

# COMPRESSOR CLUTCH REPLACEMENT PROCEDURE

FORD (FX-15) AND TOYOTA (NIPPONDENSO TV12C, TV14C, 10PA15, 10PA17C, 10PA20C) COMPRESSORS



**WARNING:** Keep fingers, hands and other body parts and loose clothing away from rotating components as serious injury or even death can result from contact with rotating machinery.



**WARNING:** Failure to follow these instructions when installing this clutch can be verified and will void factory warranty.

## COMPRESSOR CLUTCH REMOVAL (Refer to figure 1 for clutch diagram)

**NOTE:** Do not pound the clutch, compressor as damage will result to components.

### Step 1: Diagnose Clutch Failure

Most compressor clutch failures are a direct result of items external to the clutch. These can include compressor failure, electrical problems, or oil contamination. Before installing a new clutch, determine what caused the old clutch to fail and fix the problem.

If the clutch is replaced without fixing the cause of the clutch failure, the new clutch may fail in the same manner as the old clutch.

Please refer to the appropriate manufacturer's A/C service manuals.

### Step 2: Removing Hub/Armature Assembly (Shown in figure 1, number 3)

- Remove shall bolt (Shown in figure 1, number 8)
- Remove washer (Shown in figure 1, number 7)
- Remove hub/armature by hand. Clutch has an 8mm threaded hole to use as a jack screw for removal. (Shown in figure 1, number 3)
- Remove shims from the hub/armature assembly. The number of shims can vary. (Shown in figure 1, number 6)

### Step 3: Removing Rotor/Pulley Assembly (Shown in figure 1, number 10)

- Remove rotor/pulley snap ring (Shown in figure 1, number 11)
- Slide rotor/pulley assembly (Shown in figure 1, number 10), off the compressor nose (Shown in figure 1, number 12). If rotor/pulley assembly is hot it will not slide, DO NOT FORCE! Allow the clutch to cool and then proceed.

### Step 4: Removing Field Coil Assembly for all compressors except Ford FX15 (Shown in figure 1, number 14)

- Separate electrical connection and, if applicable, remove clutch wire retaining clip from the compressor.
- Remove field coil snap ring (Shown in figure 1, number 13), retaining the field coil.
- Remove the ground screw on the compressor, if used.
- Slide the field coil (Shown in figure 1, number 14), off the compressor housing.

### Step 5: Removing Field Coil Assembly for Ford FX-15 only (Shown in figure 1, number 14)

- Separate electrical connection at the field.
- Insert two pry tools between the rear of the field shell (Shown in figure 1, number 14), and the compressor housing. These tools should be spaced 180 degrees apart. Do not locate pry tool on terminal connector.
- Gently pry the field coil (Shown in figure 1, number 14), off the compressor housing.

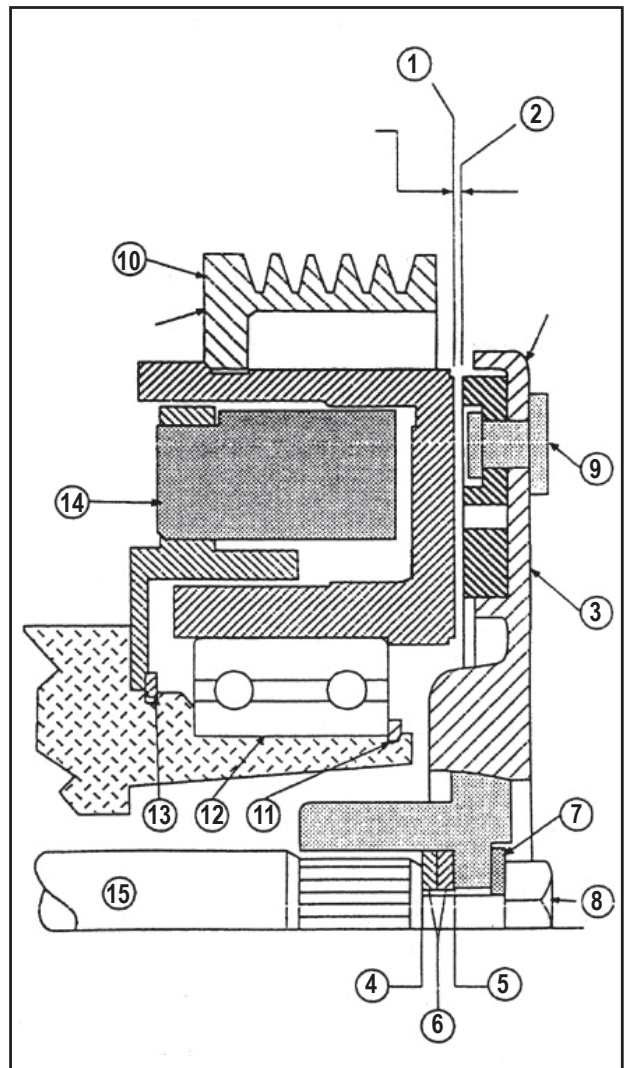


Figure 1. Clutch Components

## INSTALLING CLUTCH ON COMPRESSOR

Replace the complete clutch to ensure full performance is achieved and warranty requirements are met.

