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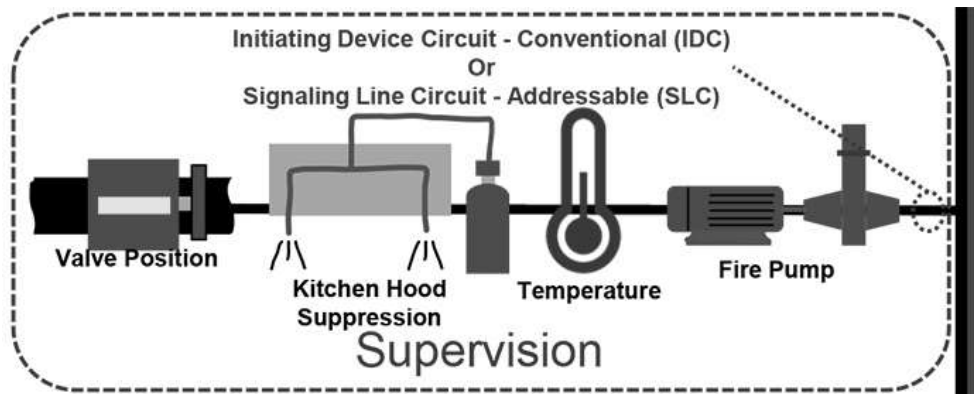
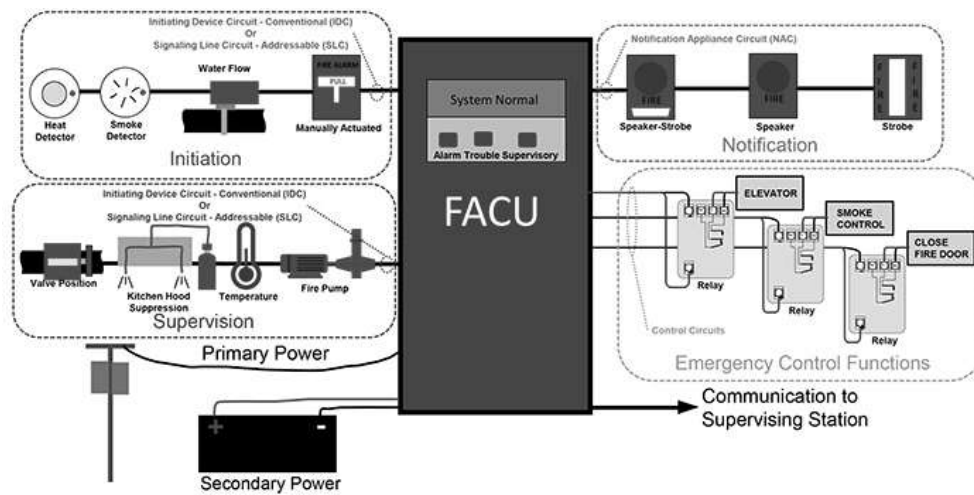
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## A Guide to Fire Alarm Basics: Supervision

