

## SECTION : 308-01 Clutch

VEHICLE APPLICATION : 2008.0 Falcon

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## SPECIFICATIONS

### Torque Specifications

| Description                                                   | Nm     |
|---------------------------------------------------------------|--------|
| CSC to clutch housing                                         | 9.5    |
| CSC to pipe fitting nut                                       | 14     |
| CSC Bleed screw                                               | 8      |
| Clutch pressure plate to flywheel                             |        |
| Non-Turbo I6 engines                                          | 22     |
| Turbo and V8 engines                                          | 48     |
| Flywheel to crankshaft                                        |        |
| I6, I6 Turbo & F6                                             | 75     |
| V8                                                            | 80     |
| Dowel insertion depth in flywheel<br>(Proud of friction face) |        |
| I6                                                            | 8mm    |
| XR6 Turbo                                                     | 10.5mm |
| V8                                                            | 11.5mm |

**NOTE:** The V8 flywheel is designed so that the dowel will bottom out at the correct insertion depth.

**NOTE:** The flywheel to crankshaft bolts must be replaced with new bolts whenever they are removed



## DESCRIPTION AND OPERATION

### Clutch (Standard I6, Turbo and V8 engines)

#### Introduction

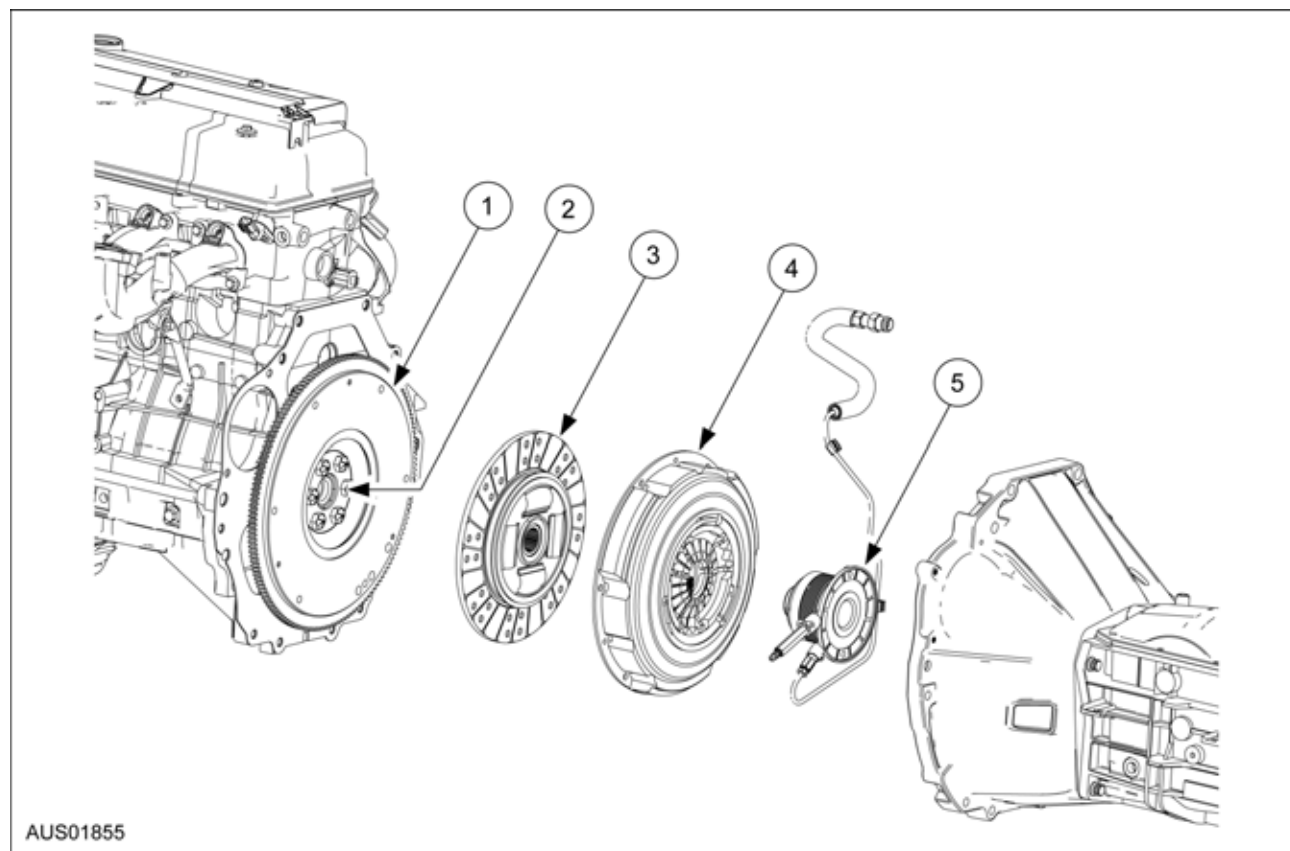
Two clutch variants are used across the manual 2008 Falcon range.

| Vehicle                  | Clutch                                 | Flywheel  |
|--------------------------|----------------------------------------|-----------|
| All V8 and Turbo engines | LuK 290 mm Self-Adjusting Clutch (SAC) | One Piece |
| Non Turbo I6             | LuK 254 mm Self-Adjusting Clutch (SAC) | One Piece |

