DUV - P8RZ

Dalton Pro ATV Clutch Kit

Model: 2008 - 2009 Polaris Ranger RZR, and RZR "S" models. 4x4 Recreation Utility Vehicle

Kit #: DUV- P8RZ

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 (QP91-67)

-10 pcs.M5x 12mm long (1.2g each)
- 4 pcs.M5x 6mm long (0.6 g each)
1 pkg aluminum rivets (.85gram) (DFRA-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 more clutch work in future(maintenance),or remove the drive clutch for easier work and inspection.. Polaris dealers have them or can order Dalton part # DCP-M.(dealer installation recommended)

Description :

Optimum CVT clutch calibration for the Polaris RZR 4 x 4 and RZR "S"models

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 without even removing the flyweights from the drive clutch. Instead of using generic flyweights or designs from OEM snowmobiles or regular ATV models ,extensive testing lead to development of a new custom base flyweight specific to this model. The new "Quick Adjust" RZR 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 easily adjusted for modifications)

-Stock tires or oversized

-Altitude adjustable

-New custom RZR specific flyweight profile

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

http://www.daltonindustries.com **PLEASE READ ALL INSTRUCTIONS CAREFULLY FIRST!**

-Please take the time to thoroughly read and understand these pages before continuing

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 ant 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 in this kit before continuing with installation. This kit contains various set up options and recommended settings for different applications.

DUV -P8RZ **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 instal 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. On Regular RZR models there is a plastic spacer on the center shaft in the primary clutch. (inside the primary spring) that could fall off the shaft. This is a SPEED LIMITING SPACER. It stops the primary motor clutch from shifting all the way. The RZR "S" model does not have this spacer from the factory. You should be aware that a regular RZR is not as wide and stable at speed as a RZR"S" model and be sure to install components as supplied by the factory.

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)

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 .
Install cover shroud. Be careful to insure all wires are tucked neatly out of harms way and zip tied, etc as necessary.

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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 principals of the system.
The cvt system on your atv 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 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

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It is VERY important to realize that on most ATV 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 clutch components are open all the way ,and have little effect ,as the belt is already up on the top of the primary clutch . 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 can not offer top speed increases.***

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 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 gear 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 with even slightly 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 at hand , so that the engine stays in its best rpm zone, whether it be a stock or modified engine, or a different terrain tire or situation.

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 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 - 08-09 RZR and RZR "S" Models

Primary springs:

The following Dalton Quick Adjust Flyweight set ups can be performed with **either** the provided Orange/Blue(DPPS-O/BL) primary spring,..or the Black/Orange (DPPS-B/O)*These two primary spring are most applicable in this application. We are constantly developing product and more options may be on our website in future.* **Both of these springs share similar fully compressed load ratings** and will both provide **required shift rpm** for the instructions in this kit and flyweight set ups provided.

Orange/Blue(DPPS-O/BL) .This primary spring is popular for this application ,but the primary springs are a personal preference item and the biggest difference between these two is the rpm at which they engage the belt to start moving the vehicle.. Engagement rpm on the Orange/Blue is more similar to stock engagement and is probably more common. This spring creates the required mid- load force needed for use with the rest of this kit without a noticeable increased engagement rpm. Most of our test riders seemed to prefer this engagement level and this spring was developed to work around that engagement and still maintain the required compressed load rating to work with the flyweights and instructions provided. *As previously mentioned, it is preference and some distinctly prefer the slightly higher engaging Black/Orange*. One of the great features of this kit is the adjustability for individual rider preference, as primary springs are simple and quick to change and experiment with.

Black /Orange (DPPS-B/O) spring provided is more aggressive . The "engagement" rpm is slightly higher(approx 300 higher) than the Orange/Blue, This spring was preferred by our test riders in some situations, like when using large mud tires on the stock vehicle.,drag racing, etc. It is not necessarily that we prefer the slightly higher engagement in that situation, but the stronger early load rating on the spring controls up shift a bit differently and many seem to like the more aggressive acceleration a bit better with it , particularly with heavier Mud type tires. You can certainly ,however, use the Orange/Blue with lower engagement to suit your preference, as these two springs have similar mid load ratings.

It is only yourself that can determine your driving style and spring preference according to what you do with the vehicle. It is nice to have the options like this all in one kit ,and experimenting with the primary springs is quick and easy if you want to try both. A few minutes of experimenting can make it seem like two different types of clutch kits.

Notes on Polaris RZR models: The 08 and 09 regular razr 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 Razr "S" you can change helixes. At Dalton Industries we are one of the largest manufacturers of aftermarket helixes for snow and atv applications ,however, testing of both showed that in most applications the stock helix is fine. We feel that the factory has chosen a good shift pattern on the secondary with the stock helix and spring. 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.

See the following page for "flyweight set up"

Quick Adjust Flyweights - Set up (QP91-67 base weight is 67g)_ **Kit# DUV-P8RZ (Rzr/Rzr S)**

08-09 regular RZR models. (Not RZR "S") 0-4000 ft elevation

25" Tires - Stock machine (and with aftermarket typical bolt ons: CDI ignition, filters, slip on pipes, etc. when used with stock camshafts and header pipes.)
- QP91-67 **w/aluminum rivet** installed in tip - use **2 long** set screws in threaded passage.

