

DaltonPro ATV Clutch kit

DBO 800 M
(Extra Large Mud tires)

Model: 2006 & up CAN-AM 800 HO Outlander and Renegade 800 4X4 ATV.

Kit #: DBO 800 M DaltonPro Mudrunner Kit (Ex large mud specific tires)

Components: 1) Dalton Green/Yellow primary clutch spring (DPPS-G/Y)
1) Dalton Yellow/Black secondary clutch spring (DPSS-Y/B)
3) DaltonPro adjustable mass flyweights (levers) Part# DB34-8A
1) pkg Hollow aluminium mass rivets (DFRA – Y .85g)
1) pkg Hollow steel weight mass rivets (DFRH– Y 2.4g)
1) pkg long, solid mass rivets (DFRL-Y 3.6g)
1) includes **Instruction manual and “CVT clutching overview”**

Description: Better belt grip and improved performance in mud conditions with large ,mud specific tires.

This kit is designed to better control the shift pattern of the CVT belt system to help re-calibrate for the big tires. Also improved backshifting under heavy load to hold rpm's better in tough mudrunning and thus minimize slippage in heavy mud conditions. This kit includes adjustable mass adjustable flyweights for more flexible tuning options.

WARNING

Read this before installing

Clutch components should only be installed by factory trained mechanics and service personnel with a complete knowledge of snowmobile / ATV Variable Rate Belt Transmissions. Make sure your clutches have been properly inspected for fatigue, cracks, wear, etc. DaltonPro clutch components are produced with high quality materials and a controlled procedure. NEVER cut, weld or manipulate clutch components. ATV clutches are assembled under spring pressure. DO NOT attempt to disassemble clutches if you are not qualified, serious personal injury could result.

This is a performance kit and is intended for the use of Experience Adult Riders, who are trying to obtain a higher level for racing, etc. This kit should NOT be installed on any ATV that will be used by any person of MINOR age. Dalton Industries has no control over the use or misuse of these components and assumes no responsibility for any injury or damage.

Installation Instructions

IMPORTANT: Always remove the key from the ignition when working around clutches.

This is a dealer recommended installation. There are a couple of optional procedures listed in the Bombardier service manual for drive clutch removal. The following is only a basic guideline, always consult your dealer service manual for more detailed description.

- 1) Remove clutch side floorboard as necessary to gain access to clutch cover shroud. Remove cover bolts and plastic cover to expose CVT clutch system.
- 2) Loosen the center bolt on the primary (motor) clutch, do not completely remove the bolt. **There are clutch holding tools and procedures in your Can Am service manual.**
- 3) Only the OUTER half (moveable) of the primary clutch will be removed. Hold the outer half of the primary clutch to be removed and with a rubber hammer, lightly tap on the side. This will jar the moveable sheave assembly from its taper fit, if it is stuck.
- 4) Remove center bolt and the moveable sheave assembly. **NOTE: Keep moveable sheave assembly together as a unit** at this time and place it on the workbench for later work. Note: the primary clutch spring and the spring retainer cup on the primary shaft. Remove the spring and set it away. Leave the SPRING RETAINER CUP on the shaft. (See fig #1)



- 5) BE CAREFUL when removing the belt, to leave the center hub sprage and spring retainer cup all the way IN on the shaft. **NOTE DIRECTION OF BELT** (arrow) when you remove it. *Make sure belt remains clean & free of any oils / grease, a non-residue cleaner like brake cleaner maybe used to clean clutch surfaces, etc.*
- 6) Remove the secondary pulley(rear clutch) by removing the center bolt. Be careful as you release the center bolt as the spring in the rear clutch will push outwards when the bolt is off the threads. Have a helper hold the clutch inward toward the vehicle while the bolt is removed.
- 7) When releasing the rear clutch to remove it **TAKE NOTE of the position of the Helix Cam** as the clutch comes off. **IMPORTANT** that it goes in the correct position during re-assembly or the clutch could lock up at partial belt travel and injury or damage may occur.
- 8) Install the supplied secondary spring and carefully re-install the rear pulley assembly taking note of the position of the helix cam as you re install the secondary clutch.
- 9) Examine belt for inspection or replacment:(flat spots on edge from burning on take off, or holding brake etc)
 - **CAREFULLY** install the belt around the rear clutch and center hub of the front clutch.
 - *Make sure belt and clutch surfaces are CLEAN!*
 - *Note direction arrow*
 - *It maybe helpful to work the belt down into the rear pulley a bit to allow more slack on the belt. (Thread in the bombardier “driven pulley expander” if available)*
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CHANGING PRIMARY COMPONENTS:

- A) With the primary assembly still together, use a marker to show orientation of spider for re-assembly (Fig# 2&3)



- B) With the primary moveable assembly on the workbench (spring side down) carefully lift spider assembly out of the moveable sheave. **ATTENTION:** *Be careful not to lose the plastic sliding buttons that will be exposed on the sides of each finger of the spider, as you lift it out. Keep the spider flat and horizontal (as not to lose the plastic buttons) and sit it aside gently. If any of these plastic slide buttons are damaged, replace them.*
- C) **VERY IMPORTANT:** The Bombardier / CAN-AM ATV drive clutch has places for 6 flyweights. On this 800cc Outlander model all 6 positions are filled, and as many of you know (Bombardier service techs) there are other models with only 3 or 4 of the positions filled and some are not used. Example: Outlander 400 has only 4 flyweights.... With 2 of the 6 positions empty (180 degrees opposite each other). In this case, we will be removing and replacing only 3 of the flyweights and leaving 3 of the stock ones in tact. In fig #4 you can see that 3 of the stock weights are still in the assembly and is ready for installation of the 3 Dalton adjustable flyweights.



The 3 stock and 3 adjustable weights are alternating. The 3 stock are 120 degrees apart, as are the 3 new ones. – Every second one is replaced. **THIS IS THE ONLY CONFIGURATION THAT 3 WEIGHTS CAN BE REPLACED.** It is well known in the snowmobile racing world, with 4 and 6 weight Drive clutches, that weights are often mixed. **BUT,** it must be: a) evenly spaced (every second one or 120’ apart) or b) Directly opposite each other (180’ apart) with the same weights.

- D) After setting up the provided flyweights **properly for your application** (* See attached “flyweight set – up” for **recommended application**), install the new flyweights into the clutch and secure the pins / nuts the same way as they were removed. Be certain to put metal washers back in place (one each side of flyweight) before putting the pin through the weight. Carefully slide the spider assembly back down onto the moveable sheave assembly, making sure the plastic buttons are still in place properly and the *spider is in the CORRECT POSITION with ROLLERS over each flyweight* and the marks you made in the correct position. With the moveable sheave / spider assembly back together, keep it together and reinstall as a unit, along with the new primary spring. **Note:** It is normal for the spring to be a snug fit. Install the new spring into the clutch first with a twisting action, then install the whole unit and re-torque as per dealer service manual. (74ft lbs)
- 10) Re-install plastic cover shroud, floorboards, etc. **Note:** Be certain that the cover gasket is properly in place and use caution not to cross thread the cover bolts.
Carefully inspect all wires, clamps, etc during re-assembly.

General Overview and CVT tuning – Can Am 800

Before moving to “Flyweight Set-Up “ take a moment to read a bit of basic CVT tuning theory. CVT tuning can get very involved and there are books written on theory of operation itself and the various ways to change the way the system reacts to loads,etc by changing or altering the tuning components(spring rate,flyweights,etc).Flyweights alone can be a long discussed topic,as on a flyweight type system,the curvature,distribution of mass,etc can dramatically change shift characteristics.Many inexperienced tuners often make the mistake of comparing flyweights by “grams” alone. We have tested and developed various flyweights for this model during testing,and the chosen curvature and mass locations,as well as the adjustability were the result. Following is a basic overview to help you understand if you are unfamiliar with cvt function.