By Shawn Mahoney

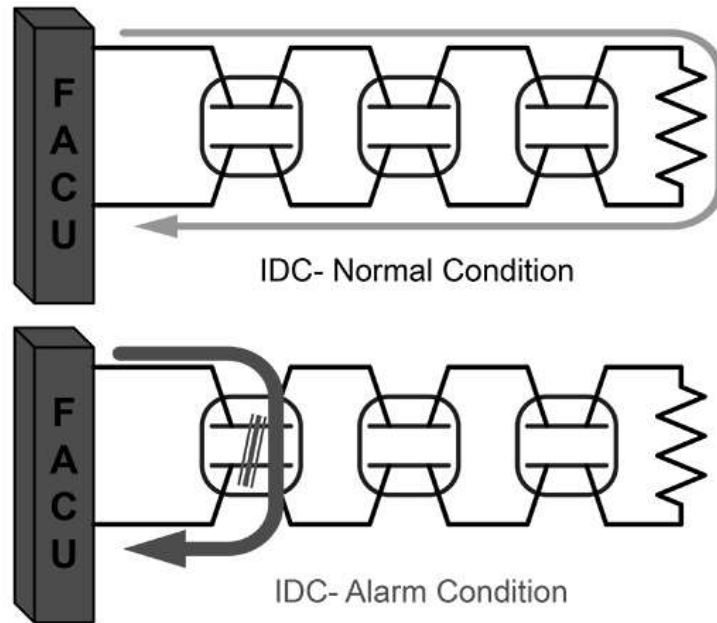
25-Jun-2021

A fire alarm system is a crucial part of the overall fire protection and life safety strategy of a building . A fire alarm system serves many functions and the differences between the functions can be a bit confusing, so I created a visual guide to fire alarm basics. The objective of this blog series is to discuss some of the major components and functions of a fire alarm system. For an overview of the entire system take a look at my [Guide to Fire Alarm Basics Blog](#). This blog will take a deeper dive into the supervision portion of a fire alarm system.



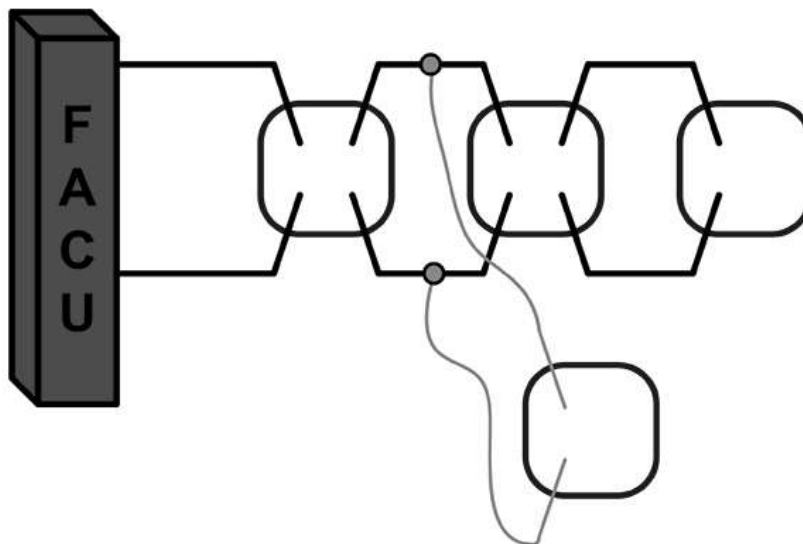
It is common and often required to utilize a fire alarm system to monitor the condition of other systems, processes, or equipment that are related to the building's fire and life safety or other systems that the owner would like to monitor. Supervision can include but is not limited to valves on fire protection systems, other fire protection systems such as kitchen hood suppression systems, valve room or storage tank temperatures, and fire pump condition. Issues with these systems would provide a signal to the fire alarm control unit via an initiating device circuit (IDC) for conventional systems, or a signaling line circuit (SLC) for addressable systems and would create a supervisory condition at the fire alarm control unit (FACU).

## Initiating Device Circuit



Conventional supervisory devices are devices that are used on an initiating device circuit and use a switch contact to short both sides of the device circuit together. By doing so, the device causes an increase in current flowing through the circuit, which the FACU interprets as a supervisory signal. Once one device shorts the circuit, no other device on that circuit or "zone" can send a signal. Because of this, any device on the circuit or "zone" will put the entire zone into a supervisory state. Zones are typically designed to enable someone to easily identify an area where the supervisory is located, for example, you may have all of the valve supervisory switches for one system on its own zone so the supervisory comes up as "supervisory wet pipe system 1".

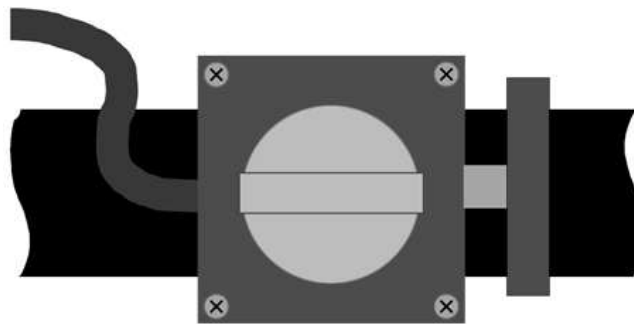
## Signaling Line Circuit



Addressable supervisory devices are capable of communicating a unique identification number or address to a control unit via a signaling line circuit. This identification consists of a binary string of 1s and 0s that indicate the address or location of that device on the circuit. When the FACU polls a supervisory device, the device responds with its status (Normal, supervisory, etc.) and address. The device address allows for the location to be identified at the FACU. When one supervisory device is activated on a signaling line circuit, the FACU is still able to poll the other devices unlike a conventional initiating device circuit.

