

A15.1 Standard of Practice - Building Automation Control System

OBJECTIVE OF STANDARD

- To acquaint designers and other interested parties with the University's provisions for building automation control systems within individual buildings and for centralized building automation control systems on the main campus.
- To insure consistent specifications for, and installation of, building automation control system hardware and software within campus buildings and campus-wide network interface between building systems.
- To extend the University's capabilities for remotely monitoring the environmental status of all campus buildings.

BUILDING INFRASTRUCTURE

The following buildings have the NCM (Metasys front end) and N2 buss and require no further infrastructure.

- | | |
|--|---|
| <input type="checkbox"/> Anschutz Science Library | <input type="checkbox"/> Nichols Hall |
| <input type="checkbox"/> Art & Design Building | <input type="checkbox"/> Robinson Center |
| <input type="checkbox"/> Bailey Hall | <input type="checkbox"/> Simons Bioscience Research |
| <input type="checkbox"/> Broadcast Hall | <input type="checkbox"/> Snow Hall |
| <input type="checkbox"/> Budig Hall/Hoch Auditorium | <input type="checkbox"/> Spencer Museum of Art |
| <input type="checkbox"/> Chiller Building | <input type="checkbox"/> Spencer Research Library |
| <input type="checkbox"/> Dole Human Development Center | <input type="checkbox"/> Strong Hall |
| <input type="checkbox"/> Dyche Hall | <input type="checkbox"/> Sunflower (dial-up connection) |
| <input type="checkbox"/> Haworth Hall | <input type="checkbox"/> Visitor Center |
| <input type="checkbox"/> Learned Hall | <input type="checkbox"/> Watkins Student Health Center |
| <input type="checkbox"/> Malott Hall | <input type="checkbox"/> Watson Library |
| <input type="checkbox"/> Memorial Stadium | |

The following buildings have an NCM (Metasys front end) that is monitoring older equipment, but will require a new NCM.

- Blake Hall
- Wescoe Hall

If the building is not listed, it may require provision of infrastructure for connection to the campus BACS. This includes a dedicated 120V, 20A branch circuit for the NCM, a double-gang box with single-gang plaster ring and a 1" conduit from the NCM to an NTS closet for the N2 buss.

EQUIPMENT CONTROL POINTS

This is a list of the control points, strategies, and equipment that the University will require, where applicable, on future building construction projects. The DESIGNER shall provide a point list and sequence of operation for all listed equipment. The DESIGNER shall review Johnson Controls shop drawings for compliance with the design intent.

Except where noted as local, these points will be on the BACS.

Chiller

- | | |
|--|--|
| <input type="checkbox"/> status | <input type="checkbox"/> chilled water temperature (EWT/LWT) |
| <input type="checkbox"/> condenser water temperature (EWT/LWT) | <input type="checkbox"/> current |
| | <input type="checkbox"/> fault/alarm contact(s) |

Refrigerant monitor

- | | |
|--------------------------------------|--|
| <input type="checkbox"/> alarm | <input type="checkbox"/> PPM (Metasys) |
| <input type="checkbox"/> PPM (local) | |

Surge Suppression

- phase module failure

Pumps (all)

- Status

Boiler (steam or hot water)

- | | |
|--|---|
| <input type="checkbox"/> alarm | <input type="checkbox"/> steam pressure |
| <input type="checkbox"/> status | <input type="checkbox"/> steam flow |
| <input type="checkbox"/> call for heat | <input type="checkbox"/> firing rate |

Hot water systems (Reheat or domestic)

- | | |
|---|---|
| <input type="checkbox"/> supply water temp. | <input type="checkbox"/> return water temp. |
|---|---|

Sump Level (Elevator and other) / Water Detection

- Alarm

Emergency Generator

- alarm
- generator status
- transfer switch status

Battery/Inverter Systems

- alarm
- status
- lamp out
- others as required for NFPA 101 compliance

Variable Speed Drive (VSD)

- status
- speed
- speed command
- safety circuit (smoke detector)
- current

Cold Room / Freezer Monitoring

- status/alarm
- temp

Air Handling Units

- RA CO2
- RA damper (%)
- OA damper (%)
- filter status
- MA temp.
- MA low limit
- PH temp
- CC (or cold deck) temp
- Hot deck temp
- DA temp
- OA temp
- OA RH %
- RA temp
- RA RH%
- VSD (as above)
- RH%
- Humidifier status
- Humidifier alarm
- Chilled water valve (%)
- Steam valve (%)
- Heating hot water valve (%)
- Discharge static pressure
- Occupied/Unoccupied
- Enthalpy

Utility Metering

- natural gas usage
- steam usage
- water usage
- electricity demand / usage (see Power Monitoring)

Power Monitoring

- KWH
- kW, demand
- kVAR
- kVA
- Power factor
- Demand, minimum
- Demand, average
- Demand, maximum
- Voltage, L-L
- Voltage, L-N
- Amps, average
- kW, demand phase A
- kW, demand phase B
- kW, demand phase C
- Power factor, phase A
- Power factor, phase B
- Power factor, phase C
- Voltage, A-A
- Voltage, B-C
- Voltage, A-C
- Voltage, A-N
- Voltage, B-N
- Voltage, C-N
- Amps, phase A
- Amps, phase B
- Amps, phase C

CONTROL STRATEGIES

HVAC Terminal Boxes

- occupied / unoccupied control

Air Handling Units

- occupied / unoccupied control

Chemical Fume Hoods

- sash position monitor
- status

Lawn Irrigation

- master control
- flow monitor

Street Lighting Master Photocell

- current monitor

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