condensor Water Supply Temp	SCWST	units=˚F precision=1
Secondary Pump Diff Press High Setpoint	SPDPHSetP	units=psi precision=1
Secondary Pump Diff Press Low Setpoint	SPDPLSetP	units=psi precision=1
Secondary Pump Ramp Timer	SPRmpTmr	units=null precision=0
Secondary Pump Start Stop	SPmp#Cmd	truetext=On falsetext=Off
Setpoint	SetP	units=null precision=0
Setpoint Adjust	SetPAdj	units=null precision=0
Setpoint High Limit	SpHiLim	units=˚F precision=1
Setpoint Low Limit	SpLoLim	units=˚F precision=1
Setpoint Offset Enable	SpOffsetEna	truetext=On falsetext=Off
Shut Down Status	ShutDWNStat	truetext=On falsetext=Off
SL Filter 1 Flow Switch Status	SndFilter1Stat	truetext=Error falsetext=Ok
SL Filter 2 Flow Switch Status	SndFilter2Stat	truetext=Error falsetext=Ok

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SL Fliter 2 Command	SndFilter2Cmd	truetext=On falsetext=Off
SL Fliter Command	SndFilter1Cmd	truetext=On falsetext=Off
Smoke Damper Status	SmokeDprStat	truetext=Open falsetext=Closed

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Display Name	Point Name	Facets
Smoke Det	SmokeDet	truetext=ALARM falsetext=Normal
Smoke Detector Status	SmokeDetStat	truetext=Error falsetext=Ok
Space Temp	SpaceT	units=˚F precision=1
Standby Clg Setpnt	SbyClgSp	units=˚F precision=1
Standby Htg Setpnt	SbyHtgSp	units=˚F precision=1
Static Press	StaticPr	units=in/wc precision=2
Static Press Setpoint	StaticPrSp	units=in/wc precision=2
Status	Stat	truetext=Error falsetext=Ok
Sump Pump Alarm	SmpPAlm	truetext=ALARM falsetext=Normal
Supply Air Dew Pnt	SADewPnt	units=˚F precision=1
Supply Air Flow	SAFlow	units=cfm precision=1
Supply Air Humidity	SAHum	units=%RH precision=0
Supply Air Reset	SAReset	units=˚F precision=1
Supply Air Static Press	SAStaticPr	units=in/wc precision=2
Supply Air Temp	SAT	units=˚F precision=1
Supply Air Temp Alarm	SATAlm	truetext=ALARM falsetext=Normal

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Display Name	Point Name	Facets
Supply Air Vel Press	SAVelPr	units=in/wc precision=2
Supply Fan Alarm	SFAlm	truetext=Alarm falsetext=Normal
Supply Fan Alarm	SFAlm	Normal,Alarm
Supply Fan Cmd	SFCmd	truetext=On falsetext=Off
Supply Fan Cmd (2 Position)	SFDprCmd	truetext=On falsetext=Off
Supply Fan Command	SFCmd	truetext=On falsetext=Off
Supply Fan Damper (Linear)	SFDprOut	truetext=On falsetext=Off
Supply Fan Inlet Vanes	SFInletVn	units=% precision=0
Supply Fan Modulation	SFVFDO	units=% precision=0
Supply Fan Smoke Det	SaSmokeDet	truetext=Alarm falsetext=Normal
Supply Fan Status	SFStatus	truetext=On falsetext=Off
Supply Fan VFD Output	SFVFDO	units=% precision=0
System Enable	SysEna	truetext=Enabledfalsetext=Disabled
Tank Temp At Ft #	TnkTmpFt#	units=˚F precision=1
Temperature	Temp	units=˚F precision=1
Terminal Load	TermLoad	units=% precision=0
Timed Override	TimedOvrride	truetext=Yes falsetext=No
Thermo On/Off State_1(Mitsubishi)	ThermoSt(Bit#)	truetext=On falsetext=Off
Tower	Twr	truetext=On falsetext=Off
TRACER Control(Trane)	TRACER	truetext=Tracer falsetext=Local
Transfer	Transfer	truetext=On falsetext=Off
Unit Alarm	UnitAlm	truetext=Alarm falsetext=Normal
Unit Heater #	UH	truetext=On falsetext=Off
Unit Ventilator	UV	truetext=On falsetext=Off

