

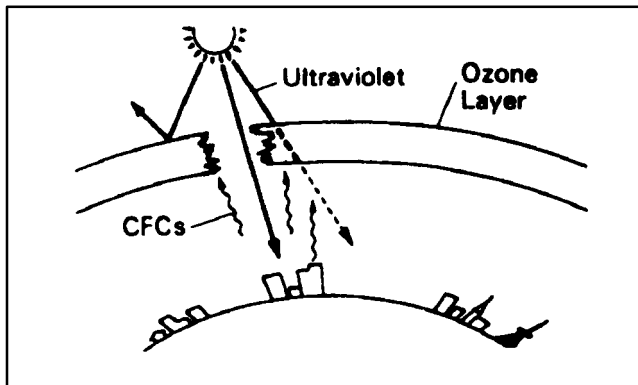
TOYOTA TECHNICAL SERVICE BULLETIN

REF.: HEATING & AIR
CONDITIONING
NO.: AC93-003
DATE: MARCH 26, 1993
MODEL: ALL MODELS

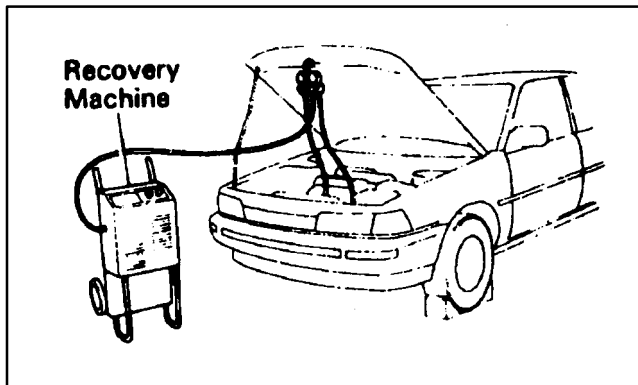
AIR CONDITIONING SYSTEM SERVICE

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In recent years, there has been a growing concern for the effects of chemical substances on the environment throughout the world. One of the substances that has attracted attention is the R-12 refrigerant used in automotive air conditioning (A/C) systems.



The chemical name for R-12 is Chlorofluorocarbon (CFC) and it has been identified along with CFCs from other sources as being a contributing factor in the depletion of the ozone layer in the earth's atmosphere. The ozone layer provides protection from the harmful effects of the sun's ultraviolet rays. Consequently it is very important to minimize the amount of refrigerant released into the atmosphere.

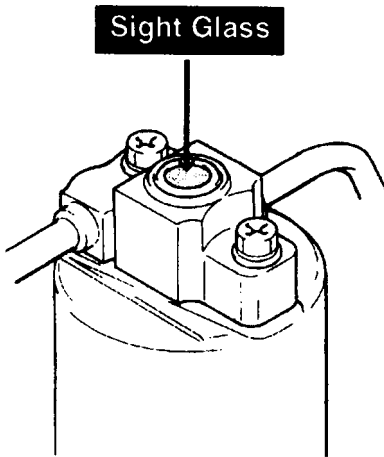


When servicing the A/C system it is mandatory to use a **Toyota Approved R-12 refrigerant recovery machine (Toyota P/N 00002-01396-01)** or its equivalent, and to use only the minimum amount of refrigerant necessary to test or charge the system.

The actual repair of each model's A/C system is detailed in the appropriate Toyota repair manual. However, to aid you in making quick, accurate diagnosis and repair of low refrigerant level conditions, the following inspection procedures have been developed.

QUICK CHECKS OF REFRIGERANT VOLUME:

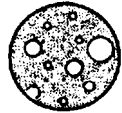
Inspect the condition of the refrigerant flowing through the sight glass, according to the following indicators:



Properly Charged

Properly charged system

- Almost no air bubbles are seen in the flow of refrigerant. When raising the engine speed gradually from idle to 1500 rpm, the bubbles disappear, making the refrigerant transparent.



Insufficiently Charged

Insufficiently charged system

- Air bubbles seen continuously in the refrigerant.

Excessively charged system

- No air bubbles seen in the refrigerant flow.