Changing CVT tuning components is done for many different reasons,but the thing that you are doing is ultimately **changing the rate of upshift and back shift of the belt** in the pulley system.The factory sends the machine with a calibration that they feel is a good “all around” set up. The factory set up not only has to be able to tow a trailer,do ok in a drag race,climb and backshift decently, but it also has to consider fuel economy and emissions during its testing. Many owners of ATV's have a desire to re-calibrate the clutch system more specifically to their needs based on their own usage,and situation. Common reasons are racing,oversized tires,altitude,mud running,or towing. For instance ,if you are a fan of mud and big tires,it is obvious that the taller final drive ratio from installing the tires changes things. With larger tires and more rotating weight,the last thing you would want would be to upshift too quickly and kill the rpm too rapidly,so you want that initial upshift to be slower.If you install tires much larger than the acceptable envelope that the manufacturer recommends,you can easily burn belts,the CVT systems can't change the actual gear ratio,but by re-calibrating it(changing the rate of shift of the belt),you can often change the shift pattern to help get better results for your application. It will hold its correct rpm better by properly shifting on its own to the proper belt ratio as it comes under load(backshifting),etc based on what you set it up to do. If your machine was still upshifting quickly(like you can get away with with small stock tires) it would lower the rpm lower than the peak hp rpm and performance would suffer.

It is also very **important to remember** that cvt tuning parts only control the rpm during the “**clutching phase**” The clutch phase is when the belt is going from low ratio to high ratio. ATV's are not like snowmobiles,..on ATV's the “clutch phase”is over in a distance of approximately 500 ft on a full throttle run . Once the belt is to the top of the primary clutch,it is to the top and clutch components no longer control the rpm after that point. With stock tires the engine will often start to overrev,but it is because the belt can shift no farther to control it. For atv testing it is good to use short distances(200 ft and 400 ft) to determine clutch rpm. **Dalton adjustable flyweights** help make it flexible.

Flyweights- Flyweights are the principal item to control rpm during the clutch phase. **Heavier** weights upshift *faster* and *lower* the rpm. **Lighter** weights upshift *slower* and thus *increase* rpm during the clutch phase. It is NOT that lower,or higher rpm is better. Ideally,you want the clutch calibrated to shift the belt at the correct rate to hold the rpm at the rpm that the engine makes best HP. If an engine makes peak hp at 7000,then having it calibrated to run at 7600 is probably much worse than if set up to run at 6900,as many crankshaft engine dynos will easily prove.The proper amount of flyweight mass is determined by both the **other cvt tuning components being used**, the **given situation** or intended use of the vehicle, and ultimately the **field tested results for best efficiency for the situation** at hand.

As an example look at our DBO800R(stock to 28 in tires) kit for the Renegade model . The stock tires set up in that kit is different than in the DBO800 kit for the Outlander.For stock tires on the renegade kit,you use the same base weight,but it calls for the heavier 3.6g rivet.Compared to a Outlander, renegade is a much lighter vehicle,it has smaller stock tires(you can get away with upshifting faster),and it uses lighter different flyweights in the 3 stock positions.

Primary Springs- Primary springs have some overlapping uses. The springs are usually compared by using their pressure load rating at two intervals. The **first load rating** is often referred to for **engagement**(stall rpm) first load number on a primary spring is the principal component to control engagement rpm.

The fully compressed or **second load rating** is used as the principal **opposing force to the flyweight**. Stronger fully compressed load ratings are a factor in how much flyweight mass you can run. You can often switch from one primary spring to another and leave flyweight mass the same if the second load rating on the springs are within the same zone and have minimal effect on top rpm. This is useful for those who like to experiment with engagement rpm. Engagement rpm is a personal preference. It is good to have options for this. There are optional spring load rating charts available on www.daltonindustries.com under "components"

Secondary Springs- Secondary clutch springs are a component that has many overlapping features. Its principal function is torque feedback sensing, that is that it initiates backshifting of the belt to proper ratio to maintain rpm. The secondary, however, does have effect on upshift characteristics. CVT's are about efficiency. Proper balance of components for efficiency is the way to good belt life. The key to preventing slippage is having the belt in the correct ratio at the right time.

A general rule of thumb is to only use enough spring pressure as necessary for the situation. Excessive secondary spring pressure can cause inefficiency and prematurely wear belts as bad as not enough pressure. For many Can Am 800 cc applications (stock up to 28" trail/mud tires) the stock secondary spring is sufficient and you are best to use our regular kits. **This clutch kit is the DBO 800M** for extra large tires and mud use. Included is a **heavier than stock** secondary spring. A **heavier** secondary spring **slows the upshift** which is a good characteristic if you are running huge tires and the resulting taller gear ratio. If you change components in a secondary clutch that slow upshift and increase rpm, it, in some instances means you need to add primary weight to re-balance the system and get proper shifting rpm. When you get into extreme mud tires the combination of this stiffer secondary spring allows you to add back some flyweight mass and again have a balanced system with the appropriate spring for the big mud tires.