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Display Name	Point Name	Facets
Unocc Clg Setpnt	UnoccClgSp	units=˚F precision=1
Unoccupied Dehumidification	UnoccDeHum	truetext=Yes falsetext=No
Unoccupied High Humidity	UnoccHiHum	units=% precision=0
Unoccupied Status	UnoccStatus	truetext=On falsetext=Off
Unoccupied Status	UnoccStatus	truetext=On falsetext=Off
Valve Position	VlvPos	units=% precision=0
Valve Status	VlvStat	
Variable Frequency Drive	VFD	units=% precision=0
Variable Frequency Drive Alarm	VFDAlm	units=% precision=0
Variable Frequency Drive Frequency	VFDFrq	units=% precision=0
Variable Frequency Drive Output	VFDO	units=% precision=0
Ventilation Mode	VentMode	
VVT Box	VVT	
Warm/Cool Adjust	WCAdj	units=null precision=0
Warmest Zone Temp	WarmestZnT	units=˚F precision=1
Water Differential Pressure	WDP	units=psi precision=1
Water Flow	WtrFl	units=gal/min precision=1
Zone	Zn	units=null precision=0
Zone Damper	ZnDprCmd	units=% precision=0
Zone Damper Pos (Linear)	ZnDprPosOut	truetext=On falsetext=Off
Zone Damper Status	ZnDprStat	truetext=On falsetext=Off
Zone Demand	ZnDmd	DeltaF
Zone Humidity Setpnt	ZnHumStpnt	units=%RH precision=0
Zone Reheat Valve	ZnRhtVlv	units=% precision=0

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Display Name	Point Name	Facets
Zone Setpnt	ZnTStpt	units=˚F precision=1
Zone State	ZnState	
Zone Temp	ZnT	units=˚F precision=1
Zone Temp Alarm	ZnTAlm	truetext=ALARM falsetext=Normal
Zone Temp Low Alarm	ZnTLoAlm	truetext=ALARM falsetext=Normal
AC Start Sequence	StrtSeq	truetext=On falsetext=Off

Attachment B

5. Default Building Occupancy Schedule

Default Building Occupancy Schedule: The following occupancy schedules shall be programmed into the FMCS DDC unless otherwise directed by the UNCC.

Building Use	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Administrative	0730-1800	0730-1800	0730-1800	0730-1800	0730-1800	By Appointment	By Appointment
Type X	0600-2000	0600-2000	0600-2000	0600-2000	0600-2000	0600-2000	0600-2000
Type Y	0530-2130	0530-2130	0530-2130	0530-2130	0530-2130	0530-2130	0530-2130
Type Z	By Appointment	By Appointment	By Appointment	By Appointment	By Appointment	By Appointment	By Appointment
Dorms	Heating 0600-1700 65°F 1700-0600 72°F Cooling 0600-1700 80°F 1700-0600 74°F	Heating 0600-1700 65°F 1700-0600 72°F Cooling 0600-1700 80°F 1700-0600 74°F	Heating 0600-1700 65°F 1700-0600 72°F Cooling 0600-1700 80°F 1700-0600 74°F	Heating 0600-1700 65°F 1700-0600 72°F Cooling 0600-1700 80°F 1700-0600 74°F	Heating 0600-1700 65°F 1700-0600 72°F Cooling 0600-1700 80°F 1700-0600 74°F	Heating 0600-1700 65°F 1700-0600 72°F Cooling 0600-1700 80°F 1700-0600 74°F	Heating 0600-1700 65°F 1700-0600 72°F Cooling 0600-1700 80°F 1700-0600 74°F