

AIR CONDITIONER**6820-11****GENERAL****1. SPECIFICATIONS**

Component		Description	
Compressor	Type	Variable Displacement	
	Model	Single	V-5 Compressor
		Dual	KC83
		Gasoline	KC83
	Displacement	Single	9.8 ~ 151 cc/rev
		Dual	175.5 cc/rev
Gasoline		175.5 cc/rev	
Max. RPM	6,000 ~ 7,500 rpm		
Refrigerant	Type	R-134a	
	Capacity	Single	850 ± 50 g
		Dual	1200 ± 50 g
Oil	Type	Synthetic PAG Oil	
	Capacity	260 cc	
Receiver-drier	Material	Aluminum	
	Capacity	260 cc	
A/C condenser	Max. capacity	11,400 Kcal/h	
Evaporator	Size	263.0 x 228.6 x 88.9 mm	
	Capacity	6,500 Kcal/h	
A/C pressure sensor	High pressure	A/C ON/OFF	305/425 psi
	Low pressure	A/C ON/OFF	39/30 psi
A/C cutoff pressure	High pressure	32 Kg/cm ²	
	Low pressure	4 Kg/cm ²	

Modification basis	
Application basis	
Affected VIN	

2. REPAIR INSTRUCTIONS

1) Precautions for Working with R-134a

- R-12 refrigerant and R-134a refrigerant are not compatible. These refrigerants must never be mixed, even in the smallest amounts. If the refrigerants are mixed, compressor failure is likely to occur.
- Use only specified lubricant for the R-134a A/C system and R-134a components. If lubricant other than that specified is used, compressor failure is likely to occur.
- The specified R-134a lubricant rapidly absorbs moisture from the atmosphere.

The following handling precautions must be observed:

1. When removing refrigerant components from a vehicle, immediately cap (seal) the component to minimize the entry of moisture from the atmosphere.
2. When installing refrigerant components to a vehicle, do not remove the caps (unseal) until just before connecting the components. Connect all refrigerant loop components as quickly as possible to minimize the entry of moisture into system.
3. Only use the specified lubricant from a sealed container. Immediately reseal containers of lubricant. Without proper sealing, lubricant will become moisture saturated and should not be used.
4. Avoid breathing A/C refrigerant and lubricant vapor or mist. Exposure may irritate eyes, nose and throat. Use only approved recovery/recycling equipment to discharge R-134a refrigerant. If accidental system discharge occurs, ventilate work area before resuming service. Additional health and safety information may be obtained from refrigerant and lubricant manufacturers.
5. Do not allow lubricant to come in contact with Styrofoam parts. Damage may result.

Modification basis	
Application basis	
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2) General Refrigerant Precautions

- Do not release refrigerant into the air. Use approved recovery/recycling equipment to capture the refrigerant every time an air conditioning system is discharged.
- Always wear eye and hand protection (goggles and gloves) when working with any refrigerant or air conditioning system.
- Do not store or heat refrigerant containers above 52°C.
- Do not heat a refrigerant container with an open flame: if container warming is required place the bottom of the container in a warm pail of water.
- Do not intentionally drop, puncture, or incinerate refrigerant containers.
- Keep refrigerant away from open flames: poisonous gas will be produced if refrigerant burns.
- Refrigerant will displace oxygen, therefore be certain to work in well ventilated area to prevent suffocation.
- Do not introduce compressed air to any refrigerant container or refrigerant component.

3) Handling O-Ring

1. Even though O-rings may look identical, it is extremely important that only recommended service replacement air conditioning O-rings be used, or excessive leakage of the refrigerant may occur.
2. Always O-ring and installation area should be kept clean. Any foreign material and dust may result in excessive refrigerant leakage.
3. Before installation, verify that both O-ring and fittings have not been nicked or deformed. Deformed or nicked parts must be replaced.
4. Failure to use the proper service replacement parts and procedures may result in excessive refrigerant leakage.

4) Handling Refrigerant

1. Always work in a well-ventilated area.
2. If you have difficulty breathing, seek medical attention immediately. If refrigerant comes in contact with any part of your body, flush the exposed area with water. If a rash or pain develops seek medical attention.

Modification basis	
Application basis	
Affected VIN	

5) Handling of Refrigerant Lines and Fittings

1. Using too low or too high a torque when tightening a fitting can result in loose joints or deformed joint parts.
2. Back up the opposing fitting to prevent the distortion of the connecting lines or the components. Back up both the swaged fitting on the flexible hose connections and the coupling to which it is attached two wrenches to prevent turning the fitting and damaging the ground seat.

6) Maintaining Chemical Stability In the Refrigeration System

The efficient operation and life of the air conditioning system is dependent upon the chemical stability of the refrigeration system.

When foreign materials, such as dirt, air or moisture, contaminate the refrigeration system, they will change the stability of the refrigeration and the polyalkalene glycol (PAG) compressor oil. They will also affect the pressure-temperature relationship, reduce efficient operation and can possibly cause interior corrosion and abnormal wear of moving parts.

