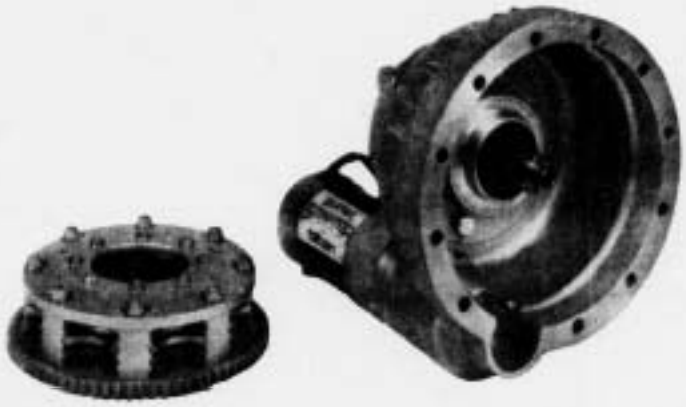
INSTALLATION INSTRUCTIONS
for
TILTON ENGINEERING'S
MIDGET CLUTCH-STARTER PACKAGE

IMPORTANT!

The following is NOT a simple installation.
This unit will require precise alignment, welding and some machine work. To insure performance and reliability of this unit, Tilton strongly recommends installation be done only by a professional chassis or engine builder. Improper installation of this package could result in damage to the car and, in extreme cases, physical injury.

Please! Take a few minutes before beginning and review the complete instruction booklet carefully. It is important that you fully understand the product you are about to install. The information enclosed was compiled during many hours of engineering and an actual installation in an effort to correct any problems before you received your package. Tilton feels that if these instructions are digested prior to starting this project, it will save you both time and money. There is a lot of money invested in this package and the car you are about to work on. Please don't take a chance by trying to shortcut this installation.

Read the instructions! — the small investment in time will be well rewarded by results. Installation time: minimum 8 hours. (1st time)



—TOOLS AND ADDITIONAL PARTS REQUIRED FOR INSTALLATION—

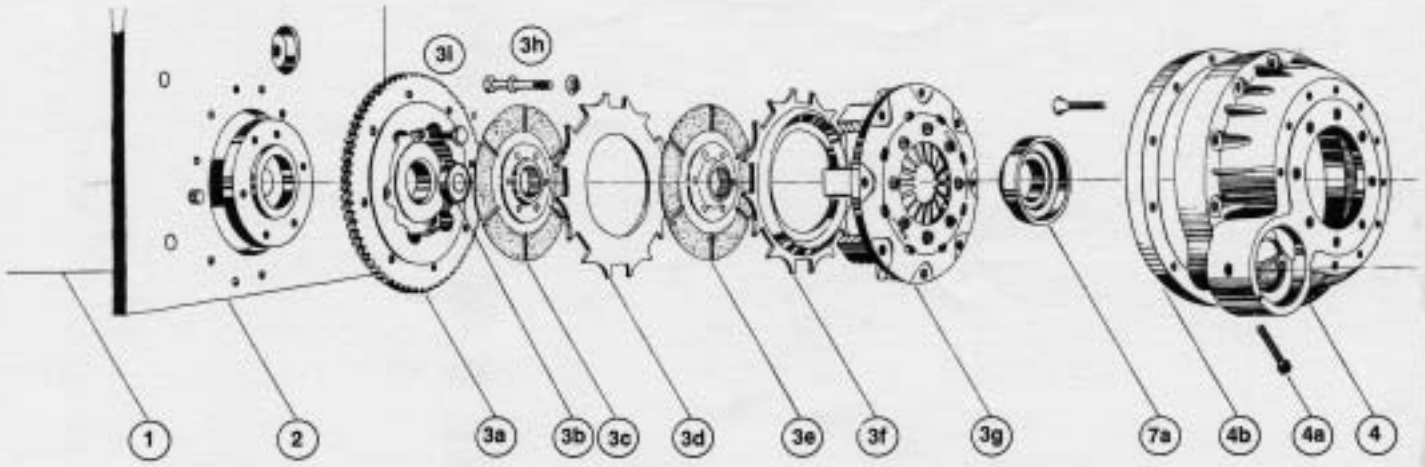
Tools Required:
Basic tool box
Dial indicators
Magnetic base
Finger type test indicator
Lathe or ????? to cut drive shaft
Welder of choice
Brackets on frame
Clutch alignment tool (may use 1 ⅜" x 26 output
Brake bleeder kit 72-503 (optional)

Parts Required:
AN-3 brake line (m/c to bearing)
Hoses and fittings
Paint and frame brackets
Brake fluid (DOT 3/4/5)
Starter switch or button
Wire and terminals (14 ga/button; 2 ga.min/battery)
Bolts, nuts and washers
Loctite™ or similar chemical locking agent
Quick disconnect for off board battery
Steering pump extension shaft (some app.)
Tilton clutch actuation kit 59-500 (optional)

TILTON DRILL FIXTURES	
Applications	Part No.
Gaerte, Arias/Fontana Chevy II, Scat	59-510
Cosworth DBP	59-511
Pontiac (6 or 12 bolt crank) Canady Sesco	59-512

Other fixtures available.

TILTON REMOTE PUMP MOUNTING KIT (OPTIONAL)		
Applications	Crank to Cam C/L	Part No.
Gaerte, Chevy II, Scat, Pontiac	4.520"	59-520
Arias/Fontana	4.413"	59-521
Optional spacer 59-524, see page 7		



1. Engine
2. Motor Plate
3†. Clutch-flywheel assembly 57-7xx
   a. Flywheel 51-7xx
   b. Pilot bearing
   c. Disc 67DP-59
   d. Floater 67-119
   e. Disc 67DP-53
   f. Pressure plate (67-118HR)
   g. Cover assembly
   h. Clutch bolts
   i. Flywheel bolts (most applications)