#### Clutch Function

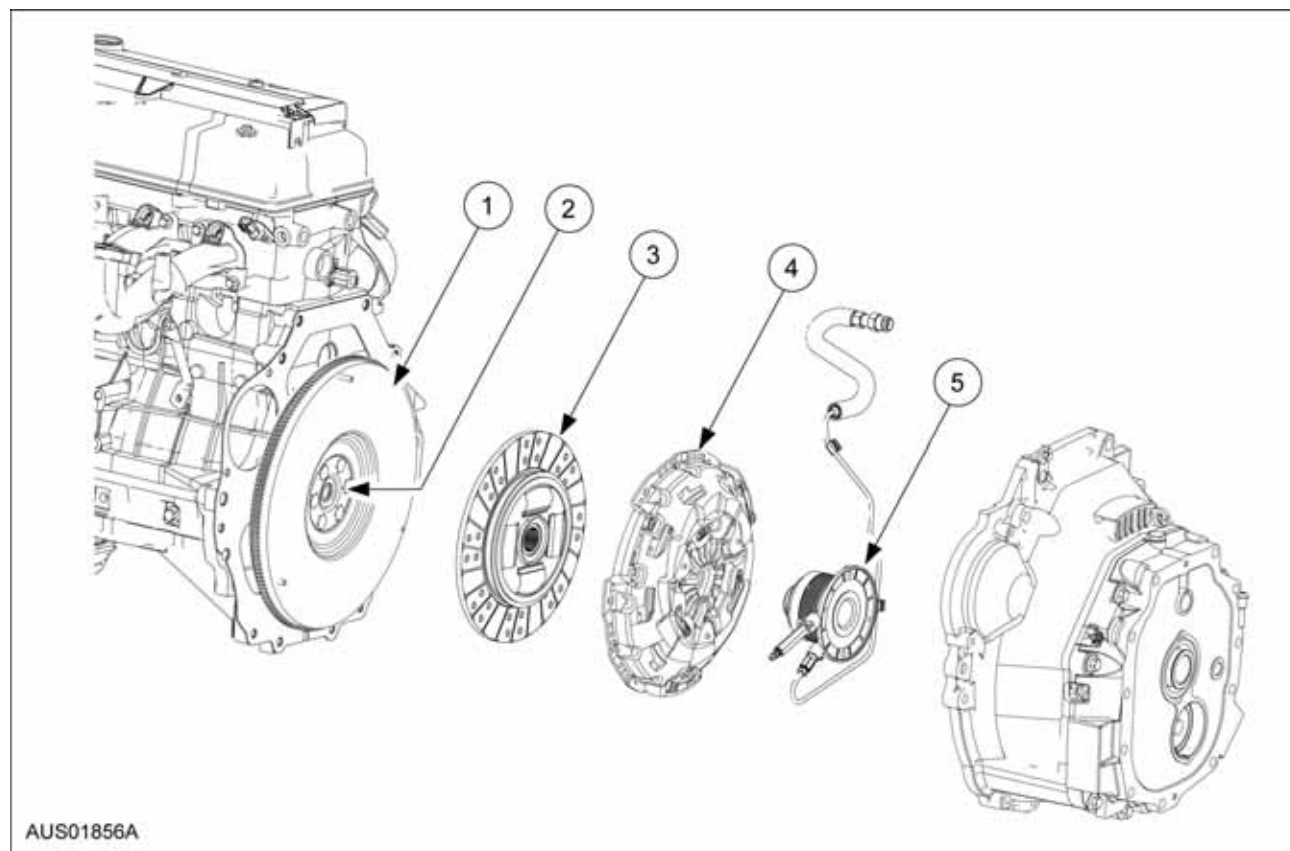
The primary function of the clutch system is to connect and disconnect engine power to the transmission upon driver command.



**DESCRIPTION AND OPERATION (Continued)****Clutch System Components — STD I6**

| Item | Description                                          |
|------|------------------------------------------------------|
| 1    | Flywheel                                             |
| 2    | Transmission input shaft pilot bearing(F65A-7120-AA) |
| 3    | Clutch disc                                          |
| 4    | Clutch pressure plate                                |
| 5    | Clutch slave cylinder/clutch release hub and bearing |



