

POWERTRAIN TECHNOLOGY



CLUTCHES - FLYWHEELS - FLEXPATES
BELLHOUSINGS - RELEASE BEARINGS
CUSTOM MANUFACTURED
DRIVETRAIN SOLUTIONS

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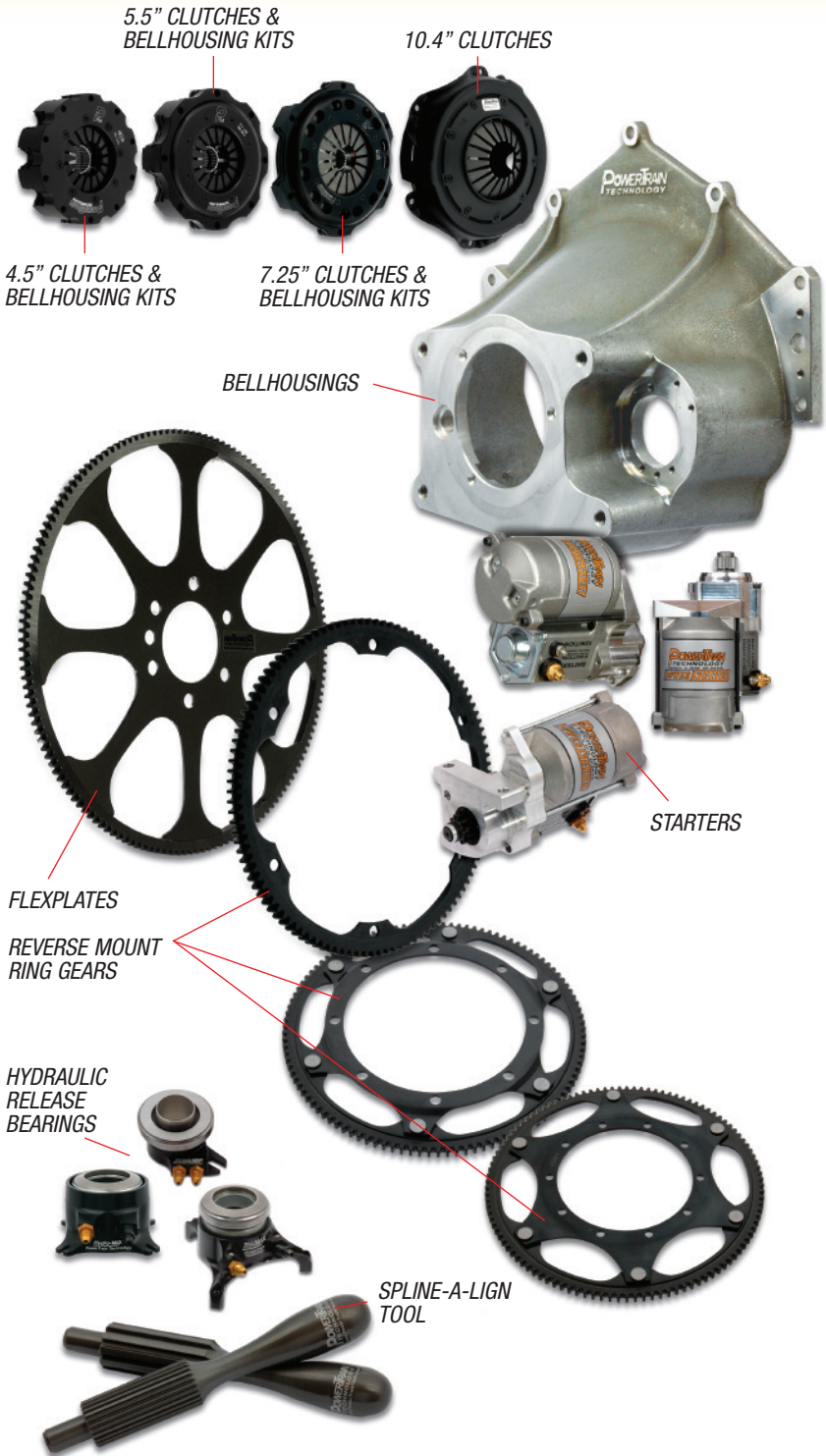


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PRODUCT OVERVIEW





ABOUT POWERTRAIN TECHNOLOGY, INC. (PTT)

PowerTrain Technology (PTT) was formed in 2002 by Steven Fox. Steve was not new to racing clutches and drivetrain technology. Steve was the Manufacturing & Design Engineer for Quarter Master Industries for close to 20 years. He is a highly qualified machinist, racer, and top shelf mechanic who has over 45 years of experience in the racing industry. Steve left Quarter Master after the original owner sold the company in 1999. Steve then spent the next year designing and developing the next new generation in low Moment of Inertia (MOI) multi-disc racing clutches now sold by PTT.

All PTT products are engineered and designed with Computer Aided Design (CAD) software and then Computer Numerically Controlled (CNC) machined to exacting tolerances. PTT's prototype products go through rigorous in-house testing to validate the integrity of the design, and then are tested on the race track before being offered for sale.

PTT's manufacturing process begins with selection of only the highest quality raw materials. All raw materials are selected based on the specific chemistry best suited for the part being made. PTT parts are machined to tolerances, frequently closer than 0.001" (0.025mm) and continuously checked for accuracy throughout the manufacturing process. After machining, parts are subjected to heat treat, or specific surface finishing designed to increase their toughness, and longevity.

Finally, every part PTT makes is labeled with PTT's logo, part number, and production batch code.

Parts are stored, in a temperature and humidity controlled environment until they are sold. All clutches are assembled per order, following rigid assembly and quality assurance procedures. All hydraulic release bearings are assembled in clean room like conditions. Each and every bearing assembly is pressure bled and then pressure tested to a minimum of twice its normal operating pressure.

PTT clutch components are modular. This means they can be assembled in a wide variety of combinations to fit each specific racer's requirements. Individual, hand assembly per order means PTT can offer you the absolute best clutch for your application, while at the same time achieving a quality level which far surpasses the actual price paid.

Because PTT parts are manufactured to such exacting specifications they normally do not need to be spin balanced. Due to the tight parallelism and run-out tolerances PTT holds, all components have what is called inherent balance.

Involute gear and spline design is a niche specialty at PTT. Properly designed gears transmit power in a very efficient manner with minimal parasitic losses. Properly designed involute gear teeth also provide superior strength. All of PTT's geared products feature high strength tooth forms to give you the strength and reliability advantage you seek on the race track.

PTT offers a complete line of automotive racing driveline products that deliver a competitive advantage. PTT's lightweight line of open style clutches in 4.5", 5.5" & 7.25" diameters are available in 1, 2, 3, or 4 disc configurations. They feature good linear engagement, good friction life and a positive feel. To put it simply: PTT builds racing drivetrain parts that are second to none. Listening to our customers and giving them what they ask for is what drives this company to excellence!

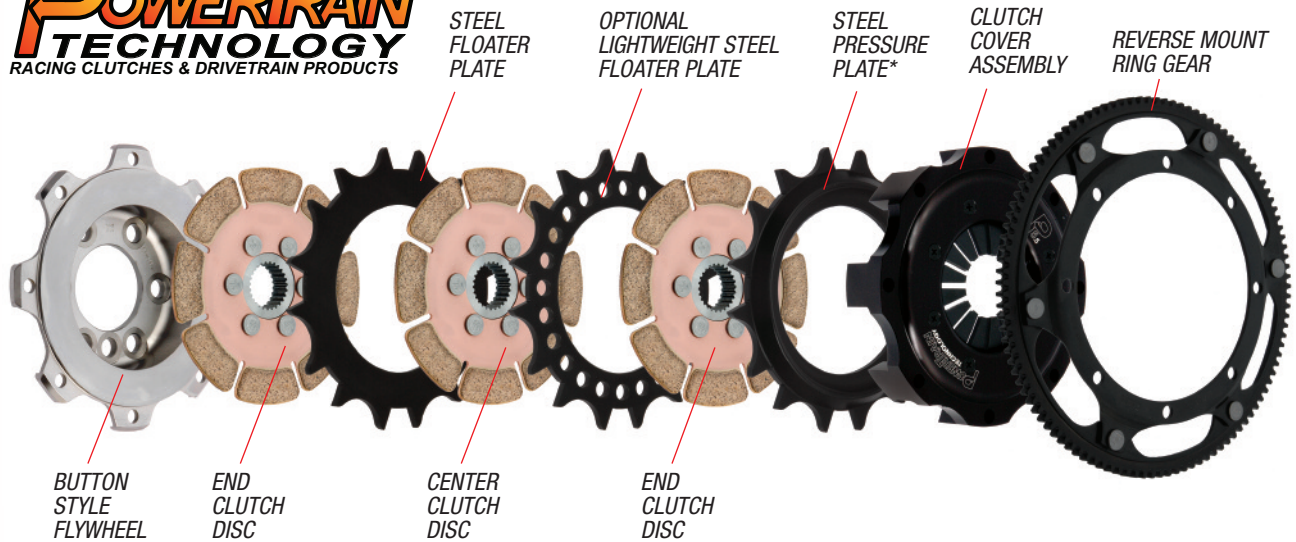


If you would like more information on PowerTrain Technology's full product line please scan this code with your smart phone



ANATOMY OF A PTT RACING CLUTCH

PowerTrain
TECHNOLOGY
RACING CLUTCHES & DRIVETRAIN PRODUCTS



* Also available as an optional aluminum pressure plate with lightweight floater

CLUTCH FACTS: WHAT MAKES A PTT CLUTCH BETTER THAN THE COMPETITION?

COMPETITIVE EDGE

Highly Engineered = Extreme Levels of Performance (Strength AND Light Weight); Ease of Use; Quality; Dependability. These are the terms that have come to be associated with products from PowerTrain Technology.

LOW MOMENT OF INERTIA (MOI)

Critical weight is removed from the largest diameters of rotating parts, where it reduces MOI the most. Low MOI means more of your engine's horsepower gets to the drive wheels. This results in Quicker Acceleration; Increased Engine Braking under deceleration; Easier on Brakes; and (potentially) better fuel economy.

SIZE

Fits into a smaller work envelope due to improved design and flush mounted fasteners. Approximately .250" shorter overall than other competitors' similar clutches.

BETTER CONTROL

Optimized clutch cover design, translates to lower pedal effort, better modulation or drivability and better clutch control.

COOLER RUNNING

Open housing design means improved cooling and dust evacuation.

BETTER BALANCE

Power-V clutch cover leg design offers a level of performance that is superior to other competitor's designs. Power-V makes the clutch components self-centering and therefore self-balancing under load.

PROPRIETARY FRICTION MATERIALS

State-of-the-art clutch friction materials feature smoother engagement and longer life.

MICRO-FINISHING

PTT clutch discs are ground to an extremely fine surface finish. This eliminates the need for any bedding-in, and reduces excessive wear when new.

