

DIVISION 25 BUILDING AUTOMATION

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Unless stated otherwise, the standards in this Facilities Design Manual (FDM) are directed to the Design Professional to incorporate into the Project.

Although the Owner encourages improved concept, method and product recommendations by the Design Professional, deviation from these standards, including product requests for “approved equivalent” status, requires written justification from the Design Professional and written approval from the Owner’s Representative before completion of Design Development Documents.

25 00 00 BUILDING AUTOMATION

A. BUILDING AUTOMATION SYSTEM (BAS) DESCRIPTION

1. The Iowa State University campus is monitored and controlled by a central Building Automation System (BAS).
2. The BAS operates all buildings for the purpose of environmental control, equipment monitoring, lighting control, energy utilization, and fire alarm reporting.
3. The BAS consists of a single file server with master control modules and application specific controllers that communicate over a single network.
 - a. The BAS master control modules are interconnected over the ISU Ethernet system.
 - b. Each alteration or addition must be seamlessly compatible with the BAS.
4. The BAS may not be available for locations outside the central campus area.
 - a. Consult with the Owner's Representative for specific applications.

B. BAS VENDOR

1. The BAS vendor is Johnson Controls, with which the Owner has had a long term contractual agreement that defines the relationship and responsibilities of the parties.
2. The Owner will only consider substitutions which are able to communicate and be totally transparent with the central processor using a single operator interface that communicates with and controls all equipment.
3. The BAS vendor will provide and coordinate start-up services for all contractors and suppliers of equipment connected to the BAS.
4. The BAS vendor will provide on-line troubleshooting within 1 hour and trained personnel on-site with tools and parts within 12-24 hours, depending upon the urgency of the situation.

C. BAS APPLICATION PHILOSOPHY

1. Typical equipment controlled by the BAS is based upon established university preferred control sequences using multiple input and output signals.
2. All components requiring control shall be fully integrated in the campus BAS system.
3. All programming logic shall be maintained within application specific devices whenever possible.
4. There will be limited application of pneumatic controls; consult the Owner's Representative regarding non-DDC actuated devices or controls. All steam valves and chilled water valves over 2" in size shall be pneumatically actuated.
5. Stand-Alone Equipment
 - a. Provide a factory equipped dedicated processor to control all functions of the system.
 - 1) This system shall be capable of operating as a stand-alone system.
 - 2) The BAS will provide the start/stop signal, a setpoint (when applicable) and will monitor the status of the equipment.
 - 3) The following equipment is typically installed with stand-alone factory controls:
 - i. Automatic Emergency Defibrillator (AED)
 - ii. Air Compressors
 - iii. Boilers
 - iv. Chillers
 - v. Domestic Hot Water Heaters
 - vi. Electrical Emergency Generators
 - vii. Fire Panels & Pumps

- viii. Pure Water Systems & Water Softeners
 - ix. Sump Pumps & Sewage Ejector Pumps
 - x. Ultra-Low Freezers
 - xi. Variable Frequency Drives
 - xii. Walk-in Coolers and Cold Rooms
6. Equipment with no BAS interface:
- a. The following equipment is typically installed without any BAS interface:
 - i. Autoclaves
 - ii. Elevators
 - iii. Fume Hoods and Bio-Safety Cabinets
 - iv. Growth Chambers
 - v. Lighting Control Panels
 - vi. Security Systems
 - vii. Specialized Departmental Equipment
7. Utility Metering
- a. The following utilities are monitored by the BAS system:
 - i. Electricity
 - 1. Fully integrated via BACnet MS/TP
 - ii. Chilled Water
 - 1. Chilled water flow meter (AI)
 - 2. Supply and return temperatures
 - iii. Steam
 - 1. Steam condensate flow meter (AI)
 - 2. Steam pressure before and after pressure reducing stations
 - iv. Domestic Water
 - 1. Domestic water flow meter (AI)
 - 2. Domestic water pressure at building entrance
 - b. All meters are owner provided.

D. BAS INSTALLATION PHILOSOPHY

- 1. Controller Locations
 - a. In panels
 - b. Above ceilings
- 2. Provide BAS components with a dedicated 120 VAC power panel. Coordinate location with Owner's Representative during the design process. All 120 VAC power shall be provided by Division 26.
- 3. Provide master control modules and critical devices with emergency power.
- 4. Do not splice control and sensor cable.
- 5. Run all sensing and control DDC cabling in dedicated blue conduit or raceway.
- 6. Connect each master control module to an Ethernet connection (data jack) provided by the Telecommunication contractor.
- 7. Run control system communication cabling to each control device location in a serial manner.
- 8. Occupancy and Vacancy Sensors

- a. Sensors furnished and installed by the Electrical contractor.
 - b. Sensors can provide either lighting, BAS operation, or both.
 - c. Wiring connected to sensors' auxiliary contacts by the Temperature Control Contractor (TCC).
9. All pneumatic work shall be provided by the TCC.
 10. It is important to clearly note in the plans and specifications that incidental control wiring related to packaged stand-alone equipment shall be provided by the TCC, for example, the control wiring of a chiller's flow switch to its on-board controller. Clearly specifying this type of work will reduce confusion by prospective bidders.

E. ROLES AND RESPONSIBILITIES

1. Collaboratively work together with the Owner's Representative to customize the building automation package for a specific project.
2. Provide a detailed sequence of operation, along with flow diagrams and point schedules on the bid drawings by the 100% Design Development stage of the process.
3. These documents will be reviewed in detail by the design professional, Johnson Controls, and ISU Energy Management in multiple sessions as required to finalize the control design. Prior to bid, it is desired that the controls design shall meet the approval of all stakeholders.
4. Programming of the fully integrated BAS master control modules and application specific controllers shall be provided separately by a direct contract to JCI paid for by the Owner, outside of the construction contract. Creating color electronic graphics, trends and alarms are requirements of this contract.

END OF DIVISION 25 BUILDING AUTOMATION