

# INSTALLATION INSTRUCTIONS

## OT-II 7.25" (185mm) Cerametallic Rally Clutches



### TOPICS COVERED

- A. *Driveline Alignment*
- B. *Flywheel Installation*
- C. *Clutch Disc Installation*
- D. *Clutch Assembly Installation*
- E. *Release Bearing Installation*
- F. *Master Cylinder Selection*
- G. *Bleeding / Pedal Stop Set-up*
- H. *Maintenance*
- I. *Service/Warranty Information*

### A. Driveline Alignment

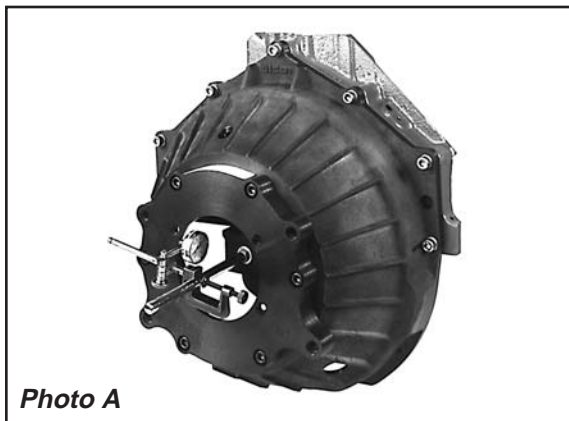
The typical production engine has been made to align the transmission good enough for an OE-size clutch with a single sprung hub disc. These tolerances are not tight enough for a small clutch with solid discs.

The bellhousing must be checked to see if it is both concentric (*Photos A*) and parallel (*Photos B*) while bolted to the engine. This is easily checked with a dial indicator mounted to the bare crankshaft.

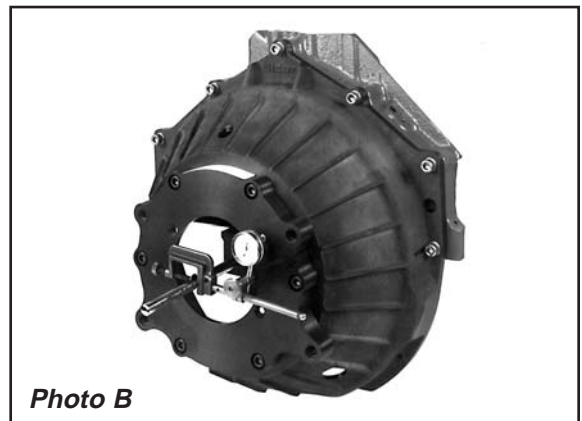
**Maximum out-of-concentricity at the transmission register I.D. is .010" total indicator runout (T.I.R.) and the maximum out-of-parallel is .010" T.I.R. measured at a 6" diameter.**

***The following may occur if driveline alignment is not correct:***

- Hub spline wear
- Cracking of friction discs
- Pilot bearing wear
- Loose or failed disc rivets
- Transmission input shaft and bearing damage



**Photo A**

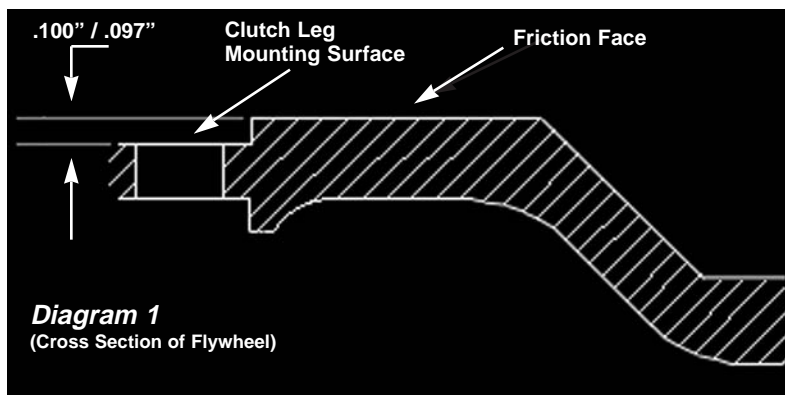


**Photo B**

If you know your housing is accurate, you can correct block concentricity by using a Tilton block drilling fixture (P/N 53-100 for Chevy, P/N 53-100F for Ford and P/N 53-100M for Mopar). An out-of-parallel block should have the rear face machined by a competent machine shop.

