ABC123	Entire Article 2000 Chevrolet Camaro

ARTICLE BEGINNING

2000-01 GENERAL SERVICING
Compressor Servicing

DELPHI-THERMAL (HARRISON) HD6/HT6/HU6 & HD6/HR-6HE 6-CYL., V5

5-CYL. & V7 7-CYL.

CLUTCH ASSEMBLY

CAUTION: DO NOT hammer on compressor shaft to remove clutch plate, as compressor damage will result.

Removal

1) Remove compressor from vehicle. Place compressor in Holding Fixture (HD6/HT6/HU6 and HD6/HR-6HE compressor use J-33026; on V5 or V7 compressor use J-34992 or J-41790). On V5 or V7 compressor, remove dust cover (if equipped). Use Clutch Plate Spanner (J-33027-A) to hold clutch plate and remove compressor shaft nut using Shaft Nut Socket (J-33022). See Figs. 1 or 2.

2) On all compressors, using Clutch Plate Remover/Installer (J-33013-B), remove compressor clutch plate and hub. See Figs. 1 or 2. Hold remover body and turn center screw into remover body to remove clutch plate and hub. Ensure forcing tip on remover/installer center screw is flat or end of shaft/axial plate will be damaged. Remove shaft key.

3) Remove snap ring. Install Puller Guide (J-33023-A) on front head. Position Pulley and Bearing Puller (J-41552 for HD6/HT6/HU6 and HD6/HR-6HE or J-33020 for V5 or V7 compressor) into inner circle of slots on pulley assembly. Turn puller clockwise in slots. Tighten puller and remove pulley assembly.

NOTE: On compressor with conventional mount, it is not necessary to remove staking in front of bearing before removing bearing. Bearing removal and installation for compressor with direct mount is not available from manufacturer.

4) If bearing is to be removed on compressor with conventional mount, remove forcing screw from puller. With puller still engaged in pulley slots, invert assembly onto a solid flat surface. Use a hammer and Bearing Remover (J-9398-A) to drive bearing from pulley. See Figs. 1 or 2.

5) Disconnect clutch coil lead. Scribe marks on compressor and clutch coil for installation reference. Remove clutch coil using Puller Adapter (J-33023-A) and 2-jaw puller.

Installation

1) Align reference marks made during removal. Using Puller Adapter (J-33024) and Puller Bar (J-8433-1), press clutch coil onto compressor. Ensure clutch coil and installer stay lined up during installation. Using a 1/8" punch, stake clutch coil inner ring in 3 places, 120 degrees apart. Stake size should be 1/2 the area of punch tip and 0.010-0.015" (0.28-0.38 mm) deep.

NOTE: To ensure proper bearing clearance, it is necessary to remove old stake metal before installing new bearing.

2) To install pulley bearing, place pulley on Support (J-21352-A). DO NOT support pulley rim on flat surface, or pulley will be damaged. Install bearing in pulley using hammer, Bearing Installer (J-9481-A) and Handle (J-29886).

3) With pulley on support, use Bearing Staking Guide (J-33019-1) and Bearing Staking Pin (J-33019-2) to stake pulley in 3 places, 120 degrees apart. Reposition pulley on support to ensure full support under staking pin. Metal stake should be similar to original stake (down to, but not touching bearing). Position pulley on compressor.

4) Place Bearing Installer (J-33017) and Puller Guide (J-33023-A) over inner race of bearing. Using puller, press pulley onto compressor. Install snap ring. Install shaft key in clutch plate, allowing key to protrude about 1/8" from rear of clutch plate.

5) Install clutch plate on compressor shaft. Using clutch plate remover/installer, press clutch plate onto compressor. Ensure shaft key is still in keyway before installing clutch assembly.

6) Air gap between friction surfaces for HD6/HT6/HU6 and HD6/HR-6HE compressor is 0.020-0.030" (0.51-0.76 mm); for V5 and V7 compressor air gap is 0.015-0.020" (0.38-0.51 mm). On V5 and V7 compressor, using clutch plate spanner, install compressor shaft nut. Tighten shaft nut to 12.5 ft. lbs. (17 N.m). Check components for proper rotation.

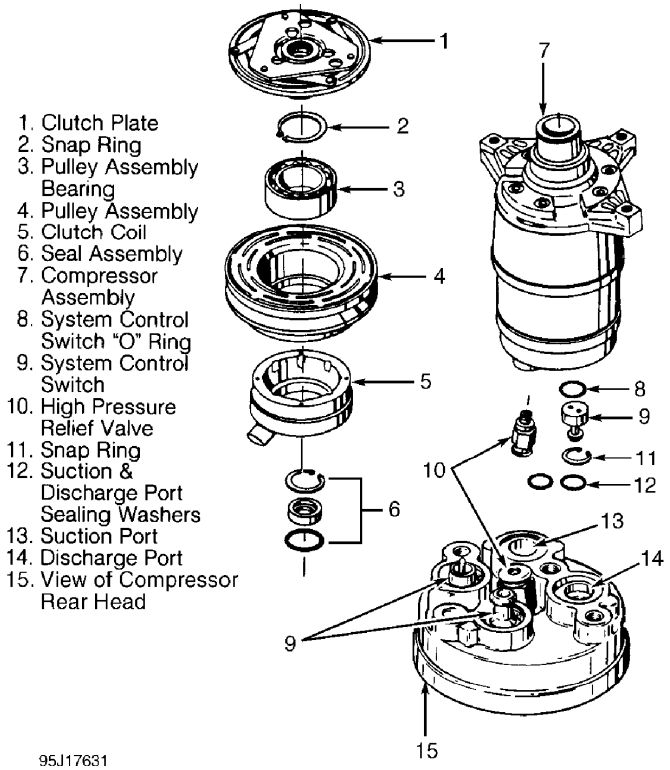


Fig. 1: Compressor Components (Harrison HD6/HT6/HU6 & HD6/HR-6HE 6-Cyl.)

Courtesy of General Motors Corp.

