

SECTION : 7B

MANUAL CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

CAUTION : *Disconnect the negative battery cable before removing or installing any electrical unit or when a tool or equipment could easily come in contact with exposed electrical terminals. Disconnecting this cable will help prevent personal injury and damage to the vehicle. The ignition must also be in LOCK unless otherwise noted.*

TABLE OF CONTENTS

SPECIFICATIONS	7B-2	HANDLING OF REFRIGERANT LINES AND FITTINGS	7B-20
A/C SYSTEM CHARGING CAPACITY	7B-2	MAINTAINING CHEMICAL STABILITY IN THE REFRIGERATION SYSTEM	7B-20
FASTENER TIGHTENING SPECIFICATIONS	7B-2	DISCHARGING, ADDING OIL, EVACUATING, AND CHARGING PROCEDURES FOR A/C SYSTEM	7B-21
SPECIAL TOOLS	7B-3	SERVICEABLE COMPONENTS	7B-23
SPECIAL TOOLS TABLE	7B-3	TEMPERATURE CONTROL CABLE	7B-23
SCHEMATIC AND ROUTING DIAGRAMS	7B-6	CONTROL ASSEMBLY	7B-23
A/C SYSTEM – TYPICAL	7B-6	CONTROL ASSEMBLY KNOB LIGHTING ...	7B-23
AIRFLOW – TYPICAL	7B-7	BLOWER MOTOR	7B-23
A/C SCHEMATIC	7B-8	HIGH-BLOWER RELAY	7B-23
DIAGNOSIS	7B-9	BLOWER RESISTOR	7B-23
GENERAL DIAGNOSIS	7B-9	CONTROL ASSEMBLY SWITCHES	7B-23
TESTING THE REFRIGERANT SYSTEM	7B-9	A/C PRESSURE TRANSDUCER	7B-24
INSUFFICIENT COOLING "QUICK CHECK" PROCEDURE	7B-9	A/C COMPRESSOR RELAY	7B-25
A/C PERFORMANCE TEST	7B-10	AIR FILTER	7B-26
PRESSURE-TEMPERATURE RELATIONSHIP OF R-134A	7B-11	A/C CONTROL VACUUM TANK	7B-27
LEAK TESTING THEREFRIGERANT SYSTEM	7B-12	A/C EXPANSION VALVE	7B-28
V5 SYSTEM AIR CONDITIONING		HEATER/AIR DISTRIBUTOR CASE ASSEMBLY	7B-29
DIAGNOSIS	7B-13	A/C HIGH-PRESSURE PIPE LINE	7B-30
INSUFFICIENT COOLING DIAGNOSIS	7B-13	HEATER HOSES	7B-32
SYMPTOM DIAGNOSIS	7B-17	HEATER CORE	7B-32
PRESSURE TEST CHART (R-134a SYSTEM)	7B-17	EVAPORATOR CORE	7B-32
LOW AND HIGH SIDE PRESSURE RELATIONSHIP CHART	7B-19	A/C SUCTION HOSE ASSEMBLY	7B-34
MAINTENANCE AND REPAIR	7B-20	RECEIVER-DRYER	7B-35
ON-VEHICLE SERVICE	7B-20	COMPRESSOR	7B-36
GENERAL A/C SYSTEM SERVICE PROCEDURES	7B-20	CONDENSER	7B-38
O-RING REPLACEMENT	7B-20	UNIT REPAIR	7B-40
HANDLING REFRIGERANT	7B-20	COMPONENT LOCATOR	7B-40
		V5 COMPRESSOR	7B-40
		V5 AIR CONDITIONING COMPRESSOR OVERHAUL	7B-42

CLUTCH PLATE AND HUB ASSEMBLY 7B-42
 CLUTCH ROTOR AND BEARING 7B-44
 CLUTCH COIL 7B-47
 SHAFT SEAL REPLACEMENT 7B-49
 PRESSURE RELIEF VALVE 7B-51
 CONTROL VALVE ASSEMBLY 7B-52
 REAR HEAD, GASKET, VALVE PLATE,
 REED PLATE, AND O-RING 7B-53
 CYLINDER TO FRONT HEAD O-RING 7B-55
 LEAK TESTING (EXTERNAL) 7B-57

**GENERAL DESCRIPTION AND SYSTEM
 OPERATION** 7B-58
 GENERAL INFORMATION 7B-58
 THE V5 A/C SYSTEM 7B-58
 SYSTEM COMPONENTS – FUNCTIONAL .. 7B-58
 SYSTEM COMPONENTS – CONTROL 7B-59
 V5 COMPRESSOR –
 GENERAL DESCRIPTION 7B-59
 V5 COMPRESSOR –
 DESCRIPTION OF OPERATION 7B-60

SPECIFICATIONS

A/C SYSTEM CHARGING CAPACITY

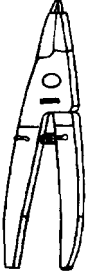
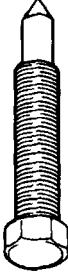
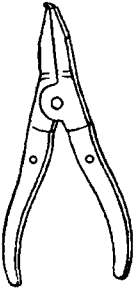
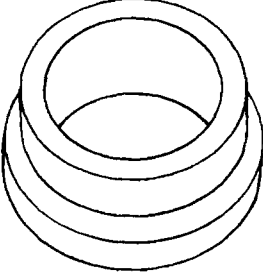

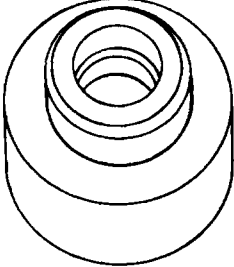

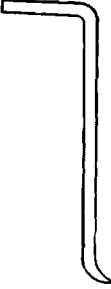
Application	Description
R-134a System	750 20 g
Refrigerant Oil in A/C System	Synthetic PAG 265 ml

