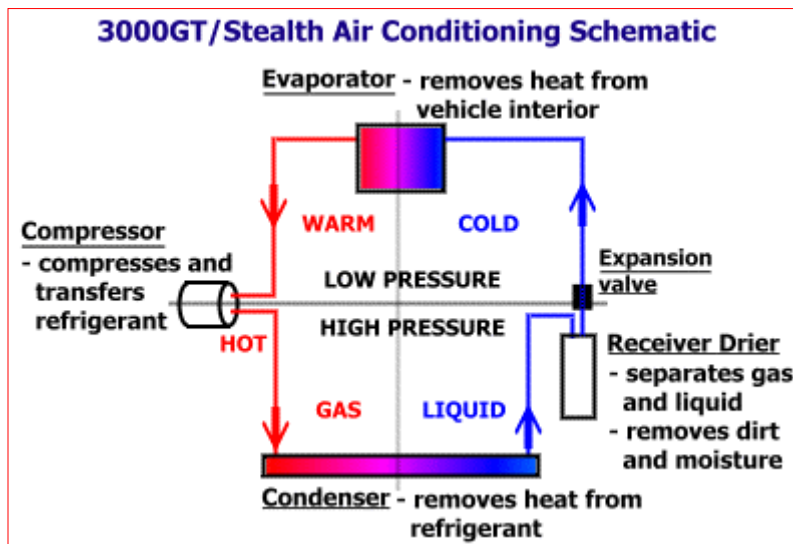


## Air Condition Tips

### 1. General Troubleshooting:

The schematic below of our car's air conditioning system shows the major mechanical components, their functions, and how the system is divided into low and high pressure sides and cold (liquid) and warm/hot (gas) sides. The compressor is the heart of the system, compressing and pumping the gaseous refrigerant through the system. Liquid refrigerant should never enter the compressor. The refrigerant changes from gas to liquid inside the condenser, located in front of the radiator, as heat is removed from the refrigerant. The expansion valve, located on the evaporator in our cars, controls the flow of liquid refrigerant through the system and changes the pressure from high to low. Refrigerant changes from liquid to gas in the evaporator, located behind the glove box, as heat is absorbed from the passenger's compartment.



The electrical and electronic control of our AC system depends on whether the manual or full auto version is installed. There are very specific guidelines in the service manual for troubleshooting each type of system. For the particular symptom I had, no cold air coming out, the service manual lists the following 11 items to be checked in the order given. Notice that the refrigerant amount is not a list item, but that is covered elsewhere (see sight glass

inspection). Also, the manual recommends physical inspection of the refrigerant lines (hoses and pipes).

### 2. Troubleshooting Basic Air Conditioning Problems:

Most problems with the air conditioning system are best left to experts with the knowledge and proper equipment. There are, however, a number of problems that you can check out yourself.

Problem	Is Caused By	What to Do
There's little or no air coming from the vents (and you're sure it's on)	The A/C fuse is blown	Check and/or replace fuse
	Broken or loose wires or connections	Check and/or repair connections
	The on/off switch is defective	Have switches checked and/or replaced
The air coming from the vents is not cool enough	Windows and air vent wings open	Close windows and vent wings
	The compressor belt is slipping	Tighten or replace compressor belt
	Heater is on	Shut heater off

	Condenser is clogged with debris	Clean the condenser
	Refrigerant has escaped through a leak in the system	Have system checked
		Have system serviced
The air has an odor	Vacuum system is disrupted	Have the system checked/ repaired
	Odor producing substances on the evaporator case	Clean the evaporator case
	Condensation has collected in the bottom of the evaporator housing	Clean the evaporator housing drains
System is noisy or vibrating	Compressor belt or mountings loose	Tighten or replace belt; tighten mounting bolts
	Air in the system	Have the system serviced
Sight glass condition Constant bubbles, foam or oil streaks Clear sight glass, but no cold air Clear sight glass, but air is cold Clouded with milky fluid	Undercharged system (see text) No refrigerant at all System is OK Receiver/drier is leaking desiccant	Have system charged/checked Have system charged/checked Have syste

### 3. Air Conditioning Unit Tips

Before turning on your unit every year, below are some basic maintenance tips to ensure your air conditioning season gets off to a good start.

Be sure that the condensing unit located outside is not covered up and is clear of brush. The unit needs to draw air into the system to cool inside, but the process is hindered if it cannot pull enough air.

Run your air conditioner for a few minutes now, before you need it. That way if a problem is found, you'll have enough time to schedule a service call to have a BGE HOME professional come to fix it.

Change the filters regularly. Dirty filters restrict air flow, reducing efficiency and worse case, can cause the evaporator to ice up. Disposable fiberglass filters should be replaced. Electrostatic or electronic filters need to be cleaned regularly.

Be sure all access panels are secure, with all the screws in place.

Clean obvious obstructions such as newspaper, leaves, etc. from around the exterior of the unit.

Be sure the thermostat is set in the cooling mode. Just setting the dial below room temperature will not activate the air conditioning if it is set in the heat mode.

A thoroughly cleaned air conditioning unit will operate at top efficiency. However, homeowners are strongly discouraged from using a hose and water to try clean it themselves because of the very serious risk of electrical shock and possible shorting of electrical components.



