Dalton Pro ATV Clutch Kit

2011-2014 Polaris 900 RZR XP - Stock / Over sized tires, adjustable kit.

*****For "Jagged X" model, or addition of Polaris Stage 2 performance package #2879557, Follow all regular instructions, and see last page for "flyweight set-up guide" for that application.

Kit #: DUV P9XP

Components:	1 Dalton Orange/Silver primary spring	(DPPS-O/S)
	1 set of Dalton Quick Adjust flyweights/hardware	(QP94-56.5)
	6 flyweight thrust washers	(.250x.500x.030)
	10 pcs.M5x 12mm long threaded set screw.	(1.2g each)
	4 pcs.M5x 6mm threaded set screw.	(0.6 g each)
	1 pkg silver hollow steel mass rivets	(1.8g) part # DFRS-Y
	1 pkg aluminum mass rivets	(0.85g)part# DFRA-Y

Tools: *Primary clutch puller bolt* is recommended, 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-C

Description:
Adjustable clutch kit for the 2011 and newer Polaris 900cc RZR XP Sport Utility Vehicle (stock or over sized tires).
One clutch kit that can be set up for different terrain and tires sizes/elevations means accurate clutch tuning for your situation. Improved acceleration, back shifting, and belt performance .
This kit includes Dalton's patented "Quick Adjust" flyweight system that allows you to add or subtract some of the 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, the new "Quick Adjust" flyweight in this kit was designed specifically for this application.

-Ultimate RPM control (can be adjusted for modifications)
-Set up manual includes set up instructions for applications.

PLEASE READ ALL INSTRUCTIONS CAREFULLY FIRST!

Please take the time to thoroughly read and understand all of 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.

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 left rear wheel, shock bolt, etc. 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. **Remove the 6 bolts and clutch cover plate. 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 primary clutch cover plate off, and the spring removed, remove the flyweight pivot pin (note direction) and the stock flyweights. ****Take note that with the new adjustable flyweights kit you will be using a thrust washer on each side of the flyweight.**

5)* **Set up the flyweights** as described in this instruction manual for your desired application **See "Set-Up Guide" …**.For Jagged X and HO versions (Polaris Perf. pkg) see last page.
Take note of your set up guide and set up the flyweights, then install the flyweights into the drive clutch. Be sure to read complete document before continuing.

**** Install thrust washer on each side of new supplied flyweights. (see picture- Set up Guide)**

6) Install new primary spring into the clutch and re-install the cover onto the drive clutch (primary clutch). **Note : alignment marks.**
7) Re- install the primary clutch center bolt and torque to manufacturers specs.(96 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 the factory belt . ***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".
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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 over sized 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 over sized 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 **higher 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.

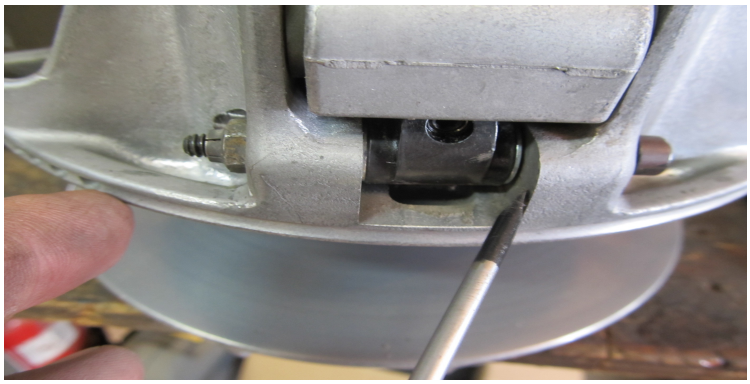
Springs – In general, stiffer springs slow the up shift. Softer springs up shift faster.
Primary springs are in the front motor clutch. Sometimes primary springs are compared on load charts**. The intial load (first part of the compression) ,**of a **primary spring** controls **engagement RPM.** Primary motor clutch springs are the principal control of engagement rpm. Sometimes a stronger compressed load rating spring (second part or load listing of a primary spring on a spring load comparison chart) can allow the use of more flyweight and the combination is effective for a situation ,but not all situations are the same.
Secondary springs are more related to controlling back shift, torque sensing. A spring is another type of tuning component. A spring is always chosen relative to the flyweight and the rest of the system. Sometimes the stock springs are fine, other times re-calibration requires one or both springs in the clutches to be changed to suit the application.

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 900 XP make best hp at 7900-8200 **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. Where the weight is located can change the shift pattern.

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***.
Often, for example, switch from one size of tires to another, you could 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 guidelines are on the following page for different applications.

Always be certain that you keep track of the set screws....it helps to mark the clutch in number from 1-3 to keep track. Be certain to not cause an imbalance . Keep track of screws remaining.
Make sure all screws go in all the way and bottom for secure fastening.(do not over tighten)*



****Install Thrust Washers**- When installing the Dalton Quick Adjust flyweight, it is **important** to install the supplied thrust washers. One on each side of each flyweight. These Flyweights were designed to be used with these washers. These steel washers offer better, more accurate flyweight movement, and improve durability.