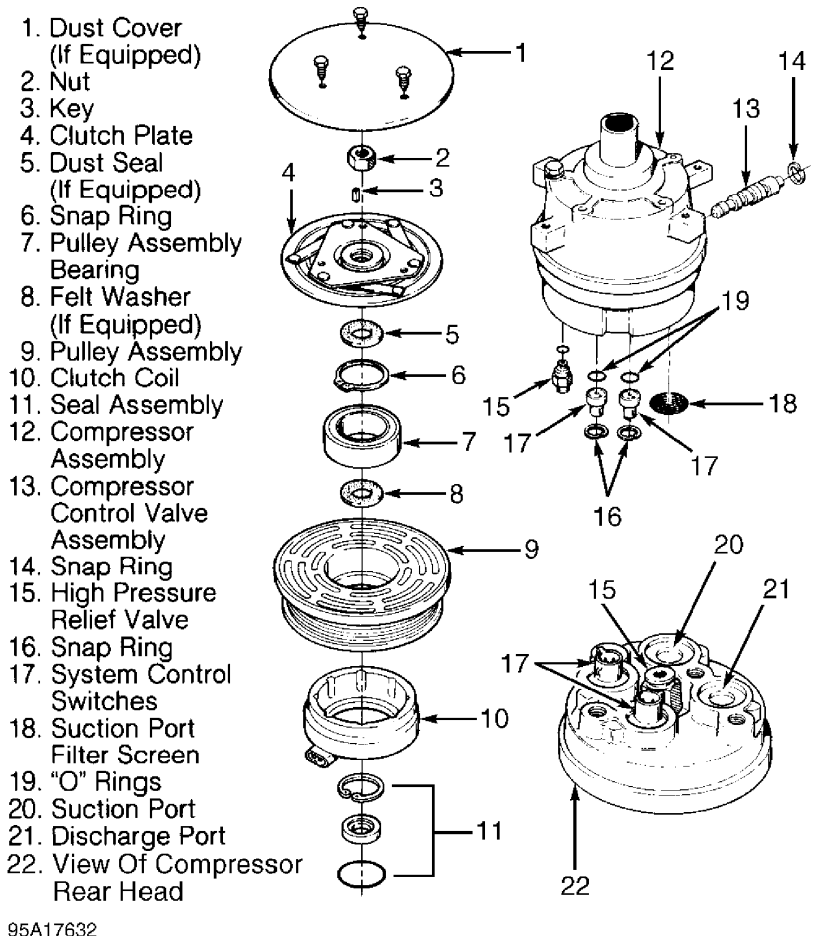


Fig. 2: Compressor Components (Harrison V5 5-Cyl. With Conv. Mt. Shown; V7 7-Cyl. Is Similar)
Courtesy of General Motors Corp.

SHAFT SEAL

NOTE: General Motors no longer authorizes replacing the compressor shaft seal on Delphi-Harrison compressors. For additional information See Technical Service Bulletin (TSB) No. 01-01-38-001.

FORD FS-10 10-CYLINDER

CLUTCH ASSEMBLY

Removal

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove A/C compressor. Using Clutch Holder (T94P-19703-AH) to hold compressor shaft from turning, remove clutch plate bolt. Discard bolt.

2) Thread an 8-mm bolt into clutch plate, and remove clutch plate and shims. Remove pulley outside snap ring. Remove pulley

assembly. See Fig. 3. Note location of clutch coil electrical connector.

3) Disconnect clutch coil lead. Install Field Coil Remover (T89P-19623-FH) on nose opening of compressor. Using a 2-jaw puller, remove clutch coil from compressor. DO NOT use air-powered tools when removing clutch coil.

Installation

1) Ensure clutch coil mounting surface is clean. Install clutch coil. Ensure electrical connection is correctly positioned. Position Coil Replacer (T91L-19623-CH) onto coil and Coil Pressing Adapter (T89P-19623-EH) onto coil replacer.

2) Install 2-jaw puller (D80L-1002-L) on compressor and coil replacer. Engage puller jaws with compressor front mounts. Carefully tighten puller until clutch coil bottoms completely against compressor. DO NOT use air-powered tools when installing clutch coil.

3) Carefully install pulley assembly onto compressor, ensuring that it is properly aligned. Install pulley assembly snap ring, with beveled side out. Install shim(s) and clutch plate. Install a NEW clutch plate bolt, and tighten to 98-123 INCH lbs. (11-14 N.m).

4) Using a feeler gauge, measure air gap between clutch plate and pulley assembly mating surfaces in 3 places. Air gap should be 0.014-0.030" (0.36-0.75 mm). If air gap is not as specified, add or remove shims as necessary.

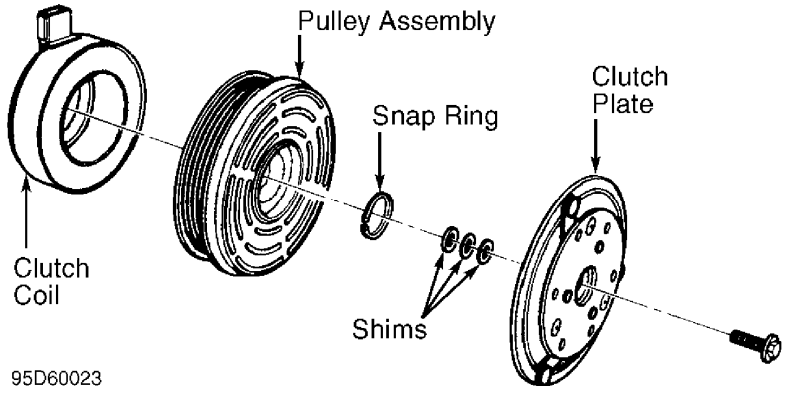


Fig. 3: Exploded View Of Compressor Clutch Assembly (Ford FS-10; Sanden Is Similar)
Courtesy of Ford Motor Co.

SHAFT SEAL

Removal

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor. Remove compressor clutch assembly. See CLUTCH ASSEMBLY.

2) Remove compressor shaft felt seal. Using low pressure compressed air and a lint-free cloth, thoroughly clean seal inside and outside of compressor nose area. Using Snap Ring Remover (T89P-19623-DH), rotate eye of snap ring toward compressor shaft. Quickly pull up snap ring while holding snap ring at an angle.

3) Position Shaft Seal Remover (T89P-19623-BH) over compressor shaft. Push shaft seal remover downward against seal.

Ensure end of shaft seal remover engages inside diameter of seal.

4) Rotate shaft seal remover handle clockwise to expand remover tip inside seal. Pull shaft seal from compressor. Ensure dirt or other debris does not enter compressor.

Installation

1) Lubricate Shaft Seal Protector (T89P-19623-CH) and shaft seal with refrigerant oil. Coat shaft seal protector with clean refrigerant oil. Install shaft seal on shaft seal protector so lip of seal is toward large end of shaft seal protector. Install shaft seal protector onto compressor shaft.

