DaltonPro Clutch kit _ DBO 1000 R

Model: 2012,13 CAN-AM Outlander 1000, Renegade 1000 4X4 ATV models.
Kit #: DBO 1000 R Adjustable Kit .**Outlander -Stock and oversized tires**
Renegade -Oversized tires* (or stock size for sand or high elevation)

** Renegade 1000 Stock Tire – for typical hard packed and mixed trail use at low elevation, the factory calibration has proven to work well for the stock tires.*

Components: 1)Dalton Yellow/Red primary clutch spring (DPPS-Y/R)
3) DaltonPro adjustable mass flyweights (levers) (Part# DB35-C w/ adjustable tip)
1) pkg Hollow aluminium mass rivets (DFRA – Y .85g)
1) pkg Hollow steel weight mass rivets (DFRH– Y 2.4g)
1) pkg solid steel mass rivets (DFR-Y 3.1g)
1) includes **Instruction manual** and flyweight set up guide / applications

Description: **Better belt grip and improved performance .** This one clutch tuning package can optimize CVT calibration for many tire sizes and applications. A new case specific, adjustable flyweight was built for this application, to work with the spring provided in the kit. This combination provides for better acceleration, and improved backshifting. Holds rpm better under load conditions. Adjustments can be made to the adjustable flyweight lever arms to optimize performance with stock tires, or help compensate for oversized tires, terrain conditions, as well as power loss from operating at higher elevations. Flyweight set-up guide is included. There are notes included in this set up guide to add an **optional secondary spring for use with 29.5 and larger tires** in severe mud applications.

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. 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 Experienced 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 Can am service manuals for drive clutch removal. The following is only a basic guideline, always consult your dealer service manual .

READ AND UNDERSTAND ENTIRE DOCUMENT BEFORE STARTING TO INSTALL !!

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. If it does not pop loose on it's own, 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 work bench for later work. Note: the primary spring and the spring retainer cup on the 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) It is not necessary to remove the belt unless for inspection reasons, or replacement. If you remove belt for inspection, use the "driven pulley expander" or a M8 x1.25 fully threaded bolt to spread the secondary pulley sheaves. This allows slack in the belt for easier removal. A fully threaded bolt of 75mm length can be used.

7) Be certain belt is clean of any dirt , oil, or residue. Clean belt in warm soap and water , rinse and air dry if necessary.

8) **Install belt. Examine belt for inspection or replacement (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. There is a threaded hole in the secondary clutch that can be used to spread the sheaves of the secondary . Can Am technicians have a special bolt *"driven pulley expander*". This will assist in letting the belt down into the secondary and make re-installing the belt easy. This hole is a M8 x 1.25 . A FULLY threaded bolt of aproximately 75mm length can be used.
- *Make sure belt and clutch surfaces are CLEAN! (non residue cleaner like brake cleaner if necessary for sheaves)*
- *Note direction arrow on the belt.*
- *New belts should be first washed with hot soapy water to remove mould release residue,then rinsed thoroughly .*

***** The Factory Can Am belt** is the best belt for this vehicle.As much as we would like to recommend a cheaper priced alternative,the factory belt is superior and recomended for this application. In fact the components in this kit and the " set up guide" are calibrated to this belt compound.The drive belt is a CRITICAL component in tuning this vehicle.*

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.*

Continue on next page.

C) **VERY IMPORTANT:** CAN-AM ATV drive clutch has places for 6 flyweights. On this 1000cc Outlander model all 6 positions are filled, and as many of you know (CAN AM service techs) there are other Can Am models with only 3 or 4 of the positions filled and some are not used at all. Example: Outlander 400 has only 4 flyweights…. With 2 of the 6 positions empty (180 degrees opposite each other). Some models only use 3 positions. In this case, we will be removing and replacing only 3 of the flyweights and leaving 3 of the stock ones intact. 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 re-install 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 the primary (*89 ft lbs)**

IMPORTANT

***This outer moveable sheave /spider assembly attaches to the clutch via a set of matching tapers. Be certain the tapers are clean and dry (only use non-residue cleaner like brake cleaner,never lube or oil) . It is critical that you torque the primary assembly properly. The male and female tapers must be a CLEAN and DRY fit so they can lock together properly.**

- Re-check torque at 89 ft/ lbs.(+/- 6 lbs) Do NOT guess or make assumptions here, you want good lock up

9) Re-install plastic cover shroud, **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.
-re-install console panels,seats, etc.