ALIGNMENT

All PTT Clutches positively locate with a stepped flywheel register. This results in improved actuation, and improved balance.

PRECISION

CNC machined to very tight tolerances using state-of-the-art machines, materials, and finishes.

ORDER LINE: 847.458.2323 FAX: 847.458.2324



CLUTCH FACTS: HOW TO SELECT A RACING CLUTCH

Circle track racing clutches are designed to be as light in moment of inertia (MOI) as absolutely possible. You always want to select the lightest clutch and drivetrain components which the rules you race under will allow. The only exception to this has to do with durability. In order to finish first, first you must finish!

The clutch you select will be a fine balance of lightweight and low moment of inertia performance combined with enough durability for your particular car/engine/driver combination. Too heavy, and you will not be competitive. Too light and you might not finish the race. The clutch that you ultimately select is based upon several factors. Here is a step by step guide to selecting the correct clutch for your application. First, let's talk about some clutch basics.

CLUTCH BASICS

The reason for selecting a multi-disc racing clutch is increased torque capacity. If you want to double the torque capacity of a one disc clutch, simply add another clutch disc. Do you want triple the torque capacity? Use three clutch discs. Adding clutch discs is a great way to increase torque capacity, without increasing the diameter (or MOI) of the clutch or increasing the pedal effort.

An alternative way to increase the torque capacity of a clutch would be to increase the diameter. Increasing the diameter is usually impractical due to size limitations. Doubling the diameter of a clutch will double the torque capacity, but the clutch will have **four times** the moment of inertia.

CLUTCH FACTS: CLUTCH SELECTION GUIDE

1. ENSURE THE CLUTCH YOU ARE CONSIDERING CONFORMS TO THE RULES

The sanctioning body which governs your type of racing usually has a 'clutch rule'. Generally sanctioning bodies like to spell out minimum clutch disc diameters, or limit you to a single disc clutch.

2. SELECT A CLUTCH WITH THE RIGHT TORQUE CAPACITY

The minimum break-away torque capacity of the clutch you select is based upon how much peak torque your engine develops. Clutches only care about torque, NOT horsepower. The rule of thumb PTT uses to properly size a clutch to your application is as follows:

Multiply your engine's peak torque by 1.25 (minimum) and select a clutch that has at least as much or more, torque capacity. For instance, if your engine has a peak torque of 400 lb. ft. multiply 400 by 1.25 (400 x 1.25 = 500). Therefore, in this example, you would select a clutch which has a torque

capacity of at least 500 lb.ft. For all wheel drive (AWD) cars, you should use a 1.5 multiplier.

Engines that have unusually high harmonic vibration, such as some inline 4 cylinders, or inline 6 cylinders or engines with extremely light rotating/reciprocating assemblies (light cranks and pistons, titanium rods, no harmonic damper, etc.) should be rated using a 1.5 multiplier.

Too much clutch torque capacity can be just as harmful as too little clutch torque capacity. Think of your clutch as a fusible link between your drive wheels and your engine. If the drive wheels rub up against another car (or the wall) or come to an abrupt stop for whatever reason (collision) the clutch will slip and not transmit a harmful torque spike from the drivetrain to the engine. This can save valuable engine components, saving you a considerable amount of money.

Formula Enterprise (FE) racecars use a PTT 5.5" 2D clutch, flywheel, flexplate and release bearing. PTT is the exclusive clutch supplier for Formula Enterprise.



POWERTRAIN
TECHNOLOGY
RACING CLUTCHES & DRIVETRAIN PRODUCTS

REMEMBER

It is important to always specify a clutch with more torque capacity than needed. Always round up when it comes to selecting a clutch with the proper torque capacity. This avoids the possibility of slippage, which will quickly destroy a racing clutch due to excessive heat buildup.

Avoid using a clutch with a torque capacity of 2.0 or more times the engine's peak torque rating (see PTT Clutch Facts: Too much clutch torque capacity? on page 5).



CLUTCH FACTS: CLUTCH SELECTION GUIDE, CONTINUED

3. SELECT A CLUTCH SIZE MATCHED TO YOUR RACECAR OVERALL WEIGHT

Lightweight cars (formula cars, small 4 cylinder cars, etc.) can use the smallest clutches (4.5"). Heavier cars have more kinetic energy, and will need to go up in clutch diameter. Bigger diameter clutches have more mass. This extra clutch mass is needed for cars with more kinetic energy.

4. GEAR RATIOS

If your racecar has a tall first gear, or a tall final drive ratio (or both), you might want to consider going to a larger diameter clutch than you would normally install. The increased amount of clutch slippage needed to get the car rolling, due to high gear ratios, will generate increased heat in the clutch. More clutch mass is needed to offset this increased slippage.

5. DURABILITY VS PERFORMANCE

The primary consideration in selecting the diameter of the clutch comes down to balancing durability against performance. A smaller clutch will give the car better performance. A bigger clutch will give extra durability. All things being equal, a 4.5" clutch has approximately half the MOI of a 5.5" clutch. A 5.5" clutch has about half the MOI of a 7.25" clutch. The performance benefits with a clutch that has half (or one fourth!) the MOI of larger clutches help immensely on the track.

A WORD ABOUT CLUTCH HEAT

It is important to understand that the smaller the clutch is, the more sensitive it is to excessive heat build-up. The driver must be very careful and always drive the smaller clutch within its limits. Just as conserving your tires or your brakes is important, so is **conserving your clutch!**

To help you understand how critical this is, think of a 4.5" clutch as a cup of water, and think of a 5.5" clutch as a quart of water, and a 7.25" clutch as a gallon of water. If you put a cup of water and a gallon of water on the stove to boil, which one will boil sooner? The cup of water boils sooner, due to its lower mass. Think of slipping the clutch as being equivalent to putting the water on the hot stove. Lower mass can be a great help in getting around the race track faster due to lower MOI, BUT you have to be careful to *not overheat the clutch!*

With a small clutch you should always *push* your car around in the pits, *never drive the car on the trailer*, and *avoid slipping the clutch*. In the heat of the battle (leaving the pits under a green flag pit stop, or spinning out in the in-field, it is **always** better to break the tires loose to get the car going, rather than excessively slipping the clutch.

6. DRIVER SKILL LEVEL

Getting maximum life out of your clutch is an acquired skill. First you must ask yourself, "How good is my driver?" Does he/she have multi-disc racing clutch experience? Can he/she make a racing clutch pack last a full season or longer? If the answer is yes, select the smallest clutch you can afford that meets the torque requirements, vehicle weight, and gear ratio guidelines specified above.

If you have a newer, less experienced driver, here is a trick we often recommend. You may want to add an additional disc to your selected clutch assembly. This will help the clutch withstand more heat abuse (because it now has a little more mass), while still improving the racecar's performance over what is achievable with a larger diameter clutch. If you have the choice of adding a disc to a small diameter clutch or going to the next size larger clutch, adding the extra disc to the smaller size clutch will give you much better performance than the larger clutch *and* give you the extra durability required. Generally the next bigger size clutch roughly doubles the clutch MOI. As the driver's performance (skill with the racing clutch) improves, it is inexpensive to get a shorter clutch cover, and remove one clutch disc and floater plate.

HEAT IS A RACING CLUTCH'S MORTAL ENEMY



Every time you are slipping the clutch, the clutch friction surfaces are generating heat. You should always try to conserve your equipment by keeping the heat build-up in your racing clutch to an absolute minimum. This is best accomplished by using the minimum engine RPM necessary to get the car launched, and/or slipping the clutch for the shortest amount of time needed to get the car moving. Get your crew to push the car off when leaving the pits or paddock area. Once the car is rolling, and the driver's foot is completely off the clutch (clutch is fully engaged), you can do whatever you want with the throttle.

NEVER drive the car onto the trailer. Use a winch.

Matching engine RPM on downshifts also helps reduce clutch heat build-up (and excessive wear) immensely. You should NEVER slide or 'fan' the clutch coming off a slow corner to make up for a wrong gear ratio. The amount of heat generated doing this to a small multi-disc clutch will damage it in a short time.



CLUTCH FACTS: TORQUE FACTS

CLUTCH TORQUE IMPROVES OVER THE LIFE OF THE CLUTCH.

The torque capacity of all PTT clutches increase as the clutch wears. As the clutch wears, the clutch will transmit more torque! Once you understand this little known fact, you can rest easy in the knowledge that if the clutch does not slip when it is initially installed then, like a fine wine, it will only get better with age.

TOO MUCH CLUTCH TORQUE CAPACITY?

Sizing the clutch torque capacity to your application is covered elsewhere. However, it should be noted that it is possible to have too much clutch torque capacity. You should avoid having more than twice the engine torque for the clutch torque capacity. You want the clutch to slip if a sharp torque spike is transmitted back up the drivetrain from the drive wheels, such as if a driver experiences wheel-to-wheel contact with another competitor, the wall, or upon impact with a stationary object that suddenly stops the drive wheels. This helps avoid expensive engine or gearbox damage.

CUSTOM TORQUE CAPACITY.

PTT clutches can be custom tailored for a lower clutch release force by installing a lighter diaphragm spring. This is frequently done for a couple of reasons. It reduces pedal effort to the driver and it reduces the force on the engine's crank thrust bearing. This helps reduce driver fatigue in longer endurance events, while improving engine durability. Some smaller 4 cylinder engines cannot withstand the excessively high release loads imparted from some aftermarket racing clutches. PTT's clutches with lower release loads eliminate the chance of expensive engine rebuild costs due to 'crank walk'. See our article on crank walk at www.PowerTrainTech.com.



THE TORQUE CAPACITY OF A PTT CLUTCH CAN BE CHANGED IN THREE WAYS:

- 1. Install a high-torque pressure plate instead of a standard pressure plate.** This pressure plate has a reduced diameter fulcrum. Installing a high-torque pressure plate will increase the torque capacity of a clutch with NO increase in spring clamp load or pedal effort.
- 2. Select a different diaphragm spring.** PTT diaphragm springs are rated from 'AA' to 'C'. Standard clutches come with 'A' rated springs. Changing from an 'A' spring to a 'AA' spring will increase the torque capacity as well as pedal effort and thrust bearing load. Conversely, changing from an 'A' spring to a 'B' spring will reduce the torque capacity, pedal effort, and thrust bearing 'stress'. Typically clutch diaphragm springs are changed to accommodate pedal effort requirements just as much as for peak torque capacity fine tuning.
- 3. Select a different friction material.** PTT offers bronze metallic, organic and iron metallic based friction materials. Different friction materials offer different coefficients of friction (Cf). An alternative friction material might be selected for its drivability as well as its ultimate torque capacity.

MAXIMUM CLUTCH RELEASE LOAD LIMITS.

All PTT clutches are designed to never exceed 800 pounds of force during clutch disengagement (clutch release). Some unknowledgeable clutch manufacturers will install two standard diaphragm springs into a 7.25" clutch cover and call it 'high performance'. This is irresponsible, and demonstrates a lack of good engineering judgment (or no engineering at all!) Although this doubles the torque capacity of the clutch, it also doubles the load on the engine's thrust bearing, causing its early failure and expensive replacement. This 'trick' will also double the force needed to disengage the clutch, causing driver fatigue.



