General Description

Description
The temperature interlock is designed to automatically start kitchen hood exhaust fans and keep them running while heat is being generated from the cooking appliances. Hood systems should always be manually started before equipment is turned on. If the fans are forgotten to be turned on, the interlock will turn the fans on once heat is detected. The interlock consists of a temperature controller, resistive temperature detector (RTD), junction box, Evergreen Compression Seal threaded fitting, and is contained in a stand alone box or can be added to a pre-engineered fan control center.

Purpose
To meet IMC 2006 section 507.2.1.1, interlock between exhaust fans and cooking equipment. This system will utilize a temperature sensor in the exhaust duct collar or in capture area of hood to detect heat generated from cooking operations and automatically activate the exhaust fans if not already turned on. Field wiring may be required depending on location of components.

Product Application
The temperature interlock is designed to be used with Type I and Type II hoods. It is not to be used in conjunction with exhaust fire dampers. Accurex recommends using one interlock per hood system (activates all fans linked to system simultaneously).

Performance Goals
Automatically energize the exhaust fans when cooking equipment generates heat. Basic controls will be provided with a temperature sensor and will consist of an 8 x 8 electrical box with controls and a labeled terminal strip to hook-up incoming power and fan starters. A temperature controller is used to keep the exhaust fans running when the temperature controller initially closes to prevent the fan from cycling on and off at startup and shut down. Fans will shut down automatically once the temperature has gone below the set point plus hysteresis. The hysteresis can be adjusted based on jobsite requirements.

Product Specification

Digital Temperature Interlock
International Mechanical Code (IMC) 2006 section 507.2.1.1 Compliant Electrical Package

Provide Accurex temperature interlock electrical package as shown on plans and in accordance with the following specification:

The temperature interlock(s) consists of a temperature controller, resistive temperature detector (RTD), junction box, fire proof/leak proof threaded fitting (Evergreen Quik-Seal® and/or Evergreen Compression Seal), and shall be a self-contained unit or as part of another pre-engineered electrical control package.

The temperature interlock package shall close a relay powering the fans when the sensor detects the temperature set point. The interlock shall hold the circuit closed upon fan switch being turned off until the temperature sensor detects a temperature below the set point plus hysteresis. Once the temperature is below the set point plus hysteresis, the fans shall shut down.

The temperature interlock package shall be constructed by Accurex in accordance with International Mechanical Code. The manufacturer shall provide, upon request, the necessary data that confirms compliance with the code listed above.

Due to continuous research, Accurex reserves the right to change specifications without notice.
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Receiving and Handling

Upon receiving the equipment, check for both obvious and hidden damage. Check to be sure that all parts of the shipment, including accessories, are accounted for. Make sure the equipment does not suffer any heavy vibrations or knocks.

Storage

If a temperature interlock must be stored prior to installation, it must be protected from dirt and moisture. Indoor storage is recommended. For outdoor storage, cover the control package with a tarp to keep it clean, dry, and protected from UV (ultraviolet) radiation damage.

Improper storage which results in damage to the unit will void the warranty.

Installation

Control Box Mounting

Locate an area with enough space to mount the control box and fasten to the wall. Avoid installing the control box in environments with high magnetic and/or radio frequency interference.

NOTE

Control box may be factory mounted. If so, continue to the next section.

Resistive Temperature Detector(s)

Hood Mounting

NOTE

Resistive temperature detector(s) may be factory installed. If so, continue to the next section.

1. Locate flat area(s) at the top interior of the hood in front of the filters, towards the front of the hood.

2. Cut a 3/4 to 7/8-inch diameter hole in the flat spot of the capture tank. Make sure the resistive temperature detector(s) will not interfere with fire system nozzles and is not within 12 inches of light fixtures.

3. Place the J-box plate inside of the octagon extension ring and place over the hole.

4. Disassemble the compression seal and place through hole and J-box plate as shown. Tighten the nut inside the octagon extension ring.
5. Place the resistive temperature detector through the compression seal and tighten the compression fitting.

6. Refer to Electrical Connections section for instructions on wiring the temperature sensor.

7. Install the cover for the octagon box.

**Resistive Temperature Detector(s)**

**Duct Collar Mounting**

1. Locate the exhaust duct on top of the hood. A 3/4 to 7/8-inch (19.0 to 22.2 mm) diameter hole must be cut into the duct 2 inches (50.8 mm) above the hood top. Center the hole along the side of the duct. Make sure that the resistive temperature detector will not interfere with any fire system nozzles, or other items installed in the exhaust duct. If an exhaust fire damper is present the hood exhaust collar, it must be removed prior to temperature sensor installation.