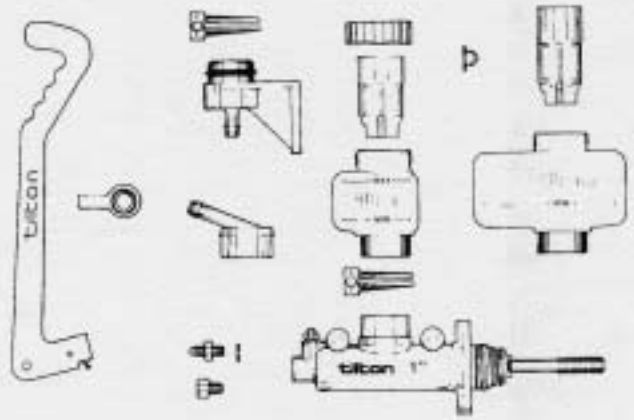
†Parts included in package

4†. Clutch housing and bolts 59-205
   a. Starter clamp bolt
   b. Cosworth spacer (Cosworth BDP only)
5. Pump mounting bracket (optional)
6†. Super Starter 59-100
7†. Output housing 50-210 w/ bearing housing
   a. Hydraulic release piston and bearing
8†. Output shaft
   a. Splined drive shaft coupler
9. Torque ball
10. Torque ball retainer
11. Torque tube
12. Drive shaft

OPTIONAL PACKAGE ACCESSORIES

Tilton Clutch Actuation Kit 59-500

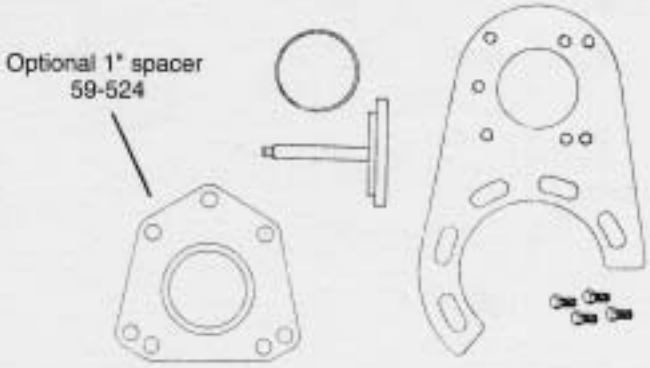
Contains: Master cylinder kit with remote-mount reservoir and actuation lever. This kit is engineered using the optimum lever ratio, enabling the driver to modulate the clutch with ease. The actuation kit is designed for ease of installation and may be mounted on the right or left and comes with a Tilton ⅝" master cylinder kit.

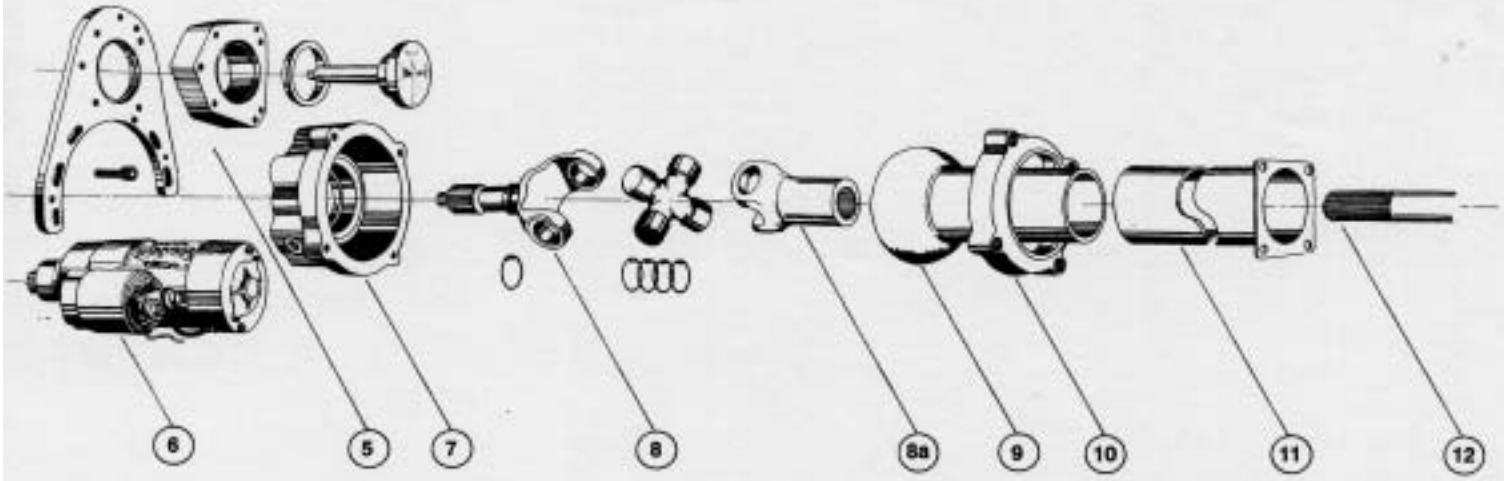


Tilton Mounting Remote Pump Kit 59-520 or 59-521

(for Lee and KSE steering pumps)

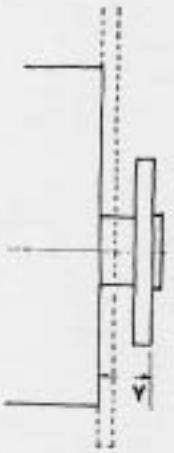
In some installations, it will be necessary to relocate pump(s) for housing clearance. Tilton has engineered a remote pump mounting bracket that moves the pump away from the torque plate and locates it on the housing. The bracket is engineered for easy installation and comes with bolts and alignment tool.





SPECIFIC APPLICATION INFORMATION

1. Essingler/Ford 2300: While most Tilton flywheels include a pilot bearing in the flywheel, Essingler/Ford 2300 applications require a pilot bearing/bushing (.592" I.D.) in the stock location. Flywheel installation will require the use of 7/16" flywheel bolts.



Y= Crankshaft Offset

2. Cosworth BDP: This application must use a .540" spacer (59-522 included in package) between the motor plate and the housing. Also, check flywheel to insure flywheel bolts do not interfere with the clutch discs.

3. Cosworth YBV: Assembly requires a .592 ID Pilot bushing/bearing in the crankshaft.

VERY IMPORTANT—PLEASE READ!

