

# HUMMER A/C Service

The compressor is basically a pump. It compresses a gas, let's it expand, and physics basically says that when a gas expands, it tends to cool. As the gas expands, air is passed by a hose grid and is subsequently cooled. It's then condensed to then get compressed/expanded again. You also get a nice liquid/gas conversion as well in both the high and low pressure sides.

R134A A/C systems are generally supposed to be a sealed system. However, its molecular structure is smaller than a lot of the seals, so it will leak. Not a lot - but it will leak. Hence it needs to be topped off every once in a while.

The system has a high side and a low side. High side is generally known as the Discharge side, and the low side is generally known as the suction side.

This part will cover tools and the service port locations.

Tools needed:

- Gauges
- Service port connectors (one high and one low side designed for R134A ports). These service port connectors attach to the blue and red hoses on the gauge set.
- A R134A can tap (attaches to the yellow hose on the gauge set)
- Vacuum pump (also attaches to the yellow hose on the gauge set)
- UV Dye Lamp

## Service ports

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On top of the engine, you will find the compressor. It's held in by 4 bolts, is a common GM Compressor (cross reference the ubiquitous 2000 Chevy G-Van with the 6.5L TD engine), and has it's compressor manifold held in by a bolt on the top of the compressor. You will have two electrical connectors on the compressor - one for the solenoid, the other (on the back) is a pressure monitor of sorts.

Depending on the model year (97 to 99, or 2000 to 2003), you will have two service ports generally marked with blue and red caps. Blue denotes low pressure (suction), Red denotes high pressure. Low pressure side is generally on the driver's side of the compressor, the high pressure side is on the passenger side of the compressor.

97 to 99 trucks will have a rounded compressor manifold with hoses clamped onto aluminum extensions. 2000 and up trucks will have a blocky, rectangular compressor manifold with hoses screwed into the manifold. You can theoretically convert a 97-99 truck to use the 2000 and up manifold set.

Inside the service port is a typical Schrader valve that is similar to what you see in your tires. It does require a longer valve core tool to do the work. Don't remove any valve cores unless the system is discharged fully.

## **Serviceable items**

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These are the serviceable items on our trucks:

- Compressor
- Manifold
- Drier/Accumulator

The compressors are normal GM parts. The Drier/Accumulator and manifold are AMG specific parts (but the drier can be had if you can find it).

Manifolds can crack. They can be repaired by TIG welding it. Most A/C shops can TIG weld repair the manifolds.

## **Tools and basic service**

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As mentioned, you need tools to work on the A/C. In addition to your common wrenches, you need the aforementioned gauges, vacuum pump, and other stuff.

Using the gauges:

Your gauge set will have a set of blue and red gauges, and three hoses (red, blue, and yellow). Red hose goes to the red gauge side, blue hose goes to the blue gauge side, and the yellow hose goes to the center connector.

Attach the port service connectors to the hoses. One will be blue, the other red. Screw them onto their respective colors. This will allow you to connect up the hoses to the high and low side service ports. It's a air chuck style fitting with a quick release style valve.

Next - (and this is VERY important), close the gauge valves on both the high and low sides. These valves are the water hose looking valves that are on either side of the gauges.

Then, remove the blue cap. Push the blue hose fitting on. Do the same to the red cap.

Now, start your truck. Turn the A/C on Max A/C and turn on the rear A/C as well.

Depending on your ambient temp, you should see that your blue gauge reading should be anywhere from 10 to 55 PSI. The red gauge reading should be anywhere from 112-390 PSI.

Listed below (from the service manuals) is the High/Low PSI range corresponding to ambient temp.

**F° /Low Psi/High Psi**

70 /10-32/112-270

75 /12-33/120-280

80 /17-34/131-310

85 /18-35/185-325

90 /19-47/210-330

95 /21-47/225-350

100 /28-51/240-370

110 /30-55/255-390

Low and high side pressures are affected by relative humidity. Greater humidity will cause higher pressures

Anything outside this range, consult this diagnosis chart below.