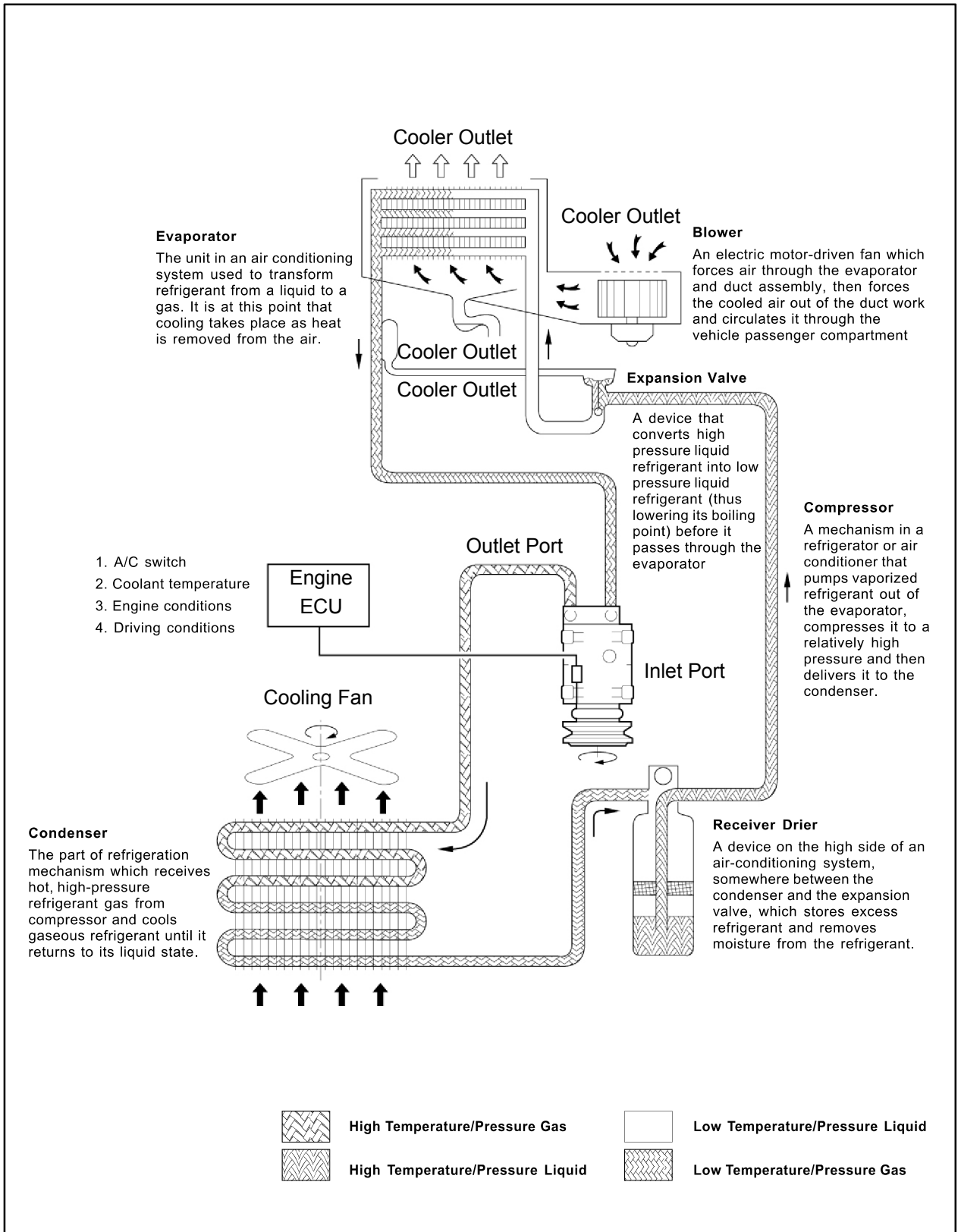
Observe the following practices to ensure chemical stability in the system:

1. Wipe away dirt or oil at and near any connection before opening that connection. This will reduce the chance of dirt entering the system.
2. Cap, plug or tape both sides of a connection as soon as possible after opening the connection. This will prevent the entry of dirt, foreign material and moisture.
3. Keep all tools clean and dry including the manifold gauge set and all replacement parts.
4. Use a clean and dry transfer device and container to add PAG refrigerant oil. This will ensure that the oil remains as moisture-free as possible.
5. When opening an A/C system, have everything needed to perform all operations ready. Do not leave the A/C system open any longer than necessary.
6. Evacuate and recharge any A/C system that has been opened.

Modification basis	
Application basis	
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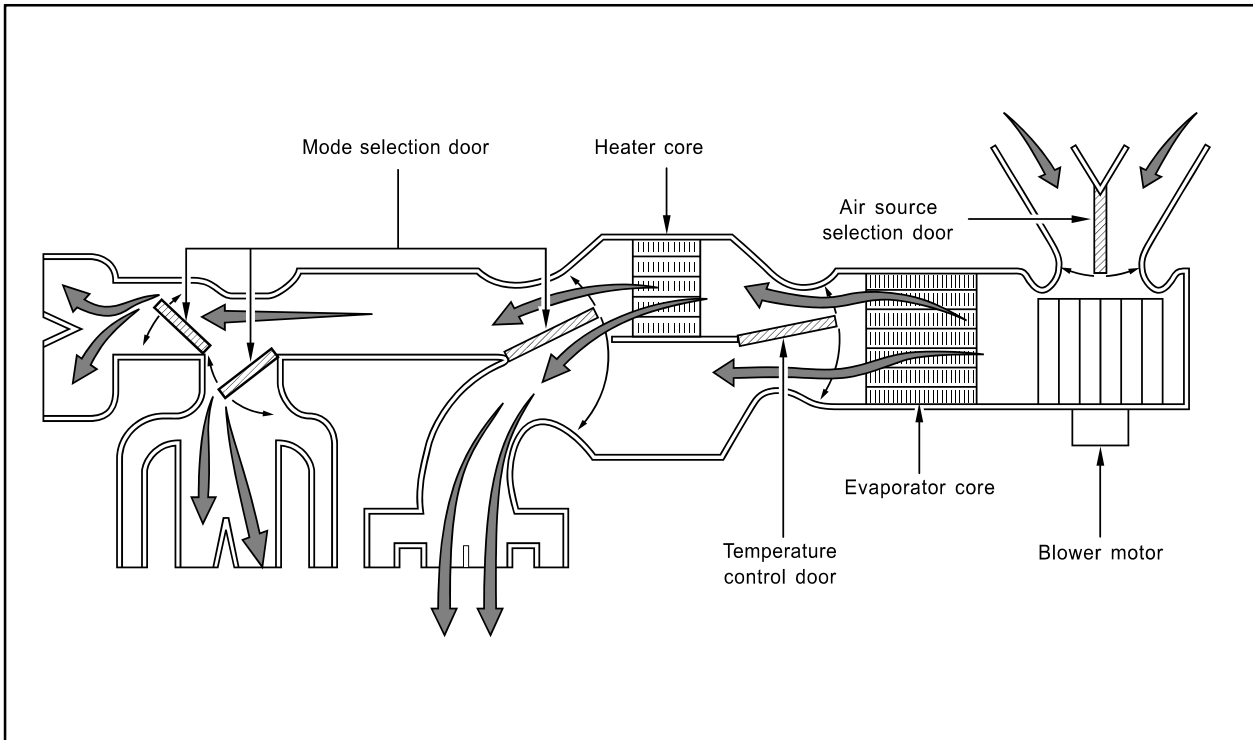
OVERVIEW AND OPERATION PROCESS

