



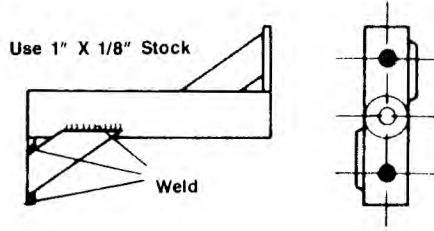
# INSTALLATION INSTRUCTIONS FOR CLUTCHES AND FLYWHEELS

1. It is recommended that you have your old flywheel resurfaced when installing a new disc and pressure plate. Most automotive machine shops can handle this for you.
2. Check the pilot bearing/bushing in the end of the crankshaft for excessive wear, and if in doubt at all replace with a new one. We highly recommend the use of a new pilot bearing or bushing in all cases.
3. Clean crank flange removing all burrs.
4. Install flywheel, lining all holes up correctly. Torque to specifications as follows:
 

7/16"-20 x 1"	70-80 Ft. Lbs.
1/2"-20 x 1"	100-110 Ft. Lbs.
1/2"-20 x 3/4"	100-110 Ft. Lbs.
5. Before installing clutch disc, lubricate input shaft of transmission lightly with a light grease. Slide clutch disc over splines to assure that it moves freely. Be sure your hands are clean when installing the clutch disc as any oil or grease on the lining will considerably shorten its life. Using an aligning tool insert through disc and into pilot bearing making sure that you have the sprung center hub facing away from the flywheel. Be very sure of this when possible, use a Hays aligning tool-see accessories for proper applications. Under no circumstances attempt to use the transmission to to line up disc as the weight of the transmission can bend the disc resulting in erratic operation of the clutch.
6. Wipe pressure plate face with clean, solvent damp rag and dry. Install the pressure plate attaching the bolts finger tight and then tightening progressively around the pattern to the following:
 

5/16"-25 to 30 foot pounds torque maximum.
3/8"-30 to 40 foot pounds torque maximum.
7. Remove lever blocks only after pressure plate is torqued to flywheel, they are located between the levers and the cover. Do not leave them in. Save blocks for when pressure plate is removed. Never remove pressure plate without first putting lever blocks back in. If they are not properly utilized, the end result will be a bent clutch cover. If fiber blocks are lost when removal of clutch is desired, use a substitute 1/4" spacer of any kind of metal will do. (This does not apply to diaphragm style clutches)
8. Check the spring clip on the throw-out arm and install a new throw-out bearing if necessary, being careful to insert it in the spring clip the correct way. (See throwout bearing section of catalog if a new bearing is desired)
9. Inspect clutch and shifting linkage, replacing all worn bushings or pilot points.
10. Hook up clutch linkage and adjust throw-out clearance to at least 1/4" between bearings and fingers regardless of floor to pedal clearance.
11. On aluminum flywheels use only flat washers between crankshaft bolts and flywheel. No other kind (lock, external or otherwise), should be used. Use Loc-Tite on all cap screws both for the flywheel and pressure plate assembly.
12. On stock cast iron flywheels there will appear heat checks which are normal, but when the cracks extend down to the center of recess, throw the flywheel away as it can very easily come apart due to the torque applied on it and not RPM which is generally thought to be the reason of clutch and flywheel explosion. A few dollars spent in replacement now is a lot cheaper than a blown apart car or loss of limbs.

13. On some models of cars, it may be necessary to remove the rubber pedal stops under the dash to have sufficient pedal throw.
14. On Chevrolet models when using a pressure plate of 3400 lbs. or more, use Mr. Gasket-Hays Clutch linkage or modify linkage. The slightest clutch linkage deflection will effect the operation of the clutch at high RPM.
15. On Ford cars it is advisable to beef up the bell crank per sketch below, otherwise it may rip apart when used with a clutch under high pressure.



16. Clutch equipped cars using a line loc should be checked for "creep" before racing. This is done as follows:
  - a. After installation, stage car (do not engage line loc). Rev motor to approximate RPM range you will be using in competition.
  - b. Depress clutch pedal.
  - c. Drop in gear.
  - d. Check linkage for flexing.
  - e. If linkage is flexing, car will usually "creep". If your car is "creeping", your linkage needs to be strengthened. Do not try to race until situation has been corrected and under no circumstances engage line loc. If line loc is engaged before situation is corrected, you may burn up your clutch.