CLUTCH FACTS: FRICTION MATERIALS

SINTERED BRONZE METALLIC

PTT's standard friction material is a proprietary sintered metallic material that has been custom blended to meet a variety of different requirements. It is also ground to an extremely fine surface finish. This eliminates excessive clutch wear the first time the clutch is used. It also doesn't require bedding-in when first installed. Standard thicknesses available in this material are 0.105", 0.125", 0.200", or 0.250" thick. The thickness of the disc for use in your clutch is determined by the type of use it is put to. Generally, a thicker disc would be selected if the clutch is going to be consistently subjected to higher operating temperatures brought about by lots of slippage. Thinner discs are selected for their lighter MOI, resulting in faster shifting, and longer transmission part life.

Under normal conditions, each 7.25" disc provides 300 lb.ft. of torque capacity. PTT metallic friction materials stand up to extreme heat abuse better than organic friction materials, and do not drop as much Cf as organic materials as the lining temperature goes up.

ORGANIC

Organic friction materials have a softer, more forgiving engagement characteristic. PTT organic discs have a higher coefficient of friction (Cf) than some metallic linings offered. Using a clutch cover with the same clamp load (diaphragm spring), the organic material will deliver a higher clutch torque capacity. GENERALLY, you can plan on approximately 400 lb. ft. of torque per 7.25" disc. Organic friction materials lose Cf as the lining temperature goes up. If you get an organic clutch hot, and it slips, let the clutch cool down to avoid costly damage to the rest of the clutch components due to excessive heat.

Organic discs are designed mainly for street driving. Organic clutch discs should not be used in applications over 400 hp or other extreme applications, such as drag racing.

SINTERED IRON METALLIC

PTT's highest Cf friction material. If you have a difficult application, and need every last lb.ft. of torque capacity then this is the material for you! When used in a single disc 7.25" clutch this iron material has a torque rating in excess of 600 lb. ft. In many situations, this clutch will allow you to go from a standard 2 disc clutch to a 1 disc clutch in order to reduce static weight and MOI. This material drops Cf moderately with increased lining temperature. It is also 'grabber' than our velvety smooth bronze material. Most drivers will initially find iron material more difficult to drive at first.

MOMENT OF INERTIA

Moment of inertia, (MOI) or more properly called angular moment of inertia as it applies to rotating parts (racecar drivetrain parts) deserves important consideration.

The reduction of MOI in your racecar's drivetrain will pay big dividends in your car's performance. First let's consider how MOI is calculated. The MOI of rotating parts can be solved by the formula $1/2 MR^2$ where M = mass and R = radius. This means that one half the mass of a rotating part times the radius (squared) of the rotating part will give us the MOI of the part expressed in lb./in.². Let's solve for the MOI of a simple flywheel:

Let's say we have a flywheel that weighs 12 pounds and is 10" in diameter.

$$\text{Mass (M) = 12 lbs. and Radius (R) = 5"} \\ 1/2 \times 12 \times 5^2 = 150 \text{ lb./in.}^2$$

Now let's take our 12 pound flywheel and put it on a diet. Let's turn 4 pounds off of it to reduce its weight down to 8 pounds. (That is a full 1/3 reduction in weight!)

$$\text{Now, M = 8 lbs. and R = 5"} \\ 1/2 \times 8 \times 5^2 = 100 \text{ lb./in.}^2$$

This shows that a 1/3 reduction in weight results in a 33% reduction in MOI. OK. Good. 1/3 lighter MOI will result in a good performance increase on-track.

To illustrate how important MOI is, let's look at this problem a little differently. Let's reduce the size of the flywheel to a 6" diameter but for comparison sake we will say that it still weighs 12 pounds (just as heavy as our original flywheel).

$$\text{Now, M = 12 lbs. and R = 3"} \\ 1/2 \times 12 \times 3^2 = 54 \text{ lb./in.}^2$$

This shows that a 50% reduction in size results in a 64% reduction in MOI.

$$\text{Now, M = 6 lbs. and R = 3"} \\ 1/2 \times 6 \times 3^2 = 27 \text{ lb./in.}^2$$

Your flywheel now has a full 82% reduction in MOI!

This example illustrates that you get a bigger reduction in MOI by reducing the rotating diameter than by reducing the rotating weight. So... the next time you are shopping for a new clutch you should not ask how much it weighs. *Instead, ask how much MOI it has.*



MOMENT OF INERTIA, CONTINUED

This also clearly illustrates that the MOI of a 5.5", 3 disc clutch (39.4 lb./in.²) will be significantly lower than a 7.25", 2 disc clutch (71.4 lb./in.²).

Every spinning part PTT engineers is built with an eye towards reduced MOI, while still paying critical attention to rugged reliability and quality. It is this low MOI that gives you the unfair advantage over your competition. You may be fast, but PTT racing products can allow you to go faster!

REDUCED MOI SHOWS UP AS A BENEFIT IN YOUR RACE CAR IN SEVERAL DIFFERENT WAYS:

Low MOI Advantage #1

On acceleration the engine's horsepower is more efficiently transmitted to the drive wheels. Due to the fact that this extra power is not being absorbed by having to spin up the excess inertia of the heavier clutch and flywheel, the racecar with the lower MOI driveline parts will out-accelerate a racecar with heavier MOI driveline parts.

Low MOI Advantage #2

On braking when approaching a turn, the racecar with the lower MOI driveline parts decelerates harder, with less stress on the braking system. This is due to the fact that the engine has much less flywheel inertia trying to carry the car deeper into the corner. This increased engine braking can result in less brake pad wear and less stress on the rest of the brake system.

Low MOI Advantage #3

Lower MOI parts take less horsepower to accelerate. This can result in lower fuel consumption. In an endurance event this can add up to a substantial fuel savings. Perhaps enough to alter your pit stop strategy.

Low MOI Advantage #4

Low MOI rotating parts usually also have lower static weight. This allows the racecar designer to reduce the car's weight. If the class has a minimum weight and the car is already under that weight, it allows the designer to put the ballast where it will help the car's handling the most.

Low MOI Advantage #5

Low MOI clutch disc(s) allow for quicker up-shifts and down-shifts. This can be a measurable difference in reduced lap times on a road course.

Low MOI Advantage #6

Low MOI clutch discs allow for reduced stress on transmission synchros or dog rings. Because the clutch disc(s) change RPM quicker there is less force applied to synchros or dog rings, resulting in longer life of these critical transmission components.

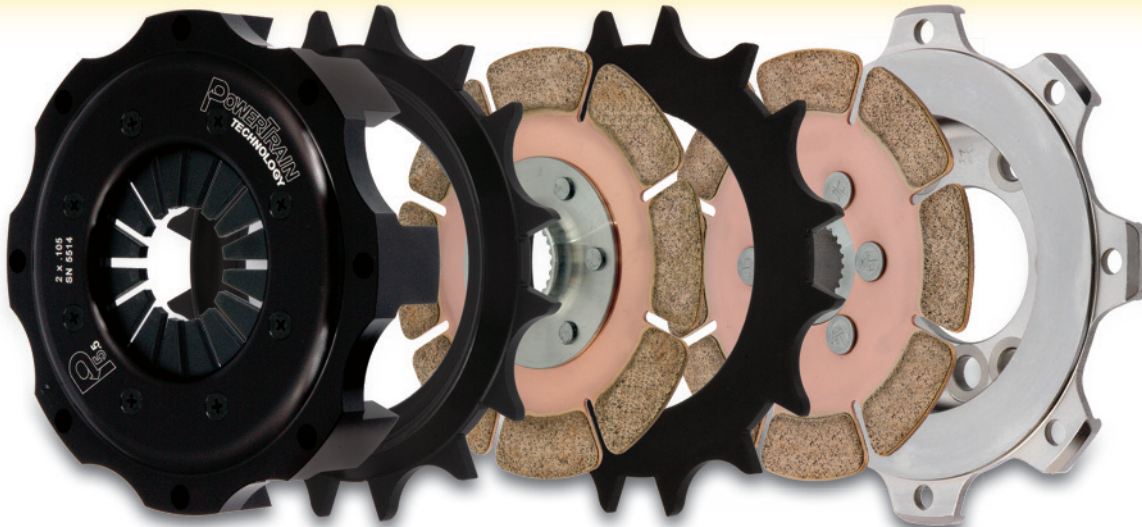
Q . Is it more important to reduce the static weight of your racecar, or reduce the MOI of your car's rotating parts?

A . It is generally recognized that there is about a ten to one advantage in favor of reducing rotating weight over static weight in a racecar. As an example...if you have the chance to remove just one pound of rotating weight from your flywheel, you will see an immediate and noticeable improvement in the racecar's acceleration. On the other hand if we put a ten pound brick in your racecar without your knowledge, you probably would not even realize it was there.





4.5" CLUTCHES AND BELLHOUSING KITS



4.5" POWER-V RACING CLUTCH

4.5" Power-V racing clutches are the lightest Moment of Inertia (MOI) clutches in our product line. They are approximately half the MOI of our 5.5" clutches. If the rules you race under allow a clutch this small, you should take advantage of the performance gains offered by this clutch.

The PTT 4.5" Power-V Racing Clutch features the Power-V drive system. PTT President Steve Fox invented this technology for modern racing clutches back in 1997. The benefits of this type of drive are many. The angled Power-V drive legs make the floater plates self-centering. They even out the drive forces in the clutch, and provide inherent dynamic balance. The resulting increased surface area of the Power-V lowers stress in the clutch as well, allowing longer life of component parts.

Here are the facts: A PTT 4.5" clutch makes your racecar accelerate faster.

The lower rotating weight in your racecar's driveline allows your engine horsepower to accelerate the car faster. A PTT 4.5" clutch also allows the car to decelerate faster while using less of your brakes (there is less drivetrain inertia that the brakes have to slow down so you get more 'engine braking' with a lighter clutch.) Quicker Shifting is another great advantage. The lighter (lower MOI) clutch discs allow quicker shifting, while also causing less wear on the syncros, or dog rings, in your transmission. Lower MOI clutch discs change RPM faster because they have very low stored inertia. This low inertia creates less stress on transmission parts. The 4.5" clutch has 56% of the MOI of a 5.5" clutch.

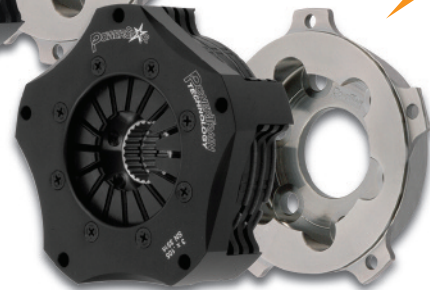


- 4.5" Power-V Racing Clutches are available in 1, 2, or 3 disc configurations
- Lifetime guarantee against defects in material and workmanship
- Different friction materials are available for specific racing needs (see friction materials on page 6).