1. OVERVIEW

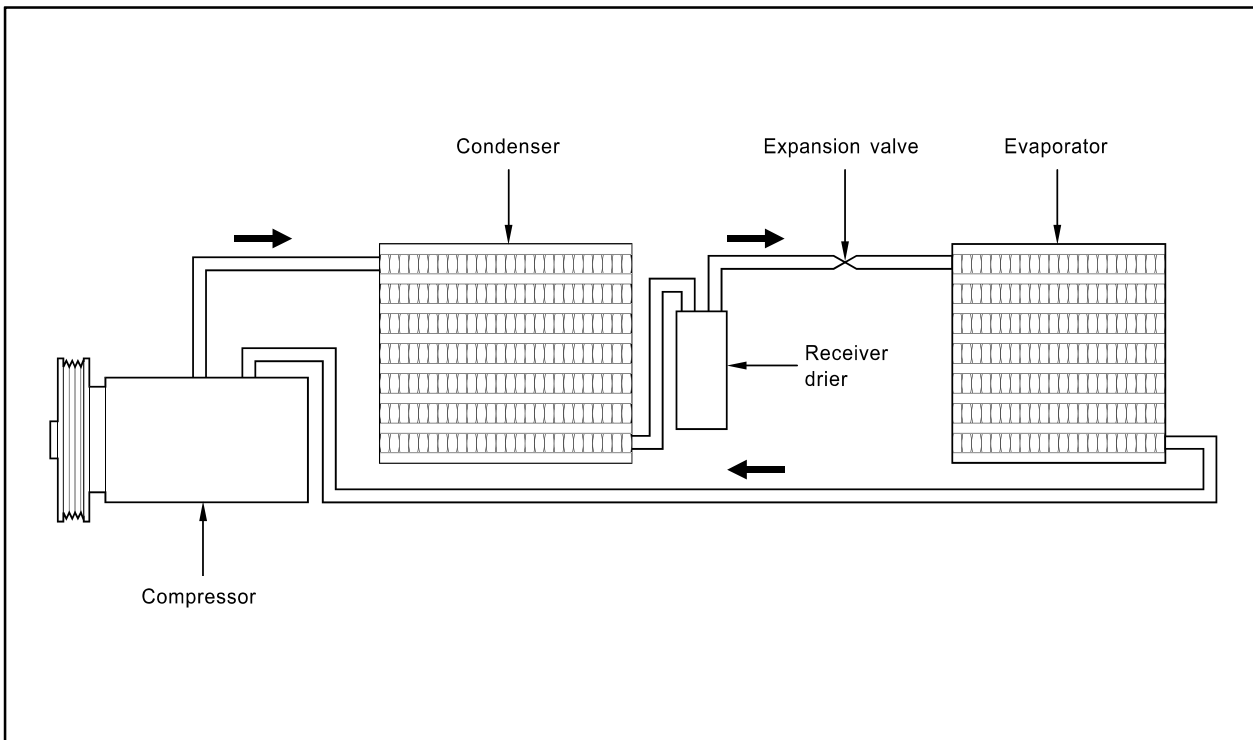


Modification basis	
Application basis	
Affected VIN	

2. AIR FLOWS



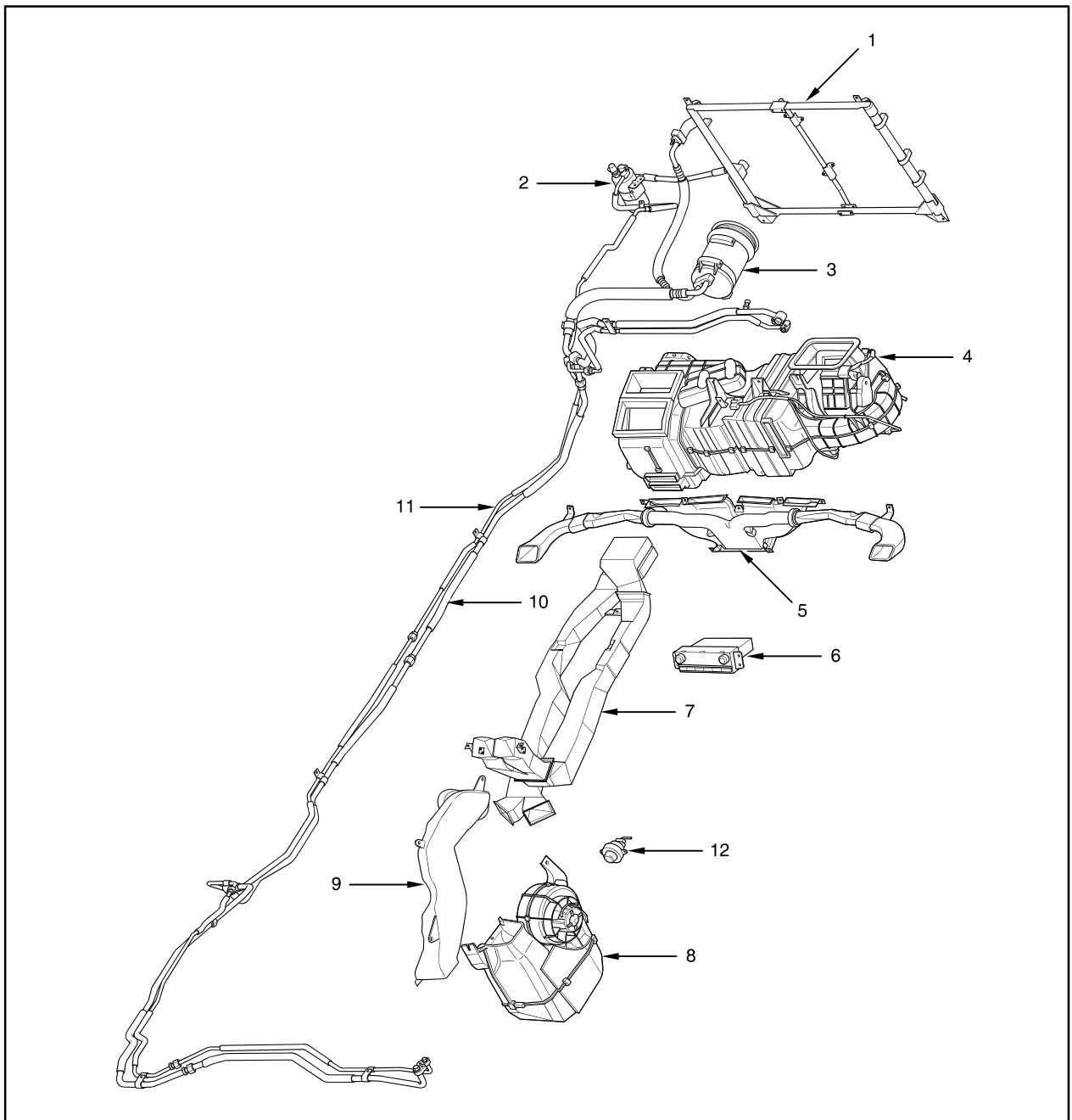
► Refrigerant Flows



Modification basis	
Application basis	
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3. SYSTEM LAYOUT

► Components Locator



- | | |
|---|----------------------------|
| 1. Condenser | 7. Rear duct |
| 2. Receiver drier | 8. Rear cooler assembly |
| 3. Compressor | 9. Rear cooler duct |
| 4. Air conditioner/Heater (Blower) module | 10. Suction rear pipe line |
| 5. Defrost nozzle | 11. Liquid rear pipe line |
| 6. Front air conditioner controller | 12. Rear cooler controller |

Modification basis	
Application basis	
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4. FUNCTION DESCRIPTION

1) Compressor

All compressor are belt-driven from the engine crankshaft through the compressor clutch pulley. The compressor pulley rotates without driving the compressor shaft until an electromagnetic clutch coil is energized. When voltage is applied to energize the clutch coil, the clutch plate and hub assembly is drawn rearward toward the pulley. The magnetic force locks the clutch plate and pulley together as one unit to drive the compressor shaft. As the compressor shaft driven, it compresses the low pressure refrigerant vapor from evaporator into high pressure, high temperature vapor. The refrigerant oil that is used to lubricate the compressor is carried with the refrigerant.

2) Magnetic Clutch

The magnetic clutch is assembled in front of the compressor and controls to stop or operate the compressor. The center piece is inserted to the compressor crankshaft and rotate the only the pulley when it doesn't operate the compressor. When the A/C switch is turned ON, the current flows into the wrapped coil of the stator and the stator is converted to the powerful electromagnet. Therefore, the compressor can rotate with the pulley together because the stator can pull the center piece tightly.

3) V-5 Compressor-General