Item	Symptom	Amount Of Refrigerant	Remedy
1	Bubbles present in sight glass (See note below)	Insufficient	(1) Check for gas leakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
2	No bubbles present in sight glass	None, sufficient or too much	Refer to items 3 and 4
3	No temperature difference between compressor inlet and outlet	Empty or nearly empty	(1) Check for gas leakage with gas leak tester and repair if necessary (2) Add refrigerant until bubbles disappear
4	Temperatures of compressor inlet and outlet are noticeably different	Correct or too much	Refer to items 5 and 6
5	Immediately after air conditioner is turned off, refrigerant in sight glass stays clear	Too much	(1) Recover refrigerant (2) Evacuate air and charge proper amount of purified refrigerant
6	When air conditioner is turned off, refrigerant foams briefly and then stays clear	Correct	—

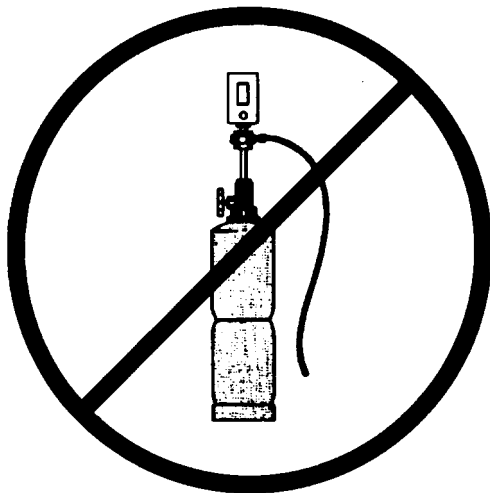
NOTE: With higher ambient temperatures (above about 85° F), bubbles in the sight glass can be considered normal if cooling is sufficient.

LEAK DETECTION:

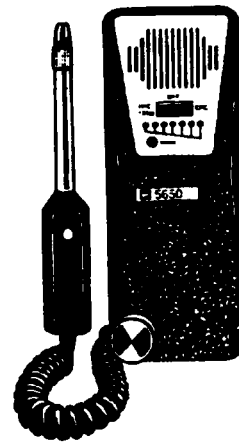
Identifying the exact location of A/C refrigerant leaks must be done with great care and can sometimes be difficult.

1. Ensure that at least 1 lb (450 g) of refrigerant is in the system.
2. Install a gauge set and operate the A/C system to obtain normal system pressures. (Low: 21 – 28 psi, Hi: 206 – 213 psi)
3. Stop engine and allow low side pressure to peak.
4. Always use a proper gas leak detector for the refrigerant you are working with.
 - A) **Do not** use propane type testers.
 - B) Always allow full warm-up of electronic type testers.
 - C) Calibrate instrument according to manufacturer's instructions.
 - D) Do not get probe wet or oily, etc.
5. Inspect the A/C system according to the following A/C system inspection procedures.

NOTE: BEFORE PERFORMING ANY REPAIRS, CONNECT AND USE THE REFRIGERANT RECOVERY MACHINE.

