

## **DIY - AC & Oil Fan Series Resistors**

### **Part 1 - Checking the AC & Oil Fan Series Resistors**

Failure of the original air condenser & oil fan series resistors is common. If replacement is necessary, a new resistor with cooling plate must be installed. The cooling plate is located between the cooler air guide and the resistor.

The AC & Oil fan series resistors are part of a system that includes the Climate Control Unit (CCU), fans, relays, fuses, temperature sensors and wiring. With the exception of the original series resistors, the other system components are very reliable.

Photos that accompany this writeup can be found here:

<https://goo.gl/photos/jD9FL832hqEW5i1S7>

The parts diagrams show the cooling assemblies which are located in the left and right front wheel wells. The AC cooler is on the left and the oil cooler is on the right.

In the photos you can see what the new series resistor looks like along with the cooling plate. The same series resistor part is used for both the AC & oil fan coolers.

The fan motor is of a DC type and operates in low or high speed mode, speed being dependent upon voltage. 12v for high speed and ~4v for low speed. The low speed mode is controlled by a relay which shunts current through the resistor which is wired in series with the fan.

The symptom of a failed resistor is that low speed operation of the fan is absent. Failure of the series resistor does not affect the high speed operation of the fan. However, it is important to have a low speed operation mode to achieve best performance and longevity of air conditioning and engine system components.

For a quick operational test of the AC fan resistor, start the engine and turn on the air conditioner. If the resistor is working, the fan in the left front wheel well can be heard running at low speed.

For an operational test of the oil fan resistor, warm the engine up until the temperature gauge needle is at about the 9 o'clock position. If the resistor is working, the fan in the right front wheel well can be heard running at low speed.

If a fan is not running, check the fuse panel located in the trunk.

The oil fan fuse is in position #2 and is a 30 amp fuse.

The AC fan fuse is in position #39 and is a 30 amp fuse.

Use the yellow fuse removal tool to pull a fuse out. Be careful to not drop the fuse when removing it.

If a fuse is blown, replace the fuse and check for signs of a short circuit. Note that when the series resistor fails, it fails with an open circuit. So it is not likely the series resistor would be the reason for a blown fuse.

More detailed testing steps for the series resistors are covered next.

### **Stuff You Need**

To do the following tests you will need a few things:

- Short length of 14 AWG wire
- Disconnect pins with 1/4 inch wide blade
- Crimping tool
- Multimeter

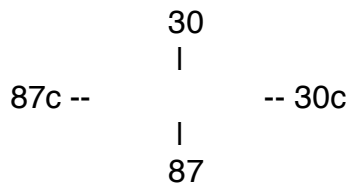
### **Testing with a relay jumper wire.**

Make a jumper wire to use for testing.

Remove the key from the ignition.

Locate the pair of relays in positions R04 (oil fan) and R14 (AC fan).

Simplified Relay Plug Chart:



Test each fan using this procedure:

Remove the relay.

Low speed test: Jumper terminals 30c and 87c.  
Fan should run in low speed.

High speed test: Jumper terminals 30 and 87.  
Fan should run in high speed.

## **Testing with a Multimeter.**

### **Measuring resistance across the series resistor:**

Insert an empty disconnect pin into terminals 87 and 87c.

Insert the probes into the disconnect pins in 87 and 87c.

Measure the resistance.

Value measured should be in the range of .6-.8 ohms.

A high resistance, for example 20 ohms, indicates an open circuit.

### **Measuring voltage:**

Insert an empty disconnect pin into terminals 30 and 87.

Value measured should be about 12v.

### **Measuring voltage drop in low speed mode:**

Insert a empty disconnect pin into terminals 30 and 87.

Jumper terminals 30c and 87c.

Value measured should be about 4v.

No voltage drop, i.e., a value of 12v, indicates a failed resistor.

At this point, enough information should be available to decide whether or not to replace the series resistor. In my case, the AC fan series resistor was determined to not be working and will need to be replaced. Although the oil fan series resistor appears to be working ok, I will order a replacement and change it if it has not been updated.

Replacing the AC fan series resistor will be covered in Part 2.