Electrical: Fuses

A fuse is a device designed to stop the flow of current in order to protect the circuit and equipment when it is overloaded as a result of too many appliances and/or equipment on the circuit. It also provides protection when a short circuit develops in a wire or a ground fault.

Fuses are common in many older buildings that have no had electrical systems upgraded. Even if the main electrical service has been updated to circuit breakers, the use of fuse-protected sub-panels is fairly common.

Fuses can be safe, however, it is recommended that fuses be replaced and updated to circuit breakers. If this is not feasible, the following safety precautions should be followed:

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Typical screw-in fuse panel.

Electrical Inspection

The presence of fuses indicates that the electrical service was installed prior to 1970 and is over 50 years old. This wiring was installed to meet the electrical needs at that point in time. With the added power demands in today's world, such as appliances and technology equipment, this older wiring may not be adequate. A certified electrician or licensed electrical contractor should be hired to inspect the electrical system. This inspection will identify the electrical demands needed and any corrections that are necessary. This should be completed, at a minimum, once every three years.

Tamper Proof Fuses

More often than not, a blown fuse is the result of an overloaded circuit. This means that there is too much electrical demand on the circuit. If the fuse is continually blowing, there is a much more serious problem, and a certified electrician or licensed electrical contractor should be hired to correct the problem.

However, an all too common practice to stop a fuse from continually blowing is to install a higher-rated fuse in the circuit. For example, replacing a 15-amp fuse with a 20-amp fuse. This is a recipe for disaster, as this allows for more current into the circuit than it was designed for, which can lead to overheating of the wire and probable fire.

To prevent mismatching or over fusing of the circuit, Fustat® fuses – also called type "S" tamper-proof fuses – should be installed for all screw-in fuse panels. These come in different amperage sizes, and each tamper-proof fuse will only screw into the correct tamper-proof base. This will prevent installing a higher-rated amp fuse into a lower amp-rated circuit.



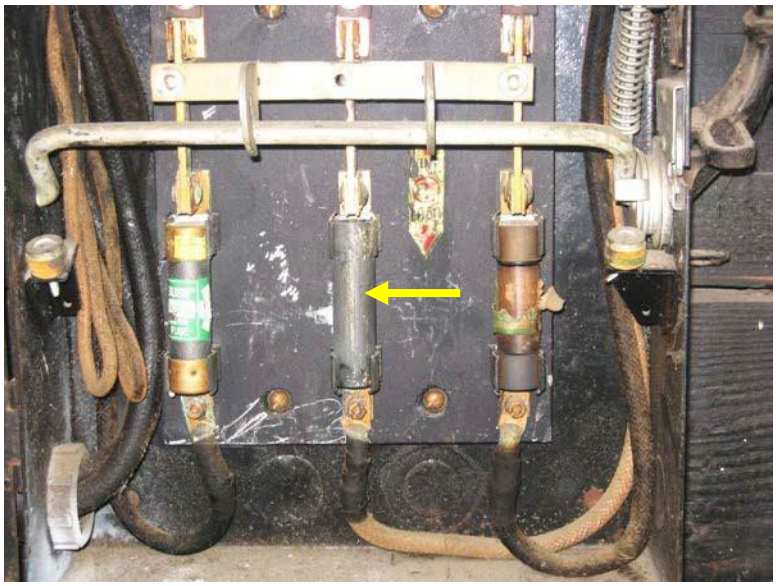
Fustat® fuses, (also called type S) as shown in the image above, are not interchangeable, meaning you cannot install a 20-amp fuse into a 15-amp base. The base adapter on the right screws into any fuse socket.



Screw the Fustat® into the base adapter (as shown above), and then screw the combined assembly into the socket on your electrical panel. The next time you unscrew this fuse, its base adapter will stay in place and will only accept the Fustat® fuse in the correct amp rating.

Fake Fuses

The ability to insert copper/metal tubes (fake fuses) with cartridge-style fuses is an extremely dangerous situation, since this does not provide over current protection. If the circuit is not protected, you are increasing the potential for a fire to occur, arcing and electrical shock. If a fuse has to be replaced, always install properly matched fuses. If the fuse is continually blowing, as earlier discussed, this is an indication of a more serious problem and should be corrected by a certified electrician or licensed electrical contractor.



This image shows a piece of metal tube that was inserted in the middle circuit. This is being used as a conductor and was most likely installed because the existing fuse kept blowing. This practice should never be done.