4.5" 10 BOLT POWER-V RACING CLUTCH



POWERSTAR

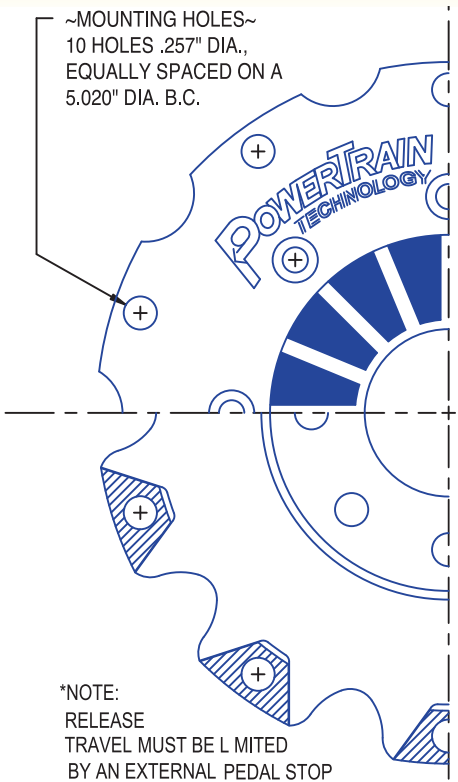


4.5" 5 BOLT POWER-V POWERSTAR RACING CLUTCH

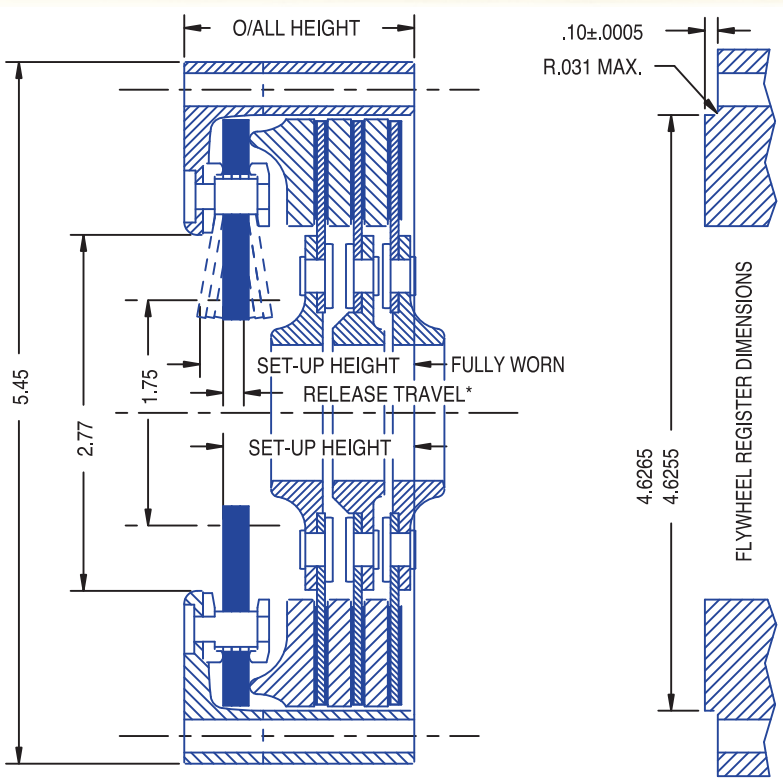
- 5-leg clutch for cutting edge MOI reduction
- For specific applications, part numbers and other technical information please see our Application Guide, or visit

www.PowerTrainTech.com

When it is time to select a winning clutch, remember:
LIGHTER REALLY IS FASTER!



*NOTE:
RELEASE TRAVEL MUST BE LIMITED BY AN EXTERNAL PEDAL STOP



Number of Discs	Set-up Heights		Release Travel*	Height Overall	Disc Thickness	
	New	Fully Worn			New	Fully Worn
2	1.20"	1.33"	0.16"	1.54"	0.105"	0.090"
3	1.49"	1.62"	0.16"	1.81"	0.105"	0.095"
4	1.77"	1.90"	0.16"	2.09"	0.105"	0.097"

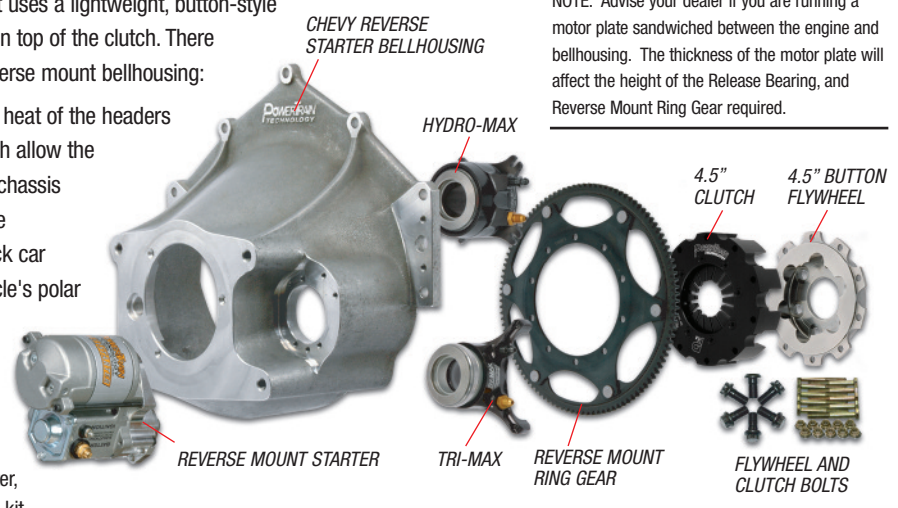
4.5" CLUTCH REVERSE STARTER MOUNT BELLHOUSING KITS

PTT's reverse starter mount bellhousing kit uses a lightweight, button-style flywheel and a starter ring gear mounted on top of the clutch. There are a number of advantages to using a reverse mount bellhousing:

1. The starter is mounted away from the heat of the headers
2. The small diameter flywheel and clutch allow the drivetrain to be mounted lower in the chassis
3. The smaller overall physical size of the bellhousing fits more easily into a stock car
4. Relocating the starter lowers the vehicle's polar moment of inertia, resulting in better handling and faster turn-in response.

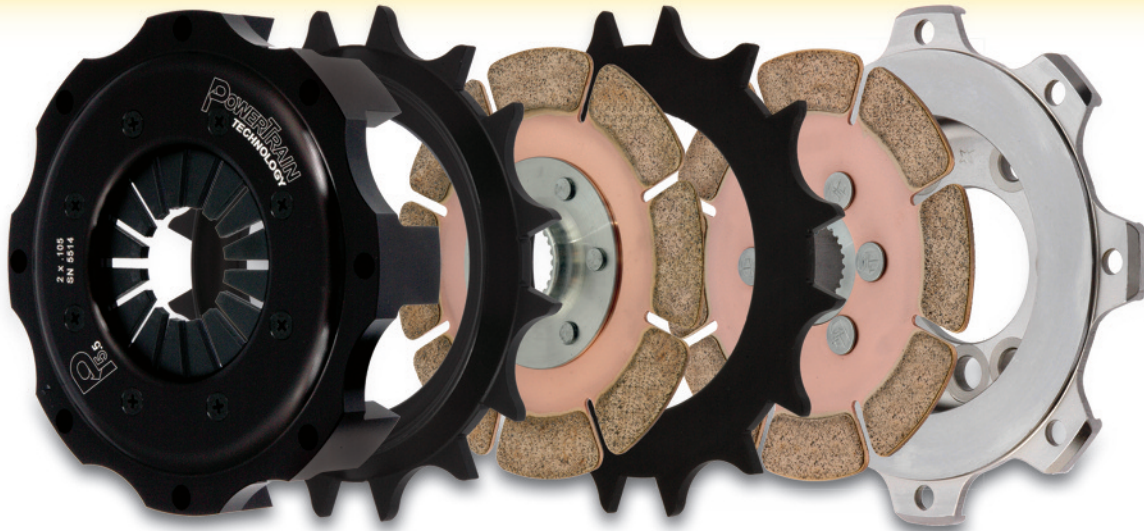
Kit includes: 4.5" Clutch, Lightweight Button Flywheel, Reverse Starter Mount Bellhousing (aluminum or magnesium), Reverse Mount Starter, Hydraulic Release Bearing with External Bleeder kit (Hydro-MAX or Tri-MAX), Reverse Mount Ring Gear, Clutch Bolts & Flywheel Bolts.

NOTE: Advise your dealer if you are running a motor plate sandwiched between the engine and bellhousing. The thickness of the motor plate will affect the height of the Release Bearing, and Reverse Mount Ring Gear required.





5.5" CLUTCHES AND BELLHOUSING KITS



5.5" POWER-V RACING CLUTCH

PTT offers racing clutches that feature innovative design, high reliability, and above all else the competitive edge you seek. Our 5.5" line of metallic clutches feature Ultra-Low Moment of Inertia (MOI). They are up to 20% lower in MOI than other manufacturers' equivalent clutches. PTT clutches have Race Winning Reliability built into them. This level of performance comes from over 35 years of experience building championship winning, quality products. The engineering excellence, vision, and dedication to using the finest quality materials and manufacturing methods speaks for itself every time you pick one up.

The PTT 5.5" Power-V Racing Clutch features the Power-V drive system. PTT President Steve Fox invented this technology for modern racing clutches back in 1997. The benefits of this type of drive are many. The angled Power-V drive legs make the floater plates self-centering. They even out the drive forces in the clutch, and provide inherent dynamic balance. The resulting increased surface area of the Power-V lowers stress in the clutch as well, allowing longer life of component parts.

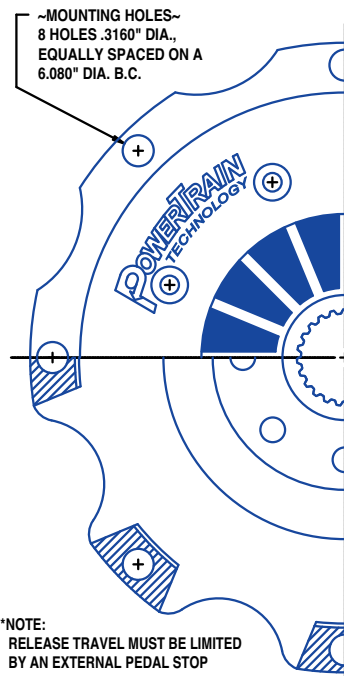
Standard features included in every PTT 5.5" clutch are: Low profile cover design, Flush mount fasteners, Power-V drive legs, Micro-Finished friction material, CNC manufacturing ensuring the highest level of quality, Open Design for cleaner operation & longer maintenance intervals. Also offered are: Different friction materials to suit specific racing needs, Lightened Chrome-Moly Floater Plates & Pressure Plates, and Aluminum Pressure Plates for the ultimate in low MOI. The 5.5" clutch has 58% of the MOI of a 7.25" clutch.