FASTENER TIGHTENING SPECIFICATIONS

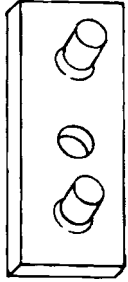

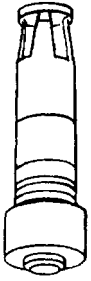
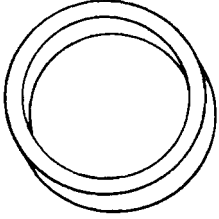
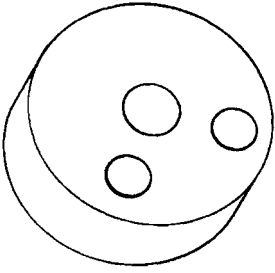
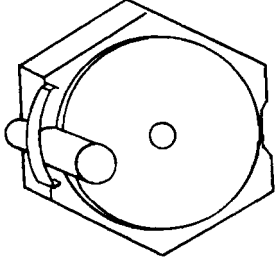
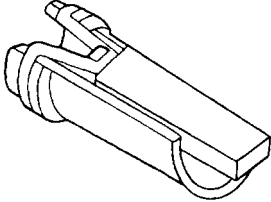
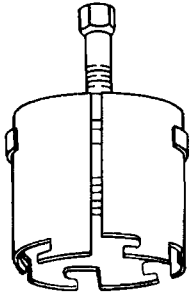
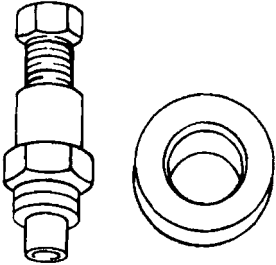

Application	N•m	Lb-Ft	Lb-In
A/C Suction Hose Clamp Bolt	10	–	89
Air Cleaner Housing Assembly Retaining Bolts	10	–	89
Band Clamp Bolt	5	–	44
Clamp Bolts	4	–	35
Clutch Plate and Hub Assembly Retaining Nut	17	13	–
Discharge Hose Connecting Block-to-Compressor Retaining Nut	33	24	–
Discharge Hose Mounting Block-to-Condenser Nut	16	12	–
Evaporator Flange Connecting Block Retaining Nut	10	–	89
Expansion Valve Bolts	10	–	89
Front Compressor-to-Bracket Bolts	35	26	–
High Pressure Pipe-to-Evaporator Flange Connecting Block Nut	10	–	89
High Pressure Pipe-to-Receiver-Dryer Connecting Block Nuts	10	–	69
Liquid Evaporator Pipe Clamp Bolt	4	–	35
Pressure Relief Valve	16	12	–
Pressure Transducer	10	–	89
Rear Compressor-to-Bracket Bolts	20	15	–
Suction Hose Connecting Block Retaining Nut	10	–	89
Suction Hose Support Clamp Retaining Bolt	5	–	44
Suction Hose Support Clamp Retaining Nut	5	–	44
Through-Bolts	10	–	89
Upper Condenser Mount Nuts	4	–	35
Vacuum Tank-to-Bulkhead Nuts	4	–	35

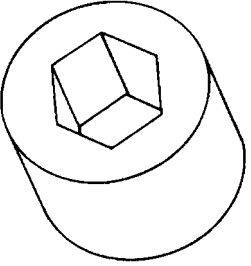
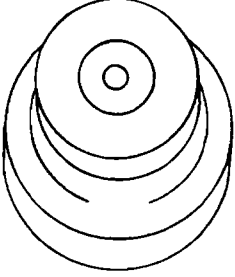
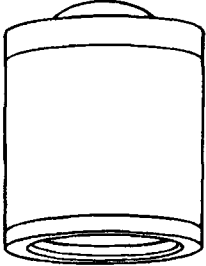
SPECIAL TOOLS

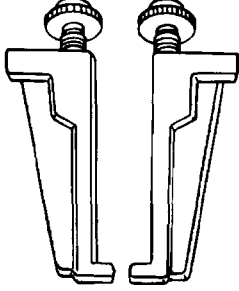
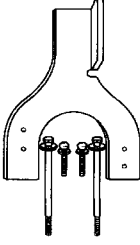
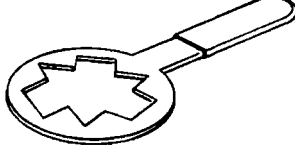
SPECIAL TOOLS TABLE

 <p>A108B078</p>	<p>J-5403 Snap Ring Pliers</p>	 <p>A108B082</p>	<p>J-8433-3 Forcing Screw</p>
 <p>A108B079</p>	<p>J-6083 Snap Ring Pliers</p>	 <p>A108B084</p>	<p>J-9398-A Bearing Remover</p>
 <p>A108B080</p>	<p>J-8092 Driver Handle</p>	 <p>A108B085</p>	<p>J-9481 Bearing Installer</p>
 <p>A108B081</p>	<p>J-8433-1 Puller Crossbar</p>	 <p>A108B086</p>	<p>J-9553-1 O-Ring Remover</p>