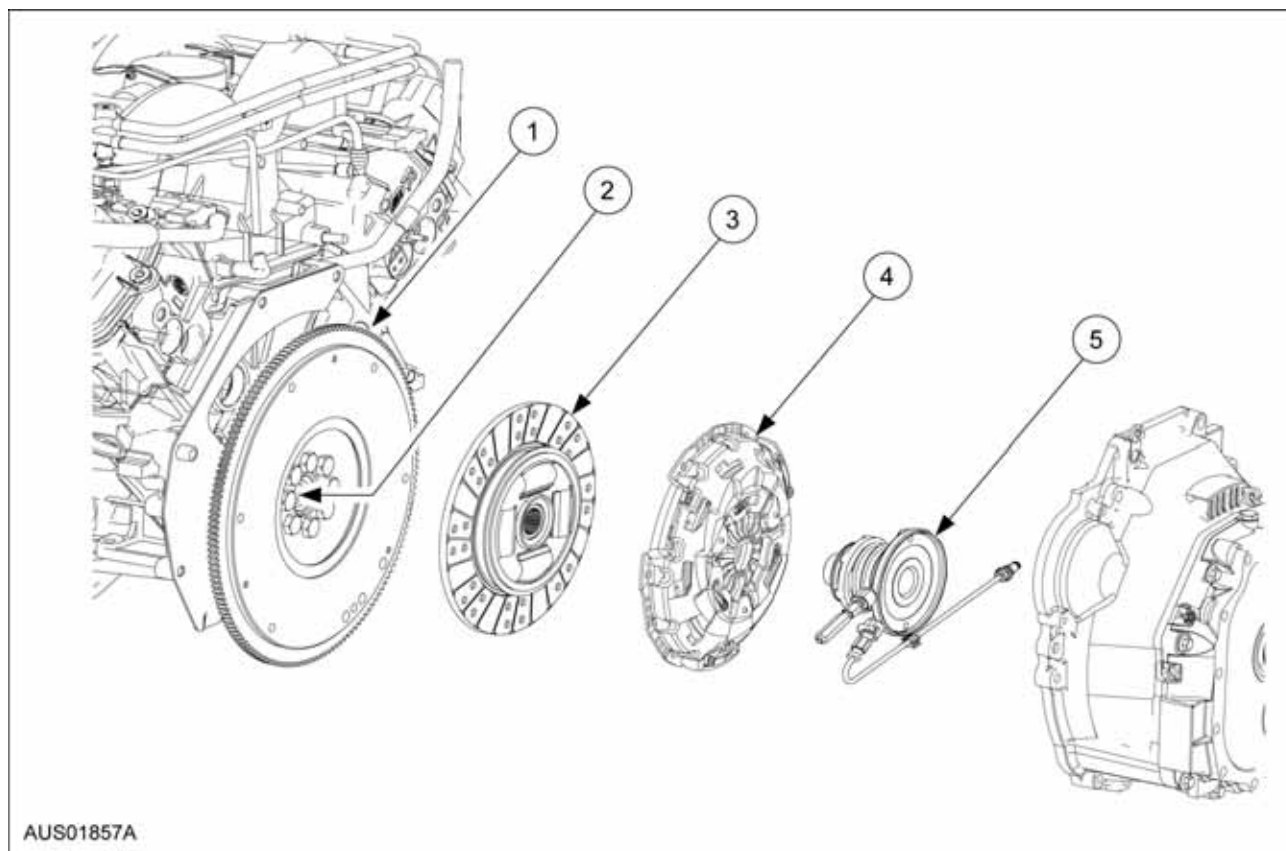
**DESCRIPTION AND OPERATION (Continued)****Clutch System Components —Turbo Engines**

| Item | Description                                          |
|------|------------------------------------------------------|
| 1    | Flywheel                                             |
| 2    | Transmission input shaft pilot bearing               |
| 3    | Clutch disc                                          |
| 4    | Clutch pressure plate                                |
| 5    | Clutch slave cylinder/clutch release hub and bearing |



## DESCRIPTION AND OPERATION (Continued)

### Clutch System Components — V8



| Item | Description                                          |
|------|------------------------------------------------------|
| 1    | Flywheel                                             |
| 2    | Transmission input shaft pilot bearing               |
| 3    | Clutch disc                                          |
| 4    | Clutch pressure plate                                |
| 5    | Clutch slave cylinder/clutch release hub and bearing |

#### For All I6, I6 Turbo & V8 Clutches:

The clutch is a single plate, dry friction clutch disc with a self-adjusting, diaphragm-style spring clutch pressure plate.

The clutch operating mechanism consists of a clutch slave cylinder with an integral release bearing.

A pilot bearing located in the engine crank supports the end of the input shaft. The bearing should be lubricated when the clutch system is serviced.

**NOTE:** When a new clutch friction disc is installed, the clutch pressure plate should be adjusted (re-set) before installation (see Clutch Pressure Plate Adjustment Procedure). If a new clutch set (Friction Disc and Pressure Plate) is installed, this adjustment is not required as the pressure plate is correctly adjusted as manufactured.

**NOTE:** During clutch replacement, if the flywheel shows signs of overheating, scoring, or other damage, it should also be replaced.