Before beginning installation, the crankshaft offset (measurement between the flywheel mounting face and machined surface at the rear of the engine block) should be checked. It is our experience that crankshaft offset can vary greatly because of tolerance differences not only among engine manufacturers, but also crankshaft grinders. In the Tilton package, crankshaft offset is one of the most critical dimensions and should be held to within ±.015 of the following specifications below:

CRANKSHAFT OFFSET DIMENSIONS

	Engine	Y= crankshaft offset
A.	Chevy II, Scat V4, Arias Fontana	.700"
B.	Pontiac SD 4 cyl., Canady Sesco	.130"
C.	Cosworth BDP (Jennings, Voglar)	1.200"
D.	Gearte 4 cyl.	.560"
E.	Esslinger 4 cyl., Ford 2300	.710"
F.	VW (Autocraft crank w/ Autocraft coupler # 03084)	.240"
G.	GM Metric 4 cyl. & 60° V6	.020"
H.	Cosworth YBV	.685"

If dimension differs more than ±.015", contact Tilton Engineering before proceeding with installation.

IMPORTANT NOTE!

It is important that concentricity between the Tilton housing and crankshaft centerline be verified during installation of this package and engine changes. Concentricity must be within .005" TIR (total indicator runout). See part IV, "Check Concentricity".

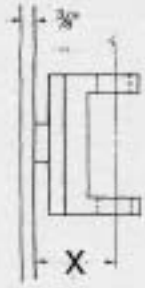
To maintain concentricity, all engine motor plates should be located on the engine with dowels. The dowel holes in the motor plate should not be more than .0015" larger than the dowel. This will insure that a motor plate (which has been modified to accept a Tilton package) can be removed and replaced without affecting concentricity.

If more than one engine is to be used with a common motor plate, concentricity should be rechecked to verify that the dowel locations are the same in all the engines to be used (see "Check Concentricity"). If crankshaft center to clutch housing varies more than .005" between engines, a separate motor plate should be done for each engine or dowel position corrected.

Failure to verify and correct the above *will* cause damage to the clutch, bearings and driveline components.

DISASSEMBLY

1. Disconnect differential from torque arms and shocks. Unbolt torque ball from housing.
2. Remove any cam-driven pumps and plug all lines with suitable caps or plugs.

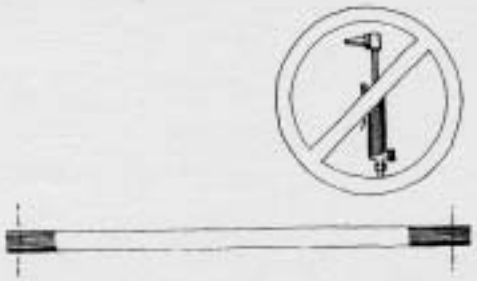


5.812 – X = the amount the driveshaft needs to be shortened

X is the distance between motorplate and U-joint center on the existing drive yoke.

3. Measure from the motor plate to the U-joint yoke center. Subtract that dimension from 5.812" (the new motor plate-to-yoke center dimension), this result is the amount to remove from the shaft and tube. Be sure there remains sufficient spline on both ends.

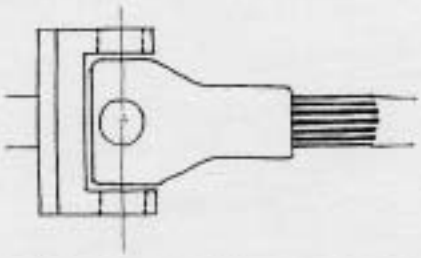
Recommendations for cutting drive shaft:



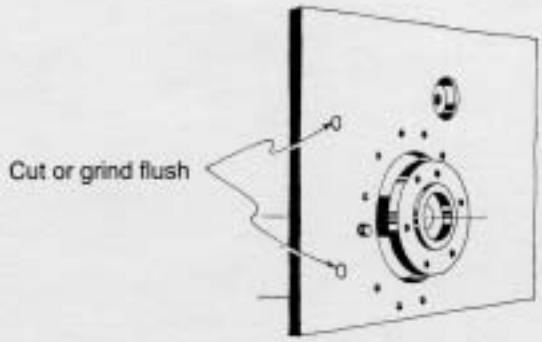
Solid or hollow steel: Never use a cutting torch. A steel drive shaft can be safely cut with any of the following tools: 1. lathe 2. cutoff saw 3. bandsaw 4. hacksaw. After cutting, carefully deburr shaft. Test fit to splined output to ensure free movement.

Titanium: Tilton strongly recommends that titanium drive shafts **be cut only by qualified machinists.**

4. Remove housing and drive coupler from crankshaft.



5. Disassemble drive coupler and retain slip yoke portion of drive line for installation on the new Tilton assembly.

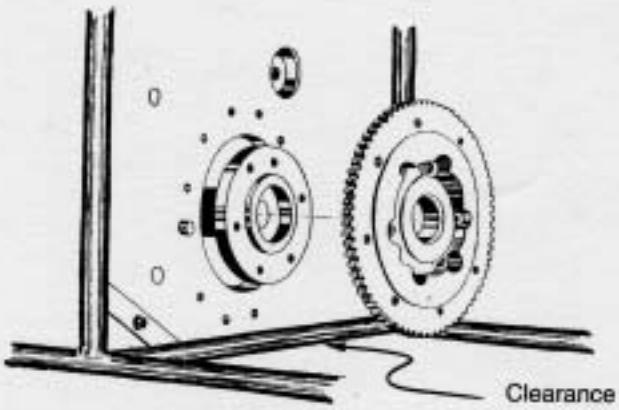


6. To aid installation, engine dowels should be flush with the back of the motor plate.

IMPORTANT NOTE: This package was designed to work with a ⅜" motor plate only. If any other thickness is used, it will be necessary to adjust for that difference. Before beginning, the rear engine block face and motor plate should be checked. They should be free of burrs and debris between the block face and motor plate.