Vehicle using the V5 compressor may have differences between installations in the mounting brackets, the drive system, the pulleys, the connections and the system capacities. Basic overhaul procedures are similar between the compressors used on different vehicles. When serving the compressor, keep dirt and foreign material from getting on or into the compressor parts and the system. Clean tools and a clean work area are important for proper service. The compressor connections and outside of the compressor should be cleaned before performance of any on-vehicle repairs and before removal of the compressor. The parts must be kept clean at all times and any parts that are to be reassembled should be cleaned with trichloroethane, naphtha, stoddard solvent, kerosene or equivalent solvents and dried with dry air. Use only lintfree cloths to wipe the parts. The operations described are based on bench overhaul with the compressor removed from the vehicle, except as noted. They have been prepared in the order of accessibility of the components. When a compressor is removed from the vehicle for servicing, the amount of oil remaining the compressor should be drained, measured and recorded. This should then be discarded and new polyalkaline glycol (PAG) refrigerant oil added to the compressor.

Modification basis	
Application basis	
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CAUTION

The oil drain plug must be removed and the oil drained through the plug opening to insure complete draining of oil from the compressor.

4) V-5 Compressor-Operation

The V5 is a variable displacement compressor that can match the automotive air conditioning demand under all conditions without cycling. The basic compressor mechanism is a variable angle wobble-plate with seven axially oriented cylinders. The center of the control of the compressor displacement is a billows-actuated control valve located in the rear head of the compressor that senses compressor suction pressure. The wobble-plate angle and the compressor displacement are controlled by the crankcase suction pressure differential. When the A/C capacity demand is high, the suction pressure will be above the control point. The valve will maintain a bleed from crankcase to suction. With no crankcase suction pressure differential, the compressor will have maximum displacement.