7B – 4 MANUAL CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

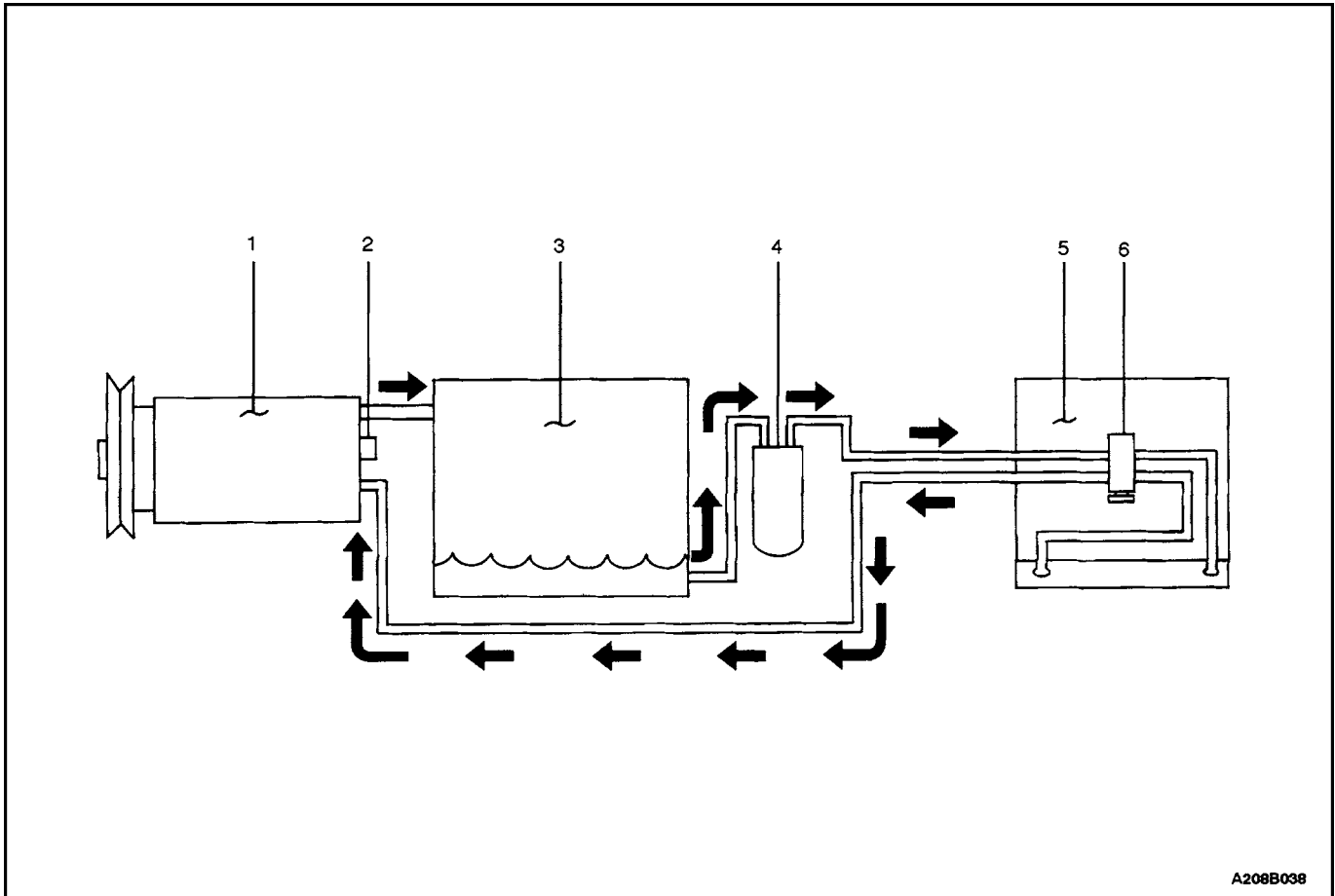
 <p>A108B087</p>	<p>J-9625-A Pressure Test Set Con- nector</p>	 <p>A108B092</p>	<p>J-34993 Cylinder Alignment Rods</p>
 <p>A108B088</p>	<p>J-23128-A Seal Seat Remover and Installer</p>	 <p>A108B093</p>	<p>J-33017 Pulley Rotor and Bearing Assembly Installer</p>
 <p>A108B089</p>	<p>J-35372 Support Block</p>	 <p>A108B094</p>	<p>J-33019 Bearing Staking Tool Set Includes: J-33019-1 Bearing Staking Guide J-33019-2 Bearing Staking Pin</p>
 <p>A108B090</p>	<p>J-33011 O-Ring Installer</p>	 <p>A108B095</p>	<p>J-33020 Pulley Puller</p>
 <p>A108B091</p>	<p>J-33013-B Hub and Drive Plate Re- mover and Installer</p>	 <p>A108B096</p>	<p>J-34614 Shaft Seal Protector</p>

 <p>A108B097</p>	<p>J-33022 Shaft Nut Socket</p>
 <p>A108B098</p>	<p>J-33023-A Puller Pilot</p>
 <p>A108B099</p>	<p>J-33024 Clutch Coil Installer Adapter</p>

 <p>A108B100</p>	<p>J-33025 Clutch Coil Puller Legs</p>
 <p>A108B101</p>	<p>J-34992 Compressor Holding Fix- ture</p>
 <p>A108B102</p>	<p>J-33027 Clutch Hub Holding Tool</p>