INSTALLATION

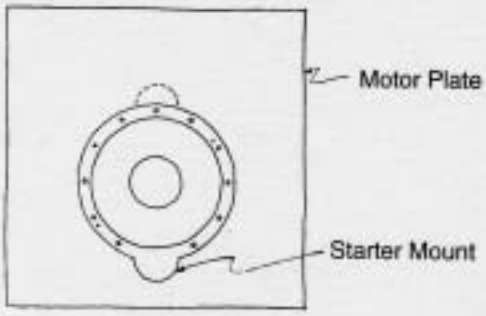
A. Test Fit Flywheel



Check to ensure the flywheel will clear any frame rails or panels. Next, check flywheel fit. Due to manufacturing tolerances in both the crankshaft and flywheel, fit may vary from slip to slight interference. Be sure that the flywheel rests squarely against the crankshaft flange.

Remove the flywheel and check carefully for evidence of improper fit. No galling or burrs should be present on either the flywheel or the crankshaft flange.

B. Locate Clutch Housing Position

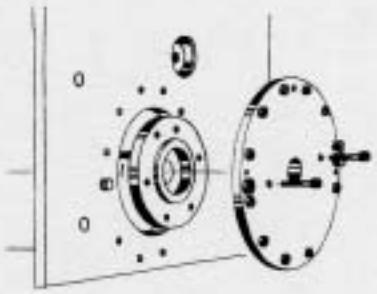


Trace the outline of the clutch housing on a piece of cardboard. Using this as a template, locate the starter position that allows for maximum leg and foot room; optimally, near 6 o'clock or 12 o'clock.

If necessary, cut template to clear chassis, pump drive, etc. This can be used later to locate areas on the drill fixture and/or housing that will require clearancing.

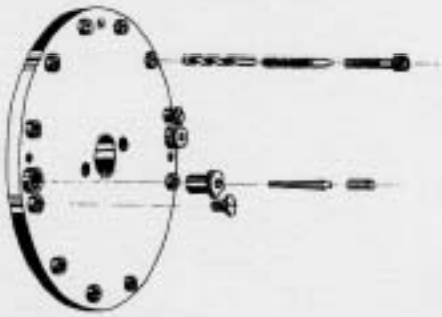
C. Drill and Tap Motor Plate for Clutch Housing

(Requires Tilton drill fixture- see chart on front for engine application.)



1. Rotate drill fixture to desired starter position. Clearance drill fixture where required (refer to template). Bolt fixture to crank (rotating crank may be necessary).

NOTE: You may not be able to use some bolt holes due to clearancing for the pump drive and frame rails. There must be a **minimum of seven bolts** holding the clutch housing in position.



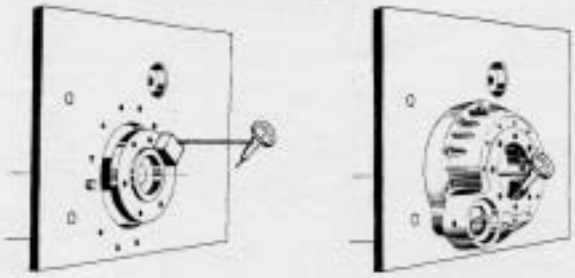
2. Using the 1/16" drill bit supplied, drill the first bolt hole. Place a dowel or pin through the fixture and into the motor plate, to keep the fixture from moving and continue to drill remaining bolt holes.

IMPORTANT! Take care not to drill through the plate into the engine block! Calculate the thickness of the fixture and motor plate, then either mark the bit at the proper depth or use a drill bit stop.

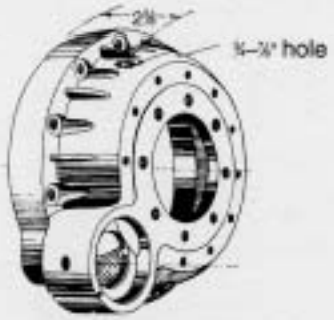
3. Install the 1 3/4" removable drill bushing in both dowel locations and drill dowel holes. Next, install 5/16" removable reamer bushing in both dowel locations. Ream both holes using reamer supplied with fixture kit.
4. Remove fixture and press 5/16" dowels into reamed dowel holes.

5. Tap all 5/16" bolt holes with 3/8"x16 tap, supplied. Be very careful that the holes are tapped straight. We recommend the use of a tap guide.

D. Check Concentricity

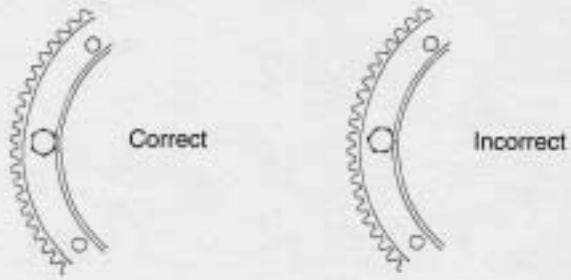


1. To verify concentricity, bolt the clutch housing (without the clutch or output housing) to the modified motor plate. Attach a magnetic base test type dial indicator to the crank. Rotate the crank and check concentricity to the 3½" hole in the rear of the housing. Concentricity should be within .005" TIR. Concentricity should be rechecked after any engine change. If concentricity is not within .005" TIR after changing engines, it may be necessary to have a dedicated motor plate for each engine. The other alternative is to reposition the dowels in the engine(s) (i.e., offset dowels).
2. Remove clutch housing and continue with installation.

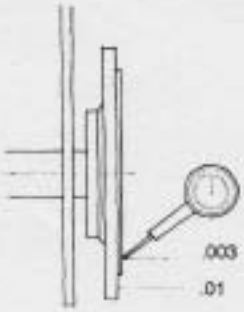


NOTE: USAC has mandated there be an inspection hole in the clutch housing. Before installing clutch housing, drill a ¼" to ⅜" hole approximately. 2¾" back from where housing mounts to the motor plate. Locate the hole between the ribs and in an area that will be easily seen once the housing is mounted. A suitable cover should be used to keep debris out of the clutch housing.