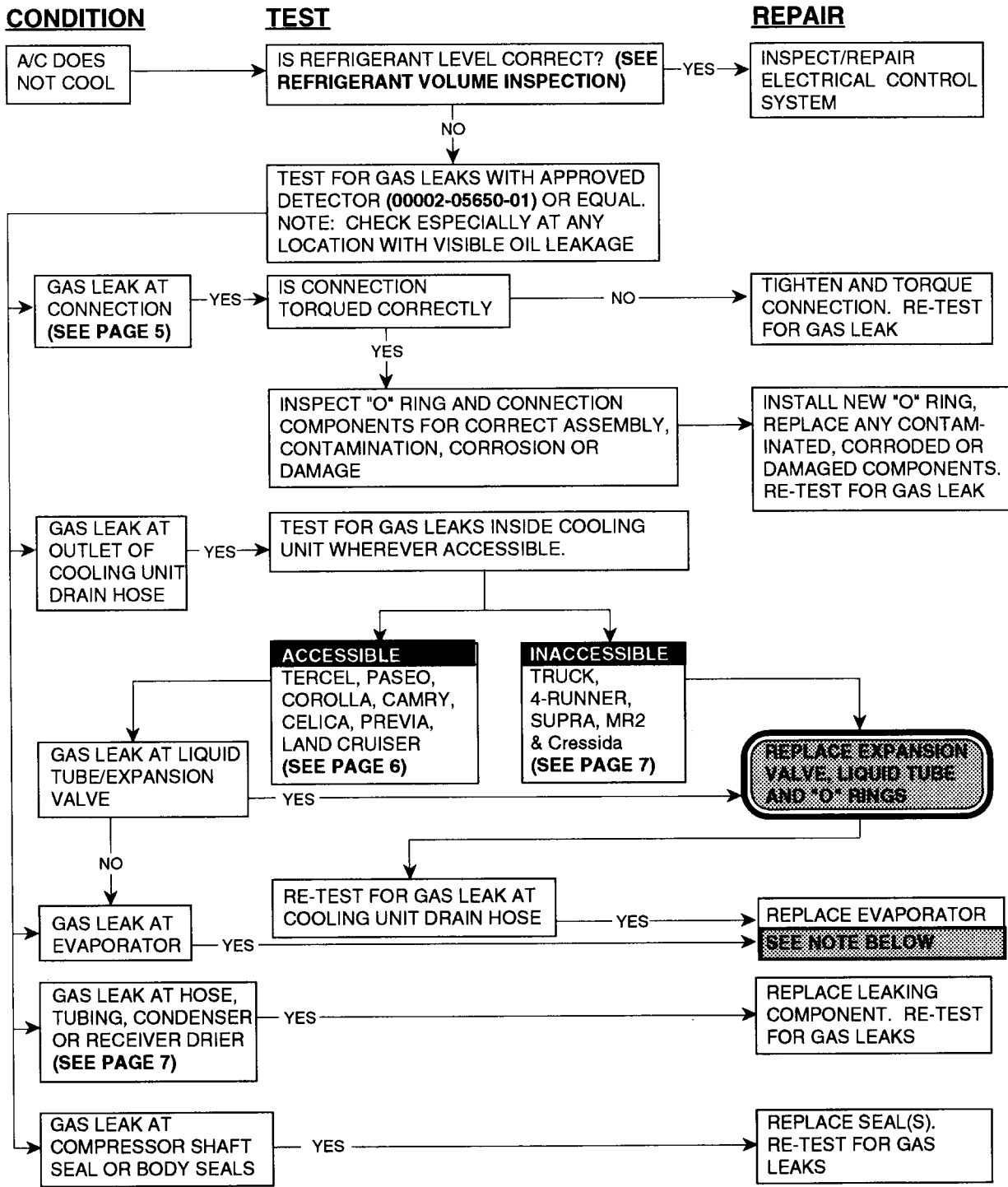


Halide Leak Detector



HFC 134a & R-12 Electronic Leak Detector

A/C SYSTEM INSPECTION PROCEDURE:



IMPORTANT
EVACUATE AND RECHARGE A/C REFRIGERANT AFTER REPAIRS ARE COMPLETED

NOTE:
LEAKS IN EVAPORATORS ARE RARE. DO NOT BE MISLED BY THE PRESENCE OF REFRIGERANT GAS IN THE EVAPORATOR HOUSING, IT MAY BE FROM THE EXPANSION VALVE OR LIQUID TUBE AND NOT THE EVAPORATOR. (SEE PAGE 8 & 9, "A/C SYSTEM COOLING UNIT COMPONENT LOCATION").

GAS LEAK INSPECTION:

1. CONNECTION

INSPECTION AND REPAIR PROCEDURE	REMARKS
<pre> graph TD A[Check For Gas Leak] -- NG --> B[Check Connection Torque] B -- OK --> F[Inspect "O" Ring And Connection] B -- NG --> C[Tighten and Torque Connector] C --> D[Re-Check For Gas Leak] D --> F F --> E[Install New "O" Ring And Replace Any Damaged Components] E --> G[Re-Check For Gas Leak] </pre>	<p>Carefully check each connection in the refrigerant system:</p> <ul style="list-style-type: none"> • Pipe to pipe • Pipe to each functional A/C component <ul style="list-style-type: none"> • Refer to the applicable repair manual to obtain correct torque value and determine O-Ring lubrication requirements.