SCHEMATIC AND ROUTING DIAGRAMS

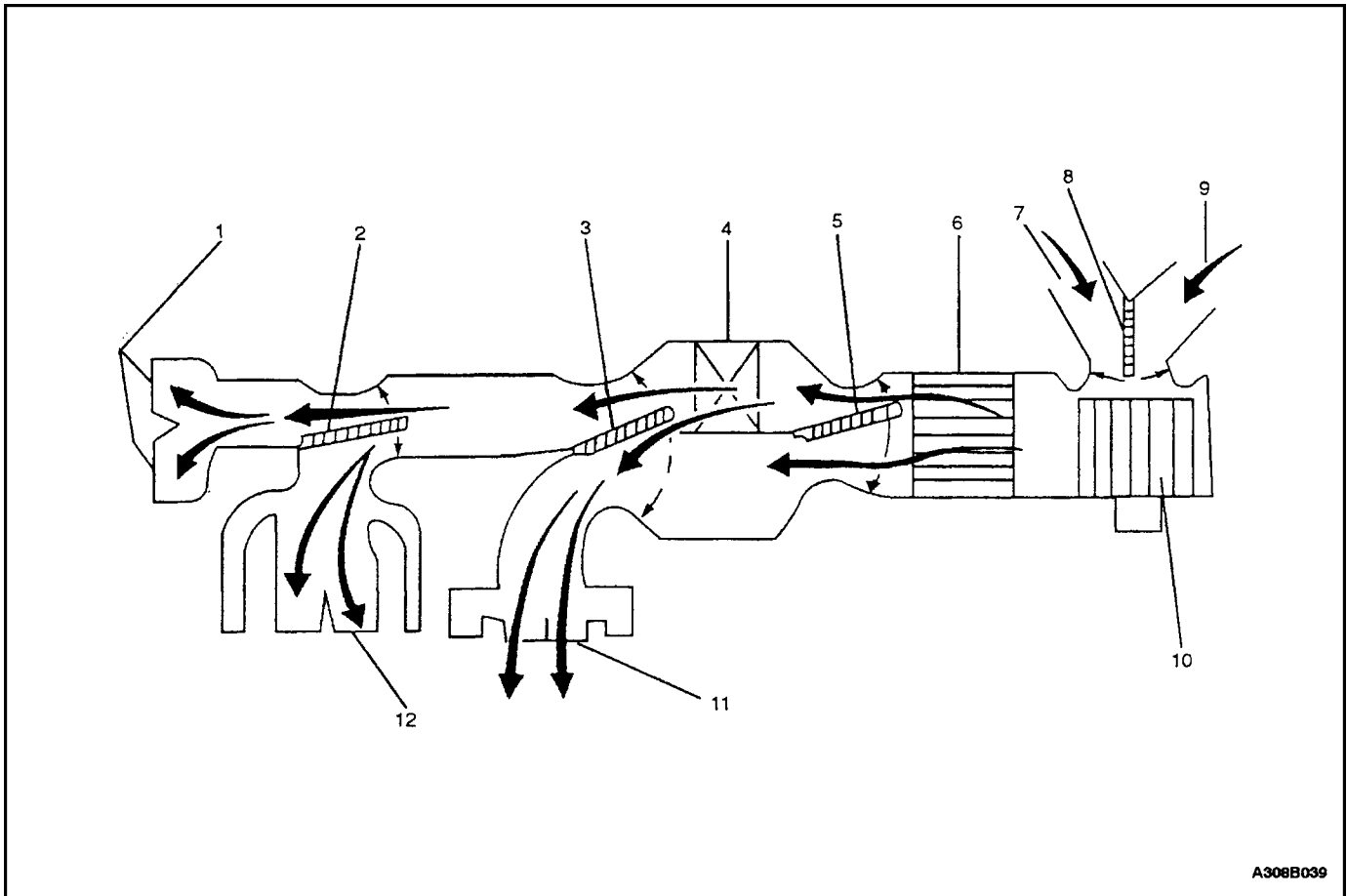
A/C SYSTEM – TYPICAL



1. Compressor
2. Pressure Relief Valve
3. Condenser

4. Receiver-Dryer
5. Evaporator
6. Expansion Valve

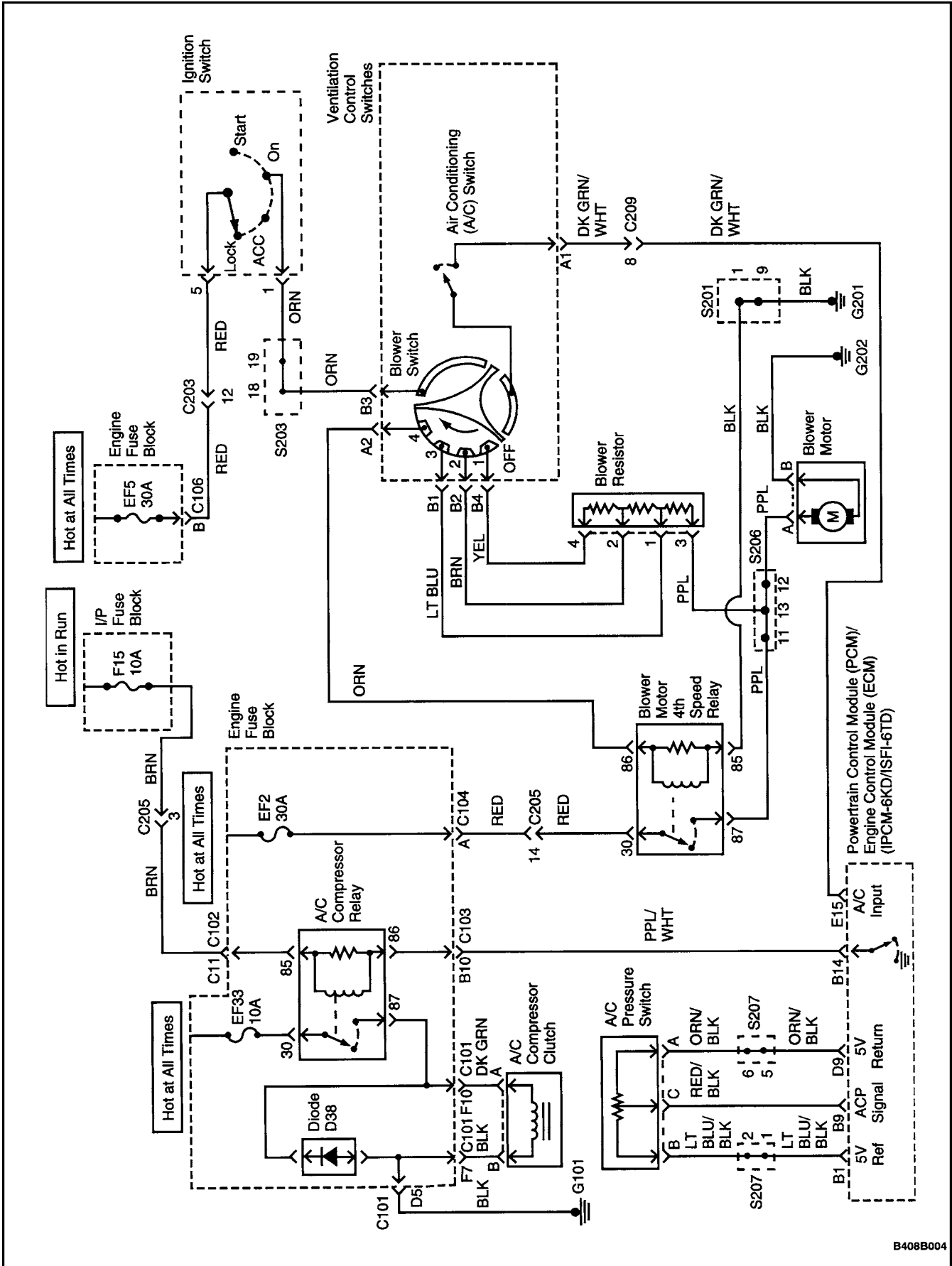
AIRFLOW – TYPICAL



A308B039

- | | |
|--------------------------|-------------------------------------|
| 1. Heater Outlets | 7. Outside Air Inlet |
| 2. Heater/Defroster Door | 8. Fresh Air/Recirculating Air Door |
| 3. Mode Door | 9. Inside Air Inlet |
| 4. Heater Core | 10. Blower |
| 5. Evaporator (A/C Only) | 11. Vent Outlets |
| 6. Expansion Valve | 12. Defroster Outlets |

A/C SCHEMATIC



DIAGNOSIS

GENERAL DIAGNOSIS

TESTING THE REFRIGERANT SYSTEM

If you suspect a problem in the refrigerant system, check for the following conditions:

1. Check the outer surfaces of the radiator and the condenser cores to be sure that the airflow is not blocked by dirt, leaves, or other foreign material. Check between the condenser and the radiator, as well as all outer surfaces.
2. Check for restrictions or kinks in the condenser core, the hoses, and the tubes.
3. Check the operation of the blower fan.
4. Check all the air ducts for leaks or restrictions. Low airflow rate may indicate a restricted evaporator core.
5. Check for slippage of the compressor clutch.
6. Check the drive belt tension.

INSUFFICIENT COOLING "QUICK CHECK" PROCEDURE

Perform the following "hand-feel" procedure to get a quick

idea of whether the A/C system has the proper charge of Refrigerant-134a. The air temperature must be above 21°C (70°F) for most models.