When the A/C capacity demand is lower and the suction pressure reaches the control point, the valve will bleed discharge gas in the crankcase and close off a passage from the crankcase to suction plenum. The angle of the wobble-plate is controlled by a force balance of seven pistons. A slight elevation of the crankcase suction pressure differential creates total force on the piston resulting in a movement about the wobble-plate pivot pin that reduces the plate angle. The compressor has a unique lubrication system. The crankcase suction bleed is routed through the rotating wobble-plate for lubrication of wobble-plate bearing. The rotation acts as an oil separator that removes some of the oil from the crankcase where it can lubricate the compressor mechanism.

5) Condenser Core

The condenser assembly in front of the radiator consists of coils, which carry the refrigerant and cooling fins that provide the rapid transfer of heat. The air passing through the condenser cools the high-pressure refrigerant vapor and causes it to condense it to condense into a liquid.

6) Receiver-Drier

The sealed receiver-drier assembly is connected between the condenser and evaporator. It acts as a refrigerant storing container, receiving liquid and some vapor and refrigerant oil from the condenser. At the bottom of the receiver-drier is the desiccant, which acts as drying agent for the moisture that may have entered the system. An oil bleed hole is located near the bottom of the receiver-drier outlet pipe to provide an oil return path to the compressor. The receiver drier is serviceable as an assembly.

Modification basis	
Application basis	
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7) Expansion Valve

The expansion valve can fall in three different positions: open, closed or restricted.

An expansion valve that fails in open position will result in a noisy A/C compressor or no cooling. The cause can be a broken spring, a broken ball or excessive moisture in the A/C system. If the spring or the ball are found to be defective, replace the expansion valve. If excessive moisture is found in the A/C system recycle the refrigerant. A restricted expansion valve will result in low suction pressure and no cooling. This may be caused by debris in the refrigerant system. If debris is believed to be the cause, recycle the refrigerant, replace the expansion valve and replace the receiver-drier.

8) Evaporator

The evaporator is a device which cools and dehumidifies the air before it enters the vehicle. High pressure liquid refrigerant flows through the expansion tube (orifice) and becomes a low pressure gas in the evaporator. The heat in the air passing through the evaporator core is transferred to the cooler surface or the core, which cools the air. As the process of heat transfer from the air the evaporator core surface is taking place, any moisture (humidity) in the air condenses on the outside surface of the evaporator core and is drained off as water.

9) Pressure Relief Valve

The compressor is equipped with a pressure relief valve which is placed in the system as a safety factor. Under certain conditions, the refrigerant on the discharge side may exceed the designed operating pressure at approximately at 3,171 to 4,137 kPa (460 to 600 psi) in an R-134a system. Conditions that might cause this valve to open, such as a defective pressure transducer, an inoperative cooling fan, etc., should be corrected. The refrigerant oil and the refrigerant should be replaced as necessary.

10) Controller

The operation of the A/C system is controlled by the switches and knob on the control head.

This consolemounted controller contains following control knobs.

Temperature control

- Actuates by cable.
- Raise the temperature of the air entering the vehicle by sliding to the right or the red portion of the knob.
- Varies the mix of the fresh air from outside the vehicle with the heated air from inside the vehicle to suit individual performance.

Modification basis	
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► Mode control

- Actuates by cable.
- Regulates the air distribution between the windshield, the instrument panel and the floor vents.

► Blower control

- Turn on to operate the blower motor at four speeds.
- Turn OFF to stop the blower.
- Operates completely independently from both the mode control knob and temperature control knob.
- Changes the fan speed in any mode and at any speed.

► A/C System Delay Relay

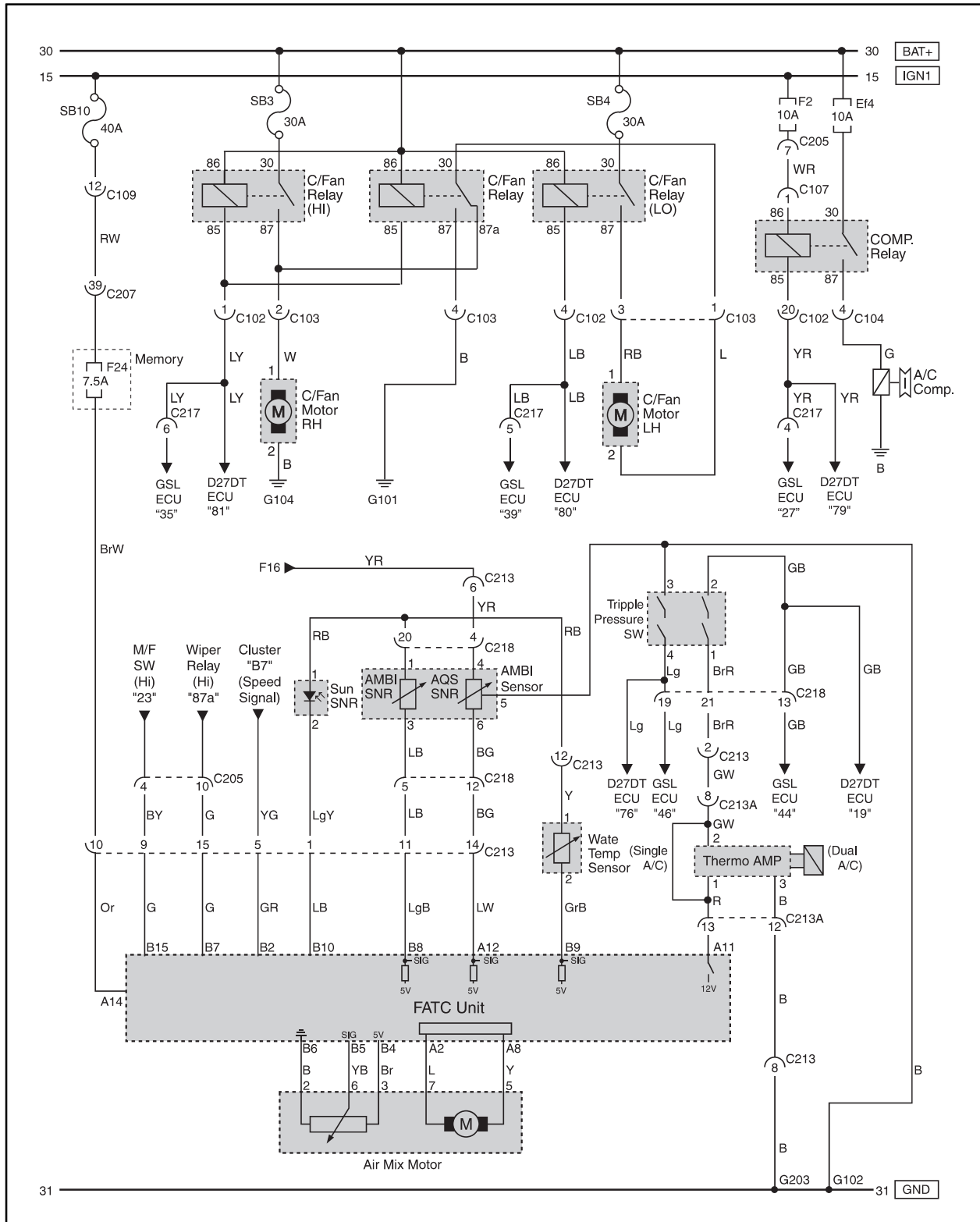
This relay controls the current to A/C system and instantly delays the A/C operation during starting the engine.