**Low Side / High Side / Air Temp / Diagnosis or Solution**

Low/Low/Warm = Needs more refrigerant

High/High/Warm = Too much refrigerant

High/High/Cool = Air in the system (needs to be evacuated/purged/recharged)

Normal/Normal/Warm = Moisture in the system (needs to be evacuated/purged/recharged)

High/Low/Warm = bad compressor (Needs to be evacuated/purged/recharged/replace drier)

There are other items on the chart, but generally, anything other than this - you need to take it in. It's not beyond a backyard mechanic, but it's going to require way more tools than most mechanics have. For example, a low/low/warm condition can mean tearing into the truck's A/C to get to the expansion valve and orifice tube, which means removing a ton of stuff on the passenger side. It also could mean that it's got a restriction somewhere in the high side, and needs more advanced diagnostic tools to determine where the restriction is.

## Common repairs

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Low refrigerant:

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Tools needed: Gauges, R134A can tap, one can of R134A.

Steps: Close all gauges. Attach low and high side hoses to the service ports. Turn on the truck.

Next - follow these steps exactly. DO NOT TOUCH THE RED GAUGE VALVE! PERIOD! Doing so will literally explode the R134A can in close proximity to your body.

- 1) Attach the can to the can tap. Connections vary, so read the instructions based on which can tap you use. Attach the yellow hose to the can tap.
- 2) Bleed off any ambient air from the yellow hose. Do this by unscrewing the yellow hose from the gauge set until you hear a hiss. Then screw it back on and tighten.
- 3) Slowly open the BLUE valve.
- 4) Hold the can upside down. Shake until it's empty.
- 5) Close the BLUE valve.
- 6) Remove the can from the can tap

Rev up your engine to 1200/1500 RPM. Measure your output temp from the passenger side vent using a thermometer and the A/C on Max. The output air should be within 40-50 degrees of the ambient air. Example - Ambient air is 100 degrees. Output air should be at least 50-60 degrees.

Too much refrigerant:

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Tools needed: Gauges, Fan, Recovery system (if possible).

Steps: Close all gauges. Attach low and high side hoses to the service ports. Turn on the truck.

Next - follow these steps exactly. DO NOT TOUCH THE RED GAUGE VALVE!

EPA Notice - This should be done using a recovery system. You technically can just vent the R134A into the air, but that's not recommended. R134A hugs the ground, so keep all pets and very small children away. Don't drop any flammable items nearby for at least 10 minutes after releasing R134A.

- 1) Attach the recovery unit to the yellow hose. Follow the instructions of the recovery unit to remove R134A that is in excess of factory specifications.

Backyard Method

- 1) Dangle the yellow hose near the inside of the driver's side tire.
- 2) Turn on the truck.

3) Slowly open the blue gauge valve. Close when enough R134A has been removed from the system.

Testing/Replacing the drier:

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Turn truck on. Turn A/C On to Max. Look at sight glass on the drier (oversized beer can device behind the batteries on the passenger side). You should see either bubbles or gaseous wisps streaming by (which means the drier is okay). If you see small white BB like objects - it needs replacement.

Tools needed: Gauges, Can Tap, vacuum pump, 3/4" wrench, adjustable wrench, screwdriver. Recovery system (preferred but optional).

Parts needed: O-Rings, replacement drier, PAG Oil.

Close all gauge valves BEFORE attaching to the service ports.

Step 1 - evacuate the system, EPA approved method.

- Attach gauges to low and high side service ports.
- Attach recovery system to gauges. Follow the directions to remove all R134A from the system.

Step 1 - evacuate the system, backyard method.

- Attach gauges to low and high side service ports.
- Put the yellow hose on the inside of the driver's side tire.
- Open both the blue and the red valves. Keep all flammables away. Allow R134A to vent until all pressure is gone from high and low sides.

Step 2 - remove the drier.

- Take the screwdriver and loosen both hose clamps.
- Take the 3/4" wrench and remove both fittings. Some minor residual pressure may be present.
- Remove both old o-rings from the fittings
- Remove the pressure switch from the top of the drier using the adjustable wrench.