## DIAGNOSIS AND TESTING

### Clutch

#### Symptom Chart

| Condition                                                                                                      | Source                                                                                                                                                                                                                                                         | Action                                                                                                                                                      |
|----------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Clutch does not disengage correctly (Clutch Drag)</li> </ul>            | <ul style="list-style-type: none"> <li>Worn, damaged or incorrectly installed clutch disc.</li> </ul>                                                                                                                                                          | <ul style="list-style-type: none"> <li>Inspect installation and replace worn or defective parts</li> </ul>                                                  |
|                                                                                                                | <ul style="list-style-type: none"> <li>Failed pressure plate.</li> </ul>                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Replace pressure plate</li> </ul>                                                                                    |
|                                                                                                                | <ul style="list-style-type: none"> <li>Self Adjusting Clutch (SAC) over adjusted.</li> </ul>                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Remove SAC and reset the self adjusting mechanism (See Clutch pressure plate adjustment procedure)</li> </ul>        |
|                                                                                                                | <ul style="list-style-type: none"> <li>Air or water in hydraulic system</li> </ul>                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Flush, refill and bleed hydraulic system</li> </ul>                                                                  |
|                                                                                                                | <ul style="list-style-type: none"> <li>Low fluid level in clutch hydraulic system</li> </ul>                                                                                                                                                                   | <ul style="list-style-type: none"> <li>Bleed and refill reservoir</li> </ul>                                                                                |
|                                                                                                                | <ul style="list-style-type: none"> <li>Damaged Concentric Slave Cylinder (CSC).</li> </ul>                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Repair or replace CSC. Refer to Section 308-02.</li> </ul>                                                           |
|                                                                                                                | <ul style="list-style-type: none"> <li>Excessive flywheel machining</li> </ul>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Inspect and replace the flywheel if necessary</li> </ul>                                                             |
|                                                                                                                | <ul style="list-style-type: none"> <li>Bent/damaged clutch drive straps</li> </ul>                                                                                                                                                                             | <ul style="list-style-type: none"> <li>Replace clutch pressure plate assembly</li> </ul>                                                                    |
|                                                                                                                | <ul style="list-style-type: none"> <li>Binding of the disc on the input shaft splines</li> </ul>                                                                                                                                                               | <ul style="list-style-type: none"> <li>Check splines for burrs, rusting and damage. Clean up splines and lubricate with the specified lubricant.</li> </ul> |
| <ul style="list-style-type: none"> <li>Excessive clutch pedal effort or clutch pedal slow to return</li> </ul> | <ul style="list-style-type: none"> <li>CSC damaged.</li> </ul>                                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Repair or replace CSC. Refer to Section 308-02.</li> </ul>                                                           |
|                                                                                                                | <ul style="list-style-type: none"> <li>Damaged or failed clutch assist spring (Turbo &amp; V8)</li> </ul>                                                                                                                                                      | <ul style="list-style-type: none"> <li>Replace faulty parts</li> </ul>                                                                                      |
|                                                                                                                | <ul style="list-style-type: none"> <li>Blockage in hydraulic system</li> </ul>                                                                                                                                                                                 | <ul style="list-style-type: none"> <li>Flush, bleed and refill hydraulic system</li> </ul>                                                                  |
|                                                                                                                | <ul style="list-style-type: none"> <li>Clutch Master cylinder damaged.</li> </ul>                                                                                                                                                                              | <ul style="list-style-type: none"> <li>Replace clutch master cylinder</li> </ul>                                                                            |
|                                                                                                                | <ul style="list-style-type: none"> <li>Damaged or broken clutch pressure plate assembly</li> </ul>                                                                                                                                                             | <ul style="list-style-type: none"> <li>Replace pressure plate</li> </ul>                                                                                    |
| <ul style="list-style-type: none"> <li>Noisy clutch operation when engine running</li> </ul>                   | <ul style="list-style-type: none"> <li>Worn, misaligned or defective CSC bearing</li> </ul>                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Replace CSC. Refer to Section 308-02.</li> </ul>                                                                     |
|                                                                                                                | <ul style="list-style-type: none"> <li>Damaged clutch disc splines, worn stop pins or broken/damaged damper</li> </ul>                                                                                                                                         | <ul style="list-style-type: none"> <li>Replace clutch disc</li> </ul>                                                                                       |
|                                                                                                                | <ul style="list-style-type: none"> <li>Loose flywheel bolts</li> </ul>                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Replace the bolts and then torque the bolts to spec.</li> </ul>                                                      |
| <ul style="list-style-type: none"> <li>Noisy clutch operation with engine off</li> </ul>                       | <ul style="list-style-type: none"> <li>Worn or improperly lubricated pedal components               <ul style="list-style-type: none"> <li>Pedal pivot</li> <li>Pedal return spring</li> <li>Pedal assist spring</li> <li>Clutch switch</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>Lubricate with engine oil or replace worn components</li> </ul>                                                      |
|                                                                                                                | <ul style="list-style-type: none"> <li>CSC damaged or worn</li> </ul>                                                                                                                                                                                          | <ul style="list-style-type: none"> <li>Replace CSC. Refer to Section 308-02.</li> </ul>                                                                     |



**DIAGNOSIS AND TESTING (Continued)**

| Condition                                                                                       | Source                                                                                                                                                                                                                                                                                         | Action                                                                                                                                                                                                                                                                         |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>Clutch slips or chatters</li> </ul>                      | <ul style="list-style-type: none"> <li>Worn or contaminated clutch lining</li> <li>Grease or oil on clutch facings from:               <ul style="list-style-type: none"> <li>Release bearing</li> <li>Engine</li> <li>CSC</li> <li>Pilot bearing</li> <li>Transmission</li> </ul> </li> </ul> | <ul style="list-style-type: none"> <li>Replace defective part. (If grease or oil is causing the clutch to slip, replace the disc, remove the grease or oil from the pressure plate and flywheel and reuse if it is not burned or scored.) Repair source of leakage.</li> </ul> |
|                                                                                                 | <ul style="list-style-type: none"> <li>Blockage in hydraulic release system</li> </ul>                                                                                                                                                                                                         | <ul style="list-style-type: none"> <li>Flush, refill and bleed hydraulic system. Check hydraulic lines for damage, crimping or other restrictions.</li> </ul>                                                                                                                  |
|                                                                                                 | <ul style="list-style-type: none"> <li>Damaged or glazed Clutch pressure plate</li> </ul>                                                                                                                                                                                                      | <ul style="list-style-type: none"> <li>Replace pressure plate</li> </ul>                                                                                                                                                                                                       |
|                                                                                                 | <ul style="list-style-type: none"> <li>Loose clutch pressure plate to flywheel bolts</li> </ul>                                                                                                                                                                                                | <ul style="list-style-type: none"> <li>Replace the bolts and then torque the bolts to spec.</li> </ul>                                                                                                                                                                         |
|                                                                                                 | <ul style="list-style-type: none"> <li>Loose engine mount bolts</li> </ul>                                                                                                                                                                                                                     | <ul style="list-style-type: none"> <li>Replace the bolts and then torque the bolts to spec.</li> </ul>                                                                                                                                                                         |
|                                                                                                 | <ul style="list-style-type: none"> <li>Damaged or misaligned CSC</li> </ul>                                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Replace CSC. Refer to Section 308-02.</li> </ul>                                                                                                                                                                                        |
|                                                                                                 | <ul style="list-style-type: none"> <li>Failed master cylinder</li> </ul>                                                                                                                                                                                                                       | <ul style="list-style-type: none"> <li>Replace clutch master cylinder</li> </ul>                                                                                                                                                                                               |
|                                                                                                 | <ul style="list-style-type: none"> <li>Damaged, heat affected, glazed or improperly machined flywheel</li> </ul>                                                                                                                                                                               | <ul style="list-style-type: none"> <li>Replace Flywheel</li> </ul>                                                                                                                                                                                                             |
| <ul style="list-style-type: none"> <li>Clutch noisy when disengaged (Engine running)</li> </ul> | <ul style="list-style-type: none"> <li>Worn, misaligned or defective Pilot bearing</li> </ul>                                                                                                                                                                                                  | <ul style="list-style-type: none"> <li>Replace pilot bearing</li> </ul>                                                                                                                                                                                                        |
|                                                                                                 | <ul style="list-style-type: none"> <li>Worn, misaligned or defective CSC bearing</li> </ul>                                                                                                                                                                                                    | <ul style="list-style-type: none"> <li>Replace CSC. Refer to Section 308-02.</li> </ul>                                                                                                                                                                                        |

