

Project-design-phase -2

Project-Name-Industry specific Intelligence Fire management system

Functional Requirement Document

The primary purpose of fire alarm system is to provide an early warning of fire so that people can be evacuated & immediate action can be taken to stop or eliminate the fire effect as soon as possible. Alarm can be triggered by using detectors or by manual call point (Remotely). To alert/evacuate the occupants siren are used and CCTV cameras can be used to detect any human presence.

Most victims of fire succumb to the smoke and toxic gases and not to burns. Fire produces poisonous gases that can spread rapidly and far from the fire itself to claim victims who are not even aware of the fire. Even if awake, the effects of exposure to these gases can cloud their thinking and slow their reactions so that they cannot make their escape. This is why it is so crucial for workers to have sufficient warning so that you can all escape before their ability to think and move is impaired.

The functional requirements for this system are:

Alarm Systems:

Smoke Alarm

Also often known as smoke detectors, these devices are one of the best early-warning devices of a fire. They are designed to sense low levels of smoke and sound an alarm. Some smoke alarms are what are known as "single station," or stand-alone devices. If they go into alarm, only the one detector is activated, alerting people right around it. Some detectors may be connected to the building's fire alarm system. When this detector senses smoke, it may either sound an alarm in the room, or send a signal to the building fire alarm system. It is important that smoke alarms are located in areas where they cannot be set off accidentally by steam from showers or from cooking smoke. Smoke detectors have two main types: Photoelectric Smoke Detectors, and Ionization Smoke Detectors.

Heat Detectors

Fixed Temperature Heat Detector,

Rate of Rise Detector,

Rate Compensation,

Line type detectors.

Fire Gases Detectors

When a fire burns in a confined space, it changes the makeup of the atmosphere within the space. Depending on the fuel, some of the gases released by a fire may include the following:

Water vapor (H₂O),

Carbon dioxide (CO₂),

Carbon monoxide (CO),

Hydrogen chloride (HCL),

Hydrogen cyanide (HCN),

Hydrogen fluoride (HF),

Hydrogen sulfide (H₂S).

Flame Detectors

That is the stage which after the smokes or gases and has the highest degree of dangerousness. There are three basic types of flame detectors (sometimes called light detectors): Detecting light in the ultraviolet wave spectrum (UV detectors), Detecting light in the infrared wave spectrum (IR detectors), Detecting both types of light.

System functionality

When a fire alarm condition is detected by one of the system alarm initiating devices, the following functions shall occur: System alarm LED shall flash. Local sounding device in panel shall be activated. The LCD display shall indicate type of device, custom label location label and point status alarm condition. Automatic programs assigned to alarm point shall be executed and associated indicating devices and relays activated. When any trouble condition is detected the following functions shall occur: Local sounding device in panel shall be activated. The LCD display shall indicate the type of trouble and custom label location associated with the trouble condition and its location. Unacknowledged alarm messages shall have priority over trouble messages. If such an alarm is displayed, then trouble messages shall not be displayed. Activation of the signal silence switch shall cause appropriate notification (indicating) appliances and relays to return to normal condition. Selection of notification appliance circuits and relays silenced by this switch shall be fully programmable. Activation of system reset switch shall cause electronically latched initiating devices or zones, as well as associated output devices and circuits, to return to normal condition after sixty seconds of alarm. If alarm conditions exist in system after system reset switch activation, system shall then re sound alarm conditions as indicated hereafter.

Power Requirements

The fire alarm control panel shall receive 220 VAC power, 60 Hz. There will be a converter circuit which converts the 220 VAC to regulated 12v dc and 5 v dc. There will be a rechargeable battery includes its regulated output voltages (12 Vdc and 5 Vdc) in case of the AC power is lost. System shall automatically transfer to standby batteries upon power failure. Battery charging and recharging operations shall be automatic. Batteries, once discharged, shall recharge at a rate to provide a minimum of 70 percent capacity in 12 hours.

System Capacity

The main fire alarm control panel capable of transmit/receive more than one slave unit,

The slave unit capable of 40-conventional devices (Five Fire Zones).

The system shall be programmable, configurable.

Fire extinguishers used

Firefighting foam

Its role is to cool the fire and to coat the fuel, preventing its contact with oxygen, resulting in suppression of the combustion

Water and dry chemical

Fault Tolerance

The system will have to place the sensors away from places where there could be smoke , heat due to manufacturing and there specific industrial conditions are to be given as prerequisite data

Recoverability

In the event the application is unavailable to users (down) because of a system failure, how soon after the failure is detected must function be restored? **Immediately if the industry is operating**