## B. Flywheel Installation

Most metallic racing and cerametallic rally clutches are used with a step-type flywheel. This step should be between **.097" and .100"** tall (*Diagram 1*). Most Tilton flywheels are designed to have the clutch mounting bolts installed from the engine side before bolting the flywheel to the crankshaft. A retaining lip is used to keep the bolt heads from turning. Crankshaft bolts must be tightened to manufacturer's specified torque when installing flywheel. Typically, Tilton steel flywheels with 7/16" bolts require **95 lb-ft** of torque. Aluminum flywheels will vary with application. Loctite may be used, but lock washers should not.



## C. Clutch Disc Installation

Install the plates and discs into the clutch (*Diagram 2*) in the following manner:

### Make sure to check the following:

- Hubs make full spline contact with input shaft
- There is clearance between hubs (and rivets)
- There is clearance between the bottom disc and flywheel bolts

**Single Disc Clutch Assembly** - Disc packs containing "A" or "F" within the part number. See *Diagram 3*.

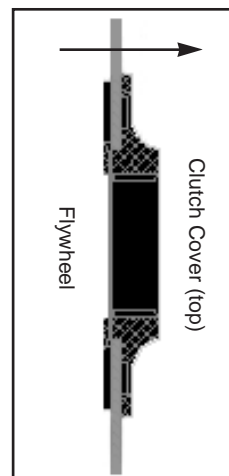
1. Install pressure plate with **raised ring** against diaphragm.
2. Install disc #1 (A or F hub) with **TE logo** on rivet heads towards the flywheel.

**Dual Disc Clutch Assemblies** - Disc packs containing "AA" within the part number. See *Diagram 4*.

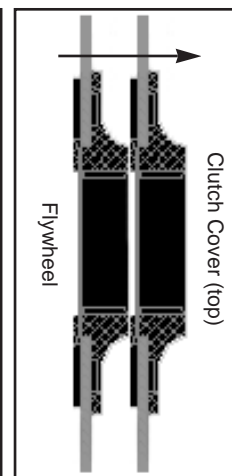
1. Install pressure plate with **raised ring** against diaphragm spring.
2. Install disc #1 (A hub) with **TE logo** on rivet heads towards the flywheel.
3. Install floater plate.
4. Install disc #2 (A hub) with **TE logo** on rivet heads towards the flywheel.



*Diagram 2*



*Diagram 3*



*Diagram 4*

## D. Clutch Assembly Installation

Now that the clutch is assembled with discs, install it onto the engine as follows:

1. Slide clutch over the mounting bolts and make sure the heads of the bolts are secure against flywheel lip. Start aircraft-type washers and nuts onto each bolt by hand.
2. Align discs with an alignment tool or a spare input shaft.
3. Tighten the six bolts in a criss-cross pattern, half-of-a-turn at a time until bottomed. Torque the nuts to **22 lb-ft** (lower when using oil or Loctite).
4. The tips of the spring fingers should taper slightly towards the transmission. The spring must not be inverted.
5. Install the bellhousing and transmission. Do not let the clutch support the weight of the transmission while installing.

**Note:** Use only aircraft grade hardware (AN or NAS) when installing this clutch. Tilton offers bolts in kit form (P/N 95-005 for one plate clutches and P/N 95-006 for two-plate clutches) for flywheels with through holes.