2) Using Shaft Seal Replacer (T89P-19623-AH), slowly push shaft seal down until it is seated. Remove shaft seal installer and protector. Install NEW shaft seal snap ring.

3) Rotate compressor shaft about 10 revolutions, and leak test shaft seal installation. Install NEW shaft seal felt. Install clutch plate. See CLUTCH ASSEMBLY.

FORD SC90V SCROLL

CLUTCH ASSEMBLY

Removal

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove A/C compressor. Drain and measure oil from compressor. Install plugs into compressor and refrigerant lines to prevent moisture and debris contamination.

2) Using a spanner wrench to hold clutch plate, remove shaft nut. Remove clutch plate and shim. Remove snap ring and pulley assembly. If necessary, use a 3-jaw puller to remove pulley assembly.

3) Remove compressor thermal cut-out switch bracket. Using a twisting motion, pull up and remove thermal cut-out switch. Remove clutch coil snap ring and clutch coil. See Fig. 7.

Installation

1) Clean clutch coil and pulley mating surfaces. Install clutch coil. Ensure clutch coil is properly aligned on compressor head. Install snap ring with beveled side facing outward. Install pulley assembly onto compressor. If properly aligned, pulley assembly should slip onto compressor. If necessary, use Pulley Replacer (T97P-19D786-A) and gently tap pulley into place. Install snap ring with beveled side facing outward.

2) Install shim. Align clutch plate with block tooth on compressor shaft and install clutch plate. Install thermal cut-out switch and tighten switch bracket bolt to 53 INCH lbs. (6 N.m). Using spanner wrench, install shaft nut and tighten to 13 ft. lbs. (17 N.m).

3) Using a feeler gauge, measure air gap between clutch plate and pulley assembly at 3 equally spaced locations. Rotate pulley 180 degrees, and measure air gap at 3 locations again. On 2000 LS, air gap should be 0.014-0.033" (0.35-0.85 mm). On 2001 LS, air gap should be 0.014-0.030" (0.35-0.75 mm). On all models, if air gap is not within specification, add or remove shims to obtain correct air gap.

4) Add correct amount of refrigerant oil to compressor and install compressor. See COMPRESSOR REFRIGERANT OIL CHECKING. Evacuate

and charge A/C system. Perform leak test.

SHAFT SEAL

Shaft seal is not serviceable. If excessive oil is present on pulley and plate friction surfaces or on compressor shaft nose area, replace compressor.

FORD SC115 SCROLL

CLUTCH ASSEMBLY

Removal

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove A/C compressor. Drain and measure oil from compressor. Install plugs into compressor and refrigerant lines to prevent moisture and debris contamination.

2) Using Holding Fixture (T94P-19703-AH) spanner wrench to hold clutch plate, remove shaft nut. Remove clutch plate and shim. Remove snap ring and pulley assembly. Using a 2-jaw puller, remove pulley assembly. Remove clutch coil snap ring and clutch coil. See Fig. 7.

Installation

1) Clean clutch coil and pulley mating surfaces. Install clutch coil. Ensure clutch coil and compressor head indexing locators are aligned. Install snap ring, with beveled side facing outward. Install pulley assembly onto compressor. If properly aligned, pulley assembly should slip onto compressor. Install snap ring, with beveled side facing outward.

2) Install shim. Align clutch plate with block tooth on compressor shaft and install clutch plate. Using Holding Fixture (T94P-19703-AH) spanner wrench, install shaft nut and tighten to 13 ft. lbs. (18 N.m).

3) Using a feeler gauge, measure air gap between clutch plate and pulley assembly at 3 equally spaced locations. Rotate pulley 180 degrees and measure air gap at 3 locations again. Air gap should be 0.014-0.030" (0.35-0.75 mm). If air gap is not within specification, add or remove shims to obtain correct air gap.

4) Add correct amount of refrigerant oil to compressor and install compressor. See COMPRESSOR REFRIGERANT OIL CHECKING. Evacuate and charge A/C system. Perform leak test.

SHAFT SEAL

Shaft seal is not serviceable. If excessive oil is present on pulley and plate friction surfaces or on compressor shaft nose area, replace compressor.

NIPPONDENSO 10-CYLINDER

CLUTCH ASSEMBLY

Removal & Installation (Metro & Tracker)

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove A/C compressor. Drain, measure and discard refrigerant oil from compressor.

2) Using Clutch Plate Holder/Remover (J-41384) remove clutch plate nut, washer and clutch plate from compressor drive shaft. Discard clutch plate nut. Remove clutch pulley snap ring and shim. Using a plastic mallet, gently tap and remove clutch pulley. Remove clutch coil wire retainer from compressor. Remove clutch coil snap ring and clutch coil. See Fig. 4.

3) Install clutch coil and snap ring. Attach clutch coil wire retainer to compressor. Install clutch pulley, snap ring and shim. Install clutch plate to compressor shaft. Measure air gap between clutch pulley and clutch plate.

4) On Metro, air gap should be 0.014-0.026" (0.35-0.65 mm). On Tracker, air gap should be 0.012-0.020" (0.30-0.51 mm). On all models, add or remove shims as necessary. Install washer and NEW compressor shaft nut. Tighten compressor shaft nut to 11-15 ft. lbs. (15-20 N.m). After repairs, add NEW refrigerant oil to compressor equal to amount drained. To complete installation, reverse removal procedure.

SHAFT SEAL

Removal (Metro & Tracker)

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove compressor. Drain, measure and discard refrigerant oil from compressor. Remove clutch plate, clutch pulley, shims, and clutch coil. See CLUTCH ASSEMBLY. See Fig. 4.

2) Using a flat-blade screwdriver, remove felt ring and felt washer from front housing. Remove shaft key and shaft seal snap ring. Insert Compressor Shaft Seal Remover/Installer (J-33942-B) into seal. Turn seal remover/installer until contact with notches in seal is made. Remove shaft seal.

Installation

1) Install Compressor Shaft Seal Protector (J-34614) onto compressor shaft. Lubricate NEW shaft seal with refrigerant oil. DO NOT touch sealing surfaces. Engage seal remover/installer into seal notches and install seal onto compressor shaft. Remove seal protector and remover/installer.

2) Install seal snap ring. Install felt washer and felt ring. Install clutch plate, clutch pulley, shims, and clutch coil. See CLUTCH ASSEMBLY. See Fig. 4. After repairs, add refrigerant oil to compressor equal to amount drained. To complete installation, reverse removal procedure. Perform leak test.