SET UP GUIDE – RZR XP 900

For all models read ALL info, but Jagged X, or vehicle with factory Polaris performance pkg (Pt#2879557 engine/exh. kit) see last page for "flyweight set up".

Primary springs:
The following Dalton primary clutch spring is provided in this kit:
Orange/Silver (DPPS-O/S) .
In this particular flyweight configuration, the orange/silver will engage only slightly higher than stock. 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.) **Primary springs are one of the principal items to control "engagement rpm**", as well as the opposing force to flyweights.

For this application there is a new **primary spring, and a set of adjustable flyweights/hardware** included in the kit.
"Engagement rpm" is the rpm reached before the vehicle moves. Different engagement sometimes makes one primary spring more suited to certain applications than the other. **The primary spring provided is the most popular , and best suited all around for the application.**

Secondary Spring
Secondary springs are tested for efficiency. The stock secondary has proven to be best for most applications for this kit for 25-28" tires. All vehicles are different, and the operator should never "assume" more parts is better. Using more spring pressure than necessary can have negative effects. There are some instances where a stronger secondary spring is required. For 28" Extreme mud competition, and 29.5" + (Extra Large Mud tires) there is the optional Grey/White secondary spring.
Grey/White (part# DPSS-GY/W)

Quick Adjust Flyweights Set up RZR 900 XP (Standard/Stock vehicle)

Use TIRE SIZE FIRST, then info(use primary spring provided, stock secondary unless noted)

25"-26" Tires – Stock machine, 0-4000' elev.

25" Tires-

- QP94-56.5 with **.85g hollow aluminum **rive**t, and **3 long set screws** in each flyweight.
- For 25" in sand use .85 Rivet and 2 set screws in each flyweight.

26" Tires-

- QP94-56.5 with **.85g aluminum **rivet**, and **2 long set screws, + 1 short set screw** in each.
- Some heavy 26" use 2 set screws and the .85g aluminum rivet in each flyweight.
- for use in primarily SAND with 26" tires, use same .85gram tip rivet, and start with 1 full length screw and one short set screw in each and test rpm. (remember this is tire size/weight related) ...you may have to add or subtract a set screw. Remember ...SAND is different in different regions, some testing may be required.
- If operating at **high elevations** with sand, it may be best to start off with no rivet, and start with 2 screws in each and adjust.
- Extra set screws are included, and fine tuning can be tested to be very case specific if you choose.
- ** See notes about installing/rivet length below

If you are using **pipes and/or other bolt on mods** for more hp, you may rev more...(or less if too rich setting from a fuel controller). Be certain air/fuel ratio is correct before too much clutch adjustment.
If you are getting rev limit sputter or **revving too high … 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. If extremely deep sand you may need lighter/no rivet and add screw.

Sand is speculative and not always the same. Test rpm during clutch phase for best results.

High altitudes (operating mostly above 4000' elevation) requires less flyweight mass. If not mentioned specifically in your tire size guide, remove one set screw from the sea level suggested starting point.

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 .
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.

* NEVER leave Screws protruding out past the flyweight curvature where it may interfere with roller path, etc.

** Put **rivets** all same direction. When using **rivets**, make sure **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 .500 " total compressed length)**, if in question, install flyweight and rotate it up to see if the rivet clears. You can peen them to a finish length if they are already partly compressed/expanded.

27” - 28” trail /mud tires (Standard/Stock vehicle)

0-4000' elevation (use primary spring provided for all set ups, and stock secondary unless noted)

Tires !!...you need to use some judgment here, some tires are very small compared to what they are marked for size, and lightweight as well, but some are very heavy and close to the advertised size. Most often we go by what is marked on the tire for this guide.

27” Tires-

- **QP94-56.5 Adjustable flyweights** w/ **.85g aluminum Rivet**** installed in the tip (part # DFRA-Y) , and **2 full length set screws** in each flyweight. For some heavy 27”radials, use alum rivet and only 1 set screw (or one long and one short) in each flyweight. Terrain and tire weight play a role.
- If your tires are on the extreme ends of size and weight, you may need to adjust the amount of set screws up or down 1 set screw.
- High Elevation with 27” start with no rivet installed and add 2 full length set screws. Test RPM
- Stock secondary spring.

28” Tires -

- QP94-56.5 flyweights w/ .85g aluminum rivet + 1 full length set screw in each flyweight**

- If your tires are on the extreme ends of size and weight, you may need to adjust the amount of set screws up or down 1 set screw. Eg:some 28” are lighter than others and only measure 27”, thus possibly it will hold rpm using 2 of the screws in each flyweight. Terrain and tires can need testing.
- Stock Secondary spring.
- If using 28” tires primarily in Dry Sand, or often in heavy mud, add the optional **Grey/White Secondary spring** part # DPSS-GY/W and start with the Aluminum rivet in each weight and add 3 full set screws in each and test.

