



How to identify and replace a failing AC capacitor

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It's summertime—and that's prime time for the HVAC contractor. As air conditioners operate all over in full force, calls pile up to fix ones that have failed or aren't working properly. One of the most common causes for an AC system malfunction is a failing capacitor. Capacitors are an integral component of an AC system, **releasing energy** to the compressor, blower and outside fan. As a contractor, there are many signs you can look for to identify the cause of an AC issue, and switch the capacitor out if needed before it becomes a bigger problem.

While a failing capacitor is fairly easy to identify visually, an air conditioner will express certain symptoms as the capacitor degrades. If the client's AC system has demonstrated the following symptoms, it's important the capacitor is switched out right away before the compressor or fan is damaged or stops working.

Application symptoms

The first sign of a failing capacitor is often the air conditioner not blowing any cold air. The AC may also take a while to start after being turned on and the compressor will make a humming noise. The capacitor may also make an audible clicking noise. Rising energy bills are another indication since the AC system will have to use more energy to operate as the capacitor fails. Eventually, the air conditioner won't stay on or will fail to turn on at all.

If the client is having any of the above problems with their AC, a visual check of the capacitor could reveal a lot. No matter the type of capacitor, they will all have the same visual symptoms.

Visual symptoms

As a capacitor degrades it will have a bulged appearance, with the normally flat top becoming domed. This is a sure sign the capacitor needs to be replaced. If an oily substance has seeped through the top as well, leaving behind a sticky residue, the capacitor has reached or is nearing the end of its life.



Bulged capacitor



Good capacitor

Necessary safety precautions

Many HVAC capacitors are designed to provide high voltages when fully charged, so improper handling can cause electrical shock. When replacing a capacitor there are several safety rules you should follow:

- Never ever touch capacitor terminals.
- Never short the terminals with a metal object. (This can create heavy sparking that can cause a fire under the right conditions)
- Discharging should be through a resistance load by a specialist.

Steps for replacing a capacitor

Replacing a bad capacitor before it damages the motor it powers is essential. Here's a brief overview of how to replace a capacitor.

1. **Remove power disconnect or turn off power to the AC.**
2. **Remove the access panel.**
After removing, find and inspect the old capacitor to see if it's the cause of the problem.
3. **Note the old capacitor's capacitance and voltage rating .**
Note the make and model of AC equipment to ensure you acquire the right replacement. If you replace the capacitor with one that has a lower voltage rating, excessive strain will be placed on the capacitor significantly shortening its lifespan.
4. **Discharge and dismount the old capacitor.**
Before dismounting, make sure to label the wires to ensure you connect the new capacitor to the correct terminals.
5. **Install the new capacitor.**
Position the new capacitor in place of the old one and reattach wires to the correct terminals.
6. **Turn the power back on and test.**
If it doesn't function, turn power back off, discharge the capacitor and check the wire leads to make sure they were attached correctly.

Installing a quality replacement capacitor for your client will make all the difference.