#### 4. Maintenance Checklists for Air Conditioning:

- Clean or replace air filter
- Inspect and clean evaporator coil, if accessible
- Inspect belts and adjust tension
- Lubricate motors and bearings
- Calibrate and check thermostat
- Inspect ducts for leaks and damage
- Check to see that the compressor is delivering proper system pressure
- Verify that temperature and airflow within the duct system are within reasonable ranges
- Check condenser (outside) coil. Straighten and chemically clean fins if required
- Check compressor voltage and amperage
- Check condition of wiring, fuses, and/or circuit breakers

#### 5. More Maintenance Tips for Air Conditioners

- Never run an air-conditioning unit when the outside temperature is below 60°F. Coils may frost up, restricting airflow.
- Wait at least five minutes before restarting a unit. This relieves stress on the compressor.
- Always turn on power 24 hours before using a central air conditioner. This gives the unit time to separate the oil from the refrigerant before cool air is required.
- Keep drapes and curtains away from window units.
- Keep vegetation, grass clippings and leaves away from the condenser grille.
- Remove window units in winter, or protect them with tight-fitting waterproof covers.

##### Once a month

- Clean filters with dishwashing detergent, rinse thoroughly and let them dry before replacing. This allows a free airflow, reducing stress on the fan. It also keeps the coils clean, so heat can dissipate easily, leading to lower operating costs.

##### Twice a cooling season

- Slide the chassis out, if possible, and lubricate the compressor fan; the oil ports are often hidden by caps or screws. Use five drops of SAE 20 nondetergent motor oil for a window unit and 10 drops for a central unit. (Some window units must be removed for oiling.) The sealed motors on newer units don't require extra oil.
- Clear the drain hole in the chassis using a stiff wire. Add a capful of bleach to the tray or pan base or wherever water collects.

##### Once a year

- Clean evaporator fins of bugs and debris, and straighten fins with a fin comb. If visible coils are dirty, coils within the unit probably are too. Take the unit apart and wipe the coils with a clean, damp rag. Use dish soap, which won't corrode metal. Finish by wiping the coils with a soap-free wet rag.
- If your unit is solely an air conditioner, turn it off at the breaker in winter. Otherwise the compressor heater will try to keep the oil in the unit warm and ready for use.

#### 6. Tips for Buying Air Conditioner

##### Central Air Conditioner

- The type and size of air conditioner you need depends on your climate and cooling loads. Evaporative coolers are practical in hot, arid regions such as the southwest. For other regions, compressor-driven air-conditioning systems are the only choice.
- When you are shopping for a central air conditioner, look for a SEER rating higher than 12.0.

- If you already have a forced-air heating system, you may be able to tie an air conditioner into existing ducts, depending on their size and your home's relative heating and cooling loads. A good HVAC contractor can do the calculations for you.
- Proper sizing and installation are key elements in determining air conditioner efficiency. Too large a unit will not adequately remove humidity. Too small a unit will not be able to maintain a comfortable temperature on the hottest days. Improper unit location, lack of duct insulation, improper duct sealing, and incorrect refrigerant charge can greatly diminish efficiency
- When buying a central air conditioner, look for a system with a fan-only switch so you can use the unit for nighttime ventilation to substantially reduce air-conditioning costs; a filter check light to remind you to check the filter after a predetermined number of operating hours; and an automatic-delay fan switch to turn off the fan a few minutes after the compressor turns off.
- Look for a unit with quiet operation.
- If you need or want to replace your existing air conditioner's outdoor (compressor) unit, make sure the indoor (blower coil) unit is compatible with the new outdoor unit. A highly efficient outdoor unit will not achieve its rated efficiency if paired with an older blower coil.

### **Room Air Conditioner**

- When shopping for an air conditioner, first determine which type of system best suits your needs- central air conditioning or room air conditioning. Central air conditioners are designed to cool an entire house, while room air conditioners are usually window-or wall-mounted units that only cool the immediate area.
- Three types of room air conditioners are available: (1) window models that can be installed in most double-hung windows; (2) casement window models that are used in narrow, vertical windows, usually requiring the removal of a window panel for installation; and (3) built-in models that are encased in a sleeve installed in the wall.
- Proper sizing is very important for efficient air conditioning. A bigger unit is not necessarily better because a unit that is too large will not cool an area uniformly. A small unit running for an extended period operates more efficiently and is more effective at dehumidifying than a large unit that cycles on and off too frequently.
- When determining the appropriate size air conditioner for your home, consider the dimensions of the area to be cooled. Based on size alone, an air conditioner generally needs 20 Btu for each square foot of living space. Other important factors to consider when selecting an air conditioner are room height, local climate, shading, window size, etc.
- Verify that your home's electrical system can meet the unit's power requirements. Room units operate on 115-volt or 230-volt circuits. The standard household receptacle is a connection for a 115-volt branch circuit. Large room units rated at 115 volts may require a dedicated circuit and room units rated at 230 volts may require a special circuit.
- If you are mounting your air conditioner near the corner of a room, look for a unit with airflow in the desired direction for your room layout.
- Look for a unit whose filter slides out easily for regular cleaning.
- Select a unit with logically arranged controls, a digital readout for the thermostat setting, and a built-in timer.
- When considering several comparable units, select the unit with the higher EER.
- If you need to mount the air conditioner at the narrow end of a long room, then look for a fan control known as "Power Thrust" or "Super Thrust" that sends the cooled air farther into the room.

### **References:**

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