- 5.5" Power-V Racing Clutches are available in 1, 2, or 3 disc configurations
- Lifetime guarantee against defects in material and workmanship
- Different friction materials are available for specific racing needs (see friction materials on page 6).

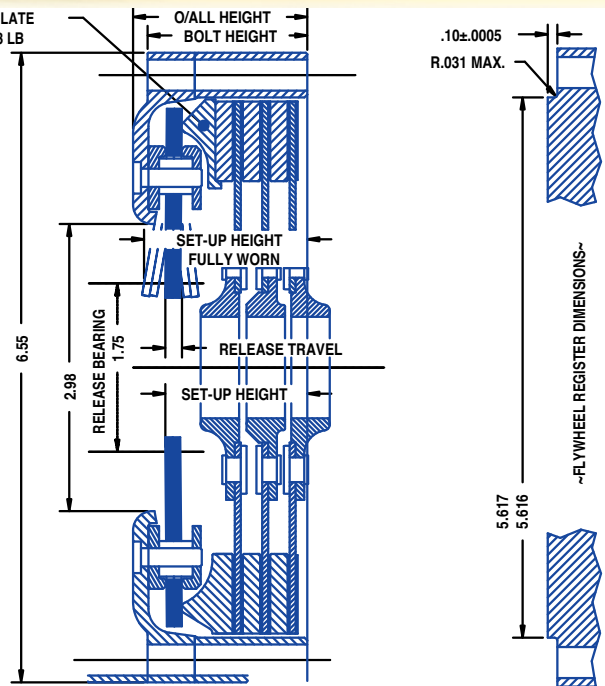
5.5" POWER-V RACING CLUTCH



Product Excellence and good old fashioned Customer Service is our way of going about our everyday business. To us, this is not rocket science, but with PTT products in your racecar, you just might think it accelerates like a rocket.



OPTIONAL ALUMINUM PRESSURE PLATE LOWERS ASSEMBLY WEIGHT BY 1/3 LB



Number of Driven Discs	Recommended Max. Engine Torque	Set-up Heights		Release Travel*	Measured Heights		Assembled Weight	Moment of Inertia	Disc Thickness	
		New	Fully Worn		Overall	Bolt HT			New	Fully Worn
1 x .105"	250 lb./ft.	0.90"	1.06"	0.19"	1.24"	1.09"	4.0 lbs.	25.6	0.105"	0.075"
2 x .105"	550 lb./ft.	1.19"	1.35"	0.19"	1.53"	1.37"	5.6 lbs.	33.3	0.105"	0.090"
2 x .200"	550 lb./ft.	1.35"	1.54"	0.19"	1.72"	1.56"	6.0 lbs.	37.3	0.200"	0.185"
3 x .105"	800 lb./ft.	1.47"	1.63"	0.19"	1.81"	1.66"	7.1 lbs.	39.4	0.105"	0.095"
3 x .200"	800 lb./ft.	1.75"	1.91"	0.19"	2.09"	1.94"	8.0 lbs.	44.9	0.200"	0.190"
4 x .105"	1050 lb./ft.	1.75"	1.91"	0.19"	2.09"	1.94"	8.7 lbs.	49.5	0.105"	0.097"

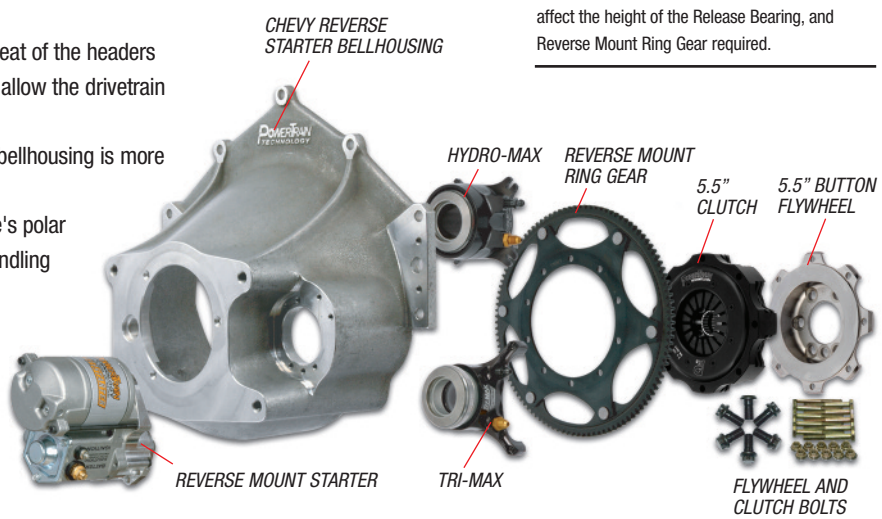
5.5" CLUTCH REVERSE STARTER MOUNT BELLHOUSING KITS

PTT's reverse starter mount bellhousing kit uses a lightweight, button-style flywheel and a starter ring gear mounted on top of the clutch. There are a number of advantages to using a reverse mount bellhousing:

1. The starter is mounted away from the heat of the headers
2. The small diameter flywheel and clutch allow the drivetrain to be mounted lower in the chassis
3. The smaller overall physical size of the bellhousing is more easily packaged in a stock car
4. Relocating the starter lowers the vehicle's polar moment of inertia, resulting in better handling and faster turn-in response.

NOTE: Advise your dealer if you are running a motor plate sandwiched between the engine and bellhousing. The thickness of the motor plate will affect the height of the Release Bearing, and Reverse Mount Ring Gear required.

Kit includes: 5.5" Clutch, Lightweight Button Flywheel, Reverse Starter Mount Bellhousing (aluminum or magnesium), Reverse Mount Starter, Hydraulic Release Bearing with External Bleeder kit (Hydro-MAX or Tri-MAX), Reverse Mount Ring Gear, Clutch Bolts & Flywheel Bolts.





7.25" CLUTCHES AND BELLHOUSING KITS



7.25" POWER-V RACING CLUTCH
 PTT's 7.25" Power-V racing clutches are the most economical way to get into a true racing clutch. They have all the same race winning qualities and reliability of PTT's 5.5" and 4.5" clutches. PTT's clutches feature proprietary, micro finished, friction material. They do not require bedding-in, and have longer life as a result. Smooth easy-driving engagement is just another benefit of PTT friction material.

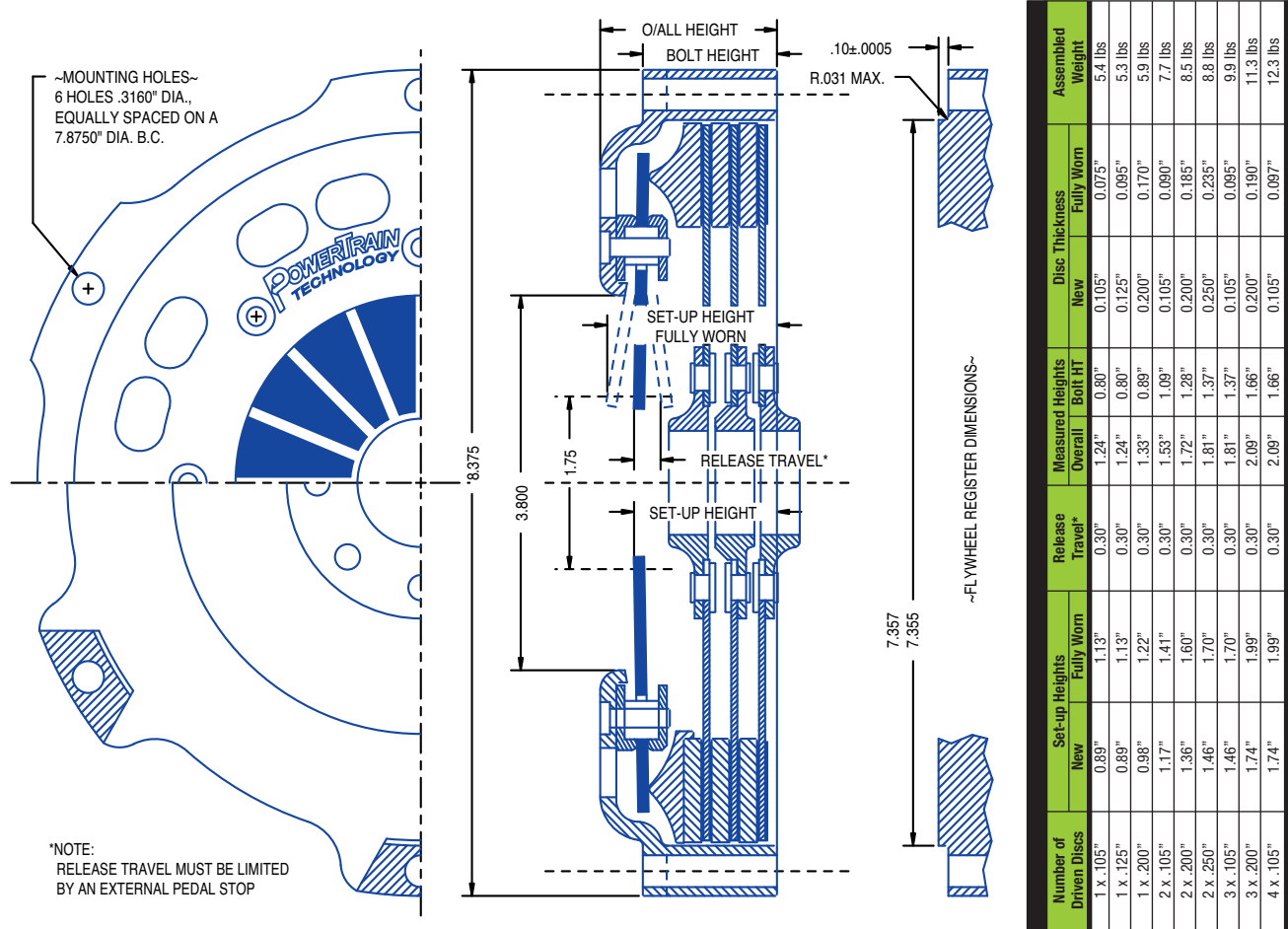
The PTT 7.25" Power-V Racing Clutch features the Power-V drive system. PTT President Steve Fox invented this technology for modern racing clutches back in 1997. The benefits of this type of drive are many. The angled Power-V drive legs make the floater plates self-centering. They even out the drive forces in the clutch, and provide inherent dynamic balance. The resulting increased surface area of the Power-V lowers stress in the clutch as well, allowing longer life of component parts.

A PTT 7.25" clutch has a much lower MOI than a stock style clutch and up to 20% lower than other manufacturers' equivalent racing clutches. This lower MOI allows faster acceleration, decreased brake wear on deceleration, quicker shifting, and reduced synchro, or dog ring wear, in your transmission. The advantages of reduced MOI can be a big advantage to your race program. Changing from a 10.5" stock clutch to a 7.25" clutch will feel like your engine makes an extra 25 horsepower.

