

## Dalton Pro ATV Clutch Kit

**Model:** 2011-13 Polaris RZR, RZR “S” (stock or oversized tires). 4x4 Recreation Utility Vehicle

**Kit #:** DUV P8RZ -11

**Components:** 1 Dalton Orange/blue primary spring (DPPS-O/BL)  
1 Dalton Black/Orange primary spring (DPPS-B/O )  
1 set of Dalton Quick Adjust flyweights/hardware (QP92-58)  
10 pcs.M5x 12mm long threaded set screw. (1.2g each)  
4 pcs.M5x 6mm threaded set screw. (0.6 g each)  
1 pkg hollow steel rivets (2.4g) part # DRFH-Y  
1 pkg steel solid steel rivets (3.1g) part# DFR-Y  
1 pkg steel solid big head rivets (3.6g) part# DFRL-Y  
1 pkg steel solid big head long rivet (4.2g) part#DFRX-Y

**Tools:** *Primary clutch puller bolt* is recommended but not required, a primary clutch puller makes for easier drive clutch service if you intend to do clutch work in future (maintenance), or remove the drive clutch for easier work and inspection. Polaris dealers have them or you can order Dalton part# DCP-M.

### Description:

Adjustable clutch kit for the 2011,2012 Polaris RZR, and 2011/12 RZR “S” model (stock or oversized tires).

One clutch kit that can be set up for different terrain and tires sizes/elevation means accurate clutch tuning for your situation. Improved acceleration without losing top speed.

This kit includes Dalton’s patented “Quick Adjust” flyweight system that allows you to add or subtract weight from the flyweights , sometimes without even removing the flyweights from the drive clutch. Instead of using generic flyweights or designs from OEM snowmobiles or regular ATV models, the new “Quick Adjust” flyweight in this kit has a different curvature , and location of mass which allows superior belt grip and RPM control .**Having a different curvature and location of mass on the flyweight means that the total GRAMS you use of flyweight mass are irrelevant to other flyweights** , there is a common misconception in the market as to comparing flyweights by only “grams”.

-Ultimate RPM control (can be adjusted for modifications)

-Set up manual includes set up instructions for above applications.

### PLEASE READ ALL INSTRUCTIONS CAREFULLY FIRST!

Please take the time to thoroughly read and understand these pages before continuing. It is a great benefit to you to get some basic understanding of the CVT drive system and how it works. This can help save your components, drive belts, as well as make your ride more enjoyable and trouble free.

## **WARNING**

Clutch components should only be installed by factory trained mechanics and personnel with a complete knowledge of variable rate belt transmission systems or CVT's. Dalton Pro clutch components are made from high quality materials in a controlled procedure. NEVER cut, weld or manipulate clutch components

Some CVT clutches are assembled under spring pressure .DO NOT attempt to disassemble clutches if not experienced or qualified.

This is a performance kit and is intended for the use of experienced adult riders ,who are trying to obtain a higher level of performance for racing, etc. This kit should not be installed on any vehicle that will be used by any person of MINOR AGE .Dalton Industries has no control over the use ,misuse, or installation of these components and assumes no responsibility for any injury or damage.

### **IMPORTANT !**

*Take the time to read the associated documents and set up instructions for the components. This kit contains various set up options and recommended settings for different applications.*

### **INSTALLATION: (dealer recommended)**

**Important:** Always remove the KEY from the ignition before working on clutches.

- 1) Remove seats, seat bracket, and accessories as necessary to access CVT clutch area. Remove the cover bolts to remove the plastic cover shroud.
- 2) Take note of direction of belt before removal. Remove belt. Remove primary clutch center bolt. Keep the spacers on the bolt and set the primary bolt aside.
- 3) Thread the primary clutch puller into the drive clutch and remove drive clutch now ,or remove belt and primary outer clutch cover plate(6 bolts) if leaving the clutch on the vehicle. **Be sure to look for alignment marks on cover plate or mark the clutch with a magic marker for orientation during re- installation.** *Be careful when removing cover plate bolts, the primary spring is under pressure.*
- 4) With the belt removed and the primary clutch cover plate off, move the sheave inward and remove stock flyweights.
- 5)\* **Set up the flyweights as described** in this instruction manual for your desired application See **“Set-Up Guide”**  
Take note of your set up guide and set up the flyweights, then install the flyweights into the drive clutch.  
**Caution:** Always assemble clutches as per factory service manual, be certain all components are re-installed properly and completely.
- 6) \*\* install chosen new primary spring into the clutch and re-install the cover onto the drive clutch (primary clutch).
- 7) Re- install the primary clutch center bolt and torque to manufacturers specs.(40-45 ft lbs)
- 8) Inspect plastic cover shroud and **gasket** , re- install clutch cover shroud.