1. Warm up engine. Run the engine at idle.
2. Open the hood and all the doors.
3. Turn the A/C switch ON.
4. Turn the temperature control knob to full cold.
5. Turn the blower speed to setting 4.
6. "Hand-feel" the temperature of the evaporator outlet pipe. The pipe should be cold.
7. Check for other problems. Refer to "Testing the Refrigerant System" in this section.
8. Leak check the system. Refer to "Leak Testing the Refrigerant System" in this section. If you find a leak, discharge the system and repair the leak, as required. After completing the repair, evacuate and charge the system.
9. If there is no leak, refer to "Insufficient Cooling Diagnosis" in this section.

A/C PERFORMANCE TEST

RELATIVE HUMIDITY (%)	AMBIENT AIR TEMPERATURE °C °F	LOW SIDE PRESSURE kPa psig	ENGINE SPEED (RPM)	CENTER DUCT AIR TEMPERATURE °C °F	HIGH SIDE PRESSURE kPa psig
20	21 70	200 29	2000	4 39	1034 150
	27 81	200 29		7 45	1310 190
	32 90	207 30		9 48	1689 245
	38 100	214 31		14 57	2103 305
30	21 70	200 29	2000	6 43	1034 150
	27 81	207 30		8 46	1413 205
	32 90	214 31		11 52	1827 265
	38 100	221 32		16 61	2241 325
40	21 70	200 29	2000	7 45	1138 165
	27 81	207 30		9 48	1482 215
	32 90	221 32		13 55	1931 280
	38 100	269 39		18 64	2379 345
50	21 70	207 30	2000	8 46	1241 180
	27 81	221 32		12 54	1620 235
	32 90	234 34		15 59	2034 295
	38 100	276 40		21 70	2413 350
60	21 70	207 30	2000	9 48	1241 180
	27 81	228 33		13 56	1655 240
	32 90	248 36		17 63	2068 300
	38 100	296 43		23 73	2482 360
70	21 70	207 30	2000	10 50	1276 185
	27 81	234 34		14 57	1689 245
	32 90	262 38		18 64	2103 305
	38 100	303 44		24 75	2517 365
80	21 70	207 30	2000	10 50	1310 190
	27 81	234 34		15 59	1724 250
	32 90	269 39		19 66	2137 310
90	21 70	207 30	2000	10 50	1379 200
	27 81	248 36		17 63	1827 265
	32 90	290 42		22 72	2275 330

PRESSURE–TEMPERATURE RELATIONSHIP OF R–134A

TEMPERATURE °C (°F)*	PRESSURE kPa (psig)*	TEMPERATURE °C (°F)*	PRESSURE kPa (psig)*
–8.89 (16)	105.70 (15.33)	37.78 (100)	856.84 (124.27)
–7.78 (18)	114.87 (16.66)	38.89 (102)	886.56 (128.58)
–6.67 (20)	124.32 (18.03)	40.00 (104)	916.35 (132.98)
–5.56 (22)	134.11 (19.45)	41.11 (106)	947.92 (137.48)
–4.44 (24)	144.24 (20.92)	42.22 (108)	979.64 (142.08)
–3.33 (26)	154.65 (22.43)	43.33 (110)	1012.11 (146.79)
–2.22 (28)	165.48 (24.00)	44.44 (112)	1045.21 (151.59)
–1.11 (30)	176.65 (25.62)	45.56 (114)	1079.14 (156.51)
0.00 (32)	188.16 (27.29)	46.67 (116)	1113.75 (161.53)
1.11 (34)	200.02 (29.01)	47.78 (118)	1149.12 (166.66)
2.22 (36)	212.30 (30.79)	48.89 (120)	1185.18 (171.89)
3.33 (38)	224.98 (32.63)	50.00 (122)	1222.07 (177.24)
4.44 (40)	238.08 (34.53)	51.11 (124)	1259.72 (182.70)
7.22 (45)	272.49 (39.52)	52.22 (126)	1298.12 (188.27)
10.00 (50)	309.58 (44.90)	53.33 (128)	1337.35 (193.96)
12.77 (55)	349.51 (50.69)	54.44 (130)	1377.35 (199.76)
15.56 (60)	392.33 (56.90)	57.22 (135)	1480.91 (214.78)
18.33 (65)	438.18 (63.55)	60.00 (140)	1589.57 (230.54)
21.11 (70)	487.27 (70.67)	62.78 (145)	1703.62 (247.08)
23.89 (75)	539.67 (78.27)	65.56 (150)	1823.04 (264.40)
26.67 (80)	609.38 (88.38)	68.33 (155)	1948.04 (282.53)
29.44 (85)	655.09 (95.01)	71.11 (160)	2078.77 (301.49)
32.22 (90)	718.39 (104.19)	73.89 (165)	2215.29 (321.29)
35.00 (95)	785.61 (113.94)	76.67 (170)	2357.81 (341.96)

* All values rounded to two decimal places.

EVAPORATOR RANGE: From –6.67 to 7.22°C (20 to 45°F), the temperatures represent the gas temperatures inside the coil and not on the coil surfaces. Add 1.67 to 5.56°C (3–10°F) to the temperature for coil and air–off temperatures.

CONDENSER RANGE: From 110 to 160°F, temperatures are not ambient. Add 19.4 to 22.2°C (35 to 40°F) for proper heat transfer, then refer to the pressure chart.

Example:

32°C (90°F) ambient temperature

+ 22°C + (40°F)

54°C (130°F)

Condenser temperature = 1379 kPa (200 psig)

Based on 48.3 km/h (30 mph) air flow.

LEAK TESTING THEREFRIGERANT SYSTEM

Test for leaks whenever a refrigerant leak in the system is suspected. Also, test for leaks whenever a service operation which results in disturbing the lines or the connections is performed. Leaks are commonly found at the refrigerant fittings or at the connections. Leaks are commonly caused by the following problems:

- Improper torque.
- Damaged O–ring seals.
- Dirt or lint on the O–ring seals.

Liquid Leak Detectors

Use a liquid leak detector solution on locations such as the fittings. Apply the solution to the area in question with the swab that is supplied with the solution. Look for bubbles to appear. This will indicate the existence and location of any leak.

For areas where this is not practical, such as sections of the evaporator and the condenser, an electronic leak detector is more useful.