NG = No Good

2. OUTLET OF COOLING UNIT DRAIN HOSE

(1) For model applications which **allow checking** for gas leaks inside cooling unit:

Celica	Corolla	Land Cruiser	Tercel
Camry	Paseo	Previa	

INSPECTION AND REPAIR PROCEDURE	REMARKS
<pre> graph TD A[Check for gas leak at drain hose] -- NG --> B[Check for gas leak on liquid tube and expansion valve] B -- OK --> F[Check gas leak at evaporator] B -- NG --> C[Replace liquid tube and expansion valve] C -- NG --> D[Re-check gas leak] D -- NG --> E[Check gas leak at evaporator] E -- NG --> G[Replace evaporator] G -- NG --> H[Re-check for gas leak] </pre>	<ul style="list-style-type: none"> CHECK WITH GAS LEAK DETECTOR AT OUTLET OF COOLING UNIT DRAIN HOSE CHECK INSIDE COOLING UNIT <ol style="list-style-type: none"> Disconnect Negative Battery Terminal Remove parts surrounding cooling unit Remove Evaporator Cover Clear any residual gas in the cooling housing by blowing with low pressure compressed air If possible, insert a partition of plastic or card board between expansion valve/ liquid tube and evaporator to more easily pinpoint gas leak location <ol style="list-style-type: none"> Check for gas leak at the following locations: <ul style="list-style-type: none"> Mating surfaces of expansion valve and evaporator or expansion valve and liquid tube Expansion valve adjustment screw Evaporator Tubes

NG = No Good

(2) For models on which it is **not possible** to check for gas leaks inside the cooling unit.