**Note:** Our testing has shown best results with the factory belt, and calibration for this kit is associated with that factory belt compound.

*\*see attached “ Flyweight set- up “for recommended set up .*

## OVERVIEW - and general CVT tuning

There are books written on CVT clutch tuning and some in depth principals of controlling the rate of shift of the belt on belt drive systems. The following is a very general guide to help those unfamiliar with understanding some basic principles of the system.

The CVT system on your vehicle is a variable rate system. It is a two pulley system that gives different belt ratio as it shifts. As the belt goes up on the primary motor clutch, it also goes down into the driven (or secondary clutch) giving a higher clutch ratio and more speed.. Conversely, as the machine comes under load or slows down its speed, it back shifts to a lower belt ratio so that it will be able to pull away again after slowing or stopping. A system that is properly calibrated for its intended application will UP SHIFT as quick as possible *while still maintaining the proper rpm for the engines power curve. If a system is up shifted TOO quickly it lowers the engine rpm to a level below peak hp....if it up shifts too slowly it will rev higher during the shift phase than that rpm where the engine makes best power .* This same system should also BACK SHIFT properly. Back shifting properly means maintaining that optimum rpm as best possible, as the vehicle comes under load. Clutch components “control the rate of shift of the belt”.

**\*\*\*It is VERY important** to realize that on most ATV/UTV situations, that the “**clutch phase** “(the time that the belt goes from low ratio to high ratio) is only for a distance of approximately 500 feet at wide open throttle,(and even much less than that on some) or around 45 mph. **After** which, the belt is fully shifted, and clutch components have little effect on rpm or speed. Once the belt is to the top, it is to the top... **and the engine starts to build rpm as the belt is out of ratio.** Clutch components cannot control rpm after full shift out is achieved. *Clutch components change the rate of shift of the belt...once the belt is shifted out, clutch kits cannot offer top speed increases.*

*-Also, when testing for clutch RPM, it is important to check rpm at around 200-300 ft of distance on a wide open throttle run (while the clutches are still not fully shifted ).*

Different tuning components can control the rate of up shift and back shift of the belt to maintain a desired rpm range. The goal of a CVT clutch system is to keep the belt in the proper ratio at any given speed and load situation. The factory has set up your system to be a decent “all around” calibration, that means it can ride in different terrain, or haul a trailer, or maintain decent emissions, and be a “general” calibration that the factory feels is a suitable compromise in many respects .Many users of ATV’s ,for various reasons , like to change the desired effects and purpose of their machine to a more case specific application, whether it be oversized tires for mud, drag racing, sand applications, pulling competition, high altitude operation where less power is available, different engine(rpm) characteristics from engine modification etc. In different situations like this , performance can be optimized by re-calibrating the shift pattern of the cvt.

An example of a need to change the shift pattern would be adding larger mud tires. When installing larger tires there are a couple of factors that effect the clutching. The larger tires result in taller gearing. With a taller gearing situation, the last thing you would want to do is up shift too fast, as you are already starting off in a higher final drive ratio from the tires. The other factor is rotating mass. Heavier , large diameter rotating mass is a real negative for acceleration. *Although most experienced tuners know that a atv/utv with oversized tires will never be as quick as one with stock lightweight tires, clutch tuning can help compensate for some of the losses and help restore performance to acceptable level.*

General tuning info continued on next page

## Dalton Quick Adjust Cam Arms -and general tuning info

**General tuning info:** following are a few general rules of thumb.

Heavier Weights- Quicker up shift and lower rpm during the “**clutch phase**”.