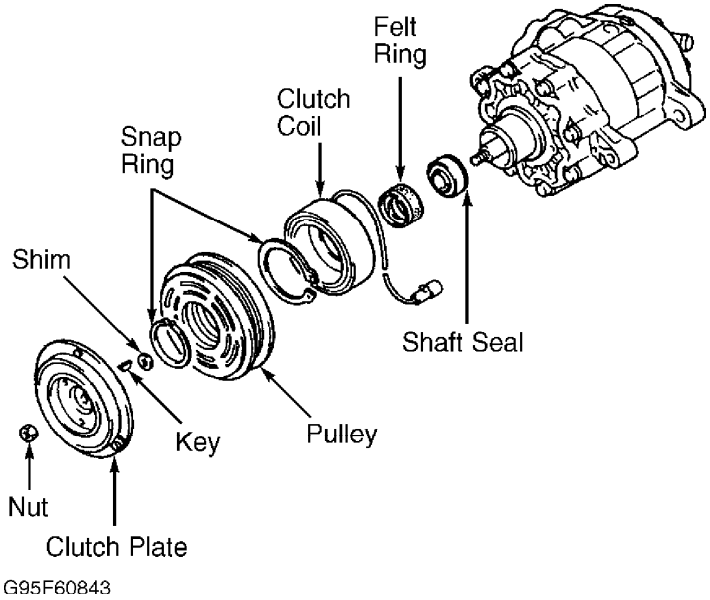


Fig. 4: Compressor Components (Nippondenso 10-Cyl.)
Courtesy of General Motors Corp.

NIPPONDENSO 10S15/10S17/10S20

CLUTCH ASSEMBLY

NOTE: Compressor clutch can be serviced in vehicle, without discharging A/C system.

NOTE: Clutch plate and clutch pulley are a mated set and can not be replaced separately. Clutch coil can be replaced separately.

Removal (Caravan, Neon, Town & Country, PT Cruiser & Voyager)

1) Disconnect and isolate battery negative cable. On all models except Neon, raise and support vehicle. On all models, remove serpentine drive belt. Disconnect compressor clutch coil and high pressure cut-out switch harness connectors.

2) Loosen all 4 compressor mounting bolts/nut. On Neon, remove bolts and support compressor to gain access to clutch. On all models except Neon, remove all mounting bolts except one, to support compressor and allow it to tilt downward for clutch access.

CAUTION: DO NOT use screwdrivers between clutch plate assembly and pulley to remove front plate. Doing so may damage front plate assembly.

3) Using a strap wrench to keep shaft from turning, remove compressor shaft center bolt. Using a plastic mallet, tap clutch plate to loosen from compressor shaft. Remove clutch plate, shaft key and shims. See Fig. 5.

4) Remove snap ring, and slide pulley assembly off of compressor. Disconnect clutch coil lead. Remove snap ring and slide clutch coil off of compressor.

5) Check friction surfaces of clutch pulley and front plate

for excessive wear or scoring. Replace as necessary. If friction surfaces are oily, remove felt packing from front cover. If felt is saturated with oil, front seal is leaking and compressor must be replaced.

Installation

1) Install clutch coil so pin in back of coil aligns with hole in front compressor housing. Ensure wiring harness is routed so wires are not pinched. Connect clutch coil and diode lead. Install NEW snap ring, with bevel side facing outward. Ensure snap ring is properly seated in groove.

2) Install rotor and pulley assembly. Install shims and snap ring. On Caravan, Town & Country and Voyager, if a new clutch assembly is being installed, use a shim stack that is 0.040" (1.0 mm) thick. On Neon and PT Cruiser, if a new clutch assembly is being installed, use a shim stack that is 0.10" (2.5 mm) thick. Install clutch hub.

3) Install dial indicator at front of clutch hub to measure clutch hub air gap. Using battery voltage, energize clutch coil. On Caravan, Town & Country and Voyager, proper air gap is 0.020-0.035" (0.51-0.89 mm). On Neon and PT Cruiser, proper air gap is 0.014-0.026" (0.35-0.65 mm). On all models, add or remove shims to obtain correct air gap. Install compressor shaft bolt. Tighten compressor shaft bolt to 11-15 ft. lbs. (15-20 N.m).

4) On Caravan, Town & Country and Voyager with 2.4L engine, and Neon and PT Cruiser, loosely install all compressor mounting bolts and then tighten to 21 ft. lbs. (28 N.m). On Caravan, Town & Country and Voyager with 3.3L and 3.8L engines, loosely install all compressor mounting bolts and nut, and then tighten to 40 ft. lbs. (54 N.m) in order. Tighten compressor upper rear bolt, lower rear bolt, lower front bolt and then upper front nut.

5) On all models, after completing compressor clutch installation, start engine. Set A/C-heater control to recirculated air mode and high blower motor speed. Set engine speed to 1500-2000 RPM. Cycle compressor on for 5 seconds and off for 5 seconds, about 20 times to burnish or break-in clutch friction surfaces.

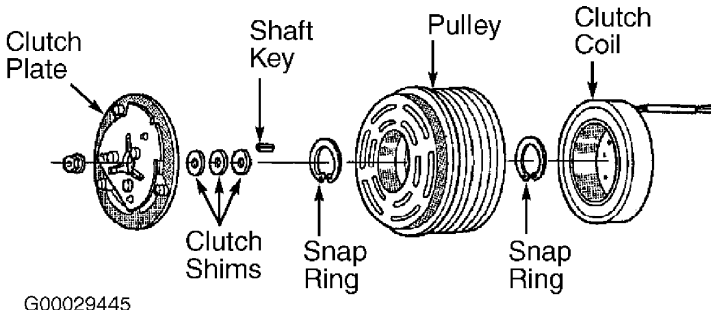


Fig. 5: Exploded View Of Compressor Clutch Assembly (Nippondenso 10S15/10S17/10S20)
Courtesy of DaimlerChrysler Corp.

NIPPONDENSO 10PA17/10PA17C 10-CYLINDER

CLUTCH ASSEMBLY

Removal (Except Grand Cherokee)

NOTE: Compressor clutch can be serviced in vehicle, without discharging A/C system.

1) Disconnect and isolate battery negative cable. Remove compressor drive belt. Disconnect compressor clutch coil harness connector. Remove compressor mounting bolts and support compressor to gain access to clutch.

CAUTION: DO NOT use screwdrivers between clutch plate assembly and pulley to remove front plate. Doing so may damage front plate assembly.