**NOTE:** CSC - Concentric Slave Cylinder

SAC - Self Adjusting Clutch





## GENERAL PROCEDURES

### Pressure Plate Inspection

1. Inspect the friction surface of the pressure plate for burn marks, scoring or ridges, and warpage.  
**NOTE:** Generally, pressure plate resurfacing is not recommended. However, minor burn marks, scores or ridges may be removed  
**NOTE:** If the flywheel is also heat affected, scored, warped or damaged, it should also be replaced
2. During the resurfacing process, the flatness of the pressure plate must be maintained. If the pressure plate is badly heat checked, or deeply scored, replace it.
3. Clean the pressure plate and flywheel to be sure the surfaces are free from any oil film. Do not use cleaners with petroleum base, and do not immerse the pressure plate in solvent.
4. If refitting the pressure plate with a new disc, ensure the self adjusting clutch pressure plate is reset as outlined in this section

### Clutch Disc Inspection

1. Inspect the clutch disc face for oil or grease. Eliminate the source of any oil or grease before replacing the disc. Excessive grease will contaminate the disc facings.
2. Inspect the clutch disc for worn or loose facings. Check the disc for distortion and for loose rivets at the hub. Check for broken springs and springs that can be moved radially.
3. Check that the disc will slide on the input shaft and that the input shaft is checked for any spline damage.

**NOTE:** Replace the disc assembly if any of these defects are present. Be especially careful when installing a new disc to avoid dropping it or contaminating it with oil or grease.

**NOTE:** When a new clutch friction disc is installed, the clutch pressure plate should be adjusted (re-set) before installation (see Clutch Pressure Plate Adjustment Procedure). If a new clutch set (Friction Disc and Pressure Plate) is installed, this adjustment is not required as the pressure plate is correctly adjusted as manufactured

### Clutch Pressure Plate Adjustment (All Clutches)

**NOTE:** When a new clutch friction disc is installed, the clutch pressure plate should be adjusted (re-set) before installation (see Clutch Pressure Plate Adjustment Procedure). If a new clutch set (Friction Disc and Pressure Plate) is installed, this adjustment is not required as the pressure plate is correctly adjusted as manufactured.

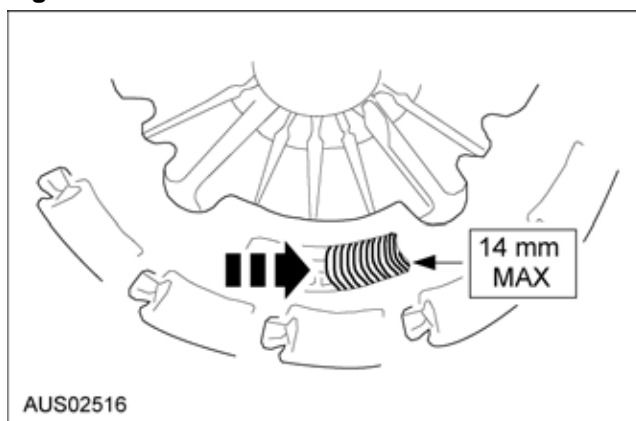
1. Compress the clutch diaphragm fingers.
  1. Position the clutch pressure plate in a press.
  2. Use a suitable adapter and press the clutch diaphragm fingers until the adjusting ring moves freely.



**WARNING:** Do not over-travel the press as damage to the diaphragm spring will occur and clamp load will be reduced.

2. Adjust the clutch pressure plate.
  1. Rotate the adjusting ring counter clockwise until the tension springs are compressed. In compressed form the springs should not be greater than 14 mm. (see figure 1)
  2. Hold adjusting ring while releasing the pressure on the clutch diaphragm fingers.

