

Environment Control System

The Environmental control system was successfully implemented, monitoring and controlling the Temperature, light, presence as well as being able to detect smoke coming from any of the 3 sections. The ECS's temperature control and lighting system is only active during the working hours of the day (0900 to 1700).

The Temperature control system reads the temperature of the current room and if it isn't at the desired temperature it sends a signal to activate the AC to bring the temperature to the desired level.

The lighting for the system is reliant on the time of day (working hours or not) and only activates when there is a presence detected within the section, which then turns the light on if the light level detected is lower than the set amount.

The fire detection system doesn't actively have any fire suppression system but will still sound a fire-alarm if there is any smoke detected within the facility

Working hours are simulated by simply using an integer and adding 100 to a 24 hour clock. Occupancy and fire/smoke are randomly generated within the 3 sections with a 2% and 1% chance respectively per code cycle to simulate occupancy and fire for the system.

The ECS has been split into 3 different sections grouped 3 different sections. As shown below

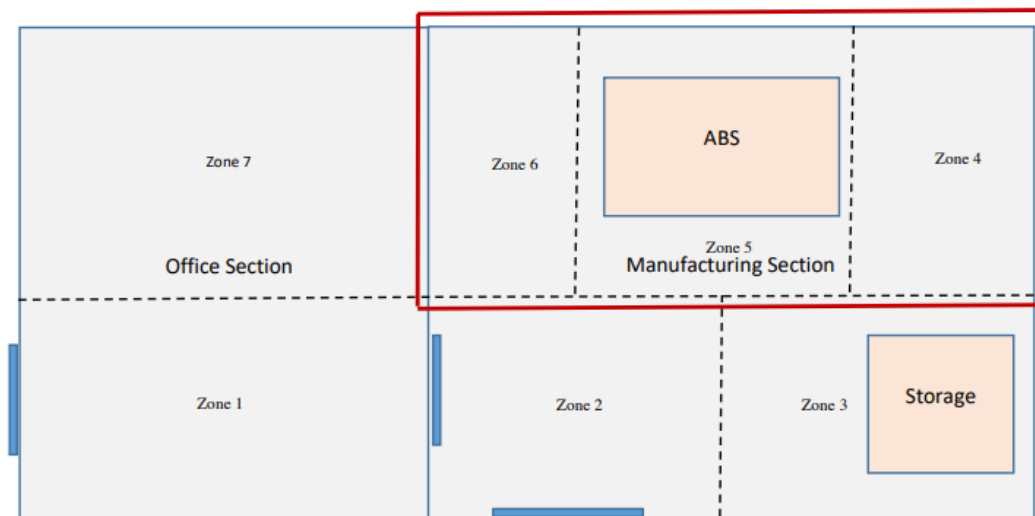


Figure 1. Manufacturing facility conceptual layout

Grouping	Zones
Section 1 (Office)	1, 7
Section 2 (Storage)	2, 3, 4
Section 3 (Manufacturing)	5, 6

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input int signal sec1Temp, sec2Temp, sec3Temp;
input signal sec1PIR, sec2PIR, sec3PIR;
input int signal sec1Lumen, sec2Lumen, sec3Lumen;
input signal sec1Smoke, sec2Smoke, sec3Smoke;
input int signal time;
output int signal sec1AC, sec2AC, sec3AC;
output int signal sec1LightBulb, sec2LightBulb, sec3LightBulb;
output signal smokeAlarm;
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The ECS system checks the temp, occupancy, light-level and smoke of each section separately in concurrent reactions so that they can operate independently.

The fire alert system all run on separate concurrent reactions to constantly check each section of the facility for smoke/fire and if it's present it will emit a signal and sound a fire alarm.

Working hours of the facility are simulated hour by hour by using an int as a 24 hour clock. E.g. 800 = 8:00am 2100 = 9:00pm, where the working hours of the facility are between 900 - 1700 and most functions of the facility won't be activated outside of working hours.

Temperature control works by reading an input int signal which comes from the "environment" and if it isn't equal, then it emits an int signal to the system to activate the AC with the desired temperature. The AC is also connected to the working hours of the system and won't activate unless it is within the day's working hours.

Occupancy detection works by simply reading the sensors from the "environment" and sustaining the section occupancy signal while the person remains within a section of the facility.

Occupancy is mainly used to control the lighting system of the building. The lighting relies on the detected light levels from the "environment" and the occupancy state where it requires the light levels to be low enough and the section occupied to send a signal to turn on a light for the building section.