**** Put rivets all same direction. When using the rivets, 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 .500 “ total compressed length), but castings vary) If you are uncertain, install flyweight and cycle it up to see if the rivet clears. You can peen them to a finish length if they are already mostly compressed/expanded.**

…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.

- If higher elevation and/or sand at elevations above 4000 use NO tip rivet (empty), install 2 screws in each 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”)**

*(2011+ RZR 900 XP makes best hp at 7900-8200 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.*

29.5" + tires (also applies to 28" Extreme Mud Tires) Stock Vehicle

The taller gearing and extra rotating weight associated with these tires require the addition of the optional secondary spring.

CAUTION: Changing the secondary spring requires special clutch compression tools, or a shop press, and knowledge of the system. If you do not have training or proper equipment and procedures, you should not attempt to change this spring. Serious damage and injury could occur.

The common set ups are as follows: (use primary spring provided)

-QP94-56.5 **w/ .85g aluminum rivet** installed in tip - use 2 **long** set screws in each flyweight. This is for use with the optional **Grey /White secondary spring part# DPSS-GY/W**

When using these set ups with the addition of the optional secondary spring, there are varying conditions and terrain.
For 28" Extreme Mud tires it may require the same aluminum rivet and 3 full length set screws, and for 31" it may require the aluminum rivet and only one screw in each.
…..Mud,...some call water mud...others call thick sticky mud . It is always best to do some experimenting for your specific tires and conditions.

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. Always try to calibrate for where you do most of your riding.

Special modifications? – There is a heavier tip rivet included for things like extra hp add ons, or smaller tire sizes, etc...and more available, but if doing mods, expect to test.

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 specific engine shop for recommendation as **testing clutch components on your own will most likely be required**. There is no way we can accurately test each of these situations. This is the nice feature of an adjustable clutch kit.

For Jagged X model and for Polaris Stage2 HO kit see last page for "flyweight set- up"

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 (The rivet should expand ans pressed).
3) Squeeze/expand the rivet. Be sure to use enough force to fully expand the rivet, some of the larger solid steel ones need a large vise with very strong force to fully expand. **Place all rivets pointing the same direction**
4) **Be certain to compress this rivet to be less than the width of the roller path up inside the spider assembly. . (usually .500 " total compressed length), but castings vary) If you are uncertain, install flyweight and cycle it up to see if the rivet clears. You can peen them to a finish length if they are already mostly compressed/expanded.**

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.

2013 "Jagged X" 900HO , or addition of Polaris Stage 2 Performance Pkg pt#2879557

The Following is only for the specific engine/exhaust described. Make sure you have read and understand the rest of this complete installation document.

When adding performance modifications to most engines, particularly camshafts of longer duration, it can change the required clutch calibration. Often, longer duration cams can make the engine so that it makes best hp at a higher rpm. Polaris now offers the Jagged X version with a longer wheelbase for offroad racing. There is also a performance package available from Polaris to get the engine mods, exhaust system, etc to upgrade the hp of the 900 XP regular chassis to that HO version. We have tested the package and have calibrations for this clutch kit to suit this engine configuration. With the Clutch kit you still get the adjustability to adapt to different tire sizes, terrain, elevation, etc. With the engine package installed, the vehicle makes best power to the ground at a slightly higher 8150-8400 rpm during the clutching phase.

The following calibrations are only for the stated package, and not for simple exhaust/bolt-on mods. If you have added the engine /exhaust package from Polaris, or have a Jagged X model, use the following settings.

Use primary spring provided, plus the following:

25" tires :

- QP94-56.5 with **1.8g rivet**, and **1 long set screw** in each flyweight.
- If mostly sand application use 1.8g rivet in each, and 1 short set screw or no set screw depending if deep, etc Deeper type sand requires less flyweight mass.

26"Tires :

- QP94-56.5 with **1.8g rivet**, and **1 short set screw** in each flyweight for most applications.
- some 26" heavy or mostly soft terrain use no set screws and the 1.8g rivet in each flyweight.
- for use in primarily DEEPER/DRY SAND with 26" tires, use .85gram (aluminum) tip rivet, and start with 1 full length screw in each and test rpm. (remember this is tire size/weight related) ...you may have to add or subtract a set screw. Remember ...SAND is different in different regions, some testing may be required.
- If operating at **high elevations** (above 4000'), it may be best to start off with aluminum .85g rivet, and start with 1 screw in each flyweight and adjust.
- Extra set screws are included, and fine tuning can be tested to be very case specific if you choose.

27-28" Tires :

-If 27"tires (like many 27") are really only 26 " measured, and fairly lightweight, use 26" tire settings above.

- Heavy 27" or full size 27", and 28" typical mix use tires use .85g aluminum rivet, and start with one short set screw.

28" + Extreme Mud tires and all 28" at high elevation- use optional Grey/White secondary spring (part#DPSS-GY/W). Use Aluminum .85g rivet and Start with 1 long set screw and test rpm.