- 5.5" Power-V Racing Clutches are available in 1, 2, or 3 disc configurations
- Lifetime guarantee against defects in material and workmanship
- Different friction materials are available for specific racing needs (see friction materials on page 6).

7.25" POWER-V RACING CLUTCH





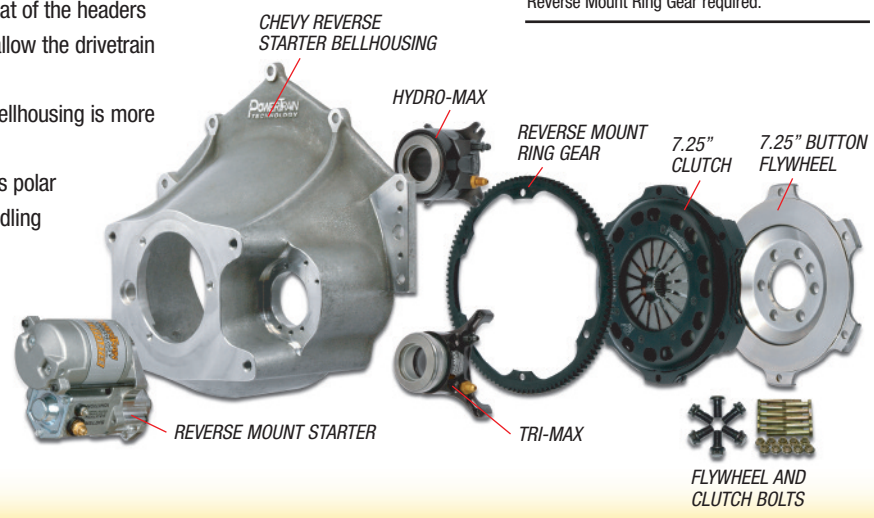
7.25" CLUTCH REVERSE STARTER MOUNT BELLHOUSING KITS

PTT's reverse starter mount bellhousing kit uses a lightweight, button-style flywheel and a starter ring gear mounted on top of the clutch. There are a number of advantages to using a reverse mount bellhousing:

1. The starter is mounted away from the heat of the headers
2. The small diameter flywheel and clutch allow the drivetrain to be mounted lower in the chassis
3. The smaller overall physical size of the bellhousing is more easily packaged in a stock car
4. Relocating the starter lowers the vehicle's polar moment of inertia, resulting in better handling and faster turn-in response.

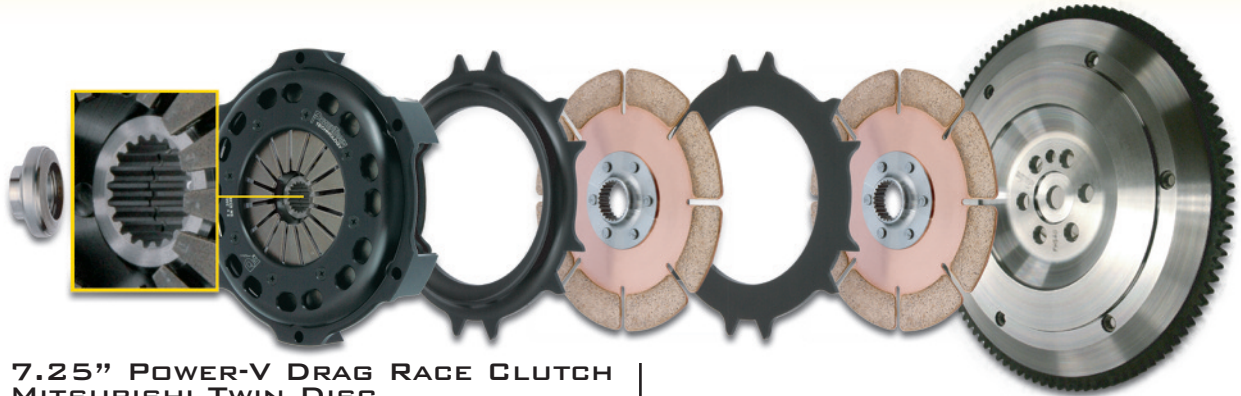
NOTE: Advise your dealer if you are running a motor plate sandwiched between the engine and bellhousing. The thickness of the motor plate will affect the height of the Release Bearing, and Reverse Mount Ring Gear required.

Kit includes: 7.5" Clutch, Lightweight Button Flywheel, Reverse Starter Mount Bellhousing (aluminum or magnesium), Reverse Mount Starter, Hydraulic Release Bearing with External Bleeder kit (Hydro-MAX or Tri-MAX), Reverse Mount Ring Gear, Clutch Bolts & Flywheel Bolts.





7.25" POWER-V DRAG RACE CLUTCH MITSUBISHI TWIN DISC



**7.25" POWER-V DRAG RACE CLUTCH
MITSUBISHI TWIN DISC**

Mitsubishi 1st & 2nd Gen. Eclipse AWD Clutch System

Get the maximum performance out of your Diamond Star! You've got the big turbo, huge intercooler, big injectors, and big horsepower. Now get the best clutch & flywheel there is to put behind your hard earned horsepower. PTT's ultimate Mitsubishi drag clutch features race winning low MOI combined with PTT bullet-proof reliability.

In drag racing, the launch is everything. This is the clutch that will stand up to what you have to throw at it. Once you get the car launched, the PTT MOI advantage starts to kick in. This is the lowest MOI metallic clutch & flywheel you can put behind your engine. With every shift you throw, the low MOI clutch discs allow you to shift quicker, and the clutch allows your engine to rev faster. The result? Lower ET's. We have had some racers report as much as a 7/10 second reduction in ET after installing this clutch system! A half second ET reduction is very common!

This clutch features a billet aluminum clutch cover with flush mount fasteners and brutally strong .20" thick clutch discs, resulting in a clutch with a reduced overall height (3/8" lower than our nearest competitor's clutch!) That means you have no need to grind on, and weaken, your clutch fork. Everything clears! Specially designed diaphragm spring and internal mounting system eliminate extremely high loads on your engine's thrust bearing. Small diameter, radius faced release bearing reduces pedal effort to round out the package.



Engineered-in reliability;
Race winning performance;
Legendary PTT Quality;
Turn-key installation; Attention to all the 'little' details. Put one in your car, and discover how quick you can really go!

- Lifetime guarantee against defects in materials and workmanship
- Different friction materials are available for specific racing needs (see friction materials on page 6).



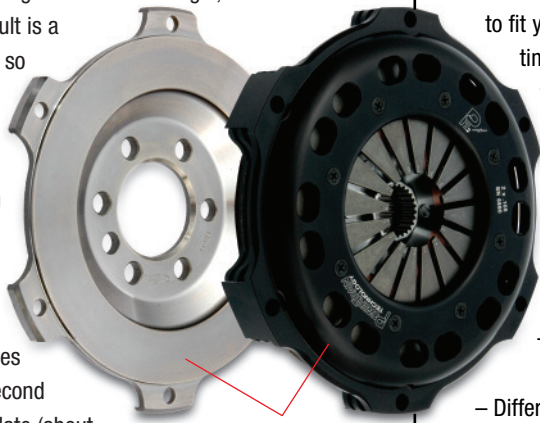
7.25" POWER-V EXTREME TORQUE, SINGLE DISC RACING CLUTCH

EXTREME TORQUE CAPACITY IN A SINGLE DISC CLUTCH

There are a few racecar sanctioning bodies that have a 7-1/4" minimum diameter clutch rule, or a single disc clutch rule. This clutch is designed for use in just such classes. It is the culmination of what-if thinking, extreme clutch friction material, and mega clamp force, all brought together in a class legal, 7-1/4" single disc size. The result is a one disc clutch that has so much torque capacity most 'other' clutch manufacturers can only put their two disc clutch up against it.

This clutch has extreme torque capacity (way over 500 lb.ft.) PTT saves you the weight of the second clutch disc & a floater plate (about 2.5 pounds). The lower MOI results in a measurable on-track performance! In tightly regulated, limited horsepower racing, it pays to reduce your clutch / flywheel package down to the minimum. The PTT Extreme Torque Clutch allows you to out accelerate your competition with an MOI advantage you cannot get anywhere else.

- Lifetime guarantee against defects in materials and workmanship
- Different friction materials are available for specific racing needs (see friction materials on page 6).



7.25 POWER-V EXTREME TORQUE SINGLE DISC CLUTCH & BUTTON FLYWHEEL

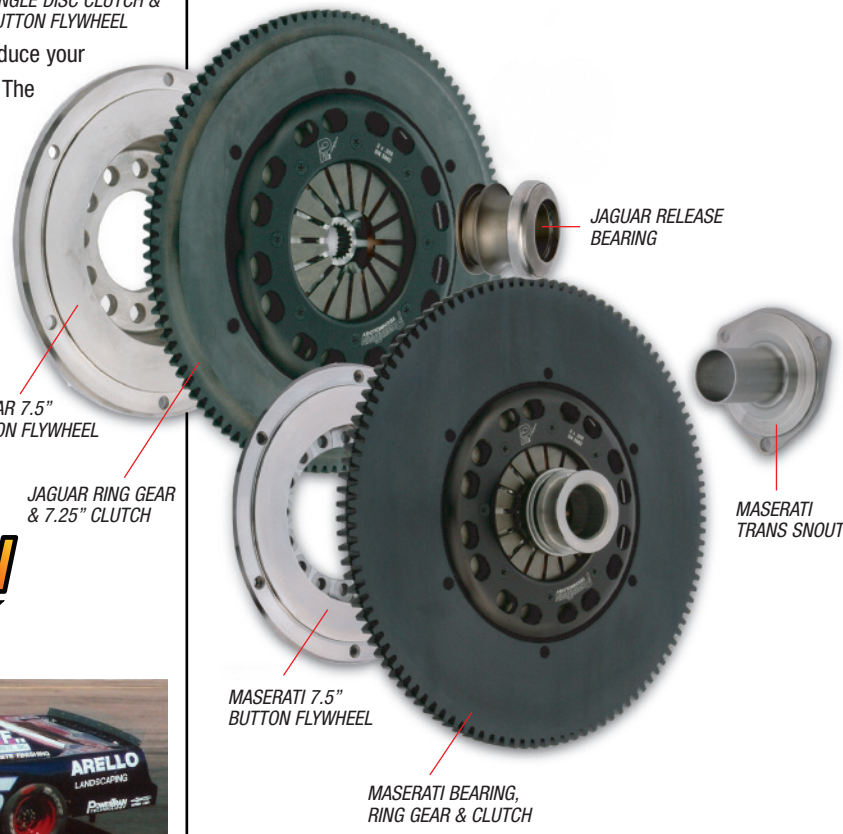
CUSTOM DESIGNED & BUILT CLUTCH SOLUTIONS

Vintage racers have a unique set of demands when it comes to racing clutches. Yesteryear's clutches were cutting edge... for their time... but by today's standards they come up pretty short. Reliability is a huge issue. Longevity is another problem. Availability of parts? Don't even think about it! What's a vintage racer to do?