26-27" Tires - Stock engine (and typical bolt ons)
-QP91-67 **w/aluminum rivet** installed in tip. -Use **1 long** set screw in the threaded passage.

28"Typical Trail/Mud type tires - Stock machine (and with typical bolt ons**)**
-QP91-67 **w/aluminum rivet** installed in tip - use **1 short** set screw in the threaded passage.

28"Extreme Mud Tires (Outlaw/Silverback)
-QP91-67 **empty tip**(no rivet) - **1 long** set screw

29.5" and larger Mud tires
- QP91-67 **empty tip**(no rivet) - **1 short** set screw

****See notes at bottom for Sand/High Elevation**

RZR "S" Model

The RZR "S" model is a different calibration than the regular rzr. This model has not only **bigger stock tires**, and a wider shock, suspension package, it also has **different factory ECU ignition, different factory camshafts, and a dual head pipe exhaust system**. The Rzr **S** will require more flyweight and ,in fact, pull that weight to it's higher rpm requirements **during the clutching phase**(first 400 ft at WOT).. This is the result of more hp. Most simple bolt on items do not make a regular RZR as strong as a RZR "S".*

***If you have a regular RZR,, treat it like a regular RZR with regard to clutch calibration unless you have made extensive mods, particularly camshafts and headers*.** If you HAVE made extensive mods, contact the supplier of the mods for rpm requirements and you **will most likely need to do case specific testing on your own using these guidelines as a baseline.** There is no way for us to do specific pipe and camshaft testing for all available aftermarket.

RZR "S" 0-4000 ft elevation

26"Bighorn Tires (stock on rzr "S" model).
-QP91-67 **w/.aluminum rivet** installed in tip - use **3 long** set screws in threaded passage.

27-28" Typical trail/mud type tires(27 XTR/Mudlite-28 /zilla, etc)
QP91-67 **w/aluminum rivet** installed in tip - use **2 long** set screws.

28" Extreme mud tires(Outlaw/Silverback)
Or **30 " mudlite/Mudzilla** (trail / mud use)
QP91-67 **w/aluminum** rivet in tip -use **1 long** set screw.

29.5" and bigger Extreme mud tires (primary mud use)
QP91-67 **Empty tip** (no rivet) - use **1 long** set screw.

** *The above is a guideline.* ***There is no way we can test every size and brand/application of tires****,in the after market the sizing and weight of tires has differences from different manufacturers.If in question go to the heavier weight set up*

****SAND / HIGH ALTITUDE(above 4000')-** the word "SAND" is speculative, Normally riding in deep/dry sand is more inclined to have hills and the riders prefer back shift and throttle response because sand is power robbing..High altitude is also less oxygen, and less power. You do not want to up shift too quickly. Start of with **one less set screw** and test for preference.. At altitudes 6000'and higher remove the aluminum rivet at the tip of the flyweights.

Set up guide continued- Other factors: Modifications/Custom considerations

29.5"+Tires Extreme Mud/Competition- Some extreme sticky mud competition situations are severe. When running ANY large Mud Tire you are outside the envelope that the vehicle gearing was designed for, and run more risk of slippage. Sometimes you have to let off the gas...even if your buddies are watching. Clutch components can help keep the belt in the correct ratio and help keep rpm and offer improved belt grip, but there is inherent limitations in the system. When you install tires that are much larger and out of the effective gearing range, that are much heavier than the vehicle was designed for you should be aware of the facts ,and **learn the limitations of your vehicle.**

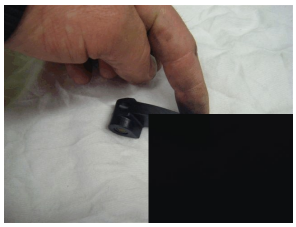
Engine /Clutch Modification- Performance enthusiasts often opt for modification. Most typical "bolt on" mods such as pipes, air box mods ,cdi ignition boxes , etc do not require much different clutching than listed in set up instruction.

If you have extensive or internal engine mods, particularly if running *longer duration camshafts* from **specialty engine shops** ,it is common to use less(1-2 grams) flyweight mass than listed above to achieve a higher rpm during the "clutch phase".Typically leave the tip rivet out and tune from there. Custom ,long duration Cams make peak hp at higher rpm. You MUST work closely with your engine builder to know peak torque and hp rpm required .**Clutch for rpm at the 200-300 ft mark** during testing **(before the clutch phase is over)** Other mods, like Nitrous Oxide injection, etc will require more total flyweight mass.

Similarly, if people experiment with other aftermarket clutches. ,it can change the shift pattern slightly and flyweight total mass may need to be tested for optimum efficiency. If you wade into the world of modified, you MUST learn to test on your own to get full benefit.

****Important tuning notes-** *As you can see from set up recommendations above, accurate clutch tuning can be variable. Tires in particular have a very wide range of sizes , as well a market inconsistency with respect to size and weight. Not to mention rider preference and intended use.* ***We can not give recommendations for EVERY tire/mod or intended use in the market.*** *There are excellent guidelines above for common situations.*

*There is no way that we can test for every tire type and size ,or intended use, particularly if modifications are made to a stock machine. The wide range of adjustability makes this a great kit for ease of fine tuning on custom mod vehicles .****In applications that are not stock, field testing is to be expected.***



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. **Place all rivets pointing the same direction**.

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
2) Wind the set screw all the way in until it is snug at bottom of threads. Do not over tighten
3) 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.