Modification basis	
Application basis	
Affected VIN	

5. CIRCUIT DIAGRAM

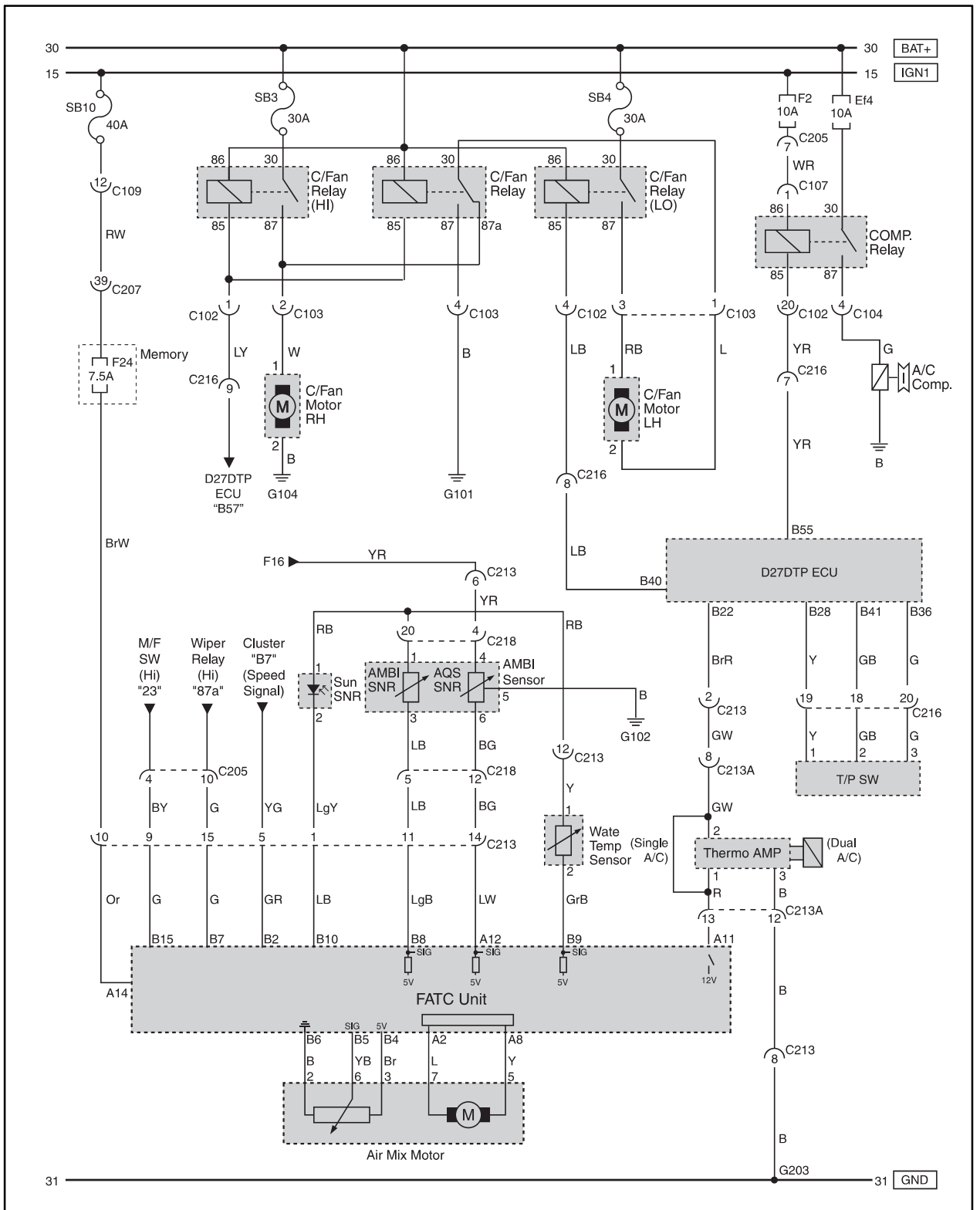
1) Automatic Air Conditioner

► CONDENSOR FAN, SENSOR (D27DT, GSL)