17. CLUTCH ADJUSTMENT- The best method of adjusting a clutch is by measuring the air gap between the clutch disc and/or flywheel with the clutch pedal fully depressed against a stop.

CLUTCH TYPE	STREET	RACING
Diaphragm	.030-.040	.030-.040
Borg & Beck	.040-.050	.050-.060
Long Style	.050-.055	.050-.060
Hays 12 Bolt		.050-.060

It may be necessary to use an adjustable pivot ball to get proper air gap-Hays Part No. 76-130.

18. ADJUSTABLE CENTRIFUGAL ASSIST - For non-shifting applications. All specially noted Long Style and Hays exclusive 12 bolt pressure plates are equipped with the centrifugal assist counter-weighted release levers. The centrifugal assist increases the holding pressure plate as the RPM increases. Desired RPM lock up is adjustable by removing or installing more or less gram-weights.

### TECHNICAL TIPS

GENERAL INFORMATION - Here is some general information regarding proper installation and achieving maximum performance from Hays products. Being familiar with the points discussed below will assure you of getting better performance and may even result in avoiding an expensive repair or product failure. We suggest that you read these Technical Tips before installation of your Hays products. With the different styles we can tailor the pressure

plate to each car's needs. Due to the wide range of engine sizes, car weights, tire sizes and gear ratios this is a must for this day and age. We believe there is no such thing as an "off the shelf model" that will perform at maximum for all cars, that is why we have a vast range of models, each for a specific application.

"DETROIT" FLYWHEEL BALANCE - Certain models engines now being produced have incorporated a counter weight in the flywheel to compensate for the lack of counter weight in the crankshaft. This is known as "Detroit Balance". Models with this balance are noted in catalog.

PRESSURE PLATE BALANCE - Whenever balancing a pressure plate to a flywheel, do not weld on the clutch lever. Remove metal from flywheel where necessary.

CAP SCREWS - We recommend that you use only Mr. Gasket-Hays cap screws with our units as they are especially designed for these specific applications. The extra strength and design of these cap screws will help avoid clutch and flywheel failure.

USE LOCTITE - We urge you to use Mr. Gasket's sealant on all threaded hardware during clutch installation. Use this sealant in addition to lock washers. The Loctite sealant forms a lasting, self-hardening bond between the flywheel and the cap screw.

OIL LEAKAGE - Before installing a new unit, note any possible oil leakage (rear main seal, rocker arm covers, cam plug, transmission seals, etc.) and repair before installation. Oil on the clutch facings will result in defective operation chatter, wear, and could possibly result in the failure of the assembly.

THROWOUT BEARINGS - When replacing a diaphragm type pressure plate with a Borg & Beck type unit on a General Motor product, you must change the release assemblies to the Borg & Beck type. The same applies to a long style clutch - use a long style bearing. The stock bearing assemblies are NOT the same. See throwout bearing section of catalog for proper application.

CLUTCH DISC WEAR - Never allow the clutch disc to wear below a compressed thickness of .280" as failure will occur below this point. When the clutch starts slipping, remove from the car and determine what the problem is and make necessary repairs or replace worn parts.

HEAT SHIELD - A Hays Heat Shield is a sintered bronze insert found in noted flywheels & pressure plates. Our heat shield is compounded particularly for Hays, of sintered bronze, fused to a thin, special competition steel backing plate. The plate is riveted to the flywheel or pressure plate with great care to maximize the heat dissipation capability of the rivets, which are tubular. Machined into the face of the heat shield are a series of expansion channels. The expansion channels perform a number of functions. First, since aluminum, steel and bronze all have different rates of expansion, these channels permit even thermal expansion and contraction, thereby eliminating internal stress build-up. Second, the reflective qualities of the heat shield plate as a heat barrier for the high temperatures and pressures developed during heavy competition use. The barrier greatly reduces the amount of heat transferred to the aluminum or steel flywheel, and thereby reduces the possibility of heat distortion or material strength deterioration. And finally, these channels at high rpm's cause the heat to be pumped out of the clutch unit and radiate into the air surrounding the clutch, where it is more quickly dissipated.