Truck	4Runner	Supra	MR2	Cressida
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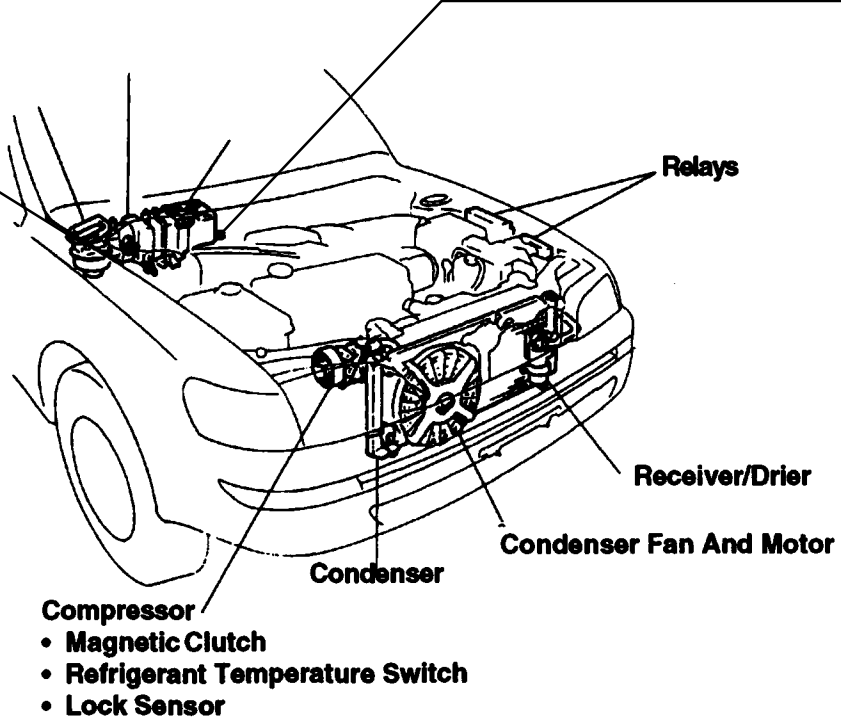
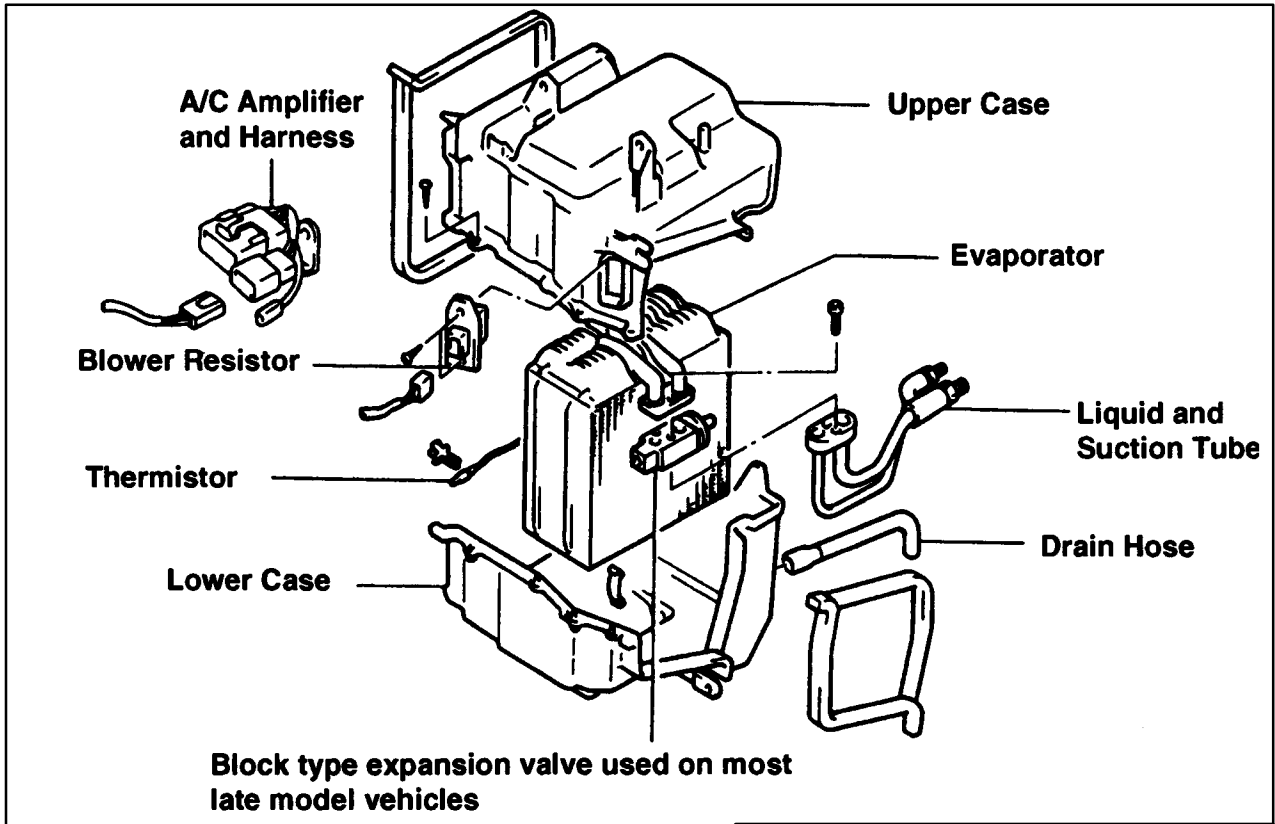
INSPECTION AND REPAIR PROCEDURE	REMARKS
<pre> graph TD A[Check For Gas Leak] -- NG --> B[Replace Liquid Tube and Expansion Valve and O-Rings] B -- NG --> C[Re-check For Gas Leak] C -- NG --> D[Replace Evaporator] D --> E[Re-check For Gas Leak] </pre>	<p>Check with gas leak detector at outlet of cooling unit drain hose.</p>

3. CONDENSER/RECEIVER DRIER/COMPRESSOR

INSPECTION AND REPAIR PROCEDURE	REMARKS
<pre> graph TD A[Check For Gas Leak] -- NG --> B[Replace Affected Parts] B --> C[Re-check For Gas Leak] </pre>	<p>Check affected components by using the gas leak detector:</p> <ul style="list-style-type: none"> • All portions of condenser • Compressor shaft seal and body seals • Compressor lock sensor

AIR CONDITIONING SYSTEM COOLING UNIT
COMPONENT LOCATION

(1) A/C system for single evaporator (all Passenger Cars)



(2) A/C system for dual evaporator Models (Previa)