### Step 1: Compressor Preparation

- Clean compressor nose of all dirt, grease and debris. Check for evidence of oil leakage from compressor front seal and through bolts. Repair or replace compressor as appropriate.
- Check mounting surfaces (Shown in figure 1, number 12), for nicks, burrs and scratches. See figure 1. Smooth with a file or emery cloth if necessary. If severe wear that affects field pilot or rotor bearing fit is evident, the compressor must be replaced.
- Check the electrical system to ensure that the voltage available to the clutch is 10.8 volts minimum.

### Step 2A: Installing the Field Coil for all fields except Ford FX-15 (Shown in figure 1, number 14)

**Note: Failure to install snap rings per these instructions can be verified and will void the compressor clutch warranty (Refer to figure two, three and four for snap ring location)**

- Align the anti-rotation pin in the back plate of the field coil (Shown in figure 1, number 14), with the hole in the compressor housing. Guide the field coil assembly into the installed position. Make sure that the lead wires are routed directly to the retaining clip on top of the compressor, if applicable.
- With snap ring pliers, spread the field coil snap ring (Shown in figure 1, number 13), and insert it into the groove on the compressor nose. See figure 2. To assure assembly retention, the ring bevel must face away from the compressor. See figure 3 and figure 4.
- Verify that the snap ring is fully seated in the groove around its circumference to assure assembly retention. See figure 4.
- Attach ground lead, if used, to the compressor housing and tighten screw.

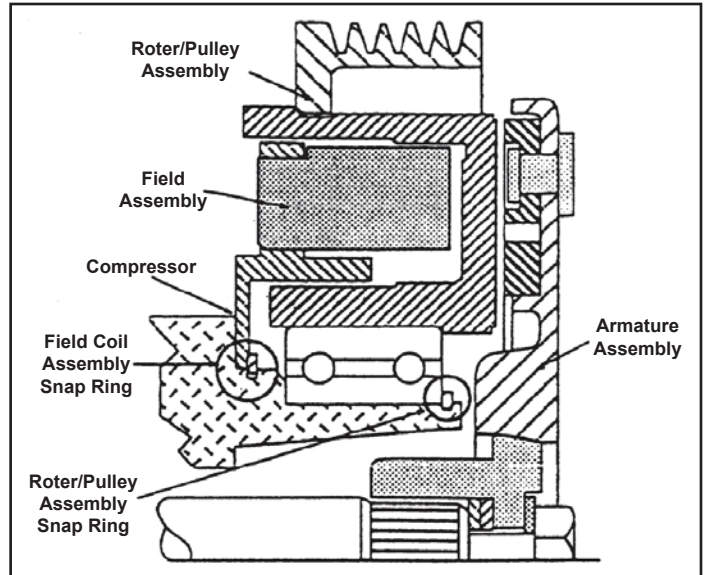


Figure 2. Location of Clutch Snap Rings

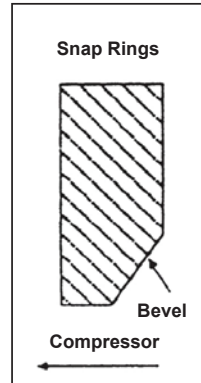


Figure 3. Snap Ring Bevel

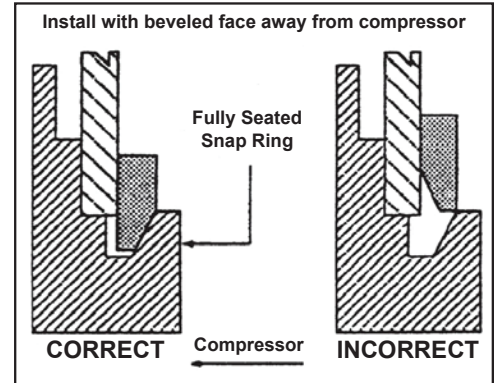


Figure 4. Correct and Incorrect Installation

### Step 2B: Installing the Field Coil for all Ford FX-15 fields. (Shown in figure 1, number 14)

- Stand the compressor on end with the nose pointing upward. Position the field assembly (Shown in figure 1, number 14), such that the field shell starts to overlap the compressor nose field mounting surface.
- Visually check to ensure the field is positioned squarely on the compressor pilot nose. Press the field assembly onto the pilot until the field shell bottoms on the compressor shoulder. See figure 5.
- Proceed to Step 3.