Electronic Leak Detectors

Follow the manufacturer's instructions for calibration, operation, and maintenance of an electronic leak detector. Battery condition is especially important to the accuracy of a portable model. Set the detector to R–134a before beginning the test.

Important : Electronic leak detectors are sensitive to windshield washing solutions, solvents and cleaners, and certain vehicle adhesives.

Surfaces must be clean to prevent false readings. Make sure that all surfaces are dry to prevent damage to the detector.

General Testing Instructions

- Follow the entire path of the refrigerant system.
- Completely circle each joint at 25 to 50 mm (1 to 2 inches) per second.
- Hold the probe tip within 6 mm (1/4 inch) of the surface.

- Do not block the air intake.

The audible tone changes from 1 to 2 clicks per second into a solid alarm if there is a leak. Adjust the balance control to maintain 1 to 2 clicks per second.

Test all of the following areas, even after one leak has been confirmed:

- Evaporator inlet and outlet.
- Receiver–drier inlet and outlet.
- Condenser inlet and outlet.
- Brazed and welded areas.
- Damaged areas.
- Hose couplings.
- Compressor rear head.
- All fittings and joints.

Testing Service Ports/Access Valves

The sealing caps provide protection for the service ports. Make sure that these caps are not missing or loose. Always use the correct cap for each port.

Testing the Evaporator Core

Leaks in the evaporator core are difficult to find. Test the evaporator core using the following procedure:

1. Run the blower fan at speed setting 4 for at least 15 minutes.
2. Turn the blower OFF.
3. Wait for 10 minutes.
4. Remove the blower motor resistor. Refer to "Blower Resistor" in this section.
5. Insert the leak detector probe as close as possible to the evaporator core. The detector will indicate a leak with a solid alarm.
6. Use a flashlight to search for refrigerant oil in the core surface.

Testing the Compressor Shaft Seal

1. Blow shop air behind and in front of the compressor clutch/pulley for at least 15 seconds.
2. Wait 1 to 2 minutes.
3. Probe the area in front of the pulley. If the detector emits a solid alarm, there is a leak.

V5 SYSTEM AIR CONDITIONING DIAGNOSIS

INSUFFICIENT COOLING DIAGNOSIS

Test Description

The number(s) below refer to step(s) on the diagnostic table.

13. See the first Important below.
32. See the second Important below.

Important : Perform this test under garage conditions with the air temperature at 21–32°C (70–90°F), and no sun load. Follow this test carefully for accurate results.

Important : Perform this test exactly as described to obtain accurate results.

Insufficient Cooling Diagnosis

Step	Action	Value(s)	Yes	No
1	Record the customer's complaint. Can you verify the customer's complaint?		Go to <i>Step 2</i>	System OK
2	1. Check the A/C fuse. 2. Check the blower fan operation. 3. Check the engine cooling fan operation. 4. Check the A/C compressor belt. 5. Check the A/C condenser for restricted airflow. 6. Check the clutch coil connection. 7. Repair or replace any components as needed. 8. Check the discharge air temperature with the A/C ON. Is the discharge air temperature normal?	At least 7°C (12°F) below ambient air temperature	System OK	Go to <i>Step 3</i>
3	1. Turn the ignition to LOCK. 2. Connect the high- and the low-pressure gauges. Are both pressures within the specified value?	69–345 kPa (10–50 psi)	Go to <i>Step 4</i>	Go to <i>Step 5</i>
4	1. Check the A/C system for leaks. 2. Repair any refrigerant leaks, as needed. 3. Recover, evacuate, and recharge the A/C system. 4. Observe the two pressure gauges. Are both pressures above the specified value?	345 kPa (50 psi)	Go to <i>Step 7</i>	
5	Observe the two pressure gauges. Are both pressures below the specified value?	69 kPa (10 psi)	Go to <i>Step 6</i>	Go to <i>Step 7</i>
6	1. Add 0.45 kg (1 pound) of refrigerant R-134a. 2. Check the A/C system for leaks. 3. Repair any refrigerant leaks, as needed. 4. Recover, evacuate, and recharge the A/C system. 5. Observe the two pressure gauges. Are both pressures above the specified value?	345 kPa (50 psi)	Go to <i>Step 7</i>	
7	1. Start the engine and allow it to run at idle. 2. Set the A/C controls to the following positions: <ul style="list-style-type: none"> • The A/C to ON. • The fresh air control switch to fresh air (indicator lamp OFF). • The blower motor to 4. • The temperature control knob to full cold. Does the A/C compressor clutch engage?		Go to <i>Step 8</i>	Go to <i>Step 10</i>

7B – 14 MANUAL CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

Step	Action	Value(s)	Yes	No
8	<ol style="list-style-type: none"> 1. Check for a knocking noise from the A/C compressor. 2. Cycle the A/C compressor ON and OFF in order to verify the source of the noise. <p>Do you hear a loud knocking noise?</p>		Go to <i>Step 9</i>	Go to <i>Step 13</i>
9	<ol style="list-style-type: none"> 1. Recover the A/C system refrigerant. 2. Replace the A/C compressor. 3. Evacuate and recharge the A/C system. 4. Check the A/C system for leaks. <p>Is the compressor running normally?</p>		Go to <i>Step 13</i>	
10	<ol style="list-style-type: none"> 1. Turn the ignition to LOCK. 2. Disconnect the A/C compressor clutch coil connector. 3. Connect a jumper wire from ground to one A/C compressor clutch coil terminal. 4. Connect a fused jumper wire from the positive battery terminal to the other A/C compressor clutch coil terminal. <p>Does the A/C clutch engage?</p>		Go to <i>Step 11</i>	Go to <i>Step 12</i>
11	<p>Repair the electrical circuit to the A/C compressor clutch coil.</p> <p>Does the A/C clutch engage?</p>		Go to <i>Step 8</i>	
12	<p>Replace the A/C compressor clutch coil.</p> <p>Does the A/C clutch engage?</p>		Go to <i>Step 8</i>	
13	<ol style="list-style-type: none"> 1. Close all of the vehicle's windows and doors. 2. Set the A/C controls to the following positions: <ul style="list-style-type: none"> • The A/C to ON. • The fresh air control switch to fresh air. • The blower motor to 4. • The temperature control knob to full cold. 3. Start the engine and allow it to run at idle for 5 minutes. 4. Feel the evaporator inlet and outlet pipes. <p>Is there a noticeable difference in the temperature of the evaporator inlet and outlet pipes?</p>		Go to <i>Step 15</i>	Go to <i>Step 14</i>
14	<ol style="list-style-type: none"> 1. Turn the ignition to LOCK. 2. Recover the A/C system refrigerant. 3. Examine the high–pressure pipe for an obstruction. 4. Examine the expansion valve for an obstruction or a malfunction. 5. Repair the obstruction or replace the expansion valve, as needed. 6. Evacuate and recharge the A/C system. 7. Check the A/C system for leaks. 8. Note the discharge air temperature with the A/C ON. <p>Is the discharge temperature normal?</p>	At least 7°C (12°F) below ambient air temperature	Go to <i>Step 15</i>	Go to <i>Step 13</i>