2. Place the J-box plate inside of the octagon extension ring and place over the hole in the exhaust collar.

3. Disassemble the compression seal and place through hole in duct collar and J-box plate as shown. Tighten the nut inside the octagon extension ring.

4. Place the resistive temperature detector through the compression seal and tighten the compression fitting.

5. Refer to Electrical Connections section for instructions on wiring the temperature sensor.

6. Install the cover for the octagon box.

**NOTE**

All field installation and wiring of electrical equipment must be done to meet NEC and local codes.

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**Electrical Connections**

**Sensor Connections**

1. Run two 18 awg stranded thermostat wires from each temperature sensor to the appropriate electrical circuit connections. (See Step 3 for connection options).

2. In junction box, connect leads on RTD to the 18 awg conductors using appropriate size wire nuts.
   - Wires are interchangeable with one another.

3. Choose the final connection option based on:

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Terminals</th>
</tr>
</thead>
<tbody>
<tr>
<td>First Sensor</td>
<td>T1-A and T1-B</td>
</tr>
</tbody>
</table>

**CAUTION**

Do not connect temperature sensor in series with fan power. This will result in damage to the temperature sensor and will require replacement.

**NOTE**

Separate as much as possible the probe and digital input cables from inductive loads and power cables, to avoid any electromagnetic disturbance. Never lay power and probe cables in the same cable conduits (including those for the electrical panel). Loosen every screw and insert the cable end, next tighten the screws and gently pull the cables to check their tightness.

**Switch Connections to Control Box or Fan Control Center**

Connect a Single Pole Single Throw (SPST) switch to terminals S1H and S1. This is the same whether temperature interlock is in a separate control box or integrated in a kitchen fan control center.

**Circuit Connections**

1. Standard Interlock Control
   - 120VAC, 10 or 15 amp circuit to terminals H1 and N1
   - 120VAC, 24VAC or other control circuit for fan starter activation (factory separated from main power connection shown in previous bullet)
     - Control circuit power to terminal CP1
     - Terminal CP2 to fan starter coils (hot)

2. Kitchen Fan Control Center Integration (XFCC)
   - 120VAC, 15 amp circuit to H1 and N1 in fan control center
     - No additional control circuits are required
     - Fan starters are factory-wired.
Calibration
The temperature controller is preset by the factory to turn the fans on at 95°F. This is controlled by the set point on the temperature controller. The temperature set point may have to be adjusted slightly depending on both ambient and cooking conditions. The adjustment is made through the buttons on the temperature controller. The controller is capable of monitoring two separate sensors. If more than one sensor is utilized with a single controller, two set points can be adjusted. To adjust, follow these instructions:
1. If setting set point 1 (St1), press Set. The display shows St1 and then the current value of St1.
2. Press the ▲ or ▼ to change the set point.
3. Press Set to confirm the new value of either St1 or St2.
4. Check system operation before making additional adjustments.

Factory Selected Parameters
The factory will pre-program the controllers to be properly integrated into the control panel. Except for the set points, the other parameters should never need adjusting. However, there are three different types of parameters that are accessible on the controller. Access differs depending on the type: set point; frequently used parameters (P); and configuration parameters (c, d, F).

Setting type P parameters
Type P parameters (frequents) are indicated by a code beginning with the letter P, followed by one or two numbers.
1. Hold the Prg mute button, after 3 seconds the displays shows the firmware revision code (e.g. r2.1) is shown, after 5 seconds (in the event of alarms, first the buzzer is muted) the code of the first type P modifiable parameter, P1.
2. Press ▲ or ▼ until reaching the desired parameter.
3. Press Set for three seconds to confirm.

Setting type c, d, F parameters
Type c, d or F (configuration) parameters are indicated by a code beginning with letters c, d, F respectively, followed by one or two numbers.
1. Press Prgmute and Set together for more than 5 seconds. The display shows the number 0.
2. Press ▲ or ▼ until displaying the password: 77
3. Confirm by pressing Set
4. If the value entered is correct, the first modifiable parameter c0 will be shown, otherwise the standard display will resume.
5. Press ▲ or ▼ until reaching the parameter to be modified.
6. Press Set to display the associated value.
7. Increase or decrease the value using ▲ or ▼ respectively, until reaching the desired value.
8. Press Set to temporarily save the new value and return to the display of the parameter code.
9. Repeat operations from 5 to 8 to set other parameters.
10. To permanently save the new values of the parameters, press Prg mute for 5 seconds, thus exiting the parameter setting procedure.