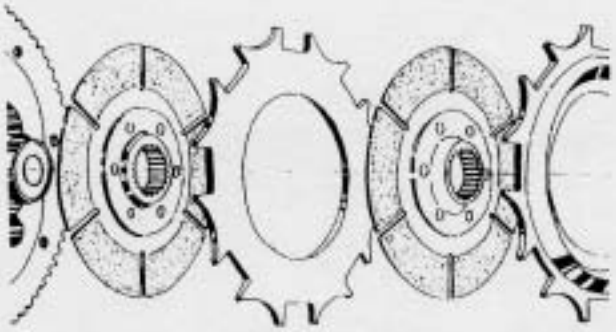
E. Install Clutch



1. Install clutch bolts (5/16"-24) through the flywheel and up against the bolt retaining lip machined in the back of the flywheel. Be sure pilot bearing is installed in flywheel, or crank as required.
2. Bolt the flywheel to the crank. Torque bolts to manufacturers recommendations. Do not use washers of any type. A chemical locking agent (such as Loctite™) may be used sparingly on bolts; however, care should be taken to keep it off crankshaft flange or register areas. Failure to do so will interfere with proper fit and alignment.

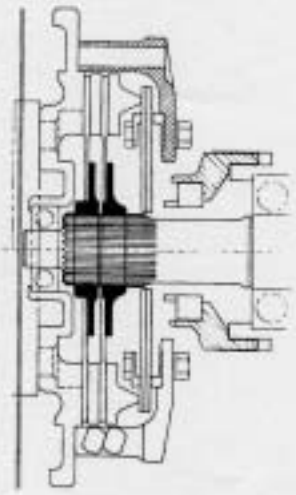


3. With the flywheel installed onto the crankshaft, check for axial runout using a dial test finger type indicator. TIR should not exceed .003" or .075mm at the clutch register diameter. TIR at the ring gear should not exceed .01" or .25mm.

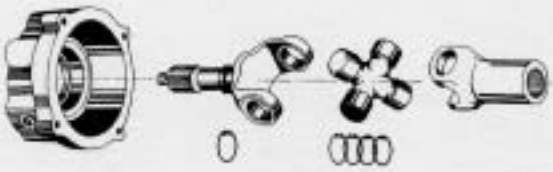


4. Place clutch assembly over the clutch bolts. Make sure discs are in proper position (rivet heads stamped T.E. go towards the flywheel—see explosion for proper position of discs), attach proper washers and lock nuts. Torque in a star pattern to 22-24 foot-pounds (30-33Nm) while using a clutch alignment tool or input shaft to align the discs. Once torqued, the clutch fingers should appear virtually flat, but not over centered.

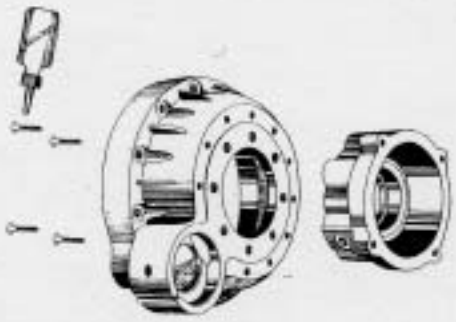
NOTE: All Tilton clutch assemblies are balanced, and marked for alignment. Care should be taken to ensure pressure plate and floater plate align with marks. Finger height runout should be less than .025" at the tip when installed.



F. Install Clutch Housing



1. Clearance clutch housing for frame, pump drive, etc., using template. Attach slip yoke to output shaft using 1310 series Spicer® U-joint or equivalent. Install output shaft into output housing and secure with snap rings.



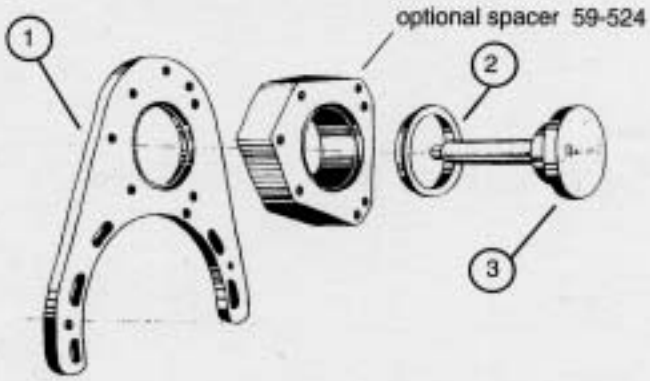
2. Install output housing onto clutch housing, with flat head screws (supplied) and a small amount of Loctite™ or similar chemical locking agent.

NOTE: Bleeder outlet on output housing should be located as high as possible. Hydraulic outlets in housing are interchangeable and can be used as either feed or bleeder line.

Before proceeding, make sure both clutch housing and motor plate are clean and free of any debris. Align output shaft with clutch disc spline and push housing into place over dowels (without starter).

3. Bolt assembly to motor plate using a small amount of Loctite™ or similar chemical locking agent.

G. Installing Optional Remote Pump Mounting Kit (where applicable)



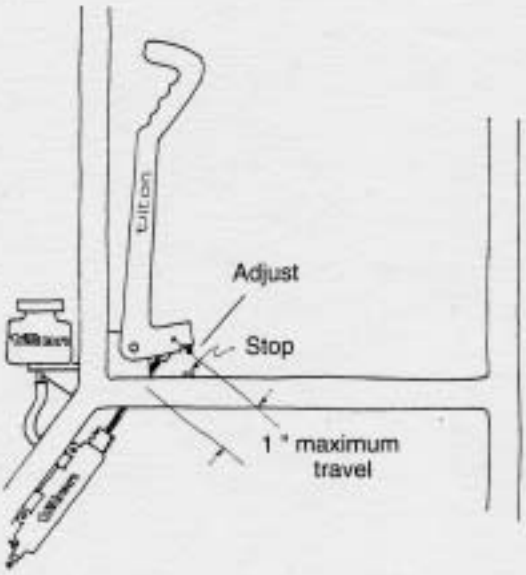
The remote pump housing kit includes:

1. (1) Pump mounting bracket
2. (1) Bracket sleeve
3. (1) Pump bracket alignment tool
4. (1) Mounting hardware (not shown)

1. Position bracket in place against clutch housing with sleeve installed and start bolts, **do not tighten.** Using the alignment tool provided, position bracket so alignment tool fits into cam hex drive and the face of the tool fits flush with the bracket. Tighten all bolts. Remove alignment tool.
2. When mounting pumps, the sleeve furnished should remain in the bracket for **Lee Pumps** and will need to be removed for **KSE Pumps.**
3. Mounting holes are drilled and tapped in mounting plate for only one position. However, it may be necessary to rotate the pump to clear the steering box, etc., and new holes will need to be drilled and tapped. If this is the case, drill and tap holes to ⅜" x 18.
4. Trial fit pump. It may be necessary to clearance the Tilton clutch housing if pump register nose does not clear.
5. Attach drive extensions and bolt pump into position (proper length pump drive extensions can be purchased through your pump manufacturer). If pump rotation alone does not allow enough clearance, it may be necessary to clearance both pump housing and steering box.