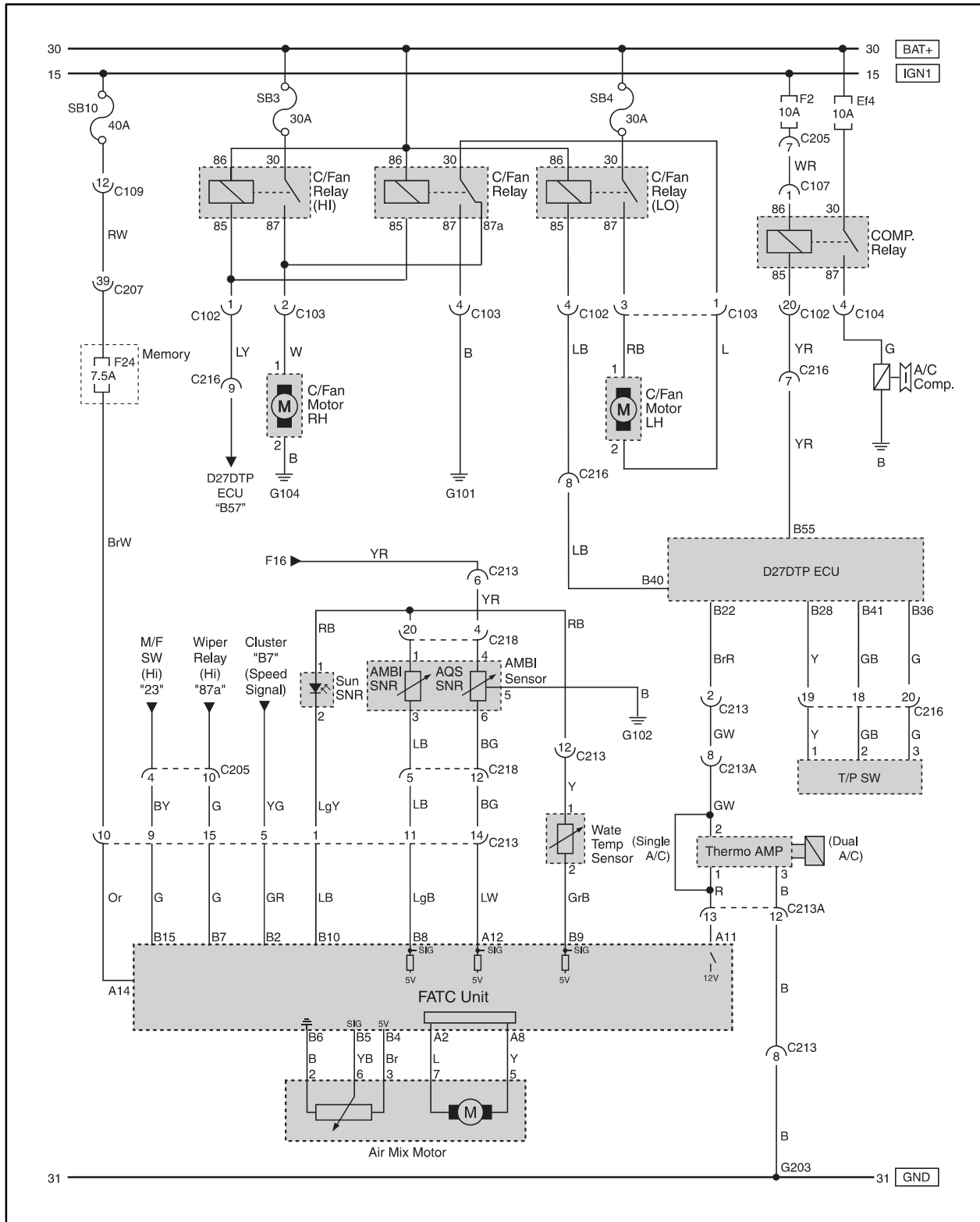
Modification basis	
Application basis	
Affected VIN	

► CONDENSOR FAN, SENSOR (D27DTP)



Modification basis	
Application basis	
Affected VIN	

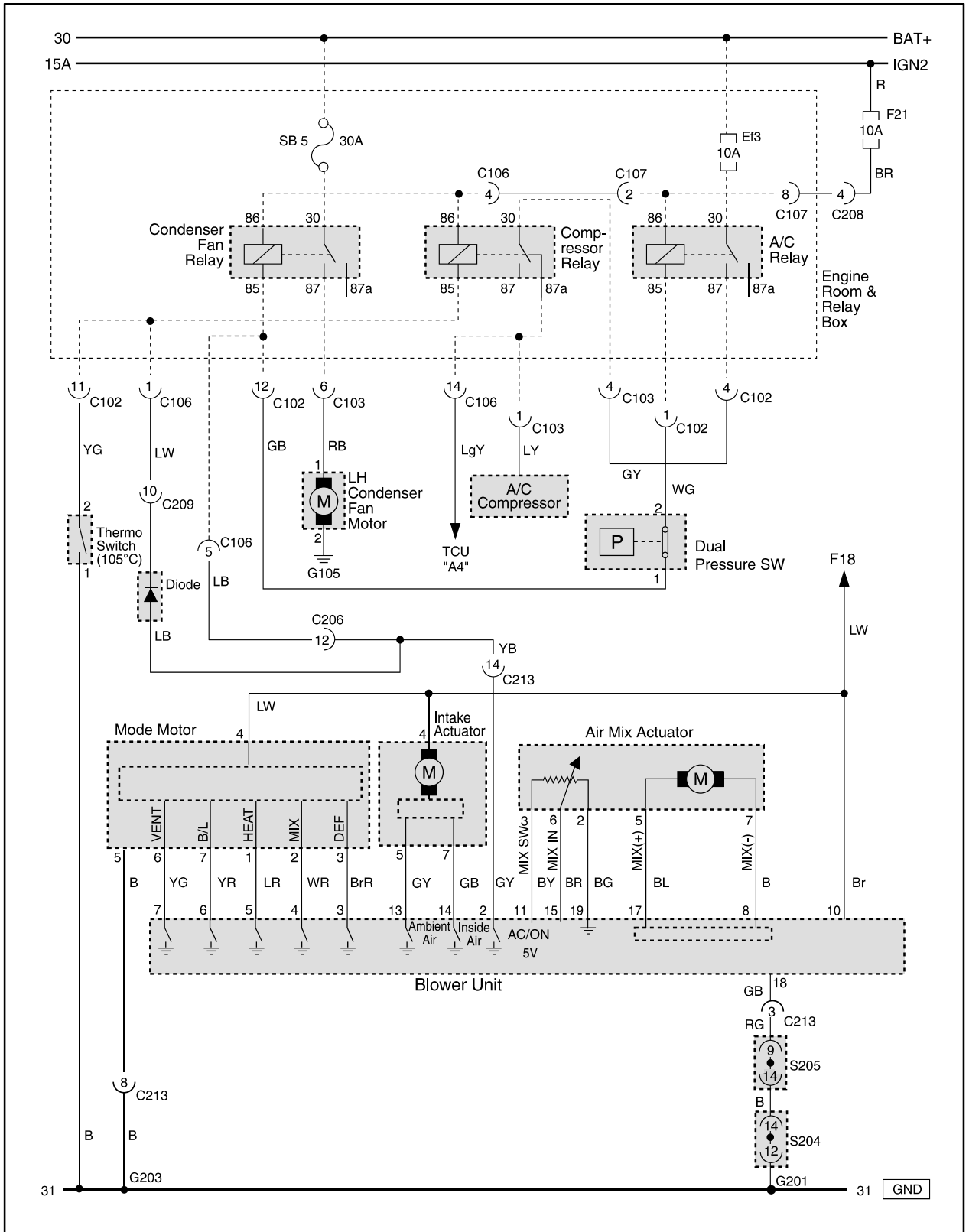
► MOTOR (MODE, INTAKE), BLOWER, POWER TR