Step	Action	Value(s)	Yes	No
15	<ol style="list-style-type: none"> Record the high– and low–side pressures after the A/C system has been operating for 5 minutes or more with the engine cooling fan ON. Locate the intersection of the high– and low–side pressures. Refer to "Low– and High–Side Pressure Relationship Chart" in this section. <p>Do the low– and high–side pressures intersect in the white area of the chart?</p>		System OK	Go to Step 16
16	<p>Check the high– and low–side pressures.</p> <p>Do the high– and low–side pressures intersect in the gray area of the chart?</p>		Go to Step 17	Go to Step 20
17	<p>Feel the liquid pipe between the condenser and the expansion valve.</p> <p>Is the pipe cold?</p>		Go to Step 18	Go to Step 19
18	<ol style="list-style-type: none"> Examine the condenser for any restriction of the airflow. Check the cooling fans for proper operation. Remove the restriction or repair the fans, as required. <p>Is the pipe temperature normal?</p>	At least 7°C (12°F) below ambient air temperature	Go to Step 13	
19	<ol style="list-style-type: none"> Recover, evacuate, and recharge the A/C system. Check the A/C system for leaks. <p>Is the system free from leaks?</p>		Go to Step 13	
20	<p>Observe the readings on the pressure gauges.</p> <p>Are the A/C compressor high– and low–side pressures within the specified value of each other?</p>	207 kPa (30 psi)	Go to Step 21	Go to Step 26
21	<ol style="list-style-type: none"> Run the engine at 3,000 rpm. Set the A/C controls to the following positions: <ul style="list-style-type: none"> The A/C to ON. The fresh air control switch to fresh air. The blower motor to 4. The temperature control knob to full cold. Close all of the vehicle's windows and doors. Turn the A/C ON and OFF every 20 seconds for 3 minutes. <p>Are the A/C compressor high– and low–side pressures within the specified value of each other?</p>	207 kPa (30 psi)	Go to Step 22	Go to Step 13
22	<p>Observe the pressure rise on both gauges and the temperatures of both the compressor suction pipe and the discharge pipe.</p> <p>Is the pressure rise on both gauges slow and the suction pipe warm with the discharge pipe very hot?</p>		Go to Step 25	Go to Step 23
23	<ol style="list-style-type: none"> Turn the ignition to LOCK. Make sure the compressor clutch is disengaged. Attempt to turn the clutch driver (not the pulley). <p>Can you turn the clutch driver freely by hand?</p>		Go to Step 25	Go to Step 24

7B – 16 MANUAL CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

Step	Action	Value(s)	Yes	No
24	<ol style="list-style-type: none"> 1. Start the engine. 2. Observe the low-side pressure gauge while running the engine between 3,000 and 3,800 rpm. <p>Does the low-side pressure rise rapidly?</p>		Go to <i>Step 32</i>	Go to <i>Step 25</i>
25	<ol style="list-style-type: none"> 1. Recover the A/C system refrigerant. 2. Replace the A/C compressor. 3. Evacuate and recharge the A/C system. <p>Is the compressor functioning normally?</p>		Go to <i>Step 13</i>	
26	<p>Check the low-side pressure.</p> <p>Is the low-side pressure within the specified value?</p>	172–241 kPa (27–38 psi)	Go to <i>Step 27</i>	Go to <i>Step 32</i>
27	<p>Feel the high-side pipe leading up to the expansion valve connecting block.</p> <p>Is the pipe cold before the connecting block?</p>		Go to <i>Step 28</i>	Go to <i>Step 29</i>
28	<ol style="list-style-type: none"> 1. Check for a restriction in the high-side pipe before the expansion valve. 2. Repair or replace the high-side pipe. <p>Is the repair complete?</p>		Go to <i>Step 13</i>	
29	<p>Add the specified amount of refrigerant to the A/C system.</p> <p>Does the cooling performance improve?</p>	0.40 kg (14 oz)	Go to <i>Step 30</i>	Go to <i>Step 31</i>
30	<ol style="list-style-type: none"> 1. Check the A/C system for leaks. 2. Repair any refrigerant leaks, as needed. 3. Evacuate and recharge the A/C system. 4. Check the A/C system for leaks. <p>Is the system free from leaks?</p>		Go to <i>Step 13</i>	
31	<ol style="list-style-type: none"> 1. Recover the refrigerant. 2. Check the expansion valve for obstructions. 3. Repair or replace the expansion valve, as required. 4. Evacuate and recharge the system. 5. Check the A/C system for leaks. <p>Is the system free from leaks?</p>		Go to <i>Step 13</i>	
32	<ol style="list-style-type: none"> 1. Run the engine for 5 minutes at 2,000 rpm. 2. Set the A/C controls to the following positions: <ul style="list-style-type: none"> • The A/C to ON. • The fresh air control switch to recirculate (indicator lamp ON). • The blower motor to 1. • The temperature control knob to full cold. 3. Close all of the vehicle's windows and doors. 4. Open the vehicle hood. <p>Is the low-side pressure within the specified value?</p>	172–241 kPa (25–35 psi)	Go to <i>Step 13</i>	Go to <i>Step 33</i>
33	<ol style="list-style-type: none"> 1. Recover the A/C system refrigerant. 2. Replace the A/C compressor control valve. 3. Evacuate and recharge the A/C system. 4. Check the A/C system for leaks. <p>Is the system free from leaks?</p>		Go to <i>Step 13</i>	