2) Using a strap wrench to keep shaft from turning, remove compressor shaft center bolt. Using a plastic mallet, tap clutch plate to loosen from compressor shaft. Remove clutch plate and shims. See Fig. 6.

3) Remove snap ring, and slide pulley assembly off of compressor. Disconnect clutch coil lead. Remove snap ring, and slide clutch coil off of compressor.

4) Check friction surfaces of clutch pulley and front plate for excessive wear or scoring. Replace as necessary. If friction surfaces are oily, remove felt from front cover. If felt is saturated with oil, front seal is leaking and must be replaced.

Installation

1) Install clutch coil so pin in back of coil aligns with hole in front compressor housing. Connect clutch coil and diode lead. Install snap ring with bevel side facing outward. Ensure snap ring is properly seated in groove. Install rotor and pulley assembly. Install shims and snap ring. Install clutch hub.

2) Install dial indicator at front of clutch hub to measure clutch hub air gap. Using battery voltage, energize clutch coil. Proper air gap is 0.014-0.026" (0.35-0.65 mm). Add or remove shims to obtain correct air gap. Install compressor shaft bolt. Tighten compressor shaft bolt to 11-15 ft. lbs. (15-20 N.m).

3) After completing compressor clutch installation, start engine. Set A/C-heater control to recirculated air mode and high blower motor speed. Set engine speed to 1500-2000 RPM. Cycle compressor on for 5 seconds and off for 5 seconds, about 20 times to burnish or break-in clutch friction surfaces.

Removal (Grand Cherokee)

NOTE: Compressor clutch can be serviced in vehicle, without discharging A/C system.

1) Disconnect and isolate battery negative cable. Remove compressor drive belt. Disconnect compressor clutch coil harness connector.

CAUTION: DO NOT use screwdrivers between clutch plate assembly and pulley to remove front plate. Doing so may damage front plate

assembly.

2) Using a strap wrench to keep shaft from turning, remove compressor shaft center bolt. Using a plastic mallet, tap clutch plate to loosen from compressor shaft. Remove clutch plate, shaft key and shims. See Fig. 6.

3) Remove snap ring, and slide pulley assembly off of compressor. Disconnect clutch coil lead. Remove snap ring, and slide clutch coil off of compressor.

4) Check friction surfaces of clutch pulley and front plate for excessive wear or scoring. Replace as necessary. If friction surfaces are oily, remove felt from front cover. If felt is saturated with oil, front seal is leaking and compressor must be replaced.

Installation

1) Install clutch coil so pin in back of coil aligns with hole in front compressor housing. Connect clutch coil lead. Install snap ring with bevel side facing outward. Ensure snap ring is properly seated in groove. Align snap ring eyelets to left or right of clutch coil pin. Install rotor and pulley assembly. Install shims and snap ring. Install clutch hub.

2) Hold clutch plate tight against shims and measure air gap between clutch plate and pulley face. Air gap should be 0.014-0.026" (0.35-0.65 mm). Add or remove shims as necessary. Install compressor shaft bolt. Tighten compressor shaft bolt to 115 INCH lbs. (13 N.m). To complete installation, reverse removal procedure.

3) After completing compressor clutch installation, start engine. Set A/C-heater control to recirculated air mode and high blower motor speed. Set engine speed to 1500-2000 RPM. Cycle compressor on for 5 seconds and off for 5 seconds, about 20 times to break-in clutch.

SHAFT SEAL

NOTE: Shaft seal replacement procedure is for 10PA17C compressor. On 10PA17 compressor, if shaft seal is leaking compressor must be replaced.

Removal

1) Discharge A/C system, using approved refrigerant recovery/recycling equipment. Remove A/C compressor. Drain oil from compressor, and measure amount drained. Remove clutch hub, shims, rotor and pulley assembly, and clutch coil. See CLUTCH ASSEMBLY. See Fig. 6.

2) Remove front housing. Remove felt holder and felt washer from front housing. Remove shaft seal snap ring. Position front housing (nose up) on cardboard, placed on a flat surface. Using brass drift, press shaft seal from front housing.

Installation

1) Lubricate new shaft seal with refrigerant oil. DO NOT touch sealing surfaces. Using a 21-mm socket, press seal into front housing, and install snap ring. Ensure shaft seal "O" ring side is facing front housing (away from compressor). Install felt washer into

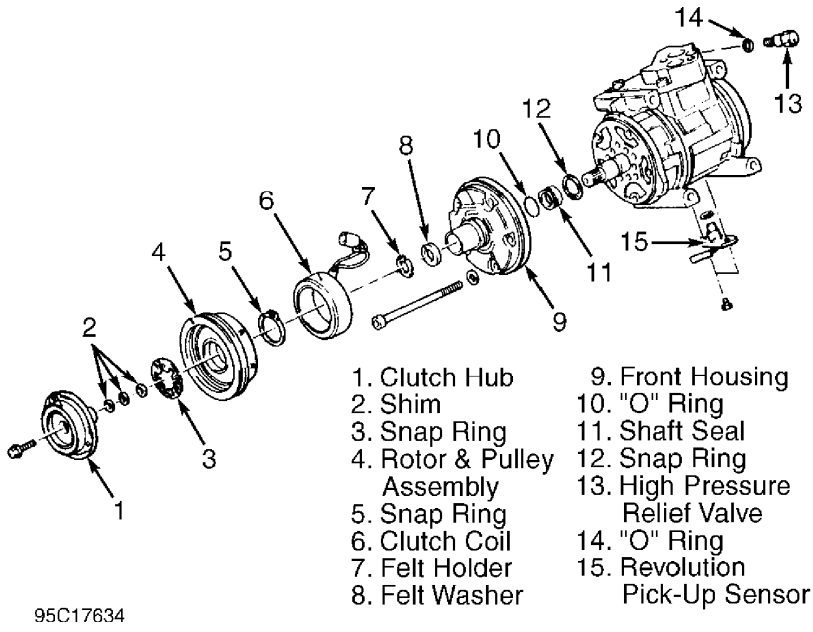
felt holder. Using a 14-mm deep socket, install felt washer and felt holder.

2) Lubricate front housing "O" ring with refrigerant oil. Install shaft seal protector on compressor shaft. Install new front housing "O" ring on compressor assembly.

3) Install front housing on compressor assembly. Ensure dowel pins are aligned. Use care when guiding shaft seal protector through seal opening. Remove shaft seal protector.