Renegade/Outlander- These two models have different flyweights from the factory, not just grams, but different in general. This set up guide you will notice has different set ups sometimes because of that. Some tuners prefer to order an extra set of three Dalton adjustables and do their own tuning with all 6 Dalton weights, a slight advantage for some who like to experiment on their own, but not necessary, as using 3 stock flyweights in each are sufficient if compensated correctly. Replacing only 3 flyweights gives you improved performance, cost effectiveness, and adjustability.

FLYWEIGHT SET-UP (DBO 800 M clutch kit)

The following set ups are for use with our most popular **green/yellow primary spring** and the **yellow/black** sec. springs included. If you would like lower engagement order Tan primary, or higher - yellow/red (see spring chart)
For use with the **stock helix cam****

28" Mud Tire -30" trail mix tires-
Outlander 800 .85g aluminum rivet
Renegade 800 2.4g hollow steel rivet

29.5" and bigger Mud tires
Outlander 800 empty (some have used 6 Dalton w/alum.)
Renegade 800 .85g aluminum

**** Alternate Set Up – for use with the secondary Helix Cam from a 650 Outlander (on a 800)**

This mod is not part of *this kit* or part of a *Can Am 800* ATV. Some mud runners like to experiment with the shallower angled helix cam from the 650 outlander. A shallow helix cam angle SLOWS the upshift even more but in a slightly different way, and thus increases rpm during the clutching phase. This helix will resist the rear sheaves from opening and even more add belt pressure on the secondary clutch. The result is that you need to add even more flyweight mass to balance it and get rpm correct. Is this for everybody?, no, it is often more revvy in the midrange cruising...but for some who frequent the real thick, sticky mud and that is their principal riding area, this set up works well for them. It seems that this set up is more often used by those that spend most of their riding in low range, more so than riders that still do a lot of trail.. Only YOU can decide if you would like to experiment with this mod. We have included a common flyweight set up guide for the 3 Dalton weights when using this mod for reference.

Using the **650 helix AND the DBO800M** kit with the yellow/black sec spring:

28" extreme mud tires-
Outlander 800 2.4g hollow steel rivet
Renegade 800 3.6g solid, long rivet

29.5-32" Ext Mud Tires
Outlander 800 .85g alum rivet
Renegade 800 2.4g hollow steel rivet

Mods and other options :

As you can see from reading the above ,CVT tuning has a lot of variables. There is no way to cover every situation. There are other options and variations/rider preferences that may work very well. For example, some people have tires that are on the edge of needing this kit (some 28" pure mud tires but for mixed mud /trail use), and have used the regular DBO kits with the stock secondary spring. Some have reported great results for that from adding an alternate helix and keeping with the stock secondary spring. If you are happy with that we are not suggesting you buy anything more than that. Others have tried similar techniques and dislike the results. Sometimes rider preferences prefer different engagement rpms. Some always use low range and others don't. In some cases the word "Mud" itself is speculative because it varies from watery 2 ft deep holes to deep sticky, thick mud. Different areas, etc can make a world of difference. Engine mods can require different shift characteristics. Some camshaft profiles require higher rpm quickly.

This is a fully adjustable kit that has guidelines that work well for most, but don't be afraid to venture into your own experimentation.



Installation and removal of Mass Rivets

- 1) Push the rivet ALL the way through the hole in the flyweight. (**remember to keep all rivets same direction**)
- 2) Using a LARGE shop vise, hold the rivet in a manner that keeps the rivet all the way through the hole so that you will be expanding the part that protrudes from the other side.
- 3) Squeeze/expand the rivet using strong pressure on the vise.

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 smaller diameter straight shaft than the drilled hole (1/8" straight shaft punch), and tap the rivet right through the hole.

Thank you for choosing Dalton Industries !

For other model info and tech support visit our website at www.daltonindustries.com