Additionally, some addressable supervisory devices are also able to transmit to the FACU a range of values such as temperature, water level, pressure, and other variables, and then the control unit software determines the set points for initiation of a supervisory signal. These types of supervisory devices are known as analog addressable as they are able to tell the FACU their address and their value.

## Valve Position



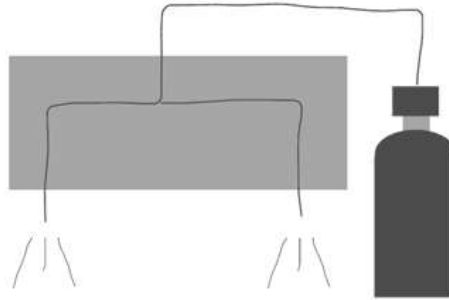
Valves that can shut off the water supply for a fire suppression system such as a sprinkler system are required to be supervised to ensure that they are not closed while the system is in service. One way of supervising these valves is the use of the fire alarm system. This is done by installing a switch, which will send distinct signals to indicate that either a control valve has been moved from its normal position (typically meaning that the valve has been shut) or that the control valve has been restored back to its normal position.

## Room Temperature



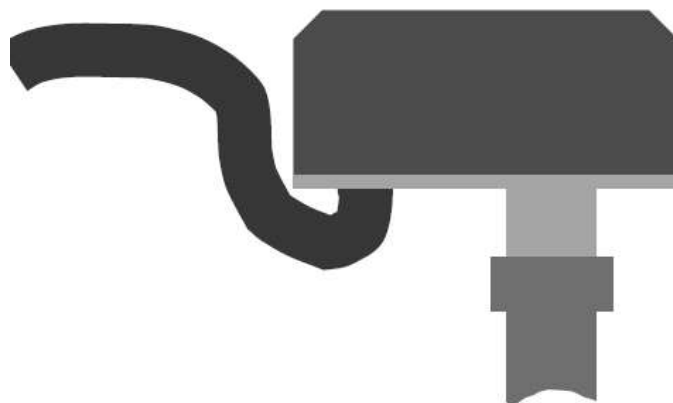
Water-based fire suppression systems are required to be maintained above a temperature of 40° F (4° C) where the system piping is filled with water. One way to ensure that these systems are not subject to freezing temperatures is to utilize the fire alarm system. This is done by placing temperature devices that can send a signal to the fire alarm control unit when the temperature in a space has dropped below 40° F (4° C) and for when the temperature has been restored to a temperature above 40° F (4° C).

## Other Suppression Systems



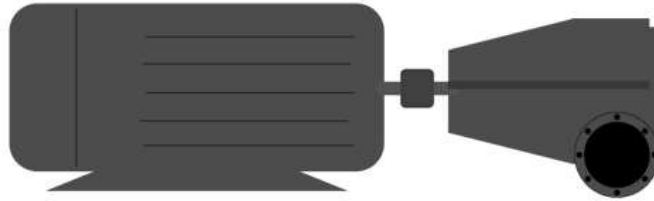
If a building has a fire suppression system other than a sprinkler system such as a kitchen hood suppression system, or an in gas system, it may be required to be monitored by the fire alarm system. Based on the system type and the building occupar some of the signals may appear on the fire alarm control unit as a supervisory signal, which indicates that either the system has actuated or there is an issue with the suppression system that must be addressed. The other suppression systems may be connected directly to the building fire alarm control unit, or the other suppression system is controlled by its own fire alarm control unit (known as a releasing panel) that is then connected to the buildings main fire alarm control unit.

## Air Pressure



Some water-based fire suppression systems such as a dry pipe or pre-action sprinkler system may require the use of pressurized air or nitrogen within the system piping. In some cases, the pressure within the piping is required to be supervised by the fire alarm system. This is done using pressure transducers or pressure switches that are connected to the fire alarm control unit. A supervisory condition may then be created if the pressure in the piping is too high, or too low.