NOTE: In some applications, due to steering box location, a 1" pump spacer (59-524) will be needed. This spacer will allow pumps to be mounted without interfering with steering box (see explosion).

H. Installing Tilton Hydraulic Actuation Kit 59-500 (sold separately)



The actuation kit includes:

1. (1) ⅝" master cylinder kit (74-625U)
2. (1) Actuation lever
3. (1) Hardware kit

1. Locate position for the actuation lever and master cylinder. **NOTE:** Because the Tilton master cylinder has a remote mount capability for the reservoir, the master cylinder can be mounted in virtually any position, providing the reservoir is mounted in a position higher than the master cylinder inlet.
2. Fabricate and weld all necessary brackets to mount the master cylinder, actuation lever and remote reservoir (if required).
3. Mount the actuation lever to the fabricated bracket.
4. Mount the master cylinder. Make sure the master cylinder rod aligns with actuation lever.
5. Mount reservoir on the master cylinder or the remote reservoir adapter, making sure the wire clamp bails are on either side of the "O" ring, then tighten the clamp.
6. Attach the rod end to the master cylinder push rod and bolt it to the actuation lever. Check the rod travel for both alignment and length; it will require ¾" to 1" of pushrod travel to completely release the clutch. Adjust lever stop to limit pushrod travel to 1 " **maximum**.
7. Mount the remote reservoir (if necessary) on the fabricated mounting bracket. Attach hose between reservoir and remote adapter and secure with tie wraps, enclosed.
8. Attach the supply line between the master cylinder and supply port on the output housing and bleed the system as follows:
   a. Fill the reservoir with fluid.
   b. Gently push or pull the actuation lever.
   c. Open the master cylinder bleed screw or disconnect the supply line until free of air or lever reaches full travel.
   d. Close the master cylinder bleed screw or reconnect the supply line and gently release the actuation lever.
   e. Continue with the above steps until the master cylinder is free of air.

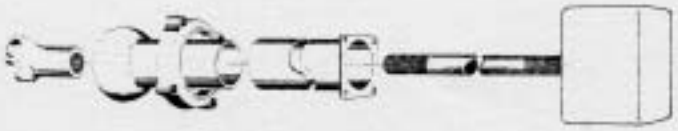
10. Bleed the hydraulic release bearing:
    a. Fill reservoir with fluid.
    b. Gently push or pull actuation lever.
    c. Open bleeder screw.
    d. Close bleeder screw and release lever.
    e. Repeat above steps until hydraulic release bearing is free of air.

We recommend using the Tilton Brake Bleeder kit, 72-503.

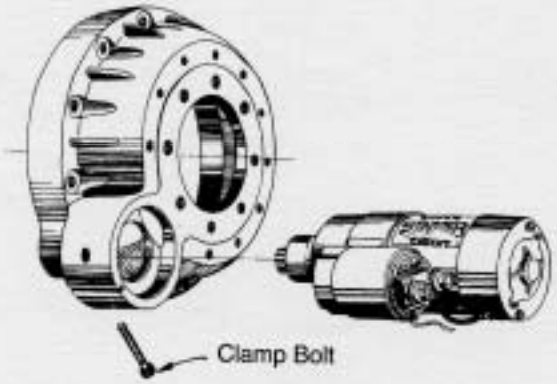
CAUTION

1. At no time should the master cylinder pushrod be depressed more than 1 ".
2. Do not install reservoirs or remote inlet fittings without clamp. Use Tilton clamps only.
3. Do not over tighten the reservoir clamp or mounting hardware.
4. For remote reservoir applications only, use either a Tilton hose 75-502 included in the kit or suitable hose for brake fluid.
5. For remote applications, use tie wraps or small hose clamps to secure hose in place.
6. When installed, the master cylinder pushrod must be fully retracted when at rest.
7. Use only DOT 3, 4 or 5 brake fluid.

I. Install Drive Shaft, Torque Tube and Starter

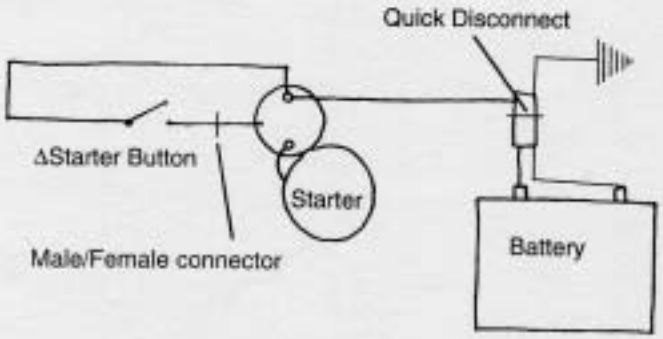


1. With shortened drive shaft in position, slide on torque tube and bolt to differential.
2. Slide pivot ball over torque tube.
3. Align spline on drive shaft with output yoke and slide into positions.
4. Bolt torque ball into place.
5. Attach differential to shocks and torsion arms. Be sure to check that everything moves freely.



6. Install starter, rotate solenoid to desired position, install clamp bolt in clutch housing collar and tighten.

J. Wiring



The following will be needed to complete wiring:

1. Quick battery disconnect.
2. 00 to 02 ga. battery cables with appropriate ends.
3. Minimum 14 ga. wire for starter button.
4. Starter switch or button.