Modification basis	
Application basis	
Affected VIN	

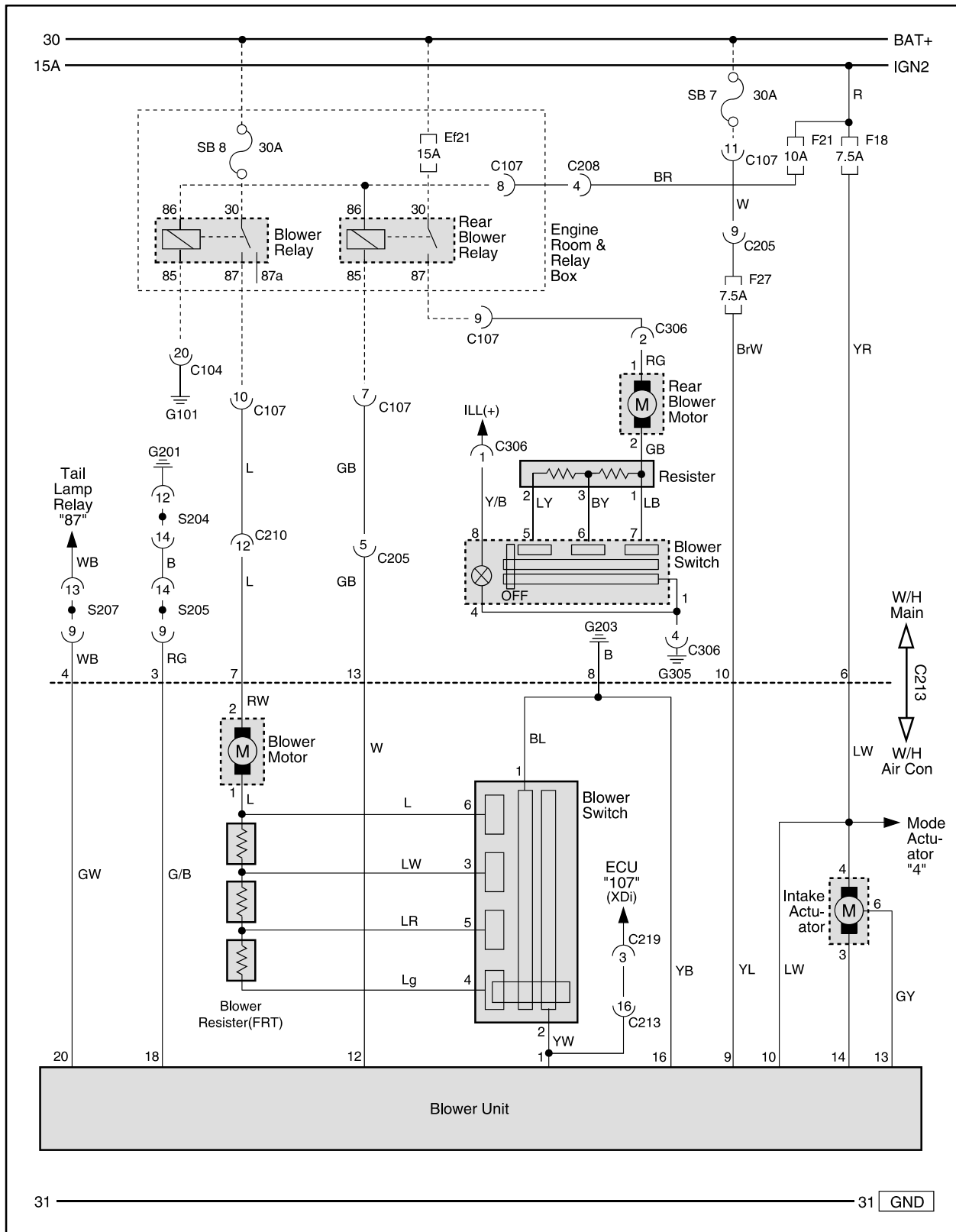
2) Manual Air Conditioner

► Power, A/C Compressor, Motors (Mode, Interior/Ambient, Air Mix)



Modification basis	
Application basis	
Affected VIN	

► Blower Motor (Front, Rear)



Modification basis	
Application basis	
Affected VIN	