PART 0  A/E INSTRUCTIONS

0.01 DESIGN REQUIREMENTS

A. The kitchen hood fire control panel is intended to provide additional safety in the operation of the kitchen range hood. This panel interfaces between the kitchen hood exhaust fan start controls, the make-up air fan, the kitchen fire suppression panel (Ansul Panel), under-hood power, under hood lights, electric gas valve(s), gas reset buttons, the building fire alarm system and the kitchen exhaust hood and make-up air systems. The kitchen hood fire control panel is field-wired.

B. The kitchen hood is normally furnished by the Owner and installed by the Contractor. Coordinate project-specific requirements with the DPS Project Manager.

C. The kitchen hood will be a dry hood unless a horizontal run in the flue requires a water wash hood.

D. Ladder Diagram: See DPS standard drawing 16799-1. The diagram is for reference and may have to be modified depending on the equipment being controlled. Additional contactors, voltage changes, etc. may be necessary to coordinate with other equipment. The electrical engineer shall coordinate the equipment and the panel and shall show a completed panel design on the 100%CD drawings.

E. Locate the kitchen exhaust hood fan starter and make-up air starter next to the kitchen hood fire control panel, which should be near the kitchen, but does not have to be in the kitchen.

F. Locate the panic button at the exit from the kitchen.

G. Locate EC-1 and EC-2 contactor above ceiling in kitchen or nearby.

PART 1  GENERAL

1.01 OWNER FURNISHED EQUIPMENT

A. Owner will furnish the kitchen hood fire control panel specified herein. The contractor will provide all terminations, wiring and connection to other components.

1.02 SYSTEM DESCRIPTION

A. Operating Sequences:

1. Initial State: This state would exist anytime there is a power outage, control power is off, or after an alarm condition has been cleared.

2. Gas Reset Condition: After power is restored and/or all alarm conditions are reset, the automatic gas valve must be manually reset (to avoid standing pilot gas entering the kitchen). Manual reset of the gas valve cannot be accomplished unless all alarm conditions are normal, the control power is on, and the hood exhaust fan is running. Standing pilots shall be lit manually.

3. Cooking State: This is the normal condition. The kitchen hood exhaust fan must be turned on in order to activate the make-up air fan (automatically started) and to enable the electrical power under the hood. Hood lights can be controlled manually independent of the kitchen hood exhaust fan operation by a wall mounted toggle switch.

4. Ansul Activation: This is activated by either melting the fusible link under the range hood or by manual pull at the Ansul system pull station. Activation of the Ansul system allows discharge of fire suppression chemicals on the range, fryers or other under-hood equipment where code-required fire suppression is mandatory. Ansul system activation will also turn on the hood exhaust fan (if not on already), turn off the make-up air unit, close the automatic gas valve, shut down all electrical power under the hood, turn off the hood lights and signal the building fire alarm system that an alarm condition exists.

5. Panic Button Activation: The panic button is located adjacent to the exterior exit from the kitchen. Pressing the panic button creates an alarm condition. The alarm will cause fans, under-hood power, under-hood lights, gas valve, and fire alarm conditions to be the same as those during Ansul activation, except that no fire suppression chemicals are discharged.
6. Fire Detection Activation: Detection of a fire condition by any of the fire detectors within the kitchen will cause the fire alarm system to go into alarm. Detection of a fire condition by any kitchen fire detectors will also cause the fans, under-hood power, under-hood lights, and the gas valve conditions to be the same as if the Ansul system was activated, except that no fire suppression chemicals would be discharged.

B. Relay Logic:

1. Reference drawing 16799-1 for relay ladder diagram operation described below.

2. A motorized gas valve is installed in the gas piping serving the appliances under the hood. The gas valve opens when power is applied to it. To reset the gas valve, power is applied to relay R2 by pressing the momentary pushbutton energizing R2 and closing contact R2-2, which will hold in relay R2. Whenever the gas valve is energized, a green LED on the front of the panel turns on indicating “GAS VALVE ON”.

3. To turn on the hood exhaust fan, make-up air fan and electrical circuits for appliances under the hood, turn on the fan switch. This energizes relay R1, which closes contacts R1-1, R1-2 and R1-3. R1-1 energizes a multi-pole contactor that controls electric circuits serving equipment under the hood, such as steamers, fryers, and stoves. When the contactor is energized, a green LED on the front of the panel indicates “APPLIANCES ON”. Contact R1-2 allows the gas valve to open once the exhaust fan is running. Contact R1-3 automatically starts the make-up air fan. Once the make-up air fan is running, it automatically starts the hood exhaust fan. A green LED on the front of the panel indicates “HOOD EXHAUST FAN ON”. Another green LED on the front of the panel indicates “MAKE-UP AIR FAN ON”.

