1 University – Designer Interaction

1.1 Through the PM the consultant should contact the Energy Management department at Purdue University as early in the design phase as possible to discuss general HVAC control systems.

*Note:* Early coordination of the mechanical design with the Energy Management department is essential.

2 Building Automation Systems

2.1 The building automation system (BAS) must be directly compatible with the existing campus systems (Automated Logic or Siemens). The design and implementation of the BAS will be provided as detailed in the A/E request for proposal (RFP).

3 Sequences of operation

3.1 A written sequence of operation of all DDC controlled equipment should be submitted to the Energy Management department in either word or .pdf format for reference and archiving records. The Energy Management department is available for consultation while developing these sequences of operation.

3.2 Identify the sequences by the individual mechanical system or miscellaneous mechanical equipment monitored or controlled by the BAS (e.g. air handling equipment, hydronic heating/cooling systems, room level control).

3.3 Items that need to be covered in the sequence:

3.3.1 A detailed operation of the equipment as engineered and designed for the specific application, and as intended for BAS software programming

3.3.2 A description of the operation of all input and output DDC points for monitoring or control shall be defined in the sequence of operation

3.3.3 Emphasis should be placed on the latest indoor air quality and energy conservation principles during the design process

3.3.4 Run conditions

3.3.5 Occupied/Unoccupied periods

3.3.6 Freeze protection

3.3.7 Economizer cycle

3.3.8 Cooling control

3.3.9 Return Chilled Water control

3.3.10 Heating control

3.3.11 Humidification control

3.3.12 Dehumidification control

3.3.13 Pressure control

• Building static

• VAV Systems

• Duct static pressure

• Water Differential Pressure

3.3.14 Set points

• Pressure

• Temperatures

• Humidity

• Minimum Outdoor Air

3.3.15 Alarms

• Set points for Alarming (When to alarm)

4 Table of submittal times

<table>
<thead>
<tr>
<th>Submittal</th>
<th>Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior to beginning Design Development</td>
<td>Contact Energy Management department for preliminary information</td>
</tr>
<tr>
<td>50% Design Development</td>
<td>First draft of sequence of operation</td>
</tr>
<tr>
<td>Bid Documents</td>
<td>Final sequence of operation</td>
</tr>
<tr>
<td>Addenda</td>
<td>Changes to sequence of operation</td>
</tr>
</tbody>
</table>

5 System requirements

5.1 Occupant adjustable thermostats should be in all private offices, secretarial areas, etc. with wired occupant override.

5.2 All controls and components shall be compatible with the Purdue Energy Management department systems.

6 Electrical interaction

6.1 Coordinate all VFD, raceway, motor, and other electrical equipment specifications with the appropriate electrical consultants and sections of this Handbook

6.2 Details and Diagrams
6.2.1 Provide the wiring diagrams and details that are sufficient to enable the tradesmen to correctly wire the AHU and all associated equipment. This is critical not just for installation but also archiving.

6.2.2 Provide a schematic block diagram showing each piece of the complete ventilating system and all the related control devices in their relative location.

6.3 Provide a complete motor starter or VFD control circuit in ladder logic drawing format

6.4 Provide adequate level of information to allow a skilled tradesman to become familiar with the particular installation in order to perform basic routine maintenance.

6.5 Install a lockable safety switch at each AHU. Mount the switch on a unistrut rack adjacent to or on the AHU, but do not to block any AHU access panels. Each remote safety switch shall have an auxiliary contact wired into the VFD control circuit.

6.6 Freeze-stats

6.6.1 Freeze-stat is to be connected to the N.C. contacts of the starter control circuit. The Temperature Control Contractor is to tie in the D.D.C. contacts to the motor starter and the N.O. contacts from the freeze-stat to the D.D.C. panel.

6.6.2 On AHU installations where there is more than one fan (i.e. a supply fan and a return air fan, relief air fan, or exhaust fan), the freeze-stats will be interlocked with supply, exhaust, and relief fans only. The freeze-stats will not shut down the return air fan.

6.7 Door interlock safety/kill switches are to be connected in series with the starter control circuit.

6.8 Smoke Detectors

6.8.1 Typically provided and wired by electrical, installed by others. Provide Project specific instructions in the Specifications and on the drawings.

6.8.1.1 Device voltage shall and connection shall be coordinated with the Fire Alarm System by the Purdue Fire Protection Engineering Department.

6.8.1.2 Smoke detectors are required to have a manual push-button reset alarm indicator light at the smoke detector site.

6.8.1.3 Each detector needs a separate remote alarm indicator with keyed test switch. Surface mount the remote indicators for the duct smoke detector(s) adjacent to the safety disconnect for the AHU (where convenient) at approximately 60" AFF.

6.8.2 Coordinate the quantity, location, and operation with the mechanical designer, PM and the Purdue Fire Protection Engineering Department, as systems with multiple supply and return ducts may require numerous duct smoke detectors.

6.8.3 Coordinate smoke detector interlocking to the AHU starter control circuit for fan shut down on alarm with the mechanical designer, PM and the Purdue Fire Protection Engineering Department. On AHU installations where there is more than one fan (i.e. a supply fan and a return air fan, relief air fan, or exhaust fan), discuss operation of each fan on alarm.

7 Preferred manufacturers

7.2 Environmental Control System:

7.2.1 Automated Logic

7.2.2 Siemens