PTT offers custom designed & manufactured drivetrain components to fit your application. We usually base the flywheel on the time tested 7-1/4" clutch. This type of clutch has been in the motorsports marketplace for well over 40 years, and will remain a standard for many more years to come.

Below are a few different applications we have done recently. When you add it up at the end of the day, it is surprisingly affordable to change over to this clutch system.

- Lifetime guarantee against defects in materials and workmanship
- Different friction materials are available for specific racing needs (see friction materials on page 6).



JAGUAR 7.5" BUTTON FLYWHEEL

JAGUAR RING GEAR & 7.25" CLUTCH

JAGUAR RELEASE BEARING

MASERATI TRANS SNOOT

MASERATI 7.5" BUTTON FLYWHEEL

MASERATI BEARING, RING GEAR & CLUTCH



CUSTOM DESIGNED & BUILT CLUTCH SOLUTIONS
7.25" EXTREME TORQUE SINGLE DISC CLUTCH

10.4" CLUTCHES



WOLF-LIKE PERFORMANCE IN SHEEP'S CLOTHING

Street Stock rules require a steel 10-1/2" clutch. The competitive nature of Street Stock racing demands a robust and reliable clutch. With limited horsepower, you need to maximize the power delivery to your rear wheels. Nothing does that better than reducing the MOI of your racecar's drivetrain components. There is nothing in the rules that says you cannot apply the technology of more advanced clutches to the 10.4" stamped steel clutch in order to gain a performance edge over your competitors.

That performance advantage is exactly what you get with every PTT 10.4" clutch. We scoured parts bins the world over looking for the lightest MOI parts we could get our hands on. What components we couldn't purchase anywhere else, we made. Assemble this cutting edge clutch cover with PTT's state of the art friction materials and you have a clutch system worthy of carrying the name PowerTrain Technology. Standard features include: combination bolt / dowel pin to ensure proper clutch location guaranteeing balance; high torque capacity; easy drivability; long life; and rugged durability. An aluminum pressure plate is optionally available for those racers who demand only the best in a racing 10.4" clutch.

Team up the 10.4" lightweight clutch with a cutting edge PTT lightweight steel flywheel and you have the lightest MOI 10.4" clutch / flywheel combination on the market. Put one in your racecar and go start thinning the herd of sheep at your racetrack!

HYDRAULIC RELEASE BEARINGS HYDRO-MAX

HYDRO-MAX DROP-IN HYDRAULIC CLUTCH RELEASE BEARING

- MAX-imum strength! Manufactured from high-strength extruded aluminum
- MAX-imum lightness! 30% to 60% lighter than other manufacturers' HRB's
- Hydro-MAX fits Muncie, Jerico, Roltek, T-10, T-101, Saginaw & other transmissions
- Designed to work with all small diameter multi-disc racing clutches
- Hard coat anodized for long life
 - Simple drop-in installation
- Includes all mounting hardware
- Self aligning for less clutch wear
- Return spring guarantees complete clutch engagement
- Includes PTT's exclusive 1.6" diameter radius faced angular contact ball bearing
- Works best with 5/8" or 3/4" master cylinders (The smaller master cylinder gives you lower pedal effort & better clutch control)



Hydro-MAX

Just Under 1-1/4 lb

PTT'S Hydro-MAX Hydraulic Release Bearing (HRB) is the lightest, strongest HRB on the racecar market. Weighing under 1-1/4 pounds sopping wet, Hydro-MAX is 30% to 60% lighter than all other return spring equipped HRB's currently available! At just over 2-1/4" tall, it is also the shortest. It has a full 1/2" of release travel, (the longest travel in its class), and a built-in return spring to ensure positive, 100% clutch engagement. PTT's custom-designed, low drag, 1.6" radius face bearing is standard equipment. The smaller diameter contact reduces clutch pedal effort, while also lowering the thrust on the back of the crank!

Another advanced engineering product from the company that works harder to get you to the winner's circle

Hydro-MAX is CNC manufactured to rigid PTT quality standards from high strength aluminum and then hard coat anodized for long life. Every component that goes into the construction of Hydro-MAX oozes quality, from the custom AN & bleeder fittings, to the highest quality rubber compounds in the o-rings. Every Hydro-MAX is pressure tested at the factory to over twice its normal operating pressure. Hydro-MAX is designed and built to take the night after night, weekend after weekend abuse that professional auto racing dishes out.

ORDER LINE: 847.458.2323 FAX: 847.458.2324



HYDRAULIC RELEASE BEARINGS TRI-MAX

HYDRO-MAX DROP-IN HRB, STANDARD HEIGHT

All installation parts are included (see RH7111 Installation Kit shown below). Adjustable from 2.28" min. to 3.03" max. overall length. Features a full 1/2" of release travel. Works best with a 5/8" or a 3/4" diameter master cylinder.



HYDRO-MAX DROP-IN HRB, TALL HEIGHT

Uses an extended length sleeve & bearing assembly. All installation parts are included (see RH7111 Installation Kit). Adjustable from 2.78" min. to 3.53" max. overall length. Featuring a full 1/2" of release travel. Works best with a 5/8" or a 3/4" diameter master cylinder.



RH7111 INSTALLATION KIT

One of these kits is included with every new HRB. Use an extra installation kit to set up a spare transmission. This kit includes all the hardware needed to install your Hydro-MAX



RH7112 EXTERNAL BLEEDER KIT

Includes a dash 3 braided stainless steel line & fitting that allows you to bleed the HRB from outside the bellhousing.



STAINLESS STEEL BRAIDED CLUTCH SUPPLY LINE

Dash 3 size, Teflon lined, high strength, light weight lines are perfect for your PowerTrain Technology HRB. Available in many lengths.



REPLACEMENT BEARING & SLEEVE ASSEMBLY

These replacement bearing and sleeve assemblies are a service item for PTT's HRB. They feature a PTT designed 40mm angular contact ball bearing with a small 1.6" radius faced contact. This bearing incorporates a low drag design and is packed with specially formulated high temperature, low drag grease. They are a drop-in, direct replacement, upgrade for HRBs' made by the following manufacturers: Coleman Racing Products, Howe Racing Enterprises, Quarter Master, and others.



TRI-MAX BOLT-IN HYDRAULIC CLUTCH RELEASE BEARING

- MAX-imum strength! Manufactured from high-strength extruded aluminum. Guaranteed for life never to break due to structural failure!
- MAX-imum lightness! Tri-MAX weighs less than 1 pound! That's 20% to 50% less than other manufacturers' bolt-in HRB's
- MAX-imum reliability! Built to withstand more than 3 times normal operating pressure.
- Tri-MAX has 3/4" of bearing travel.
- Simple bolt-in installation. No shims to adjust or complicated measuring.
- Precision aligned for less clutch wear
- Low-drag hydraulics guarantee complete clutch engagement
- Includes PTT's exclusive 1.6" diameter radius faced angular contact ball bearing.
- Works best with 5/8" or 3/4" master cylinders. (The smaller master cylinder gives you lower pedal effort & better clutch control)



Tri-MAX
Just Under 1 lb

We stay up late engineering products like this so that you don't lose sleep worrying about how to get to the winner's circle!

PTT's Tri-MAX Hydraulic Release Bearing (HRB) is the most reliable, lightest, and strongest bolt-in HRB on the racecar market. Tri-MAX is designed to work with all small diameter multi-disc racing clutches

and will fit Muncie, Jerico, Roltek, T-10, T-101, Saginaw & other transmissions. Tri-MAX has a full 3/4" of release travel, (the longest travel in it's class) and has superbly engineered hydraulics to ensure positive, 100% clutch engagement. PTT's



Tri-MAX HRB pictured above with a 4,200 pound parts hauler parked on top of it, demonstrating its incredible strength.

custom-designed, low drag, 1.6" radius face bearing is standard equipment. The smaller diameter contact reduces clutch pedal effort, while also lowering the thrust on the back of the crank! Tri-MAX works best with 5/8" or 3/4" master cylinders. (The smaller master cylinder gives you lower pedal effort & better clutch control).



**HYDRAULIC RELEASE BEARINGS
TRI-MAX**

**TRI-MAX
BOLT-IN HYDRAULIC CLUTCH
RELEASE BEARING, CONTINUED**

Tri-MAX is CNC manufactured to aircraft industry tolerances from high strength aluminum. All moving parts are premium hard coat anodized for long, trouble-free life. All Tri-MAX bearings are pressure tested to twice normal operating pressure before leaving the factory. You can bolt a Tri-MAX in with confidence knowing that it will work as advertised right out of the box. The velvety smooth clutch actuation you get from a Tri-MAX has to be felt to be believed. Tri-MAX is the reason you want to run a hydraulic release bearing.

All PTT HRB's have a dual port design that can be used with either: a PTT O-Ring Boss (as shown above) or, a standard AN Fitting (shown at right)



RH7112 EXTERNAL BLEEDER KIT

Includes a dash 3 braided stainless steel line & fitting that allows you to bleed the HRB from outside the bellhousing.



REPLACEMENT BEARING & PISTON ASSEMBLY



These replacement bearing and piston assemblies are a service item for the Tri-MAX HRB. Available in sizes for all Tri-MAX models. They are also a drop-in, direct replacement upgrade for the Tri-Lite HRB manufactured by Quarter Master.



**HYDRAULIC RELEASE BEARINGS
STREET-MAX**

**STREET-MAX
HYDRAULIC CLUTCH
RELEASE BEARING**

Street-MAX

Less than 7/8 lb

Weighing in at less than 7/8 pound, PTT's new Street-MAX offers MAX-imum strength,

MAX-imum lightness and MAX-imum reliability for street stock racers.

Designed with 3/4" of travel and made specifically for use with 10.5" street stock clutches

that require a flat face bearing. It includes PTT's exclusive custom designed, low drag, flat face angular contact ball bearing as standard equipment for use with diaphragm springs with curved tip fingers.

Street-MAX fits Muncie, Jerico, Roltek, T-10, T-101, Saginaw &

other transmissions. The Street-Max is designed to work best with stock diameter master cylinders. These are typically 3/4" to 7/8", or sometimes even 1.0". You will get best performance with a 3/4" master cylinder. Street-MAX's short 1-5/8" overall height allows it to fit into more confined areas. It includes all mounting hardware and has simple drop-in installation. The Street-MAX is self-adjusting for less maintenance.

Street-MAX is CNC manufactured to unwavering PTT high quality standards. It is manufactured from high-strength extruded aluminum and then hard coat anodized for long life. It utilizes extreme fluid power engineering in order to withstand the rigors of harsh racing environments. Every Street-MAX is pressure tested at the factory to over twice its normal operating pressure.

All PTT products come with a lifetime guarantee against defects in materials and workmanship.