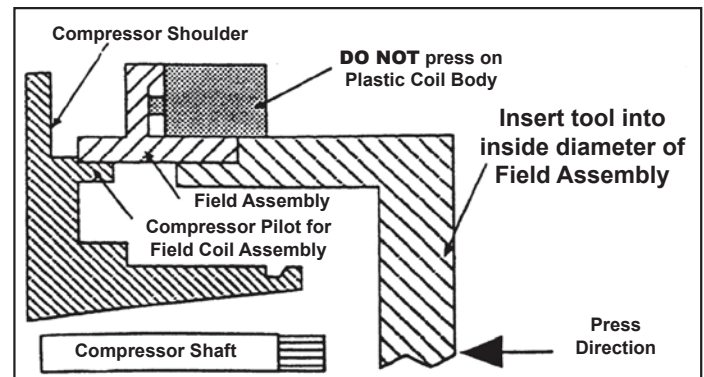


Figure 5. Ford FX-15 Field Installation

### Step 3: Installing the Rotor/Pulley Assembly [\(Shown in figure 1, number 10\)](#)

**NOTE: Do not mar the rotor/pulley or hub/armature drive surfaces. Prevent any oil or grease from contaminating the friction surfaces.**

- a. Install the rotor/pulley assembly [\(Shown in figure 1, number 10\)](#) onto the compressor [\(Shown in figure 1, number 12\)](#). If the rotor/pulley does not slide easily, check the compressor nose for nicks or burrs and remove them. If the rotor/pulley still does not slide on easily, rock the rotor/pulley back and forth by hand until it slides completely onto the compressor [\(Shown in figure 1, number 12\)](#).
- b. Make sure there is no interference between the field assembly [\(Shown in figure 1, number 1\)](#) or leadwires and the rotor/pulley [\(Shown in figure 1, number 10\)](#).
- c. With snap ring pliers, spread the rotor/pulley snap ring [\(Shown in figure 1, number 11\)](#) and insert it into the groove on the compressor nose per [figure 1](#). To assure assembly retention, the ring bevel must face away from the compressor. [See figure 3](#) and [figure 4](#).
- d. Verify that the snap ring is fully seated in the groove around the circumference to assure assembly retention. [See figure 4](#).

### Step 4: Installing the Hub/Armature Assembly [\(Shown in figure 1, number 3\)](#)

**NOTE: Do not insert screwdrivers between the hub/armature and the rotor/pulley to remove hub/armature as they will damage the clutch.**

- a. Slide the Armature assembly [\(Shown in figure 1, number 3\)](#), onto the compressor shaft [\(Shown in figure 1, number 15\)](#).
- b. Set the rotor/pulley [\(Shown in figure 1, number 1\)](#) to hub/armature [\(Shown in figure 1, number 2\)](#) air gap to .018 to .030 inches by adding or removing shims [\(Shown in figure 1, number 6\)](#). Measure using a feeler gauge at 3 locations 120 degrees apart. [See figure 1](#). Should a used clutch be installed, set the rotor/pulley [\(Shown in figure 1, number 1\)](#) to hub/armature [\(Shown in figure 1, number 2\)](#) airgap to .013 to .025 inches.
- c. Install washer [\(Shown in figure 1, number 7\)](#) and retainer bolt [\(Shown in figure 1, number 8\)](#). Torque to 155 in. lb.

**NOTE: As the shims may compress when retainer bolt [\(Shown in figure 1, number 8\)](#), is tightened, recheck airgap at three rivet locations [\(Shown in figure 1, number 9\)](#).**

### Step 5: Clutch Assembly Check

- a. Rotate the clutch and check for rubbing or interference.
- b. Reinstall belts per manufacturer's service manual. Do not overtighten.
- c. Recheck airgap at 3 or 4 points for clutch rubbing. Airgap to be .018 to .030 inches.
- d. **IMPORTANT:** Burnish as follows. Run the clutch at 2500 to 3000 RPM. Cycle the clutch ON and OFF at a rate of 10 to 15 times per minute for a total of 50 cycles minimum. This will assist in bringing the clutch up to operating torque capacity.



**CAUTION: Cycle the clutch using the controls inside the car or electrical damage could result.**