4. When the chemical fire suppression system (Ansul system) is activated, relay A1 is energized. Contact A1-3 opens, which de-energizes relay TD and closes the gas valve. Contact A1-5 closes turning on the hood exhaust fan (if it is not on already). Contact A1-1 opens, de-energizing relay EC and opening the contactor, which de-energizes all electric circuits under the hood. Contact A1-4 opens and turns off the make-up air fan. Contact A1-3 energizes sending an alarm to the building fire alarm system (dedicated zone). Contact A1-2 will also open de-energizing the lights under the hood.

5. Power is removed from the under-hood lights when the wet chemical system is activated or the emergency pushbutton is struck, or a kitchen detector goes into alarm through the FACP.

6. Pushing the panic button or a signal from the FACP duplicates all functions described above when the Ansul system is activated.
### SECTION 16799 – KITCHEN HOOD FIRE CONTROL PANEL

#### 7. TABLE OF STATES FOR VARIOUS CONDITIONS

<table>
<thead>
<tr>
<th>ACTION</th>
<th>EXHAUST HOOD FAN</th>
<th>MAKE-UP AIR FAN</th>
<th>UNDER HOOD POWER</th>
<th>UNDER HOOD LIGHTS</th>
<th>GAS VALVE</th>
<th>FIRE ALARM</th>
<th>ANSUL SYSTEM</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial state (control power off)</td>
<td>OFF</td>
<td>OFF</td>
<td>Automatic OFF</td>
<td>ON/OFF</td>
<td>Closed</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Gas Activation (Reset)</td>
<td>ON</td>
<td>ON</td>
<td>Automatic ON</td>
<td>ON/OFF</td>
<td>Open</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Cooking State (normal)</td>
<td>ON</td>
<td>Automatic ON</td>
<td>Automatic ON</td>
<td>ON/OFF</td>
<td>Open</td>
<td>Normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Ansul Activation</td>
<td>Auto ON</td>
<td>Auto OFF</td>
<td>Auto OFF</td>
<td>Auto Closed</td>
<td>Alarm</td>
<td>Activated</td>
<td></td>
</tr>
<tr>
<td>Panic-Button Activation</td>
<td>Auto ON</td>
<td>Auto OFF</td>
<td>Auto OFF</td>
<td>Auto Closed</td>
<td>Alarm</td>
<td>Normal</td>
<td></td>
</tr>
<tr>
<td>Fire Detection Activated</td>
<td>Auto ON</td>
<td>Auto OFF</td>
<td>Auto OFF</td>
<td>Auto Closed</td>
<td>Alarm</td>
<td>Normal</td>
<td></td>
</tr>
</tbody>
</table>

#### 1.03 SUBMITTALS

A. Product Data:

1. Component and accessories list.
2. Submit shop drawings of the kitchen hood fire control panel showing all relays, contacts and contactors required for the operation of the system.
3. Shop drawings must be coordinated with the range hood submittal, make-up air unit submittal, automatic gas valve submittal, etc.

B. Operation and Maintenance Data:

1. Provide complete ladder diagram of the panel operation, which includes relay numbers and the devices they control. Relays within the panel must be numbered to correspond to the diagram. Provide a diagram for the Operations and Maintenance Manual and install a diagram within the panel.

#### PART 2 PRODUCTS

##### 2.01 FABRICATION

A. Fabricate the panel from commercially available parts. Panel shall not be fabricated in the field. Panel shall be fabricated by a panel shop and shall be UL listed as an assembly or Factory Mutual label or other third party label acceptable to the State of Colorado Electrical Board for the use intended. DPS will furnish this control panel.

B. The panel shall be a surface-mounted steel or aluminum box with a keyed lock. Comply with Section 16160.

##### 2.02 PANIC BUTTON

A. Provide a red, mushroom-head, pushbutton to be located near the kitchen exit door. The push button shall be a maintained red LED illuminated type. Provide a shroud, similar to Stopper II, to prevent accidental activation of the button.
SECTION 16799 – KITCHEN HOOD FIRE CONTROL PANEL

2.03 INDICATING LIGHTS
   A. Provide LED type indicating lights to show the conditions of the system per diagram 16799-1.

2.04 IDENTIFICATION AND TAGGING
   A. Comply with Section 16195 for panel and wiring identification.
   B. Label components, such as relays and pushbuttons in the panel, as well.

PART 3 EXECUTION

3.01 INSTALLATION
   A. Contractor to install panel and interconnect wiring with range hood, makeup air unit, underhood lights and power, range hood control panel, fire suppression panel, gas reset buttons, fire alarm system, and exhaust hood.
   B. Top of panel mounted maximum 6'6" above finished floor.

3.02 TESTING AND DEMONSTRATION
   A. The completed system must be tested in the presence of the DPS Project Manager. The proper operation of the panel must be demonstrated.
   B. Panel testing and demonstration will be in addition to tests and inspections required by Code Authorities having jurisdiction.

END OF SECTION 16799