Quick disconnects and cable are available through:

Keystone Cable Co.
(800) 346-8734

1. Locate and weld mount for receiver end of quick disconnect. **NOTE:** USAC mandates battery disconnects be mounted on right side of car. Tilton recommends that for safety, the mount be located toward the rear, so no crew member is standing in front of a tire.

2. Mount quick disconnect receiver and attach cables (ends should be soldered and crimped). Ground cable should be as short as possible and bolted to frame. Make sure surface for ground is free of paint or rust. Positive cable should be kept as short as possible to limit voltage loss. Cable should be routed away from any area that might damage it, and should be attached to battery terminal of solenoid.

3. Locate and install starter switch where it can be easily reached by the driver. If the car is equipped with a magneto switch, we suggest the starter button or switch be located so the driver can control both with one hand.

4. Wire starter solenoid to button.. Route wire (min. 14 ga.) from one side of starter button/switch to the battery terminal of the solenoid. Crimp and solder ends. Second wire from starter button or switch should be attached to jumper side of solenoid (wire with connector). To make starter removal easier, use some form of male/female wire connectors.

(Wiring installation cont'd)

5. Wire remote power source attaching sufficient cable to battery(s) and output end of quick disconnect so operator does not have to step over cables.

BATTERY NOTE: We found the following worked during our tests, but may not be true in all circumstances. It may be necessary to experiment with different power supplies to find the best system for your application.

A 12-volt power supply with a minimum of 800 CCA (cold crank amps) was needed to start a cold engine with locked advance. A warm engine equipped with an ignition retard system (no more than 15° initial advance) should require only 450 CCA from the 12-volt power source..

The use of magneto advance system, like that supplied by Hunt Magneto will significantly increase starter life, and make engine start-ups easier. These systems utilize a 12° initial advance with full advance in by 1000 to 1200 RPM.

K. Plumbing

Attach all plumbing lines. It may be necessary to reroute some lines due to relocation of the steering pump and fuel pump. Some different fittings may be required to facilitate installation of new pump locations. It may be helpful for someone to sit in the car to determine location.

L. Starting Procedure

1. For cold start, prime the fuel system, making sure fuel is to engine side of the fuel pump. Care should be taken if bleeding fuel in driver compartment that any fuel spilled be cleaned up prior to starting. Check all fuel fittings to ensure none are leaking.
2. Plug in battery supply, make sure the car is out of gear, and prime cylinders by using starter to turn engine over with plugs removed and barrel valve open (make certain the mag switch is off). After priming the cylinders, close barrel valve and continue to crank engine, clearing cylinders of excess fuel. Replace plugs and continue procedure.

For locked magneto system:

a. Turn on fuel supply at barrel valve.
b. Make sure car is out of gear.
c. Begin to crank engine with mag off until it shows oil pressure (normally, 2–5 seconds is sufficient).
d. Open throttle while cranking.
e. Close throttle and switch on magneto simultaneously.
f. As engine fires, open throttle and continue to run until warm.

For cars with crank-trigger, magnetos with advance and most electronic ignition systems: (Car should start more easily.)

a. Connect power supply.
b. Make sure the car is out of gear.
c. Turn on ignition.
d. Open throttle slightly.
e. Engage starter until engine fires.

Note: In case of a stalled engine, care should be taken not to "hydraulic" the motor when attempting to restart. At times it may be necessary to push backwards in gear to clear cylinders of excess fuel.

Maintenance

A. Output Housing

1. Periodically check bolts to ensure they are tight.
2. Inspect all bearings and seals for signs of looseness or wear.
3. When necessary, clean all parts with isopropyl alcohol. **Never** use solvent of any type.
4. Inspect U-joint for signs of looseness or wear. Replace bearing caps when needed.

B. Starter

1. Never engage starter for more than 30 seconds without a cool down period.
2. Between cranking/starting attempts, allow starter to cool at least two times longer than it actually was running.
3. Periodically check condition of starter and flywheel teeth for excessive wear.

Maintenance of Tilton OT-III Racing Clutches

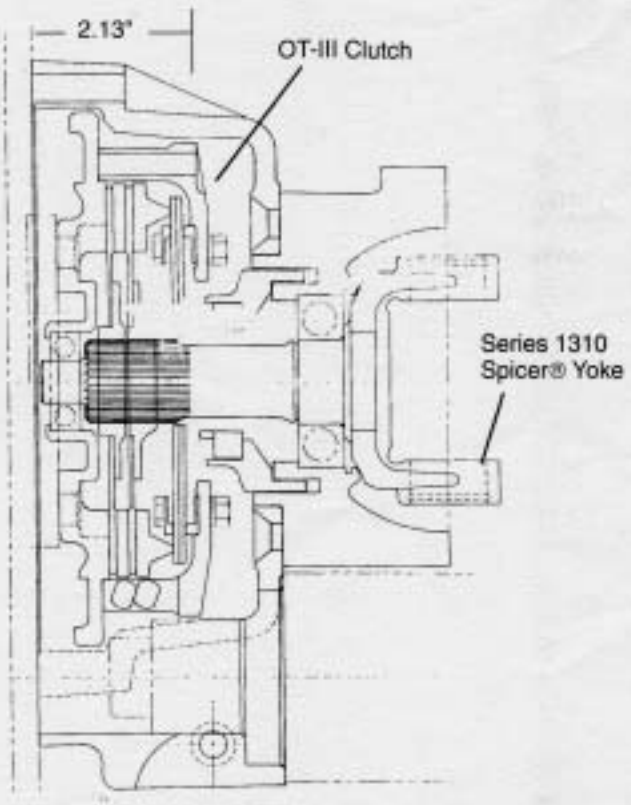
Tilton Engineering clutches represent the most advanced technology available in racing clutch design. Their open-style design lets the clutch run cooler, prevents internal dust build up and improves release characteristics as opposed to closed designs. These advantages are achieved with less weight and more importantly, with a lower moment-of-inertia. As testament to our leadership in the Industry, Tilton clutches will out-perform and out-last any other competitor's offering. Following the maintenance guidelines below will ensure that your clutch will always perform at its peak.