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Description</th>
<th>Factory Setting</th>
</tr>
</thead>
<tbody>
<tr>
<td>St1</td>
<td>Set Point 1</td>
<td>95</td>
</tr>
<tr>
<td>St2</td>
<td>Set Point 2</td>
<td>95</td>
</tr>
<tr>
<td>c0</td>
<td>Operating Mode</td>
<td>1</td>
</tr>
<tr>
<td>P1</td>
<td>Set Point Differential</td>
<td>5.0</td>
</tr>
<tr>
<td>P2</td>
<td>Set Point Differential</td>
<td>5.0</td>
</tr>
<tr>
<td>P3</td>
<td>Dead Zone Differential</td>
<td>0</td>
</tr>
<tr>
<td>c6</td>
<td>Delay between two outputs</td>
<td>0</td>
</tr>
<tr>
<td>c9</td>
<td>Minimum relay on time</td>
<td>5</td>
</tr>
<tr>
<td>c10</td>
<td>Probe alarm output status 1</td>
<td>1</td>
</tr>
<tr>
<td>d10</td>
<td>Probe alarm output status 2</td>
<td>1</td>
</tr>
<tr>
<td>c11</td>
<td>Output Rotation</td>
<td>4</td>
</tr>
<tr>
<td>c13</td>
<td>Probe Type</td>
<td>3</td>
</tr>
<tr>
<td>P14</td>
<td>Probe 1 Calibration</td>
<td>0</td>
</tr>
<tr>
<td>P15</td>
<td>Probe 2 Calibration</td>
<td>0</td>
</tr>
<tr>
<td>c18</td>
<td>Unit of Measure</td>
<td>1</td>
</tr>
<tr>
<td>c19*</td>
<td>Function of probe 2</td>
<td>0 or 7</td>
</tr>
</tbody>
</table>

*Parameter c19 is factory set at 0. If controller is connected to two sensors, then the parameter is factory set at 7.

Displaying the Inputs
1. Press ▼. The current input will be displayed, alternating with the value:
   b1 : probe1
   b2 : probe 2
   d1 : digital input 1
   d2 : digital input 2
   St1 : set point 1
   St2 : set point 2
2. Press ▲ or ▼ to select the input to be displayed.
3. Press Set for three seconds to confirm.
This Control Panel only provides control power to signal operation of supply and exhaust starters. Starters are NOT provided by manufacturer. Starters to be provided by, wired and mounted by others.
This is an example of a generic wiring diagram for temperature interlock integration into a XFCC. This diagram has 2 sensors that provide temperature interlock function for one exhaust fan and one supply fan. To see your job specific drawing, look on the inside panel of the XFCC cabinet.

TEMPERATURE INTERLOCK CALIBRATION

1. PRESS THE SET BUTTON TO SEE THE FIRST SET POINT. (PRESS THE SET BUTTON TWICE, SLOWLY TO SEE THE SECOND SET POINT)
2. PRESS THE UP/DOWN ARROW BUTTON TO CHANGE THE SET POINT
3. PRESS THE SET BUTTON TO VIEW THE CURRENT TEMPERATURE
4. CHECK SYSTEM OPERATION BEFORE MAKING ADDITIONAL ADJUSTMENTS

NOTES:
Drawing shown de-energized all L1 (Arm, WH1), if Fire System armed (normal mode), normal operation, R1 & R2 are energized. If wall mounted prevote, or field installed fire system, the fire system microswitches must be field wired.

UL LISTED UNDER SUBJECT 861
FILE RE200616
SAMPLE XFCC W/ TEMP INT
Testing

1. Turn fan switch on, then off to ensure proper fan operation before cooking equipment is started. Once this is verified, testing can proceed.
2. Heat up cooking equipment with fans off. Once the temperature reaches the set point of the temperature controller the fans will start within 5 minutes. If the fans take more than 5 minutes to start, decrease the temperature set point by adjusting the set point on the temperature controller (see Calibration).
3. If an adjustment was made in Step 2, repeat now.
4. After verification of fan start-up, shut down cooking equipment. The fan switch should still be in the off position. Once cooking equipment has cooled below the set point plus hysteresis, the fans will shut down.