## Fire Pump

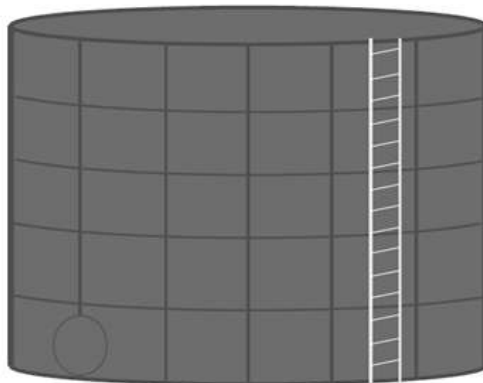


If the building has a fire pump that supplies a water-based fire suppression system such as a sprinkler system or a standpipe system, the fire alarm control unit is connected to the fire pump controller to monitor for the following conditions:

- Pump or engine running
- Controller main switch off normal
- Trouble with the controller or engine
- Main power to electric fire pump disconnected
- Phase reversal on electric fire pump
- Loss of phase on electric fire pump

For more information on fire pumps take a look at this [blog](#).

## Water Tank



If a water tank is used to supply a water-based fire suppression system, the water level in the tank and the temperature of the water may need to be monitored. This is done by installing water level sensors within the tank that can send a signal if the water level drops by a specified level, and the installation of water temperature sensors that can send signals if the temperature drops below 40° F (4° C) and for when the temperature has been restored to a temperature above 40° F (4° C).



Want to Learn More?

Like I noted in the beginning of this blog, if you are interested in learning more about fire alarm basics, take a look at my [Fire Alarm Basics Blog](#). I will be updating this series over the next few months to add a deeper dive into different portions of the fire alarm system. If you found this article helpful, subscribe to the [NFPA Network Newsletter](#) for monthly, personalized content related to the world of fire, electrical, and building & life safety.

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## Fire Alarm Basics Fact Sheet

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Shawn Mahoney

NFPA Technical Services Engineer

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A

**Adam Dalessio** 4 years ago

How are you able to identify an addressable FACU/FACP from a conventional?

👍 1 🗨️ 0 Reply

S

**Shawn Mahoney** 4 years ago

Adam, you can look in the manufacturers data sheet or contact the manufacturer. Another way to tell is to look at the panel and see if there are separate indicator lights for each "zone" if that is the case it is conventional.

👍 0 🗨️ 0 Reply

T

**Todd Humphrey** 2 years ago

If you have toner inductance wand you can "listen" to the circuit. A conventional circuit makes no noise, whereas an SLC circuit makes a ton of noise. Be careful however, because an annunciator (which is usually a type of RS-485) also makes noise.

You can also use a voltmeter. A conventional circuit is a stable voltage. A SLC circuit will have a fluctuating voltage as the polling occurs.

Shawn's suggestion is the best, but sometimes older panels are hard to find manuals for, and you may not always have good cell reception to look for a manual. Over time the steps I stated.

**TIP:** Do not touch a wire, or use a voltmeter on a system unless you place the monitoring account in test mode. If your action results in a fire truck dispatch, buy the fire house a gallon or 2 of ice cream.

👍 0 🗨️ 0 Reply

T **Todd Humphrey** ⬅️ T Todd Humphrey 2 years ago

Over time the steps I stated will be more natural to you and you will be able to identify circuits away for the panel.

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** ⬅️ T Todd Humphrey 2 years ago

Todd, thanks for that information, I think that is extremely helpful for someone trying to identify a circuit in the field.

👍 0 🗨️ 0 Reply

A **Ali Imam** 4 years ago

Great info...waiting for more !

👍 1 🗨️ 0 Reply

D **Diaaeldin Mostafa** 4 years ago

Nice article Shawn, looking forward to have deep dive in Fire alarm system 😊

👍 1 🗨️ 0 Reply

D **Don Dotson** 3 months ago

When a system is retested for acceptance for a CPU change out and a failure occurs in the 10% population, is the testing expanded to an additional 10%?