4) Install through-bolts and NEW brass washers. Using an INCH-lb. torque-wrench, check compressor shaft rotating torque. Rotating torque should be 45 INCH lbs. (5 N.m) or less. Install clutch coil and check clutch hub air gap. See CLUTCH ASSEMBLY.

5) Using refrigerant oil, add same amount of oil to compressor as was drained from it. Install A/C compressor. Evacuate and charge system. Perform leak test.



1. Clutch Hub
2. Shim
3. Snap Ring
4. Rotor & Pulley Assembly
5. Snap Ring
6. Clutch Coil
7. Felt Holder
8. Felt Washer
9. Front Housing
10. "O" Ring
11. Shaft Seal
12. Snap Ring
13. High Pressure Relief Valve
14. "O" Ring
15. Revolution Pick-Up Sensor

Fig. 6: Compressor Components (Nippondenso 10PA17C Shown; Nippondenso 10PA17 Is Similar)
Courtesy of DaimlerChrysler Corp.

SANDEN SCROLL

CLUTCH ASSEMBLY

Removal & Installation (General Motors - "K" Body)

Compressor and compressor clutch are not serviceable. If there is a compressor or compressor clutch failure, replace compressor and compressor clutch as an assembly.

SANDEN MSC90-C SCROLL

CLUTCH ASSEMBLY

NOTE: Compressor clutch can be serviced in vehicle, without

discharging A/C system.

Removal

1) Disconnect and isolate negative battery cable. Remove drive belt. Disconnect clutch coil harness connector. Without disconnecting refrigerant lines, remove A/C compressor from mounting bracket. Support compressor in engine compartment.

2) On 2001 model year 2.4L engines, remove pulley assembly. Using Spanner (MB991367) and Pins (MB991386), remove shaft nut. Remove clutch plate, snap ring and rotor/pulley assembly. Remove snap ring and clutch coil. See Fig. 7.

Installation

1) Install clutch coil. Ensure projection on back of clutch coil is aligned with pin hole in compressor body. Install snap ring so that tapered surface is facing outward.

2) Install rotor/pulley assembly and snap ring. Align match mark of clutch plate with match mark of compressor shaft spline and install clutch plate. Using spanner and pins, install shaft nut.

3) Using a feeler gauge, check air gap between clutch plate and rotor assembly at more than one place. On 2.4L engine, air gap should be 0.012-0.020" (0.30-0.51 mm). On 3.0L engine, air gap should be 0.016-0.024" (0.41-0.61 mm). If air gap is not within specification, add or remove shims as necessary. Install pulley assembly.

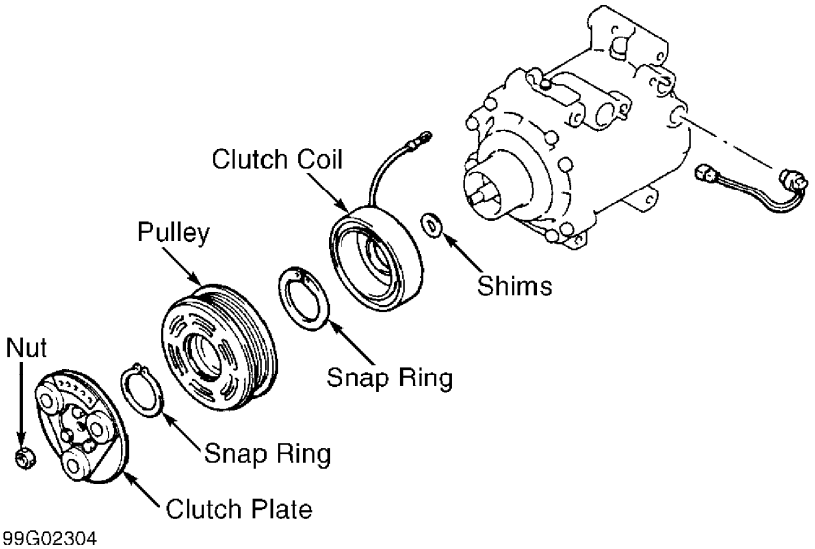


Fig. 7: Compressor Components (Sanden MSC90-C Scroll Shown; Ford SC90V & SC115 Are Similar)
Courtesy of DaimlerChrysler Corp.

SANDEN SD-7H15 7-CYLINDER

NOTE: On Cherokee, Dakota, Durango and Ram Pickup, compressor clutch can be serviced in vehicle, without discharging A/C system.

CLUTCH ASSEMBLY

Removal (Cherokee, Dakota, Durango & Ram Pickup)

1) Disconnect and isolate negative battery cable. Remove serpentine drive belt. Disconnect clutch coil harness connector. Without disconnecting refrigerant lines, remove A/C compressor from mounting bracket. Support compressor in engine compartment.

2) Using spanner wrench, hold clutch plate and remove compressor shaft nut. See Fig. 3. If vehicle is equipped with a diesel engine, go to next step. If vehicle is equipped with a gas engine, remove clutch plate and shims using a steering wheel puller. Remove external front housing snap ring and go to step 4).

3) If vehicle is equipped with a diesel engine, using Puller (6461), remove clutch plate, shaft key and shims. Remove external front housing snap ring and go to next step.

4) Install jaws of Rotor Puller (C-6141-1) into pulley snap ring groove. Install Shaft Protector (C-6141-2) over compressor shaft. Install puller flange plate on jaws. Install Puller Through-Bolts (C-6461) through puller flange plate into jaws, and hand tighten. Tighten pulley center bolt clockwise and remove pulley from compressor.

5) Check friction surfaces of clutch pulley and front plate for excessive wear or scoring. Replace as necessary. If friction surfaces are oily, remove felt from front cover. If felt is saturated with oil, front seal is leaking and compressor must be replaced. Remove clutch coil wire harness retainer from compressor housing. Remove clutch coil snap ring and clutch coil.

Installation (Cherokee)

1) Install clutch coil and clutch coil snap ring. Install clutch coil wire harness to compressor housing. Align pulley and bearing assembly on front compressor housing hub. Using Installer (C-6871), press pulley and bearing assembly onto compressor housing hub. Thread installer onto compressor shaft, and tighten nut until pulley assembly is seated.

2) Install external front snap ring with beveled side facing outward. Ensure snap ring is properly seated. Install compressor shaft key and original shims. Using a plastic mallet and Driver (C-6463), install clutch plate on compressor shaft. Tighten compressor shaft nut to 10 ft. lbs. (14 N.m).