Figure 1




## REMOVAL AND INSTALLATION

### Disc and Pressure Plate (standard I6, All Turbo and V8 Clutches)

The following illustrations show the removal and installation procedure for the standard I6 pressure plate and clutch disc, alone. However the accompanying removal and installation instructions are pertinent to standard I6, XR6T and V8 clutch systems, which are alike. As such the following instructions should be followed when assembling and/or disassembling any of these clutch systems.

**NOTE:** All V8 and I6 clutch systems utilise a self-adjusting pressure plate. In such systems the friction surface of the pressure plate ratchets progressively forward as the clutch disc becomes worn. Therefore, when a new clutch disc is installed with a re-installed pressure plate, the ratcheting mechanism in the self-adjusting pressure plate must be reset before reassembling the clutch system. The procedure for resetting the pressure plate is covered earlier in this section.

| Special Tool(s)                                                                     |                                                                                               |
|-------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------|
|  | Aligner, Clutch Disc<br>All I6 and V8: Tool 308-257 (E9276) or Transmission Input Shaft (23T) |

#### Materials

| Item                                                     | Specification |
|----------------------------------------------------------|---------------|
| High-Temperature 4x4 Front Axle and Wheel Bearing Grease | ESA-M1C198-A  |
| Threadlock and Sealer                                    | Loctite 243   |

#### Hardware - Pressure Plate-to Flywheel

| Vehicle variant          | Item                                 | Specification | QTY |
|--------------------------|--------------------------------------|---------------|-----|
| All I6 (except I6 Turbo) | Bolt - M8x1.25x25.5 HEX HD           | E602550-S36D  | 6   |
| All V8 and I6 Turbo      | Bolt - M10x1.5x28.5 HEX FLG HD PILOT | N808969-S100  | 6   |

#### Removal

1. Remove the transmission. For additional information, refer to Section 308-03.

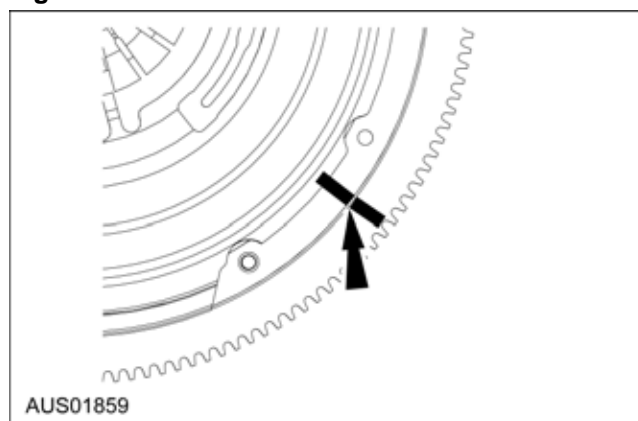
2. Remove the bolts, clutch pressure plate and the clutch disc.



**CAUTION:** If the clutch disc and pressure plate are to be reinstalled, bolts must be removed evenly or permanent damage to the diaphragm spring will occur resulting in complete clutch release.

- If the parts are to be reused, index-mark the clutch pressure plate to the flywheel (See figure 2). Also inspect the pressure plate and clutch disc as outlined in this section.

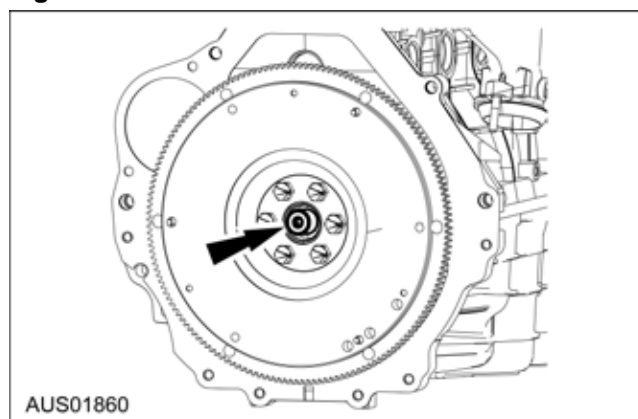
Figure 2



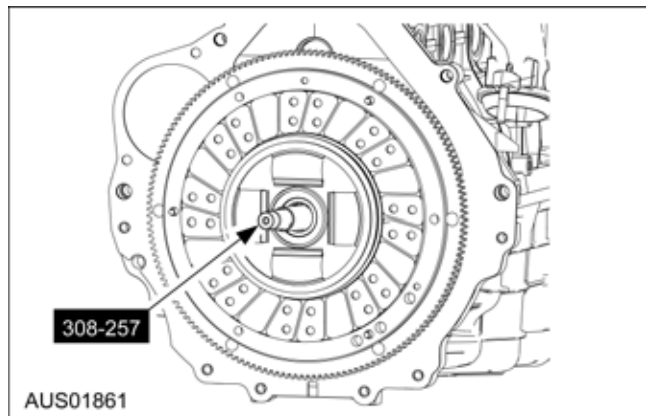
#### Installation

1. Lubricate the transmission input shaft pilot bearing with grease. (see figure 3)

Figure 3



- Using the 'Clutch Disc Aligner Tool', position the clutch disc on the flywheel.



- Using the 'Clutch Disc Aligner Tool', align the clutch disc and fit the clutch pressure plate. Install the bolts and tighten in a star pattern sequence.

