



# Technical Service BULLETIN

November 20, 1998

Title:

## R-12 AIR CONDITIONER SYSTEM RETROFIT

Models:

'86- '94 All models with R-12 Systems

2nd REVISION

AC002-98

HEATING & AIR CONDITIONING

**Introduction** The following information should be used for guidance when retrofitting vehicle air conditioning systems from R-12 to R134a refrigerant.

**Affected Vehicles**

- 1986-1989 Van, 1986-1992 Cressida & Supra, 1986-1993 Camry, Celica, Corolla, MR2, Tercel, 4Runner, Land Cruiser, 1986-1994 Truck, 1991-1993 Previa, and 1992-1993 Paseo

**Parts Information**

- General Parts not included with Set are listed in table below.
- Model specific parts are listed in the application table on pages 2 and 3.

PART NUMBER	QTY	PART NAME
88840-33020	1	R134a Retrofit Labels and Adaptors Set *1
90099-14044	2	Receiver O-Rings
90099-14045	1	Suction Side O-Ring
88374-33030		7/16-20 UNF high pressure side Quick Disconnect Adaptor*2
88374-33040		7/16-20 UNF low pressure side L-shaped Service Fitting Adaptor*2
88374-33050		3/8-24 UNF high pressure side L-shaped Service Fitting Adaptor*2
88374-33060		7/16-20 UNF high pressure side L-shaped Service Fitting Adaptor *2
08885-09107	*3	ND-Oil 8
08885-09117	*3	ND-Oil 9

**NOTE:**

- \*1 Retrofit Set 88840-33020 includes:  
 88374-33010 Low pressure side service fitting adaptor (7/16-20 UNF)  
 88374-33020 High pressure side service fitting adaptor (3/8-20 UNF)  
 88723-20040 R134a "USE ONLY" label (ND-Oil 8 for 10P, 10PA compressor)  
 88723-16050 R134a 'USE ONLY" label (ND-Oil 9 for TV type compressor)  
 88723-33050 Retrofit Caution Label  
 90099-14046 Discharge Hose O-Ring (quantity 2)
- \*2 Listed additional adaptors are available as needed.
- \*3 See applications tables on pages 2 and 3.

**Warranty Information**

OP CODE	DESCRIPTION	TIME	OPN	T1	T2
-	Not Applicable to Warranty	-	-	-	-

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**Passenger  
Vehicle  
Application  
Table**