Depending on the situation, sometimes you can get away with a quicker up shift. It is important to remember that the primary spring is the opposing force to the clutch weights, and that changing the rating of the primary spring can effect the amount of force required from the flyweights.

Lighter weights- Slower up shift during the **clutching phase**. Slower up shift increases rpm.

*Note:* Remember, sometimes different curvature and profile can make total GRAMS irrelevant to each other. **You can only compare flyweights by grams if the curve and distribution of mass of two flyweights are the same.** Curvature and distribution of mass are also tuning methods.

Springs - Stiffer springs slow the up shift. Softer springs up shift faster. The initial load (first part of the compression) of a primary spring controls engagement. Sometimes a stronger compressed load rating spring(second part of spring compression) can allow the use of more flyweight and the combination is effective for a situation ,but not all situations are the same. A spring is another type of tuning component. A spring is always chosen relative to the flyweight and the rest of the system.

**It is NOT that quicker or slower up shift is BETTER....**it is totally dependent on the situation. The goal is to achieve the best shift pattern for the application , so that *the engine stays in its best rpm zone*, whether it be a stock or modified engine. Different cams/ configurations make power at different rpm. **-2011 RZR and RZR “S” models** make best hp at 6100-6300 rpm during the clutch phase. (see “clutch phase” in overview).

### **Dalton Pro Quick Adjust Cam Arms - Adjustable flyweights.**

*Dalton’s patented quick adjust method* means that you can add and subtract flyweight mass from the main body of the flyweight without removing the weights from the drive clutch.

There is one rivet hole at the tip of the flyweight that can be used to change the “range” of the flyweight with different optional mass rivets (this rivet must be done with flyweight removed from clutch), as well as **the patented quick adjust threaded passage** that you can adjust **from outside the clutch** for most common changes and weight adjustments.

The threaded passage can hold up to 3 of the supplied threaded set screws that weigh 1.2 grams each. 3.6 grams can be *\* added or subtracted by simply turning the clutch so that the desired weight is up at the top, and using the supplied T-handle allen key to add or subtract set screws thus changing the total mass of the flyweight.*

If you were to, for example, switch from one size of tires to another, you could most often adjust your clutch to the recommended setting by simply removing the plastic cover shroud, and make weight adjustments (according to instruction sheet), then re-install the plastic cover. No puller or clutch disassembly required.

Set up and adjustment guidelines are on the following page for different applications.

*Always be certain that you keep track of the weights you have adjusted...it helps to mark the clutch in number from 1-3 to keep track. Be certain to not cause an imbalance by double adding to one passage and not all of them the same. Keep track of screws remaining.*

*Make sure all screws go in all the way and bottom for secure fastening.(do not over tighten)\**

## SET UP GUIDE - 2011/12 RZR and RZR "S" Models

### Primary springs:

The following Dalton primary clutch springs are provided in this kit:

**Orange/Blue (DPPS-O/BL)** primary spring, and the **Black/Orange (DPPS-B/O)** There are many tuning options available on our website if you like modify your machine and have need to experiment more with clutch tuning. (For example if you have a custom engine from an engine shop, you should work with them to find out required rpm, etc.)

For this application **2011/12 RZR, RZR"S"** we offer these two springs. These two springs offer different engagement rpm. Engagement is the rpm it reaches before the vehicle moves. Different engagement sometimes makes one spring more suited to certain applications than the other. There are some instances where fine tuning, or rider preference can be involved. BOTH springs have a similar fully compressed load rating, so either can be used with the provided "flyweight set-up guide". Engagement is often a personal preference. Orange/blue is only slightly higher than stock, the Black/Orange is a bit higher engagement, but not excessive. There are many other options on our website for race applications, etc. **Primary springs are an easy, quick test if you care to swap out the primary spring and test for your own personal preference.**

