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| **Fireplace Control Circuit Worksheet** |

A

B

C

D

Fireplace

Control

Circuit

Gas Line

Emergency

Cut-Off Valve

Thermal

Sensors (4)

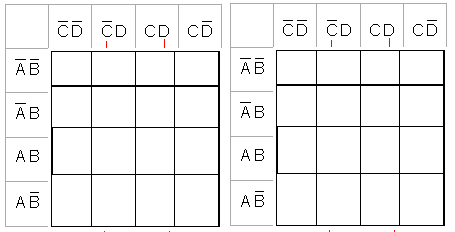


The emergency cut-off value should remain open as long as three of the four sensors indicate that a flame is present. (flame=1)

The control circuit (fault indicator) will output a logic (1) when the four sensors do not all agree (i.e., not all on, or not all off). This indicator will be used by the service technician to diagnose whether a faulty sensor exists.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **A** | **B** | **C** | **D** | **Emergency**  **Cut-Off** | **Fault**  **Indicator** |
| **0** | **0** | **0** | **0** |  |  |
| **0** | **0** | **0** | **1** |  |  |
| **0** | **0** | **1** | **0** |  |  |
| **0** | **0** | **1** | **1** |  |  |
| **0** | **1** | **0** | **0** |  |  |
| **0** | **1** | **0** | **1** |  |  |
| **0** | **1** | **1** | **0** |  |  |
| **0** | **1** | **1** | **1** |  |  |
| **1** | **0** | **0** | **0** |  |  |
| **1** | **0** | **0** | **1** |  |  |
| **1** | **0** | **1** | **0** |  |  |
| **1** | **0** | **1** | **1** |  |  |
| **1** | **1** | **0** | **0** |  |  |
| **1** | **1** | **0** | **1** |  |  |
| **1** | **1** | **1** | **0** |  |  |
| **1** | **1** | **1** | **1** |  |  |

KMap and write the equations



**Emergency Cut-Off Valve = Fault Indicator =**

**Draw what each equation looks like using AOI**

Conclusion ( on your own paper )

(minimum 250 words) Describe the process that you used to design, simulate, and build your *Fireplace Control Circuit*. This conclusion must include all of your design work (i.e., truth table, K-Maps, etc.), preliminary and final schematics, parts list, and a photograph of your final circuit. Be detailed so somebody else could make your circuit following your steps.