OSU Temperature activated automatic aeration controller

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This document describes a simple temperature actuated aeration controller designed by OSU that can be assembled from readily available commercial parts by a licensed electrician. It can control from 1 to 3 small aeration fans. See OSU Fact sheet BAE-1101 Aeration and Cooling of Stored Grain for more information on the design and operation of grain aeration systems.

OSU makes no claims or warranty on this design or its installation. It is the responsibility of the installer to insure all applicable regulations are followed during installation and operation. Proper grounding and placement of the controller away from hazardous areas is required. When the system is active, the fans can turn on without warning. Safety shielding should be installed and warning information posted to inform people of the potential dangers of this type of system.

The controller consists of a line voltage thermostat which activates relays to start the fans when the temperature falls below a preset limit. An elapsed-time clock is also activated by the thermostat to keep track of the total time that fans are operating so that the manager can insure that the aeration duration is sufficient to achieve temperature equalization throughout the entire grain bin. This controller uses time-delay relays to distribute the inrush current when fan motors start. This controller can be modified to control larger fans by using it to activate magnetic motor starters which should be used for all motors of 0.5 horsepower or larger. Controls should be cleaned at least once a year and more often if operated in dusty surroundings.

Table 1. Parts list with suggested sources.

<table>
<thead>
<tr>
<th>Schematic ID</th>
<th>Part Name</th>
<th>Qty</th>
<th>Description</th>
<th>Manufacturer</th>
<th>Model Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Enclosure (12&quot; x 10&quot; x 5&quot;&quot;)</td>
<td>1</td>
<td>Enclosure with cover, 12&quot; x 10&quot; x 5&quot;</td>
<td>Weigmann</td>
<td>B121005CH</td>
</tr>
<tr>
<td>S2</td>
<td>Line Voltage Thermostat</td>
<td>1</td>
<td>Thermostat, line voltage</td>
<td>Dayton Mfg.</td>
<td>1UHH2</td>
</tr>
<tr>
<td>K1, K2, K3</td>
<td>Socket Relay Base</td>
<td>up to 3</td>
<td>Socket for delay timer</td>
<td>Dayton Mfg.</td>
<td>5X852</td>
</tr>
<tr>
<td>K1</td>
<td>Fan Relay, no delay</td>
<td>1</td>
<td>DPDT relay</td>
<td>Dayton Mfg.</td>
<td>5X827</td>
</tr>
<tr>
<td>K2, K3</td>
<td>Fan Relays, time delay</td>
<td>up to 2</td>
<td>DPDT Relay w/ power on delay timer</td>
<td>Omron elec</td>
<td>H3CR-A8AC100-240/DC100-125</td>
</tr>
<tr>
<td>U1</td>
<td>Hour Meter</td>
<td>1</td>
<td>Hour timer, 120 VAC</td>
<td>Redington</td>
<td>722-0001</td>
</tr>
<tr>
<td>S1</td>
<td>20 Amp Toggle Switch</td>
<td>1</td>
<td>SPDT toggle switch</td>
<td>Power First</td>
<td>2VLN7</td>
</tr>
<tr>
<td></td>
<td>6-pole Terminal Strip</td>
<td>2</td>
<td>Terminal strip</td>
<td>Ideal</td>
<td>89-206</td>
</tr>
</tbody>
</table>
Figure 1. Schematic of Aeration controller with 3 fans.
Figure 2. Example aeration controller for 3 fans.

- **Enclosure to protect electronics from weather and shield hazardous voltage**
- **Hour meter**
- **Toggle switch**
- **Thermostat with sensing element protruding through bottom of cabinet**
- **0 second delay relay**
- **10 second delay relay**
- **20 second delay relay**
- **AC Power entry and exit to fans**