CHEVY STREET-MAX HYDRAULIC RELEASE BEARING WITH INSTALLATION KIT



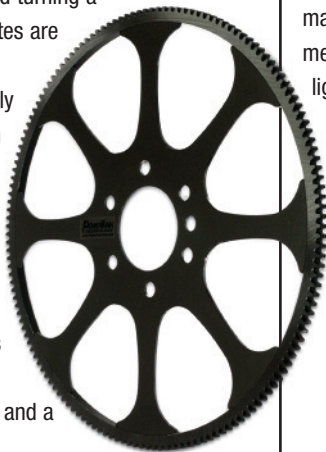
FORD & CHRYSLER STREET-MAX HYDRAULIC RELEASE BEARINGS COME WITH A SPACER BLOCK AND INSTALLATION KIT FOR PROPER FIT.



FLEXPLATES & REVERSE MOUNT RING GEARS

LOW MOI FLEXPLATES

All Low Moment of Inertia (MOI) flexplates are a way to get a lightweight racing clutch mounted on your racecar, while using a starter located in the stock location, and turning a stock diameter ring gear. These flexplates are used in combination with a lightweight button style flywheel that is approximately the same diameter as the racing clutch being mounted. The flywheels are called button style flywheels due to their small 'button-like' size. Button flywheels & low MOI flexplates are lighter than a one piece flywheel. They are lighter in price as well. If your rules dictate a stock diameter ring gear, this set-up has a high level of performance and a lot of 'bang for the buck'.



PTT's Low MOI Flexplates are engineered to make the most of lightweight racing clutches. These flexplates vary slightly by application, but all of them have reduced thickness, premium quality, hardened ring gears. The reduced thickness translates to lower rotating weight & faster acceleration, while still offering great reliability & long life. They are robotically welded to a steel center plate made from a high tensile, fatigue resistant alloy that is perfectly matched to high RPM racecar use.

REVERSE MOUNT RING GEARS

Reverse mount ring gears (RMRG) mount to the top of the clutch cover with the clutch bolts. They are used with a reverse starter mount bellhousing instead of a flexplate. The RMRG's for the 5.5" and 4.5" clutches have a scalloped adapter that reduces static weight and greatly reduces MOI. These are the absolute lightest solution for mounting a starter ring gear onto your engine! These ring gears have a 30% stronger tooth form, they are manufactured from superior material, and offer an improved heat treat over other competitor's similar products.



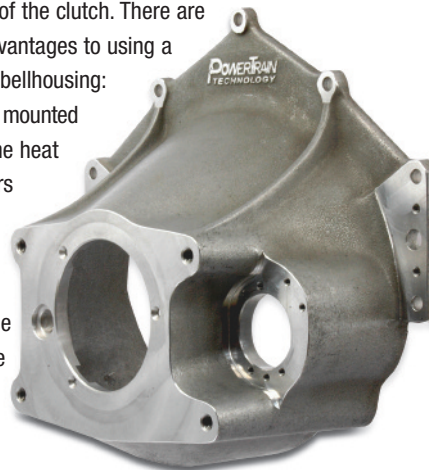
BELLOUSINGS & STARTERS

REVERSE STARTER MOUNT BELLHOUSING

PTT's reverse starter mount bellhousings have set a new standard for lightness. They are available in magnesium or aluminum. The magnesium bellhousing weighs only 6 pounds; the aluminum is a mere 9 pounds! This bellhousing is intended for use with lightweight, button-style flywheels and a starter ring gear

mounted on top of the clutch. There are a number of advantages to using a reverse mount bellhousing:

- The starter is mounted away from the heat of the headers
- The small diameter flywheel and clutch allow the drivetrain to be mounted lower in the chassis.
- The smaller overall physical size of the bellhousing is more easily packaged in a stock car
- Relocating the starter lowers the vehicle's polar moment of inertia, resulting in better handling and faster turn-in response



STARTERS

Weighing in at only 8 pounds, PTT's reverse mount starter is 3 - 4 pounds lighter than its competitors' starters. It produces 20% more torque at peak horsepower for easier starts and longer life. It has a CNC machined, one-piece, billet gear reduction mounting block with 4.44:1 gear reduction. This starter features full ball bearing construction and a heavy duty shielded solenoid. The aluminum



shield around the solenoid acts as a heat sink to dissipate harmful heat that can damage the solenoid. Every starter is dyno tested before leaving the factory. The reverse mount starter is directly interchangeable with other manufacturers reverse mount bellhousings. PTT also offers high-torque starters to fit Chevy, Chrysler and Ford Small Block V-8 engines for use with stock diameter ring gears.



SPLINE-A-LIGN, MECHANICAL RELEASE BEARINGS WITH COLLAR

SPLINE-A-LIGN

These precision clutch alignment tools are manufactured to PTT quality standards, so you know they are good. This is an affordable alternative to using a beat-up, old input shaft. Every good mechanic knows, if the clutch discs are well aligned, it makes installing the trans a breeze. If they aren't, it not only takes you longer, but you run the risk of damaging expensive clutch or transmission parts. Use the tool the professionals use. Put a Spline-A-Lign in your toolbox.



MECHANICAL RELEASE BEARINGS WITH COLLAR

PTT's 1.60" contact diameter bearing comes standard on all collars. The smaller contact diameter reduces pedal effort, driver fatigue & thrust load on the back of the crank.



FLYWHEEL BOLTS (CRANK BOLTS)



PTT premium quality crank bolts are designed and built to the highest quality standards, and feature a low profile 12 point flanged head. They are built to our specifications by ARP, and are available only through PTT. This is the only crank bolt that we recommend for use with our racing Chrome-Moly flywheels.



TERMS AND CONDITIONS OF SALES

- 1. PRICES AND TERMS.** The price of products sold shall be based upon PowerTrain Technology's (PTT) prices in effect on the date of shipment. Price is F.O.B. PTT's point of shipment. Payment terms shall be in accordance with terms set forth on PTT's invoice.
- 2. TAXES.** Published prices do not include sales tax, use tax and other excise taxes. If a tax exemption is claimed by Buyer, satisfactory proof of such exemption will need to be supplied by Buyer to PTT.
- 3. CANCELLATIONS AND CHANGES.** Order changes and cancellations must be submitted in writing.
- 4. RETURNED GOODS.** Please call PTT for a return authorization (RA) number. Clearly mark this number on the outside of the returned package. PTT will not accept unauthorized returns. Returned parts must be in clean, unused, original condition, packed in the original box, and received by PTT within 30 days of date of sale, freight prepaid by Buyer. After 30 days, PTT reserves the right to refuse credit for returned goods. Custom and obsolete products are non-returnable.
- 5. SHIPPING.** If not specified by Buyer, orders are shipped via UPS or Federal Express unless weight or size is prohibitive, in which case motor freight will be used. Shipping charges will be added to the invoice and become the responsibility of Buyer. Any claims for losses or damage in transit shall be against the carrier only.
- 6. DELIVERED QUANTITIES.** PTT will make every effort to ship quantities ordered. Any claims for shortages must be made within 10 days from the date of receipt of the goods by Buyer.
- 7. INTERNATIONAL ORDERS.** Delivery, duties, customs and taxes are the responsibility of Buyer.
- 8. WARRANTY.** All products are warranted to be free from defects in material and workmanship for the life of the product. Any product determined to be defective by PTT will be repaired or replaced free of charge at PTT's discretion. Products sold for competition and off road racing use are not intended for street use. There are no additional warranties or representations, express or implied, due to the unusual stresses placed on racing parts. In no event will PTT be liable for consequential, incidental or other damages.
- 9. CUSTOM MANUFACTURED PRODUCTS.** PTT specializes in custom manufactured drivetrain products. Cost of development varies widely based on the size and scope of the project. Once a custom design is approved and signed off by the customer, payment terms are 50% down at time of the order, balance due upon delivery.



CLUTCH SPLINE SIZE LISTING

CLUTCH SPLINE SIZE CHART

CLUTCH SPLINE SIZE CHART		
SPLINE NUMBER	O.D. X NO. TEETH	APPLICATIONS
12	.740" (18.8mm) X 18 tooth	Ford Festiva, Suzuki Swift
20	13/16" X 18 tooth	Nissan A series (Datsun A), Skoda
28	20.5mm X 18 tooth	Peugeot, Citroen Metro K
32	13/16" (20.6mm) X 24 tooth	Porsche, Alfa Romeo, Volkswagen, Vauxhall
36	7/8" (22.2mm) X 28 tooth	Volkswagen
40	7/8" (22.22mm) X 10 tooth	MG Midget, Imp, Triumph, Quaife, 750 MC, Lada
41	7/8" (22.22mm) X 20 tooth	Hewland, Ford
50	15/16" (23.5mm) x 21 tooth	Toyota (small), Lotus
53	7/8" (23.1mm) X 21 tooth	Renault, Peugeot
60	1" (25.4mm) X 10 tooth	Volvo, Alfa Romeo, Triumph
61	1" (25.4mm) X 14 tooth	Chevy Vega & Monza, Pontiac Sunbird & Fiero, Buick Skyhawk, Opel, Getrag, Manta, Calibra T
62	1" (25.4mm) X 22 tooth	Mazda RX7 & Miata
63	1" (25.4mm) X 23 tooth	Ford Rocket, Cosworth, MGB, Talbot, Austin Healy, Porsche, Xtrac, Quaife, Healy, Mitsubishi Evo
64	1" (24.7mm) X 24 tooth	Nissan (Datsun), Honda (small), Rover, Skyline, Lotus Elan
70	1-1/16" (26.9mm) X 10 tooth	Ford T5
72	1" (26.2mm) X 24 tooth	Honda (big), Integra '92 & up
78	1-1/8" (28.5mm) X 10 tooth	Getrag metric, BMW, Moss, Cosworth
80	1-1/8" (28.5mm) X 10 tooth	BMW, Chevrolet, Cosworth, Getrag, Jaguar, Muncie
81	1-1/8" (28.9mm) X 21 tooth	Toyota Supra RWD
89	29mm X 22 tooth	BMW
90	1-5/32" (28.5mm) X 26 tooth	Borg Warner T10 & Super T10, Chevrolet, Hewland, Jerico
94	1-3/16" (30mm) x 18 tooth	G-Force, Mopar, Chrysler
96	1-3/8" (35mm) x 26 tooth	BMW M-3 V-8
97	1-3/8" (35mm) X 10 tooth	BMW, Getrag
99	1-3/8" (35mm) X 10 tooth	Ford

All PTT clutches are modular. This means that any spline size can be put into any clutch combination. See PTT's Application Guide (at www.PowerTrainTech.com) for complete part number selection guides, or call PTT at 847.458.2323 for assistance.

Pro Challenge uses a PTT 5.5" 2D clutch, flywheel, flexplate and hydraulic release bearing. PTT is the exclusive clutch supplier for Pro Challenge.





See our web site for a complete listing of authorized dealers

www.PowerTrainTech.com

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