3) Using feeler gauge, measure air gap between clutch plate and pulley assembly in several areas. Air gap should be 0.016-0.031" (0.41-0.79 mm). If air gap is not within specification, adjust shim thickness as necessary. If air gap is not consistent around clutch plate, lightly pry up or tap down on clutch plate to make corrections. To complete installation, reverse removal procedure.

Installation (Dakota, Durango & Ram Pickup)

1) Install clutch coil and clutch coil snap ring. Install clutch coil wire harness to compressor housing. Align pulley and bearing assembly on front compressor housing hub.

2) Install Handle (6464) and Driver (6143) into pulley assembly bearing cavity. Ensure outer edge of driver rests firmly on inner race of bearing. Using hammer, install pulley and bearing assembly. While tapping on handle, guide pulley and bearing assembly

to prevent binding. Ensure pulley assembly bottoms against compressor housing. Install external snap ring.

3) Install original shim(s) and compressor shaft key. Use a hammer and Shaft Protector (6141-2) to install clutch plate on compressor shaft. Ensure clutch plate bottoms out on clutch shims. Replace compressor shaft nut and tighten compressor shaft nut to 10 ft. lbs. (14 N.m).

4) Measure air gap between clutch plate and pulley assembly in several areas. Air gap should be 0.016-0.031" (0.41-0.79 mm). If air gap is not within specification, adjust shim thickness as necessary. If air gap is not consistent around clutch plate, lightly pry up or tap down on clutch plate to make corrections. To complete installation, reverse removal procedure. Ensure A/C system operates properly.

5) After completing compressor clutch installation, start engine. Set A/C-heater control to recirculated air mode and high blower motor speed. Set engine speed to 1500-2000 RPM. Cycle compressor on for 5 seconds and off for 5 seconds, about 20 times to break-in clutch.

Removal (Ford Excursion, "F" Series Super Duty Pickup)

1) Disconnect and isolate negative battery cable. Discharge A/C system, using approved refrigerant recovery/recycling equipment. Disconnect clutch coil harness connector and remove compressor. Drain oil from compressor, and measure amount drained.

2) Using Spanner Wrench (T70P-4067-A), hold clutch plate and remove compressor shaft nut. See Fig. 3. If necessary, use a steering wheel puller to remove clutch plate and shim(s).

3) Using a flat-blade screwdriver, remove pulley assembly bearing dust cover. Remove compressor shaft key and internal bearing snap ring. Remove external front housing snap ring.

4) Install jaws of rotor puller into pulley assembly internal bearing snap ring groove. Install shaft protector over compressor shaft. Install puller flange plate on jaws. Install 2 puller bolts through puller flange plate into jaws, and hand tighten. Tighten pulley center bolt clockwise and remove pulley assembly from compressor.

5) Remove clutch coil wire harness retainer from compressor housing. Remove clutch coil snap ring and clutch coil.

Installation

1) Install clutch coil and clutch coil snap ring. Install clutch coil wire harness to compressor housing. Align pulley and bearing assembly on front compressor housing hub.

2) Install pulley installer handle and driver into pulley assembly bearing cavity. Ensure outer edge of driver rests firmly on inner race of bearing. Using hammer, install pulley and bearing assembly. While tapping on handle, guide pulley and bearing assembly to prevent binding. Ensure pulley assembly bottoms against compressor housing.

3) Install internal bearing and external front housing snap rings. Install original shim(s) and compressor shaft key. Using a hammer and shaft protector, install clutch plate on compressor shaft. Ensure clutch plate bottoms out on clutch shims. Replace compressor

shaft nut and tighten compressor shaft nut to 25-30 ft. lbs. (34-41 N. m).

4) Measure air gap between clutch plate and pulley assembly in 3 locations spaced equally around pulley. Rotate clutch pulley 180 degrees and check air gap as specified. Air gap should be 0.016-0.031" (0.41-0.79 mm). If air gap is not within specification, adjust shim thickness as necessary. To complete installation, reverse removal procedure. Evacuate, charge, and leak test A/C system.

SANDEN TRS-90 SCROLL

NOTE: Compressor clutch can be serviced in vehicle, without discharging A/C system.

CLUTCH ASSEMBLY

Removal

1) Disconnect and isolate negative battery cable. Remove serpentine drive belt. Without discharging A/C system or disconnecting refrigerant lines, remove compressor from mount. Position and support compressor for access. Using Spanner Wrench (C-4489), hold clutch plate and remove compressor shaft center nut.

2) Using Puller (C-6461), remove clutch plate. Remove compressor shaft key and clutch shims. Remove external front housing snap ring. Install lip of Rotor Puller (C-6141-1) into external snap ring groove. Install Shaft Protector (C-6141-2).

3) Install Puller Bolts (C-6461) through puller flange an into rotor puller jaws. Tighten puller center bolt clockwise until rotor pulley is free. Disconnect clutch coil lead. Scribe match marks on clutch coil and compressor for installation reference. Remove snap ring and clutch coil.

Installation

1) Install clutch coil on compressor using match marks. Install snap ring with beveled side away from compressor. Secure clutch coil lead to compressor front cover and connect lead to thermal limiter switch.

2) Using Installer (C-6871), install pulley assembly. Install snap ring with beveled side away from compressor. Install compressor shaft key and original shims. Using Driver C-6463 and a hammer, install clutch plate.

NOTE: When installing a new clutch onto a new compressor, use 0.040" (1.0 mm), 0.020" (0.5 mm), and 0.005" (0.13 mm) shims provided with NEW clutch.

3) Install compressor shaft center nut and tighten to 10 ft. lbs. (14 N.m). Measure air gap between clutch plate and pulley surface. Air gap should be 0.016-0.031" (0.41-0.79 mm). Add or subtract shims as necessary.

4) Ensure air gap is consistent around clutch. If air gap is not consistent, lightly pry up or tap down at points of variation as necessary. Install compressor and tighten mounting bolts to 30 ft. lbs. (40 N.m). Install drive belt. Connect clutch connector and

negative battery cable.
5) After completing compressor clutch installation, start engine. Set A/C-heater control to recirculated air mode and high blower motor speed. Set engine speed to 1500-2000 RPM. Cycle compressor on for 5 seconds and off for 5 seconds, about 20 times to break-in new clutch.

SHAFT SEAL

Shaft seal is not serviceable. If excessive oil is present on pulley and plate friction surfaces or on compressor shaft nose area, replace compressor.

SANDEN TRS-105 SCROLL

CLUTCH ASSEMBLY

NOTE: Rotor/pulley assembly and clutch plate are a matched pair and should be replaced together.