# DO'S & DON'TS PROBLEMS

Description of problem is not complete; contact the factory for "problem" cases and special situations not described below.

PROBLEM			COMMENTS
	Warranty	Non-Warranty	
Hub broken/facing stripped from both sides but facing not worn.	X		Replace but switch to solid hub for strip or "bigger" clutch for street. Check "Hays Recommendations" in catalog.
Facing stripped from flywheel side only.		X	Incorrect application - recommend heavier flywheel/solid hub disc/lower gear ratio.
Disc bent.		X	Damaged by user in installation or installed backwards.
Facing worn uneven.		X	Flywheel/pressure plate needs resurfacing.
Rapid facing wear.		X	Driver slipping clutch/clutch not fully engaging/clutch mis-installed.
Disc springs damaged or loose.		X	Clutch mis-installed - fingers hit disc/disc installed backwards hitting flywheel bolts.
Won't hold slips.		X	Check disc thickness. Min. .280 or failure will result. Check pressure plate & flywheel application, or improper linkage adjustment.
Spring loose.		X	Some springs from factory may be loose and rattle, will not effect performance.
Spline wear excessive.		X	Pilot bearing worn/misaligned.
<b>FLYWHEELS</b>			
Won't fit bellhousing.		X	Heavyweight wheels may require custom bellhousing/spacer plate. See catalog.
Won't fit crankshaft.	X		Recommend that user reverify crank pattern. See catalog.
Rivet(s) missing/loose heat shield.	X		
Ring gear loose.	X		Check starter drive.
Ring gear broken/teeth chipped.		X	Starter engaged while running.
Wrong ring gear.	X		Count teeth and check catalog.
Holes not clearly tapped.	X		
Vibration at high RPM.		X	All flywheels are balanced or "Detroit" balanced to factory specifications. Hays recommends balancing clutch/flywheel as assembly before installation. Balance with crank if possible. Check catalog for "Detroit" balance requirements.
Contact surface worn smooth.		X	Normal wear/resurface - replace heat shield.
Contact surface worn irregularly/rigged.		X	Disc/pressure plate badly worn. Do not resurface flywheel without resurfacing pressure plate and relining disc.

PROBLEM			COMMENTS
	Warranty	Non-Warranty	
Contact surface badly heat checked.		X	Mis-application - should use heat shield type flywheel.
<b>COVER ASSEMBLIES</b> <u>General (All Types)</u>			
Slips - pressure plate shows even wear and no oil.		X	Note: Check release bearing clearance. Mis-installed or mis-application. Hays clutches will not slip if used as recommended in catalog and if installed per instructions.
Slips - signs of oil.		X	Oil leakage - check rear main oil seal.
Drags - pressure plate shows uneven contact ("burnt") on one side.		X	Check for bent cover - improper installation.
Will not disengage at high RPM.		X	Linkage flexing/bent. See installation instruction.
Will not disengage (sticks).		X	Check disc thickness - 0.345" max.
Vibration at high RPM.		X	All clutches are balanced to factory specifications. Hays recommends balancing clutch/flywheel as assembly before installation and with crank if possible.
Throw out bearing contact surfaces (fingers, adjusting nuts, cone edge of diaphragm) evenly and excessively worn.		X	Mis-installed/throw out bearing rubbing when engaged riding clutch/wrong throw out bearing/bad throw out bearing.
Cover bent/damaged - w/o disc failure.		X	Improper installation. Check adjustment for over-centering.
Cover bent/damaged by failure of Hays disc.	X		But see comments under disc failure.
Cover bent/damaged by failure of non-Hays disc.		X	
<b>3 FINGERED TYPE</b> (Borg & Beck; long)			
Adjustment nuts turned.		X	User tampered with unit.
Broken/bent eye bolts, fingers, uneven finger height.		X	Over-centering - check disc to pressure plate clearance.
Fingers/adjusting screws show uneven wear.		X	Improper adjustment.
<b>DIAPHRAGM TYPE</b>			
Tension straps broken.		X	
Cone edge of diaphragm excessively worn on one side.		X	
Freezes to floor at high RPM.		X	Cannot stick if properly installed. Put stop on pedal/readjust clearance.

Warranty adjustments on returned products shall be determined by the manufacturer.