PART 1  GENERAL

1.01  For motors shut down by the fire alarm system; refer to Division 28 31 00 Fire Alarm Systems. Meet building control systems requirements.

1.02  Preferably, use motor control centers unless space limitations preclude this. If MCC are not used, combination disconnect/motor starters are required.

1.03  Variable Frequency Drives (VFDs) are required for all motors 25 hp or larger. This includes bypass starters for VFDs.

1.04  Guidelines to determine if monitoring of motor operation would require a VFD or power monitoring:

<table>
<thead>
<tr>
<th>Motor</th>
<th>Condition</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Variable Volume pump/fan</td>
<td>Motor speed is controlled by VFD.</td>
<td>VFD will provide required information.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>No additional equipment or interface is required.</td>
</tr>
<tr>
<td>Constant speed motor ≥ 25 HP</td>
<td>UAF requires soft start and motor monitoring.</td>
<td>Use VFD.</td>
</tr>
<tr>
<td>Constant speed motor &lt; 25 HP</td>
<td>Is motor is critical to building operation or processes? If yes then→</td>
<td>Equip with VFD.</td>
</tr>
<tr>
<td></td>
<td>Is procurement of replacement motor problematic? If yes then→</td>
<td>Equip with VFD.</td>
</tr>
<tr>
<td></td>
<td>Will monitoring provide energy information to identify system problems? If yes, then→</td>
<td>Equip with VFD or meter circuit.</td>
</tr>
<tr>
<td></td>
<td>Is motor status (HOA, trip and proof) important? If yes, then→</td>
<td>Equip with VFD.</td>
</tr>
</tbody>
</table>
PART 2  PRODUCTS

2.01  Acceptable manufacturers:

A. Schneider (Square D)

B. General Electric

C. Westinghouse

D. Cutler-Hammer

E. Siemens

2.02  Enclosure Sizing: Where appropriate, size enclosures to contain interposing relays for the fire alarm system and building control system and/or other monitoring and control systems.

2.03  Pilot lights: Long-life LED type.

2.04  Single phase motor starters:

A. Single phase motor starters: Motor starting switches or AC magnetic starters.

B. Motor starting switches: Thermal or solid state overload, red pilot light and toggle handle and lock-off hasp.

C. Magnetic starters: Overload protection in each phase.

D. Include Hand-Off-Automatic switch, red pilot light, and overload reset button in front cover.

E. With 120 volt coil and control circuit, control circuit derived from a separate control transformer in each starter enclosure, except for 120 volt motor starters.

1. Size control power transformer to operate an interposing relay.

2. Equip with two auxiliary control contacts, each convertible normally-open or normally-closed.

2.05  Combination magnetic starter /disconnects: Combination magnetic starter/disconnects to incorporate circuit breaker disconnect switch and a magnetic starter into a common enclosure.

2.06  Overload Relays: Solid state type, for motor starting switches and magnetic starters. Provide overload relays in each ungrounded motor circuit conductor and size to correspond with the full load current of the motor as stamped on the motor nameplate.
2.07  Energy efficient motors are specified as standard. Run a life cycle analysis on motors that are used infrequently, (such as process fume hoods that are on/off) to determine if the added cost is warranted.

2.08  Provide and verify manufacturers’ and suppliers’ certification that motors driven from VFDs are VFD compatible and suitable for use in the specific configuration (wire length, voltage, VFD, frequency). Reference section 26 29 33.

PART 3  EXECUTION (NOT USED)

END OF SECTION