SYMPTOM DIAGNOSIS

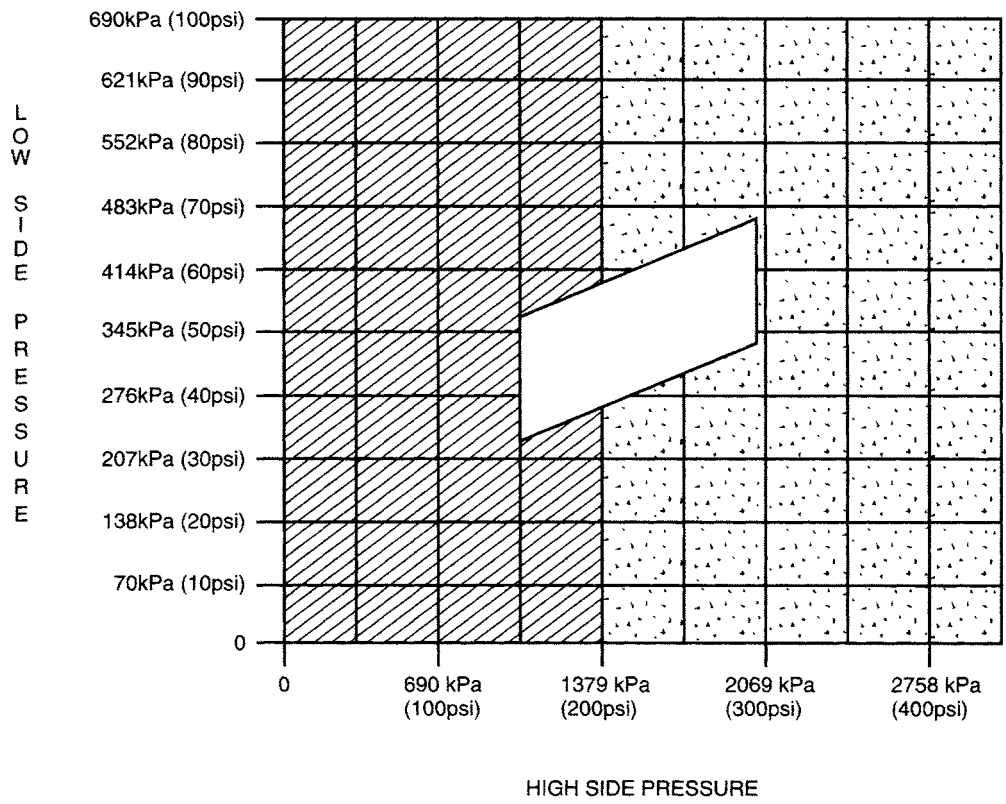
PRESSURE TEST CHART (R-134a SYSTEM)

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Discharge pressure abnormally high	After stopping the compressor, the pressure drops about 299 kPa (28 psi) quickly, then falls gradually.	There is air in the system.	Recover, evacuate and recharge the system with the specified amount of refrigerant.
	The condenser is excessively hot.	There is excessive refrigerant in the system.	Recover, evacuate and recharge the system with the specified amount of refrigerant.
	There is reduced or no airflow through the condenser.	The condenser or the radiator fins are clogged.	Clean the condenser or the radiator fins.
	The condenser or the radiator fan is not working properly.	<ul style="list-style-type: none"> • Check the voltage and the fan rpm. • Check the fan direction. 	
	The line to the condenser is excessively hot.	Restricted flow of refrigerant in the system	Locate and repair the restriction.
Discharge pressure abnormally low	The condenser is not hot.	Insufficient refrigerant in the system.	<ul style="list-style-type: none"> • Check the system for a leak. • Charge the system.
	The high and low pressures are balanced soon after stopping the compressor. Low side pressure is higher than normal.	Faulty compressor pressure relief valve.	Repair or replace the compressor.
	Faulty compressor seal.		
	The outlet of the expansion valve is not frosted, low pressure gauge indicates vacuum.	Faulty expansion valve.	Replace the expansion valve.
	Moisture in the system.	Recover, evacuate, and recharge the system.	
Suction pressure abnormally low	The condenser is not hot.	Insufficient refrigerant in the system.	Repair the leaks. Recover, evacuate, and recharge the system.
	The expansion valve is not frosted and the low pressure line is not cold. Low pressure gauge indicates a vacuum.	Frozen expansion valve.	Replace the expansion valve.
	Faulty expansion valve.		
	The discharge temperature is low and the airflow from the vents is restricted.	The evaporator is frozen.	Clear the restricted evaporator case drain.
	The expansion valve is frosted.	The expansion valve is clogged.	Clean or replace the expansion valve.
	The receiver/drier outlet is cool and the inlet is warm.	The receiver/drier is clogged.	Replace the receiver/drier.

7B – 18 MANUAL CONTROL HEATING, VENTILATION, AND AIR CONDITIONING SYSTEM

TEST RESULTS	RELATED SYMPTOMS	PROBABLE CAUSE	REMEDY
Suction pressure abnormally high	The low pressure hose and check joint are cooler than the temperature around the evaporator.	The expansion valve is opened too long.	Replace the expansion valve.
	A capillary tube is loose.		
	The suction pressure is lowered when the condenser is cooled by water.	There is excessive refrigerant in the system.	Recover, evacuate, and recharge the system.
	The high and low pressures are equalized as soon as the compressor is stopped and both gauges fluctuate while the compressor is running.	A gasket is faulty.	Repair or replace the compressor.
	The high pressure valve is faulty.		
	Foreign particles are stuck in the high pressure valve.		
Suction and discharge pressure abnormally high charge	There is reduced airflow through the condenser.	The condenser or the radiator fins are clogged.	Clean the condenser and the radiator.
	The radiator cooling fans are not working properly.	<ul style="list-style-type: none"> • Check the voltage and the radiator cooling fan rpm. • Check the fan direction. 	
	The condenser is excessively hot.	There is excessive refrigerant in the system.	Recover, evacuate, and recharge the system.
Suction and discharge pressure abnormally low	The low pressure hose and the metal end areas are cooler than the evaporator.	There is a clogged or kinked low pressure hose.	Repair or replace the low pressure hose.
	The temperature around the expansion valve is low compared to that around the receiver/drier.	The high pressure line is clogged.	Repair or replace the high pressure line.
Refrigerant leaks	The compressor clutch is dirty.	The compressor shaft seal is leaking.	Repair or replace the compressor.
	The compressor bolts are dirty.	There is leaking around a compressor housing bolt.	Tighten the bolt(s) or replace the compressor.
	The compressor gasket is wet with oil.	The compressor gasket is leaking.	Repair or replace the compressor.

LOW AND HIGH SIDE PRESSURE RELATIONSHIP CHART



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