

CONSTRUCTION REQUIREMENTS

Note: The buildings on the UCCS campus are divided into two categories: General Fund and Auxiliaries. General Fund Buildings include academic and administrative functions. Auxiliary buildings include residence halls, athletic, and dining facilities. In some cases, construction standards differ depending on the building category. Confirm building category with Facilities Services Project Manager.

- Building Automation System (BAS)

DIVISION TWENTY-THREE: BUILDING AUTOMATION SYSTEM (BAS)

A. General Overview:

- A large percentage of UCCS buildings are served by a campus wide Building Automation System (BAS). The campus BAS is developed, installed and maintained by in-house personnel. The system provides HVAC control, monitoring, alarming/paging, trending, user management and in some instances lighting control.

B. BAS Integration:

- The BAS shall have interface capabilities to modbus and BACnet field gear. Any integration of the BAS to other automation systems such as, but not limited to fire alarm, card access, security, lighting, refrigerant detection and elevator systems shall be limited to monitoring and alarming only and be coordinated with UCCS Project Manager.
- The BAS shall have the capability for the operator to access the system remotely using a WEB interface.
- The BAS shall have a historical archive system with the capability to store up to 5,000 trends for indefinite time limitation.

C. Shop Drawings:

- The Controls Contractor shall provide shop drawings and control point schedules for review.
- The Controls Contractor shall perform electronic and onsite shop drawing reviews as required by UCCS before submittal approved.

D. Equipment Operation Sequences:

- HVAC Sequence of Operation (SOO) narratives for all HVAC systems shall be written by the A/E and will be included in the project specifications. Flow schematics for more complicated HVAC systems are also strongly encouraged.
- A virtual testing demonstration of the SOO with UCCS is required. Contractor, Engineer, and Commissioning agent should be engaged in this demonstration.

- E. BAS Approved Manufacturers:
 - New installations of HVAC BAS are limited to:
 1. Setpoint Systems Corporation
 - Delta Controls: <https://www.deltacontrols.com/>
 2. ICSI Colorado
 - Automated Logic: <http://www.automatedlogic.com/>

- F. BAS Equipment and System Extent: At a minimum the following equipment and systems shall be hard wired or BACnet integrated into the BAS as required in project plans and specifications.
 - Central Station Equipment: Includes, but not limited to air handling units and associated return/relief fans, chillers, chilled water pumps, cooling towers, condenser water pumps, chilled water BTU metering stations, boilers, heat exchangers, hot water pumps, hydronic filtering stations, steam condensate return units, sewage ejectors, sump pumps and domestic water booster stations.
 - Exhaust Fans: Includes, but not limited to toilet exhaust, general exhaust, and laboratory exhaust and equipment room ventilation fans.
 - Terminal Units: Includes, but not limited to VAV boxes, reheat coils, and perimeter heating units.
 - Room Pressurization Controls: Monitoring and control of room airflows, fume hoods, relative room pressurization, etc.
 - Hydronic System Control: Control of pump speed and monitoring of system fill pressure.

- G. BAS Panel / Device Installation:
 - BAS panel and device locations shall be noted on enlarged mechanical equipment room plans and in the BAS shop drawings. BAS equipment should be located in rooms where ambient temperatures in the range of 50- 90 Deg F are maintained. Provide adequate clearance so that BAS panel doors can be fully opened without obstruction. Ensure that adequate lighting above all BAS panels and VFD's is provided.

- H. BAS Workstation:
 - Desktop computer shall be provided with any new BAS installation. Table/workstation is OFOI. Data port and electrical duplex shall be provided at workstation location.
 - A HTML5 graphical user interface shall be provided for each system and displayed on the workstation.

- I. Power/Electrical:
 - BAS controllers and system components shall be fed from dedicated circuits separate from non-BAS equipment or devices. For equipment on emergency power, BAS controllers and system components shall be powered from emergency panels.
 - Electrical receptacles should be provided adjacent to all BAS panels for power service tools.

- J. Safety Control Devices:
 - Each safety control device, such as a freeze protection thermostat, a high or low pressure safety switch, shall be hard-wired into the safety circuit with individual alarms reported to the BAS.

- K. Pneumatic Controls:
 - The use of pneumatic controls and devices is discouraged. The use of any new pneumatic control components shall be approved by UCCS Project Manager.

- L. Control Valves and Dampers:
 - The A/E is responsible for properly delineating all required valves and dampers on the drawings. As a UCCS standard, Belimo valves and actuators are preferred.

- M. Variable Frequency Drives (VFD's):
 - UCCS makes extensive use of Variable Frequency Drives (VFD's) to conserve energy. Typical applications include motors for pumps, air handling unit fans, and chillers, etc. VFD's are typically provided and installed by the contractor. All motors that are intended to be operated with VFD's need to be scheduled / specified with shaft ground is required.

- N. Sub Metering Utilities – BASE BID
 1. Domestic Water – Measure overall building consumption. Controls contractor provides communication infrastructure between meter and BAS.

 2. Natural Gas – Meter overall gas consumption tied back to the BAS controls system; Colorado Springs Utilities provides Pulse Indicator Board (PIB); Controls contractor provides communication infrastructure between PIB and BAS.

 3. Electric – Measure overall building consumption. Controls contractor provides communication infrastructure between meter and BAS.

 4. Per CSU standards, interval data at 5-minute (electric); interval data at 15-minute (natural gas, water).

Provide Add Alternate #1: Sub meter different building electrical panel loads. Controls contractor provides communication infrastructure between sub meter and BAS.

Provide Add Alternate #2: Sub meter mechanical equipment makeup water from overall building use. Controls contractor provides communication infrastructure between meter and BAS.