**Secondary clutch and different RZR model years?** The year and distinct model application is important.

The 08 and 09 regular RZR models have different secondary clutches. The early 08 models use one version of a clutch and the 09 uses a Rapid Reaction version secondary clutch. On the earlier 08 versions (previous to 30/10/08) and on the 2009 RZR"S" you can change helixes. Now, in 2010,2011,12 the secondary is different again, however, the 2011/12 800 has a newer engine configuration, timing, etc. **We feel that the factory has chosen a good shift pattern on the secondary with the stock components.** This kit enhances belt grip and shift characteristics of both clutches through the primary. Since we manufacture our own flyweights specifically for this application (not use generic snowmobile/atv existing parts), we can successfully design the flyweights to control the shift pattern. Designing the base weight to have the proper distribution of mass and curvature, along with our adjustable features, makes for easy tuning of the drive clutch.

**Special modifications?** – If you have a modified machine that have special features that effect the operating rpm of the engine, **particularly long duration camshafts or big bore kits**, you must work closely with your engine shop to find the peak rpm requirement of the engine, etc. In these instances there will be a wide variance in requirements of the clutch shift pattern. You should consult the engine shop for recommendation as **TESTING clutch components on your own will most likely be required.** There is no way we can accurately test these situations. This is the nice feature of an adjustable clutch kit.

## Quick Adjust Flyweights - Set up

### 2011/12 RZR , RZR “S” models ( 0-4000 ft elevation )

#### 25" Tires – Stock machine (stock 25” for typical trail )

- QP92-58 with 3.6g\*\* rivet, 3 long set screws.

- preferred primary spring

- for SAND use 3.6 gram tip rivet, and start with 3 screws. Deep, dry sand start with 3.6g and 2 full length screws and test rpm.

\*\*If you are using pipes and/or other bolt on mods for more hp, you may get slightly on the rev limiter just after take off.

If you have pipes/mods that are getting to the rev limit right after take off, change to the **4.2g** tip rivet, ... **if you get on the rev limiter for any reason right after take off, add a set screw (or half screw\*), or next heavier rivet in the tip** of the weight. Try adding **set screws first**. Different drive belt compounds can effect this sometimes as well. This is one of the nice things about an adjustable kit.

**Sand is speculative** and not always the same. Test rpm during clutch phase for best results. (see overview/general tuning info for **rpm required** and info regarding “**clutch phase**”)

**High altitudes** above 4000’ elevation requires 3.1g tip rivet, start with 2 screws and adjust.

**Less weight in flyweights = higher rpm.** Adjust set screws as necessary. You want as much flyweight mass as you can use **as long as you still have proper shift rpm**, and without hitting rev limiter. If you do not get enough RPM during your test, use less weight .If necessary, go to next lighter rivet and add screws back in, then re- test.

**More weight in flyweights = faster upshift and lower rpm** If you hit rev limiter at any time (usually right after takeoff if it is clutch calibration related), add another set screw or if necessary go to the next heavier rivet.

*\* When using the shorter set screw with 3 long ones, never install the short one as the last one, put it in the threaded passage before the last long one to insure full thread mesh.*

*\*\* When using the longest (4.2g) rivet, make sure you use a LARGE shop vise as indicated on the last page, and be certain to compress this rivet to be less than the width of the roller path up inside the spider assembly. . ( usually .580 “ total compressed length, but castings vary ) If you are uncertain, install flyweight and cycle it up to see if the rivet clears.*

**More notes on HIGH ALTITUDE** - High altitude is less oxygen, and even though modern fuel injection can lean out the fuel and keep the mixture ratio corrected, there is less oxygen, and less fuel which equals less hp. You do not want to up shift too quickly. If you spend a lot of time at very high elevations you may want to experiment. There are some guidelines in here with respect to tire size, but the actual altitudes and combinations can vary. Usually above 6000 requires even less weight again in the flyweights. Always try to calibrate for where you do most of your riding.

## 26-27" trail /mud tires ( stock 26" on RZR "S" and 26-27" typical trail/mud tires )

- **QP92-58 Adjustable flyweights w/ 3 full length set screws** (3 ½ screws\* for some light weight 26" tires. Try with 3 screws first, adding the short one if necessary can be easily done later.)
- use the rivet **DFR-Y (3.1g)\*\*** in the tip of the flyweight.
- For primarily sand, Orange/Blue spring is often preferred, and 2 set screws, same 3.1g rivet and test rpm during shift phase.