Removal
1) Disconnect and isolate battery negative cable. Remove serpentine drive belt. Without discharging A/C system or disconnecting refrigerant lines, remove compressor from mount. Position and support compressor for access. Disconnect compressor clutch coil harness connector.

CAUTION: DO NOT use screwdrivers between clutch plate and pulley assembly to remove front plate. Doing so may damage front plate assembly.

2) Using a strap wrench to keep shaft from turning, remove compressor shaft center nut. Using a plastic mallet, tap on clutch plate to loosen it from compressor shaft. Remove clutch plate and shims. See Fig. 3.
3) Remove pulley assembly snap ring. Install Shaft Protector (2134A) over compressor shaft. Using a 3-jaw puller, remove pulley assembly. DO NOT allow puller center bolt to damage compressor shaft. Disconnect clutch coil lead. Remove snap ring and slide clutch coil off of compressor.
4) Check friction surfaces of clutch pulley and front plate for excessive wear or scoring. Replace as necessary. If friction surfaces are oily, check shaft and nose of compressor for oil. If excessive oil is present, front seal is leaking and compressor must be replaced.

Installation
1) Install clutch coil so pin in back of coil aligns with hole in front compressor housing. Ensure wiring harness is routed so wires are not pinched. Connect clutch coil and diode lead. Install NEW snap ring with bevel side facing outward. Ensure snap ring is properly seated in groove.
2) Install rotor and pulley assembly. Install snap ring and ensure it is properly seated in groove. If a new clutch assembly is

being installed, use a shim stack that is 0.027" (0.7 mm) thick. Align clutch plate and compressor shaft mating splines, and install clutch plate.

3) Install dial indicator at front of clutch plate to measure clutch plate and pulley air gap. Press clutch plate tight against shims and measure air gap. Air gap should be 0.014-0.026" (0.35-0.65 mm). Add or remove shims to obtain correct air gap. Install compressor shaft nut and tighten to 13 ft. lbs. (18 N.m). Because shims may compress, ensure air gap is within specification.

4) Install compressor and tighten mounting bolts to 30 ft. lbs. (41 N.m). After completing compressor clutch installation, start engine. Set A/C-heater control to recirculated air mode and high blower motor speed. Set engine speed to 1500-2000 RPM. Cycle compressor on for 5 seconds and off for 5 seconds, about 20 times to burnish or break-in clutch friction surfaces.

SHAFT SEAL

Shaft seal is not serviceable. If excessive oil is present on pulley and plate friction surfaces or on compressor shaft nose area, replace compressor.

ZEXEL ROTARY VANE

CLUTCH ASSEMBLY

NOTE: On Saturn "L" models, it is necessary to discharge A/C system and remove compressor from vehicle to service clutch assembly. On Saturn "S" models, discharging A/C system and removing refrigerant lines from compressor is not necessary to service clutch assembly.

Removal (Saturn)

1) On "L" models, disconnect negative battery cable. Discharge A/C system, using approved refrigerant recovery/recycling equipment. Loosen tensioner and remove drive belt from pulley. Disconnect clutch electrical connector. Disconnect refrigerant lines and install plugs to lines and compressor. Remove compressor.

2) On "S" models, loosen tensioner and remove drive belt from pulley. Disconnect clutch electrical connector. If equipped with secondary Air Pump Reaction (AIR) system, remove combination valve mounting nuts. Disconnect air hose, vacuum source hose and move combination valve aside. Remove air pipe.

NOTE: When moving compressor, ensure discharge line does not change position and/or loosen at condenser connection. An A/C system leak could result.

3) Remove compressor mounting bolts. With refrigerant lines connected lift compressor upward and forward. Install one front mounting bolt through front engine bracket top hole and bottom rear compressor mounting ear. Tighten bolt so compressor is supported by mounting bracket.

4) On all models, position a screwdriver between 2 clutch

face vibration dampeners to hold drive plate, and remove clutch drive plate center bolt. Using a flat-blade screwdriver pry evenly under drive plate, and remove drive plate and shims.

5) Remove pulley external snap ring. Position Puller Center Adapter (SA9149AC-2) over end of compressor shaft. Attach 3-jaw puller to back of pulley. Tighten puller bolt against pulley center adapter and remove pulley. Remove clutch coil screws. Lightly tapping end of screwdriver with a plastic hammer will loosen screws for easier removal. Disconnect clutch coil wire and remove clutch coil.

Installation

1) On all models, install clutch coil in original position. Ensure electrical connector is aligned with indent in front of compressor head. Tighten screws to 44 INCH lbs. (5 N.m). Place Drive Plate Installer (SA9149AC-3) and thrust bearing on installation bolt and insert through center of pulley. Finger-tighten pulley installation bolt into compressor shaft.

2) Finger-tighten nut on installation bolt to align pulley to compressor. Hold end of bolt, and tighten nut until pulley bottoms on compressor. Loosen nut and remove installation bolt, thrust bearing and drive plate installer. Install snap ring with tapered side out.

3) Install drive plate shims (previously removed) to clutch drive plate opening. Position drive plate on compressor shaft, ensuring splines are aligned. Press drive plate into place. Position screwdriver between 2 clutch face vibration dampeners to hold drive plate. Install drive plate center bolt and tighten to 115 INCH lbs. (13 N.m). Ensure pulley rotates smoothly with no interference.

4) Using a feeler gauge, measure air gap between drive plate and pulley. Air gap should be 0.012-0.024" (0.30-0.61 mm). If air gap is not as specified, add or remove shims as necessary.

5) On "S" models, install compressor onto mounting bracket. Tighten front bolts to 36 ft. lbs. (49 N.m), and rear bolts to 19 ft. lbs. (26 N.m). Connect clutch electrical connector and install accessory drive belt.

6) On "L" models, ensure compressor contains the correct amount of refrigerant oil. See COMPRESSOR REFRIGERANT OIL CHECKING article. Position compressor to side of engine. Install rear and bottom compressor-to-engine bolts. Install upper bolt. When all bolts have been hand started, tighten to 15 ft. lbs. (20 N.m).

7) Using NEW "O" rings, install discharge and suction lines to compressor. Tighten bolts to 12 ft. lbs. (16 N.m). Tighten suction line bolt from above. Evacuate and charge system.

8) On all models, start engine and allow to idle. Turn A/C on and cycle A/C compressor on and off 10-15 times to break-in clutch drive plate and pulley assembly.

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END OF ARTICLE