👍 0 🗨️ 0 Reply

J **Justin Irvine** 5 months ago

Do water tank level alarm devices need to be listed?

👍 0 🗨️ 0 Reply

M **Milton Álvarez** 11 months ago

Hola muy buenas tardes estimados.

Les escribo desde Chile, Y me gustaría conseguir apoyo de conocimiento respecto a canalizaciones para instalar sistemas de detección de incendio en este caso, Detección de humo en particular.

La pregunta específica es saber ¿si el cableado entre el Panel de detección y los sensores puede ser Canalizado en material de tubería del tipo libre de halógeno?

¿La NFPA establece la instalación constante Y única de un tipo de Canalización en particular?

¡ De antemano muchas gracias.!

Este pregunta es Siempre con ánimos de mejorar mis capacidades, conocimientos y Principalmente el servicio a mis clientes.

👍 0 🗨️ 0 Reply

W **Walid DERBEL** 12 months ago

we need to install a new complete fire pump ( Fire pump and diesel engine) in offshore platform. it will be installed in Zone 2. the package shall be certified NFPA 20 and UL/FM .who to perform the design and which component to apply accordingly?

👍 0 🗨️ 0 Reply

T **Todd J** 1 year ago

is there a specific time that the monitoring company can notify a company for a supervisory alarm. for ex. low battery or can the property own request a designated time to be called for a supervisory only



👍 0 🗨️ 0 Reply

E **E** 2 years ago

Does an alarm control valve need to be supervised or can you simply lock the alarm control valve to discourage people from tampering with it?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 1 year ago

It depends, some building codes will require that they system be electronically supervised, NFPA 25 will also have different inspection frequencies based on the way its supervised, locking and sealing the valve are both acceptable per NFPA 25, but you would need to check with the applicable building or life safety codes and the AHJ.

👍 0 🗨️ 0 Reply

D **Danny** 3 years ago

If a fire pump is located in a prefab building not connected to the main building and contains its own fire alarm system to monitor the fire pump for supervision, does it need to be connected to the main building fire alarm system?

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 3 years ago

Danny, there is not a requirement in the fire alarm code that I am aware of, I suggest discussing this with your AHJ as they may want annunciation for the fire pump to be located within the main building.

👍 0 🗨️ 0 Reply

K **KD** 3 years ago

any guidelines for fire alarm system design of hazardous room/area within the facility

👍 0 🗨️ 0 Reply

P **Peter Bowman** 3 years ago

Shawn-

Is it acceptable to use the FACP to monitor a non-fire alarm related device? I am an architect with a client that would like to monitor the status of an emergency eye wash station. The eye wash station is activated by a pull chain, and does not automatically turn off. The client is concerned that someone may intentionally activate the eye wash ("after hours") and then walk away, allowing it to continuously operate causing extensive water damage. The proposed solution is to tie the eye wash station to the FACP; when it is operated, a "trouble signal" would be sent to the panel, thereby providing notification and minimizing potential damage. The local FM does not believe relevant codes allow this arrangement.

thanks

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 3 years ago

I am not aware of anything in the code that would prohibit this as the flowing of water from the eye wash station could be considered something that can impact the mission of the building if gone unnoticed. However, this would all need to be approved by the AHJ, and it would result in a supervisory condition, not a trouble condition. Refer to the annex material for a supervisory condition in NFPA 72. Again, you will need to confirm all of this with the AHJ, for further questions please refer to our Technical Question Service.

<https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=72&tab=questions>

👍 0 🗨️ 0 Reply

H **Hany** 3 years ago

Does the tamper switch or flow switch need a module to be connected to conventional panel or connected directly???

👍 0 🗨️ 0 Reply

S **Shawn Mahoney** 3 years ago

Hany, if you are connecting a conventional flow switch to a conventional panel then there is no need for a module. A module is only needed when connecting a conventional flow or tamper switch to an addressable panel. I recommend also checking with the manufacturer to determine what is required.

👍 0 🗨️ 0 Reply

P **Piyush Patel** 4 years ago

Thank You so much for sharing these steps as I will be glad to you. I feel that this blog is very important as fire alarm panels must be known to every one.

👍 0 🗨️ 0 Reply