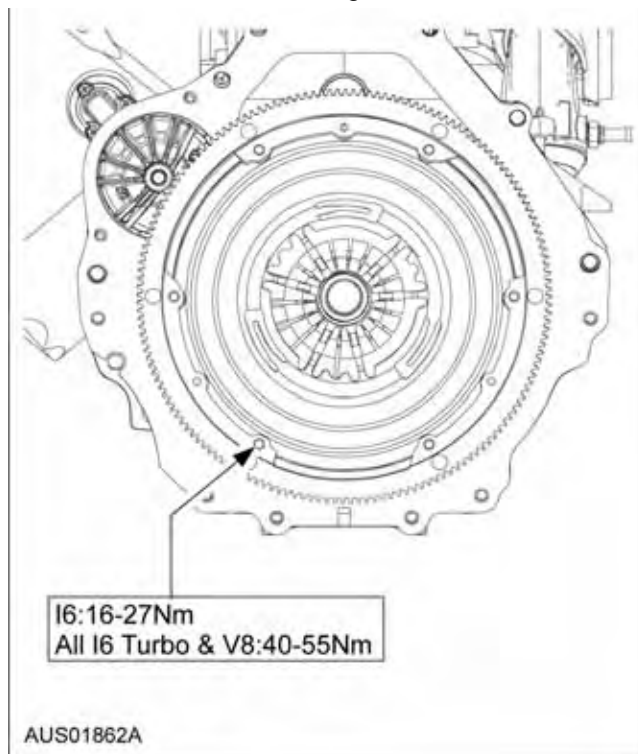
**NOTE:** If reusing the clutch pressure plate and flywheel, align the marks made during removal.

- Start the bolts by hand, and drawing them down by approximately 1/3 (one third) of their height in the star pattern sequence shown. This applies an even loading to the clutch cover housing.
- Continue the sequence by repeating the star pattern while tightening each bolt another 1/3 of their height.



- Complete the tightening process by bringing the bolts to the proper torque specification.

- Remove 'Clutch Disc Aligner Tool'.



- Install the transmission.  
For additional information, refer to Section 308-03.

## Flywheel — I6 (all variants)

### Hardware - Flywheel-to-crankshaft

| Vehicle variant          | Item                      | Specification | QTY |
|--------------------------|---------------------------|---------------|-----|
| All I6 (except I6 Turbo) | Bolt - M10x1.25x25 HEX HD | V800322       | 6   |
| ALL I6 Turbo (incl. F6)  | Bolt - M10x1.25x25 HEX HD | 3R23-7J315-AB | 6   |
| All V8                   | Bolt - M10x1x26.5 HEX HD  | N808139-S100  | 8   |

### Removal

- Remove the transmission. For additional information, refer to Section 308-03.
- Remove the clutch disc and pressure plate. For additional information, refer to Disc and Pressure Plate in this section.

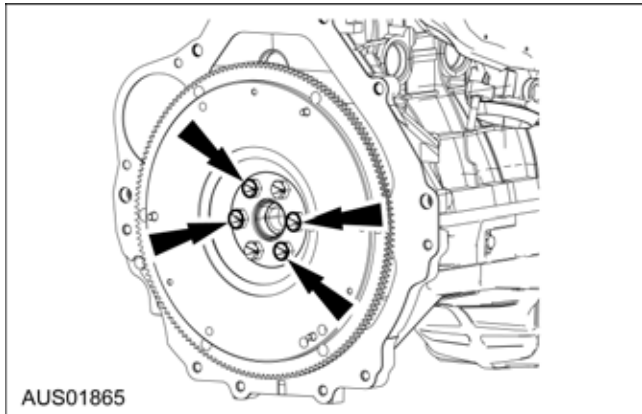


## REMOVAL AND INSTALLATION (Continued)

- Remove four of the six bolts. Leaving two opposing bolts in place, loosely.



**CAUTION:** Two bolts should be loosened but left in to prevent the flywheel from falling.



- Separate the flywheel from the crankshaft.
- Remove the bolts remaining in the crankshaft.
- Remove the flywheel.

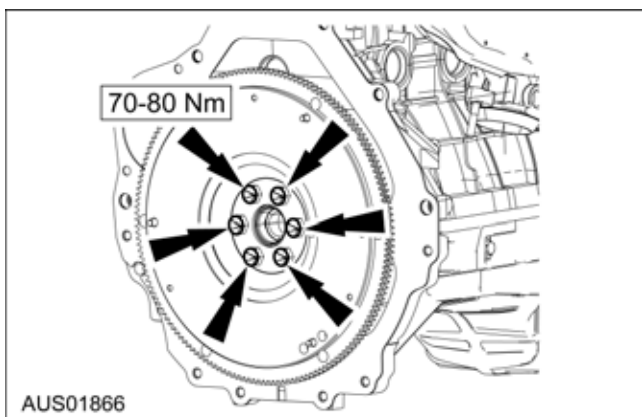
### Installation

- Position the flywheel onto the crankshaft and install the NEW flywheel-to-crankshaft bolts.

**NOTE:** Care should be taken to achieve, but not exceed, the torque values specified for all hardware. Devices such as rattle guns should not be used.

**NOTE:** The flywheel to crankshaft bolts must be replaced with new bolts if they are removed.

**NOTE:** Both the standard I6 & I6 Turbo flywheel and crankshaft are designed with a single offset bolthole to ensure correct angular alignment between crankshaft and flywheel. These holes must be aligned before installing the six flywheel-to-crankshaft bolts.