| CAUTION |
| The probes should never be exposed to direct flame. The probes are rated up to 250°F. |

| EXPOSING THE SENSOR TO DIRECT FLAME MAY RENDER THE SENSOR INOPERABLE AND WILL VOID THE WARRANTY. |

Troubleshooting

1. **Controller(s) display E01 or E02 and fans will not shut off.**
   - E01 and E02 represent probe faults
   - Check probe resistance between the two leads when disconnected from the system. At room temperature (77°F), the probe will read 1025 ohms
   - Check wiring connections between the sensor and control cabinet
2. **Fans do not turn on automatically upon cooking equipment activation.**
   - Check wiring to control panel or relay box
   - Multiple sensors must be wired separately
   - Temperature set point too high, decrease set point
   - No power to fans, check breakers/starters/relays

3. **Fans do not shut off.**
   - Check the controller to determine if there is a probe error of E01 or E02. If yes, refer to the controller display error message, item 1 above.
   - Switch must be in the off position
   - Cooking equipment hot, wait for it to cool
   - Temperature set point too low, increase set point
   - Ensure wires are connected to appropriate control circuit
4. **Fans do not turn on quick enough.**
   - Decrease temperature set point

Operation

1. Turn fans on and off using the fan switch. It is normal for the fans to remain running after the switch is turned off. The exhaust temperature controller will open after heat is no longer present under the hood and the temperature is below the set point plus hysteresis, the fans shall shut down.
2. In the event that the cooking equipment is started without turning the fans on manually, the fans will turn on automatically and remain running with the presence of heat under the hood. Once the temperature is below the set point plus hysteresis, the fans shall shut down.

| NOTE |
| During testing, if fans do not start automatically in the first 10 minutes of cooking equipment activation, manually start fans to avoid accidental fire system dump due to heat build-up. |

Maintenance

Daily
Clean the temperature sensor with cloth and degreaser. Keep clean for best performance.

Weekly
Dependant on grease production and grease filter type, clean temperature sensor.

Seasonal
May have to change temperature setting on the temperature controller if ambient kitchen temperatures fluctuate between summer and winter seasons.

Whom to call
Contact your local Accurex representative.

What to have ready for the call
Sales order, serial number and description of product.
Sales Order Number ________________________
Serial Number ______________________________
Frequently Asked Questions

What temperature is the temperature controller set to from the factory?
95º Fahrenheit.

Will the temperature interlock automatically start/stop the fans?
When connected properly to fan starters the temperature interlock will automatically control the fans without input from the user. However, the intended use of the temperature interlock is as back-up to manual control.

May I connect the power going to my fan directly through the control box?
No, the control box should only use control voltage only (24-120V), and a separate 120V power source is required to run the temperature interlock controls. Accurex recommends the use of starters sized for each fan.

Can I use one control box for multiple hood systems?
This can be done, however, it is not recommended. Any one of the temperature controllers would turn on all hoods running on that control box. It is better to have one hood/fan per control box, plus a significant energy savings can be obtained if one or more of the hoods is not in operation.

Can I still turn my fan on and off?
Yes, the temperature interlock is designed to be operated with a typical on/off switch. The fan may not turn off directly after turning the fan switch off, it will sense when the cooking operations have cooled and then turn off.

Replacement Parts

<table>
<thead>
<tr>
<th>Part Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>384925</td>
<td>Temperature Sensor (RTD) MAMAC TE-700-0-3-A</td>
</tr>
<tr>
<td>384920</td>
<td>Temperature Controller CAREL iR33-DN33 DN33W7HR20</td>
</tr>
<tr>
<td>830125</td>
<td>Extension, Octagon (drilled) SC55151-1/2 (380928)</td>
</tr>
<tr>
<td>732396</td>
<td>J-Box Plate</td>
</tr>
<tr>
<td>380926</td>
<td>Cover, Octagon Box SC#54-C-1RACO 722</td>
</tr>
<tr>
<td>384905</td>
<td>Terminal Block, Single Pole, DIN-RAIL MT, ABB ZS6</td>
</tr>
<tr>
<td>384908</td>
<td>Jumper, DIN-RAIL Terminal Block Two Pole ABB JB6-2</td>
</tr>
<tr>
<td>463570</td>
<td>Evergreen Compression Seal 1/4-inch, #302</td>
</tr>
</tbody>
</table>

Codes and Standards Compliance

- UL 710
- National Fire Protection Association (NFPA 96)
- International Mechanical Code (IMC) 2006 Section 507.2.1.1

Our Commitment

As a result of our commitment to continuous improvement, Accurex reserves the right to change specifications without notice.

Specific Accurex product warranties are located on accurex-systems.com within the product area tabs and in the Library under Warranties.