Renewable Fuses

A renewable fuse is a cartridge-style fuse. If the fuse is blown, the cap is unscrewed, and the link can be replaced, allowing the fuse to be reused. Once the link has been replaced, the mechanical connection between the link and the fuse cap can become loose, dirty, corroded or otherwise faulty, resulting in a connection that can generate heat in the hundreds of degrees and cause the insulation on the conductor to deteriorate. Once the conductor makes contact with the metal of the panel or the conduit, a short circuit occurs, which can result in arcing and fire. Renewable fuses should not be used and should be replaced with one-time use standard fuses.





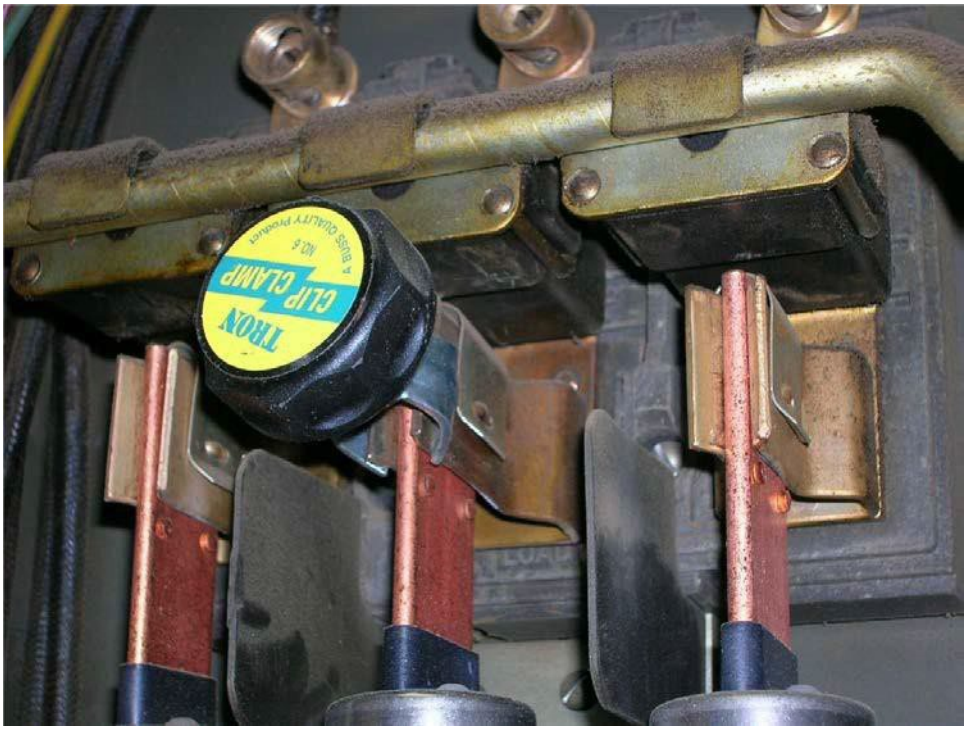
A renewable fuse is a cartridge-style fuse that can be identified by labeling (image on left) and/or by the end caps that can be unscrewed (image on right).



This images shows a renewable fuse and its components. The element is inserted into slots on the top and bottom of the fuse, and the threaded caps screw on and apply pressure to the element. (Photo courtesy of Hartford Steam Boiler)

Fuse Clip Clamps

Fuse clip clamps – also known as torpedo or depth charge clamps – were originally used on submarines and some warships in World War II. Their purpose was to prevent fuses from coming out of the clips during depth charges or other explosions. Today, these are used in some older buildings in an attempt to compress the clip to the fuse blade. This is an indication that the clamp does not have enough compression to make solid contact with the fuse cartridge blade, which can lead to resistance to current flow. This makes the clamp and blade elevate in temperature and can lead to fire. These clip clamps should not be used, and a certified electrician or licensed electrical contractor should be hired to replace the clips.



This image shows a clip clamp being used to eliminate the heating that was being caused by high resistance connections inside the fuse. The real problem is the clips do not have enough compression and should be replaced (Photo courtesy of Hartford Steam Boiler).

The presence of fuses in the electrical system indicates older wiring, and every attempt should be made to replace fuses with circuit breakers. If this is not financially feasible, and the above mentioned guidelines are followed, your chances of an electrical loss from fuses will be reduced.

1111 Ashworth Rd / West Des Moines, IA 50265 / 1.877.448.4331 / GuideOne.com

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