Vehicle Model	IDENTIFICATION			REQUIRED PARTS AND MATERIALS						
	Model Year	E/G	Compressor Model	Service Valve Extension Housing 0-Rings		Sevice Valve Plate 0-Rings	Receiver/ Dryer Replacement	PAG Oil Type (ND-Oil#)	Oil Fill Quantity (cc)	R134a Charge (g)
				88398-	90099-	90099-	88471-			
Camry 4	86	All	10P15	35010	14131(2)	14131 (4)	12080	ND-Oil 8	100	650
	87-91	All	10PA17, V	N/A	N/A	N/A	12040	ND-Oil 8	100	650
	92	All	10PA17	N/A	N/A	N/A	16050	ND-Oil 8	150	900
	93	All	10PA17	N/A	N/A	N/A	16050	ND-Oil 8	150	900
Celica 4	86-87	All	10P15	22010	14131(2)	14131 (4)	12080	ND-Oil 8	100	650
	88-89	All	10PA17	N/A	N/A	N/A	12080	ND-Oil 8	100	650
	90-93	All	10PA15, 17, V	N/A	N/A	N/A	16050	ND-Oil 8	120	700
Corolla FR 4	86-87	All	10P13, 15	35010	14131(2)	14131 (4)	2	ND-Oil 8	100	650
Corolla FF 4	86-87	All	10P13, 15	12020	14131(2)	14131 (4)	2	ND-Oil 8	100	650
	88-92	All	10PA15 <sup>5</sup>	N/A	N/A	N/A	2	ND-Oil 8 <sup>5</sup>	100 <sup>5</sup>	650
Corolla A/T 4	88.5-92	All	10PA15	N/A	N/A	N/A	2	ND-Oil 8	100	650
Corolla 4	93	All	10PA15	N/A	N/A	N/A	2	ND-Oil 8	100	650
Cressida 4	86	All	10P17	35010	14131(2)	14131 (4)	12070	ND-Oil 8	150	650
	87-88	All	10PA17	N/A	N/A	N/A	12070	ND-Oil 8	120	650
	89-92	All	10PA20	N/A	N/A	N/A	12060	ND-Oil 8	120	750
MR2 4	86-89	All	10P13	17020	N/A	14131 (4)	16060	ND-Oil 8	100	750
	91-93	All	10P13	35010	14131(2)	14131 (4)	16050	ND-Oil 8	140	800
Paseo 4	92-93	All	TV10, 12	N/A	N/A	N/A	16050	ND-Oil 8	150	700
Supra 4	86	All	10P15	N/A	N/A	14131 (4)	12070	ND-Oil 8	100	650
	86.5-92	All	10PA17	N/A	N/A	N/A	12070	ND-Oil 8	120	650
Tercel Sedan <sup>4</sup>	86	3A	10PA13	N/A	N/A	N/A	12080	ND-Oil 8	100	650
Tercel Wagon <sup>4</sup>	86-88	3A	10PA13	N/A	N/A	N/A	12070	ND-Oil 9	150	650
Tercel 4	87-90	3E	TV12, 14	N/A	N/A	N/A	12040 <sup>1</sup>	ND-Oil 9	150	650
	91-93	3E	TV12	N/A	N/A	N/A	16050	ND-Oil 9	150	650
4Runner 4	86-89	L4	10P15	N/A	N/A	14131 (4)	12080	ND-Oil 8	100	700
	88-89	V6	10PA17	N/A	N/A	N/A	12080	ND-Oil 8	100	700
	90-93	All	10PA17	N/A	N/A	N/A	16050	ND-Oil 8	120	750
Truck 4	86-88	L4	10P13	N/A	N/A	14131 (4)	12080	ND-Oil 8	100	700
	88	V6	10PA15	N/A	N/A	N/A	12080	ND-Oil 8	100	700
	89-94	All	10PA15	N/A	N/A	N/A	16050	ND-Oil 8	100	700
Land Cruiser 4	86-87	All	10P15	N/A	N/A	14131 (4)	12080	ND-Oil 8	100	800
	88-89	All	10PA15	N/A	N/A	N/A	12080	ND-Oil 8	100	800
	90	All	10PA17	N/A	N/A	N/A	12080	ND-Oil 8	220	850
	91-92	All	10PA17	N/A	N/A	N/A	16050	ND-Oil 8	220	850
	93	All	10PA17	N/A	N/A	N/A	16050	ND-Oil 8	180	850
Previa 4	91-93	All	10PA17	N/A	N/A	N/A	30390	ND-Oil 8	180	1150
Van 4	86-88	All	10P15	28010	88398-28020	14131 (4)	12080	ND-Oil 8	180	<sup>3</sup>
	89	All	10PA15	N/A	N/A	N/A	12080	ND-Oil 8	150	<sup>3</sup>

- (1) 87MY through 5/88 production: **88471-12040**, 5/88 production through 90MY **88471-12060**
- (2) 86-87 FWD, 86-88 FX & FX16: **88471-12080**, 86-87 RWD, GTS: **88471-12070**, 88-89 FWD, All-Trac, **88471-12060**, 90-92 Corolla models: **88471-16050**, 93 Corolla models: **88471-12060**
- (3) 650g with single air conditioning, 1300g with dual air conditioning
- (4) The following additional parts are required with the Retrofit Set **88840-33020**: Receiver O-Rings (2), and Suction Side O-Ring **90099-14045** (1).
- (5) GTS uses TV12, 14 compressors: use 150 cc **ND-OIL 9**

GTS:

**90099-1**

**Required  
Tools &  
Materials****A. Required Equipment:**

1. R-12 recovery/recycling/recharging equipment
2. R134a recovery/recycling/recharging equipment
3. Graduated measuring cylinder (for compressor oil)
4. Valve core remover for service valves
5. Air conditioner manifold gauge set
6. Torque Wrench Kit, 00002-50284-01, contains the following: \*<sup>1</sup>
  - 14 mm           00002-51410-01
  - 17 mm           00002-51710-01
  - 22 mm           00002-52216-01
  - 27 mm           00002-52724-01

**B. Required Parts & Materials: \*<sup>2</sup>**

1. R134a Refrigerant
2. Service Fitting Adaptors
3. Caution Labels
4. Compressor oil
5. Receiver/Dryer for R134a
6. O-Rings for hose connections
7. O-Rings for Compressor Extension Housing / Service Plate \*<sup>3</sup>
8. Loctite 262 or equivalent

**\*NOTE:**

\*<sup>1</sup>     **required size(s) dependant upon specific model.**

\*<sup>2</sup>     **see application information section of this bulletin on page 2.**

\*<sup>3</sup>     **All 10P compressors require installation of compressor O-rings. It is not necessary to replace compressor O-rings on vehicles produced from 1/93 or on DIO/PIO A/C systems with compressor production serial numbers after 1N0001 (10PA type compressors and TV type compressors).**

**Retrofitting  
Overview****A. Refrigerant and Oil Charges**

- Oil and refrigerant charge amounts are different after the R-12 system has been retrofitted to R134a. Refrigerant charge amounts are less, while oil charge amounts are greater, compared to R-12 system requirements.\*

**B. System Performance**

- A slight decrease in system performance may be noticed on some vehicles under certain operating conditions.

**C. Refrigerant Pressures**

- R134a high side pressures are greater than that of R-12 above ambient temperatures of 68°F.

**D. Flushing Requirements**

- There is no need to remove or flush R-12 mineral oil from the system. Simply charge the system with the specified type and amount\* of PAG oil to provide proper lubrication.

**E. Use of Sight Glass**

- Mineral based R-12 oil remains and circulates in the A/C system and does not dissolve in R134a refrigerant. This results in a cloudy appearance at the sight glass making it impossible to judge the refrigerant charge amount by using the sight glass method. To prevent misdiagnosis on retrofit vehicles, apply black paint to the sight glass on block-joint (FF) type receiver/dryers. Union-nut joint (BAG) type retrofit receiver/dryers are manufactured without a sight glass.

**\*NOTE:**

**Refer to the OIL TYPE and CHARGE columns in Application Tables on pages 2 and 3 for proper amounts of ND-Oil 8 or ND-Oil 9.**

**Service  
Precautions****A. Refrigerant handling**

1. Do not handle refrigerant in an enclosed area or near an open flame.
2. Always wear eye protection.
3. Avoid getting liquid refrigerant in your eyes or on your skin.
4. Never heat a container with an open flame.
5. Keep containers below 104°F
6. When heating a refrigerant can with water, keep the valve above water.
7. Never reuse empty service cans.

**B. Replacing parts**

1. Plug off any open connections to prevent the entry of moisture and dust.
2. Do not remove plugs from receiver/dryer ports until it is ready for installation.

**C. Tightening connecting parts**

1. Apply a few drops of specified PAG compressor oil to O-ring fittings before tightening.
2. Avoid twisting refrigerant piping when installing R134a service fitting adapters.
3. Tighten all fittings to specified torque.

**NOTE:**

Oil removed during R-12 evacuation should not be used with an R134a System.