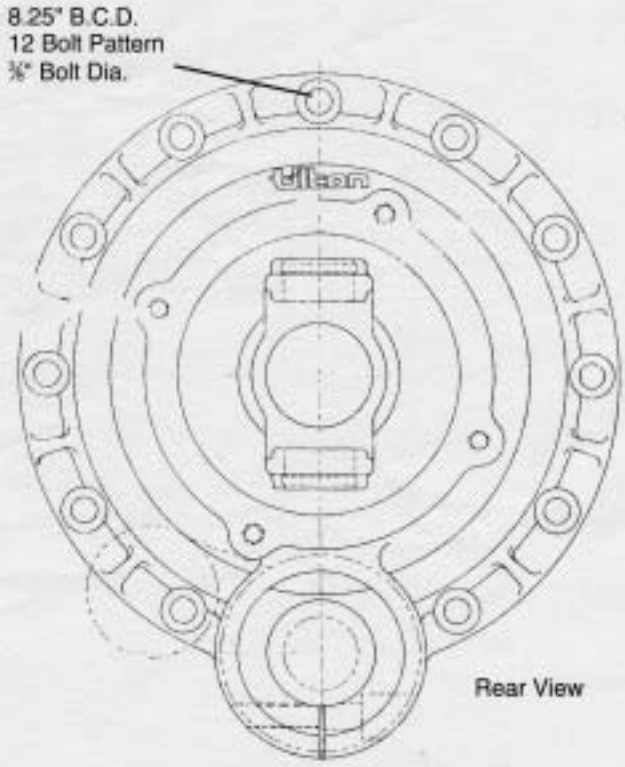
At regular intervals:

1. Inspect flywheel, ring gear and all clutch parts for cracks, especially if used on an engine with high torsional vibrations.
2. Tilton OT-III clutches will perform optimally with up to **.035"** total wear in the disc pack. The discs measure, when new **.103"**. Replace the drive discs when friction area thickness is less than: **2-disc-- .085"**. Check the drive discs for flatness with a straight edge and a feeler gauge. Any disc which is out of flat by more than **.008"** needs replacement.
3. Check for signs of excessive heat. This is indicated by discoloration in the pressure plate, the floater plate, and the diaphragm spring retainer plate. If the diaphragm spring(s) remain flat or are loose when the clutch is removed, it has been over-heated; send the entire unit back to Tilton Engineering for refurbishment.
4. Check pressure plate and floater plate for flatness. Replace any part which is more than **.008"** out of flat.
5. Examine the diaphragm spring for excessive wear at the contact surface of the release bearing. If present, return the entire clutch to Tilton Engineering for refurbishment.
6. Inspect the clutch release bearing and replace if questionable.
7. Clean all clutch components (brake cleaner or acetone are acceptable) and blow out dust from the cover assembly with compressed air prior to assembly.
8. The complete clutch should be returned to Tilton Engineering for periodic reconditioning.

Trouble-shooting Tilton OT-III Racing Clutches

1. If clutch slips, or shows evidence of extreme heat:
   a. Check for properly adjusted release bearing (is there enough free play? Is the mechanism bound?)
   b. Are the discs worn beyond their recommended minimum thickness?
   c. Look for possible interference between hub and crank bolts or other hubs.
   d. Has the diaphragm spring been overstroked? Check for evidence of contact with spring retainer plate inside cover.
   e. Has diaphragm spring been overheated? (does it remain nearly flat when the clutch is removed from the flywheel?)
   f. Check for convenient driver dead pedal. (Drivers often have two heavy feet!)
   g. If step-type, is the flywheel step height correct? (.100/.097) Clutch will act worn out if too short.
2. If clutch does not release cleanly:
   a. Check for proper release bearing travel. (Caution: Do not over stroke!)
   b. Are you using a radius-faced release bearing within the correct diameter range?
   c. Look for possibility of flexing in mechanical linkage, cable stretch, or firewall flex due to pedal effort.
   d. Bleed hydraulic lines to ensure there is no air in the system.
   e. Re-check clutch housing alignment.
   f. Are the drive discs bent or warped beyond recommended limits?
   g. Are the pressure plate and /or floater plate warped beyond recommended limits?
   h. Are the drive disc(s) binding or running out of spline on the input shaft?
   i. Check that the drive discs are installed in their correct position and that no hub interference exists between them or between the discs and the crank bolts.
   j. Look for missing buttons on the clutch legs.
   k. Is the flywheel step height correct? (.100./.097) Diaphragm fingers will appear over center if too tall.
3. If the drive disc hubs break out, rivets work loose or splines are unusually worn:
   a. Verify the clutch housing, the flywheel and the input shaft are running concentric to the crankshaft.
   b. Inspect pilot bearing for evidence of input shaft wobble,and check front bearing in transmission.
   c. Check release bearing mechanism for possible interference with the top disc drive.
   d. Look for signs of hub interference with crank bolts.
4. If clutch engagement is short or sudden(on/off effect), particularly for the OT-III:
   a. Consider using a smaller diameter release bearing.
   b. If using smallest recommended release bearing consider using a smaller master cylinder or more mechanical advantage in the clutch linkage or pedal assembly.





LIMITED WARRANTY

There is no warranty stated or implied, due to the unusual stresses placed on racing/performance parts and because we have no control over how they are used.

This warranty is in lieu of all other warranties expressed or implied, including the warranty of merchantability and fitness for use and all other obligations or liabilities on the Company's part. The obligation of TILTON ENGINEERING under this warranty shall be limited to the part or parts shown to be defective and the Company will not be responsible for any damage or loss caused by delays, failures or any consequential damage arising from any cause whatsoever, nor for labor, transportation or any other charges incurred in the replacement or repair of said defective part or parts.

This warranty to repair or replace is the only warranty expressed, implied or statutory on which the buyer purchases the Company's products. All other damages and warranties, statutory or otherwise, being expressly waived by the buyer.

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A special thanks goes out to Smokey Alleman, (Smokey's LG Machine, Atascadaro, CA 93422) whose long time experience and involvement in sprint cars and midgets proved most helpful in the development of this clutch/starter package. All of us here at Tilton are pleased to be a part of this advancement in open wheel motorsports. We support and applaud USAC's leadership into the next generation of racing.

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