**\*\* If you are using pipes and bolt on mods use 3.6g rivet in the tip, 3 full length screws.**

**...if you get on the rev limiter for any reason right after take off, add a set screw (or half screw\*), or next heavier rivet in the tip** of the weight. Try using **set screws first**. Different belts can effect this sometimes as well. Testing was done with the Polaris factory belt. Things like tires sizing and weight can be very inconsistent as well, and we are trying to give you as much info as possible to be accurate. This is one of the nice features of an adjustable clutch kit, you can fine tune your calibration.

**- If higher elevation and/or sand at elevations above 4000** use 2.4g rivet, install 3 screws and adjust as necessary. (see previous page for "more notes on high altitude" )

**Sand is speculative** and not always the same. Test rpm during clutch phase for best results. (see overview/general tuning info for **rpm required** and info regarding "**clutch phase**")

**Less weight in flyweights = higher rpm.** Adjust set screws as necessary. You want as much flyweight mass as you can use **as long as you still have proper shift rpm**, and without hitting rev limiter. If you do not get enough RPM during your test, use less weight .If necessary, go to next lighter rivet and add screws back in, then re- test.

**More weight in flyweights = faster upshift and lower rpm** If you hit rev limiter at any time (usually right after takeoff if it is clutch calibration related), add another set screw or if necessary go to the next heavier rivet.

*(2011/12 RZR makes best hp at 6100-6300 RPM while in the **clutch phase**). Remember, after the belt is fully shifted (4-500 ft. of distance at WOT on hard pack), rpm may climb but it is not necessarily clutch related. CVT components only control rpm during clutch phase.*

## .28" - 30" tires

QP92-58 w/ **3.1g steel rivet** installed in tip - use **2 long** set screws.

**\*if using half length (short) set screw with 3 long**, install in threaded passage before the last long one.

**\*\* The above is a guideline. There is no way we can test every size and brand/application of tires ,in the aftermarket, the sizing and weight of tires has huge differences from different manufacturers. If in question go to the heavier flyweight set up. Modified units will need to be tested.**

**\*\* If you get sputtering right after takeoff on a full throttle run you may need to add one set screw, or use the next heavier rivet this will lower rpm and keep it off the rev limiter.**

## Installation and removal of Mass Rivet (tip weight)



- 1) Push the rivet ALL the way into the appropriate hole in the tip of the flyweight.
- 2) Using a **large** shop vise hold the weight in a manner in the vise that holds the rivet all the way through the hole
- 3) Squeeze/expand the rivet\*\*. Some of the larger solid steel ones need a large vise with very strong force to expand. **Place all rivets pointing the same direction**

**\*\*IMPORTANT !** - As you compress the rivet it will expand and get tight in the hole of the flyweight, and then mushroom. Compress the rivet enough so that it will clear the passage it swings in, when up against the roller in the spider of the clutch. If you are in question of how much to compress, you can bolt one flyweight into the clutch and swing it up through its cycle (before you re-assemble the clutch with a spring) to make sure it clears everything. You do not need to over do it, compressing the rivet too far could damage the flyweight.

**For later removal of rivets if desired, use the following procedure:**

- 1) Mark lightly the center of the flush side of the rivet with a center punch.
- 2) Using a 3/16 " drill bit, drill approximately **half** way into the rivet.
- 3) Insert a flat ended punch with a straight shaft of 1/8" diameter into the drilled hole and tap the rivet through the hole to remove.

## Using the Quick Adjust set screws

This can be done on the bench for initial set up, and as mentioned earlier in the set up guide, it can be adjusted later while the flyweight is still in the clutch.



- 1) **Carefully** install the set screw into the threaded passage. Be careful, as the small M5 screws can easily be cross threaded. Wind the set screw all the way in until it is snug at bottom of threads.
- 2) Add additional screws as required, always bottoming on the one inside.

***Important: be sure to keep track of what you are installing and where it is installed. It helps to mark the clutch with a permanent marker from 1-3 to be sure you install the same amount of set screws in each hole.***