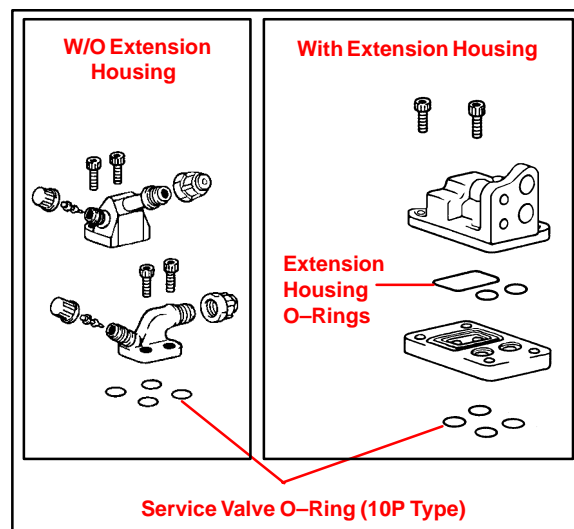
**Repair Procedure**

- A. Vehicle Inspection:
  - Ensure the integrity of the A/C system before proceeding with retrofit.
- B. Recover R-12 using R-12 recovery/recycling/recharging equipment:
  - Follow Toyota recommended procedure.
- C. Install R134a service fitting adapters:
  1. Remove valve cores from R-12 service fittings and discard.
  2. Clean external threads of the R-12 service fittings.
  3. Apply adhesive to threads (Loctite 262 or equivalent), screw on R134a adapter fittings, and tighten to **13 ft.-lb.**

**NOTE:**

Vehicles with more than 2 service fittings will require the installation of additional adaptors. All service fittings must have R134a adaptors installed.

- D. Replace compressor O-rings (**10P only**):
  1. Remove compressor from vehicle.
  2. Install covers on hose connection ports to prevent airborne contamination.
  3. Clean compressor body and service valve area using a brush and compressed air.
  4. Remove service valve plate.
  5. Remove O-rings from service valve plate and discard.
  6. Remove extension housing if used, otherwise go to step 7.
    - a. Separate extension housing from service valve plate.
    - b. Remove and discard O-rings.
    - c. Lubricate and install retrofit O-rings into extension housing using specified PAG oil (see tables).
    - d. Reassemble extension housing to service valve plate.
  7. Reinstall service valve plate to compressor. Torque bolts to **19 ft.lbs.**
  8. Reinstall compressor assembly.
- E. Replace piping and hose O-rings:
  1. Disconnect suction and discharge hoses from compressor.
  2. Remove and discard old O-rings.
  3. Lubricate and install retrofit O-rings with specified PAG oil (see tables).
  4. Disconnect discharge hose from condenser.
  5. Remove and discard old O-rings.
  6. Lubricate and install retrofit O-rings with specified PAG oil (see tables).



**Repair  
Procedure**  
(continued)

7. Reconnect hoses and torque to specification. (Specifications can be found in applicable manuals/guides.)
- F. Replace receiver/dryer
1. Remove and discard original R-12 Receiver/Dryer.
  2. Using the tables on pages 2 and 3, determine the proper type and amount of PAG oil. Pour 1/2 of the specified oil into the “OUT” side of the Receiver/Dryer.
  3. Black out the sight glass on block – joint – type receiver/dryer with black paint.
  4. Lubricate and install retrofit O-rings with specified PAG oil (see tables).
  5. Install retrofit Receiver/Dryer.
- G. Evacuate, charge, and leak test the system (Use manufacturer’s recommended procedure).
1. Evacuate for 45 minutes.
  2. Vacuum check.
  3. Add compressor oil.
    - Using recovery/recycling/recharging equipment charge the system with the remaining 1/2 of the specified amount of oil from step **F2**.
  4. Charge system with specified amount of **R134a**. (refer to tables).
  5. Perform a gas leak check.
- H. Confirm cooling performance of Air Conditioning system.
- I. Install retrofit labels:
1. Choose R134a “**USE ONLY**” label for proper oil type (**ND-Oil 8** or **ND-Oil 9**).
  2. Using a ball point pen, enter the proper retrofit refrigerant and oil charges on the caution label.
  3. Cross out unused type of compressor oil on caution label.
  4. Affix labels in a prominent location such as radiator support, underside of hood, or suspension tower area.
  5. Remove any R-12 labels.