- Install the disc and pressure plate. For additional information, refer to Disc and Pressure Plate in this section.
- Install the transmission. For additional information, refer to Section 308-03.

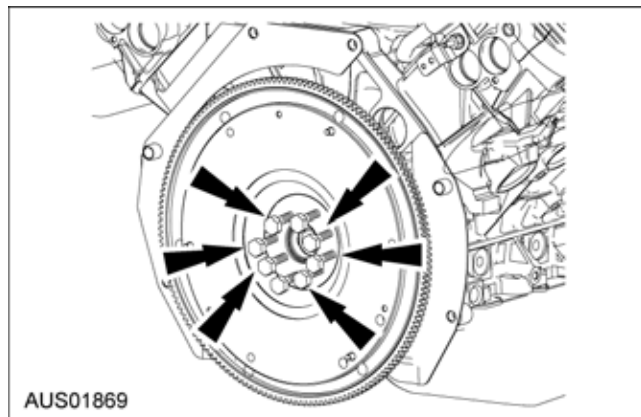
## Flywheel — All V8 Vehicles (incl XR8 & GT)

### Removal

- Remove the transmission. For additional information, refer to Section 308-03.
- Remove the clutch disc and pressure plate. For additional information, refer to Disc and Pressure Plate in this section.
- Remove six of the eight bolts. Leaving two opposing bolts in place, loosely.



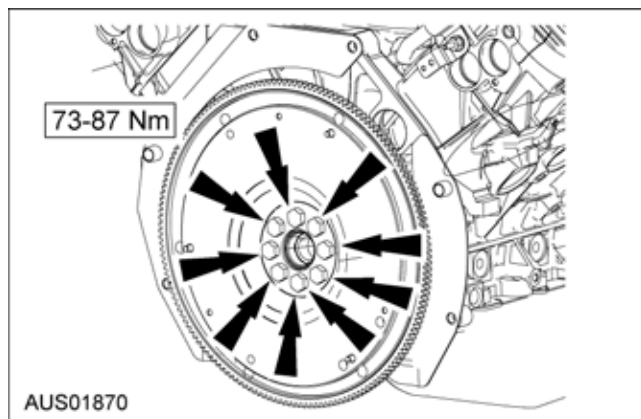
**CAUTION:** Two bolts should be loosened but left in to prevent the flywheel from falling.



- Separate the flywheel from the crankshaft.
- Remove the bolts remaining in the crankshaft.
- Remove the flywheel.

### Installation

- Position the flywheel onto the crankshaft and install the flywheel-to-crankshaft bolts.
  - Apply the threadlock and sealer to bolt threads.




- Install the disc and pressure plate. For additional information, refer to Disc and Pressure Plate in this section.
- Install the transmission. For additional information, refer to Section 308-03.



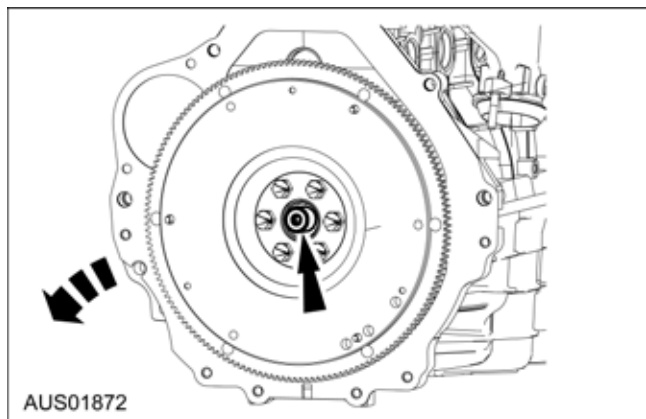
## REMOVAL AND INSTALLATION (Continued)

### Pilot Bearing — All Vehicles

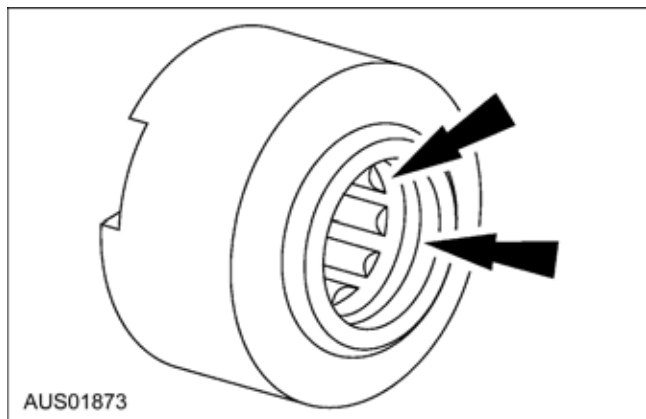
| Special Tool(s)                                                                                 |                                                   |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------|
| <br>SST308-105 | Installer, Pilot Bearing<br>308-105 (T85T-7137-A) |

#### Removal

- Using a standard bearing puller, remove the transmission input shaft pilot bearing.



- Inspect the transmission input shaft pilot bearing for:
  - misalignment and looseness in the flywheel.
  - needle rollers for scoring, worn or broken needle rollers, inadequate grease or discoloration.
  - seal leakage.



#### Installation

**NOTE:** The transmission input shaft pilot bearing should only be installed with the seal facing the transmission. The transmission input shaft pilot bearing is pregreased and does not require additional lubrication. A new transmission input shaft pilot bearing must be installed whenever it is removed.

- Using a soft-face hammer and the special tool, install the transmission input shaft pilot bearing.