Step 3 - replace the drier

- Replace the O-Rings. Use PAG oil to lubricate the rings and the fittings.
- Reinstall the pressure switch. Remove the cover port to reveal a Schrader valve. Take PAG oil and lubricate the threads on the valve. Screw on the switch onto the valve. Tighten.
- Reinsert the drier into the hose clamps. Ensure that the flow direction arrow sticker is pointing towards the rear of the truck. Tighten hose clamps.
- Reinstall fittings. Tighten as needed.

Go to vacuum and recharging section of this tutorial.

Replacing the compressor:

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Follow the steps to replace the drier. If you replace the compressor - the drier HAS to be replaced as well.

Next:

- Remove the serpentine belt from your compressor
- Undo 4 bolts holding down the compressor
- Undo the top manifold bolt
- Release the top and rear electrical connections to the compressor.
- Remove compressor.

Now - take a unusable cup of some sort. Tilt the compressor upside down to empty all the PAG oil out of the system. Measure it.

Then, take the new compressor, and a set of snap ring pliers or a hook. Remove the snap ring retainer off of the service port on the back of the new compressor and it's plug. Do the same to the old compressor, and remove the electrical pressure connector on the old compressor. Replace it onto the new compressor. Replace the snap ring.

Put in an equal amount of PAG oil that was removed from the old compressor into the new compressor. USE ONLY NEW PAG OIL!

Take the manifold, remove the two o-rings, replace with two new ones. Coat the new o-rings with PAG oil before reinstalling.

Reinstall the new compressor into the truck. Tighten all 4 bolts, reconnect the 2 electrical connections, and tighten down the manifold bolt. Do NOT over tighten the manifold bolt - tighten it down until it stops with moderate force (28 ft/lb).

## **Vacuum testing**

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In order for the A/C to operate properly, you need to introduce a vacuum type environment into the system. A vacuum pump is used to do that.

Vacuumping the system will enable all the moisture and ambient air to be removed, ensuring that the system will run moisture free.

A vacuum environment also will show if there is any leaks.

Tools needed:

Gauges, Vacuum Pump.

Steps:

- 1- attach both high and low side hoses to the service ports
- 2- attach the yellow hose to the vacuum pump. Each pump differs - read the manual!
- 3) Turn on the pump.
- 4) Open both high and low side valves on the gauges.

Read the blue gauge. The needle on the gauge should show that it's on the vacuum side (negative pressure), and it should stop at around 20-25 pounds of vacuum, depending on ambient air conditions.

Let the pump run for 15 minutes. Then, close all the valves, then shut the pump off.

Let the whole thing sit for at least another 15-20 minutes. This will boil all the moisture out. Turn on the vacuum pump, open both valves, and let it run for another 15-20 minutes.

Then, shut both valves off, shut off the vacuum pump, and let it sit. This is the leak test. If everything goes well, the entire system will hold the 20 pounds of vacuum.

Let the leak test sit for at least 20 minutes. You'll generally know if it holds a lot sooner though.

If it doesn't hold - retighten and check everything. It's likely a messed up O-Ring. Repeat all the steps above.

If it does hold - follow the charging steps below.

### **Charging your truck's A/C**

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Tools needed:

Gauges, can tap, R134A cans (50 ounces total).

Steps:

- 1- Ensure all valves are closed.
- 2- DO NOT TOUCH THE RED VALVE FROM HERE ON OUT!
- 3- Turn on the truck. Turn the A/C on Max. If you have it, set your RPM switch to 1200-1500 RPM.
- 4- Attach the can tap to the R134A can. Attach the yellow hose to the R134A can tap. Purge the air from the yellow hose by unscrewing the hose from the center connection slightly, then retighten when you hear a hiss.
- 5- Slowly open the BLUE valve.
- 6- When the first can is almost empty, the compressor clutch solenoid will activate and then you will see the compressor operate.
- 7- When the can is empty, close the blue valve. Remove the empty can from the can tap and replace it.

Repeat steps 4, 5, and 7 until 50 ounces of R134A are in the system. You will have to guess on the last can. At 1200 RPM, your blue gauge should show (according to the scale) about 40-45 degrees as a temp. When it does, stop charging, close the blue valve, and measure the temp coming out of the vents. The vent temp (on the passenger side) should be at least 40-50 degrees cooler than the ambient air temp.

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