## E. Release Bearing Installation

Make sure of the following when installing the release bearing:

- A 44mm (1-3/4") contact diameter, radius-faced bearing is recommended for use with the clutch. A 52mm radius-faced bearing can be used, but clutch performance is decreased.
- If installing this clutch with a Tilton hydraulic release bearing, follow these procedures:
  - 1) Completely compress the bearing into its hydraulic body. Take all free-play measurements of the bearing in this completely retracted state.
  - 2) Free-play from bearing-to-diaphragm fingers should be between **.160"** and **.240"** for a new clutch. This will decrease as the clutch discs wear.
  - 3) Set pedal stop as described in **Section G** of these instructions.
- If installing this clutch with a mechanical linkage, slave-and-fork, or Quarter Master bearing assembly, less bearing free-play and more frequent adjustments may be necessary.
- Regardless of bearing type used, do not travel the release bearing more than **.240"** once the bearing contacts the diaphragm fingers. More travel than this will damage the clutch. See **Section G** for information on pedal stops.

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## F. Master Cylinder Selection

If you are using this clutch with a Tilton hydraulic release bearing, it should be used with a **3/4" master cylinder**. Bleed the clutch hydraulics (being careful not to over-stroke the clutch) prior to setting the pedal stop.



**75-Series 3/4" Master Cylinder Kit**  
(P/N 75-750U)



**74-Series 3/4" Master Cylinder Kit**  
(P/N 74-750U)

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## G. Hydraulic System Bleeding & Pedal Stop Set-up

This clutch must be used with a positive stop on the clutch pedal to prevent over-stroking. Below is an easy means of setting the stop once the drivetrain is in place:

1. To bleed the system remove the pedal stop, depress the pedal 1/2", open the bleed screw, stroke the pedal its full travel, close the bleed screw, allow the pedal to return, and repeat until all air has been removed from the system.
2. Raise drive wheels and support the car on jack stands.
3. With the engine off and the car in gear, slowly depress the clutch pedal until the tires just barely break free.
4. Give the pedal an additional **.25"** of travel (measured at the foot pad) and lock the pedal stop in place. This will allow the clutch to cleanly release itself without damage.
5. No additional travel or adjustments should be needed. **With a Tilton hydraulic release bearing and a 3/4" bore master cylinder, total master cylinder pushrod travel should be approximately .71"**.

## H. Maintenance

- **Discs** - Clutch discs start new at **.283"** thick. These should be replaced when the total pack wears **.030"**. This means the individual disc thickness should not be less than:

• *Single disc = .253"*      • *Two disc = .268"*

The friction material used on these discs is wear resistant. It will typically wear quickly for the first **.002"** of disc thickness, and then wear dramatically slower after that.

- **Pressure Plate and Floaters** - Check the plates periodically for warping. This warping is caused by heat put into the clutch from slipping. Check warping with a straightedge and feeler gauges. Maximum allowable warping is **.008"** in any plate. Pressure plates can be resurfaced to a minimum thickness (after surfacing) of **.435"**. Floater plates should never be resurfaced. Be sure to align the balance marks when reinstalling the plates.

**Never put new discs into a clutch that has a warped pressure plate or floater plates.** There will not be full contact across the face of the discs and they will wear out quickly. On the same note, discs that were used in a clutch with a warped pressure plate or floater plates should never be used in a new clutch assembly.

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## I. Service / Warranty Information

**IF YOUR CLUTCH REQUIRES SERVICE, PLEASE FOLLOW THESE PROCEDURES**

1. Contact Tilton at (805-688-2353) and describe the problem or the service that is required.
2. If the clutch needs to be sent in, a Returned Goods Authorization (RGA) number is required and will be provided by a Tilton representative.
3. Write the RGA number on the outside of the package and keep a record of this number.
4. Ship the clutch to:

**Tilton Engineering  
25 Easy Street  
Buellton, CA 93427**

**DO NOT RETURN THE CLUTCH WITHOUT A RGA #**