*** FLYWEIGHT SET-UP (DBO 1000 R clutch kit)**

The following set ups are for use with the spring/s and components supplied in this kit, and those components in this 1000 configuration. The total "grams" are only relative to components supplied. These mass adjustable flyweights in this kit have a profile, location of mass, and base weight that was designed for the spring rates, and adjustable flexibility in this application.

Note: The primary spring supplied in this kit is color coded Yellow/Red. The primary spring is the principal control of the " engagement rpm" , although it has other pressure characteristics as the opposing force to the flyweights.

OUTLANDER / RENEGADE SETTINGS 25- 28" TIRES - USE STOCK SECONDARY SPRING, THE PROVIDED PRIMARY SPRING, AND THE FOLLOWING FLYWEIGHT SET UP: (Go by tire size and read notes) .

26" typical trail/mud tires (including stock 26" on Outlander version)

Use **2.4g** hollow steel rivet **

-when using primarily in sand , or when operating mostly above 4000' elevation.use .85g aluminum rivet.
-if vehicle is primarily above 6500' elevation run flyweights empty.

27 - 28" tires
Use **.85g** rivet **
(if using primarily in sand application or when above 4000' elevation use flyweight empty.)

25" Tires, Renegade Stock * (25" is smaller than stock tires on Outlander 1000)
**As mentioned in kit description, with stock tires for regular trail use a kit/re-calibration is not necessay, but the following setting can be used. This set up does give a more sporty feel and offers better response.*
Use **3.1g** rivet ** (Low elevation typical mostly regular-hard packed trail mix terrain)
-for sand terrain , use 2.4g

- above 4000 ' elevation use 2.4
- deep dry sand hills, or for sand and high elevation (4000')use .85gram rivet.(if primary use is 6500+ use empty)

USING THE OPTIONAL SECONDARY SPRING DPSS-B/V - First and foremost, DO NOT use the optional secondary spring OR the instructions below unless you require it and have the optional Black /violet secondary spring.....More parts is not always better, applications that require its use are well laid out **on our website.**

OUTLANDER 1000 Heavy passengers /load AND 28" Heavy Mud Tires

- **Use settings for 29.5 tires and the optional **Black/ Violet secondary spring (DPSS-B/V)**
- **Only for application described,** If only occasional weight/load use stock secondary &settings above.

29.5" AND LARGER TIRES – Using Optional Secondry Spring for extreme large tires / heavy mud.
*** secondary center bolt has torque spec of 15 ft/lbs + 180 degrees of rotation- attach degree wheel to torque wrench. Be sure to see instructions for installing the DPSS-B/V*
- For 29.5, 30" Tires Use 3.1g solid rivet with option**al Black/Violet** secondary spring (part# **DPSS-B/V**)
- For 31 - 32" Tires Use 2.4g hollow steel rivet with the **Black /Violet.**

** **For Installation and removal of Mass Rivets see following page**

Modified machines and other options

Clutch tuning has a lot of variables.There is no way to cover every exact situation, as there can be many variables.Things like SAND, and MUD,are not even the same to everybody, because different regions have different terrain types. That is one of the nice features of adjustability. Even tire size and weight can vary by brand.
Mods - Typical performance modifications like high flow filters, slip on pipes, etc quite often are not enough difference in engine characteristic to require different CVT calibration from the suggested settings. There are , however, some things that can require major changes. CAMSHAFTS of long duration, etc.. In those situations,you may need to test. It is best to have all possible manufacturer info for the mods.

INSTALLING AND REMOVING 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) Make certain that the flyweight is SUPPORTED all around the rivet before trying to drive out the old rivet. A hole in a steel surface or a large vise that is slightly open (close to the rivet) is good support for the flyweight.
4) 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.

Read the following pages before operation.

It is a huge benefit to the vehicle operator to understand the CVT system on this vehicle, both for the function of the belt and tuning components,and the limitations and proper use of the drive system.

Can Am 1000 - General Overview and CVT (Continuously Variable Transmission)

Clutching, belts, and potential problems.

The new Can am 1000 has excellent hp in stock form.This vehicles has plenty of power, along with very tall final drive gearing making it capable of reaching very high top speeds. Because of this combination, the potential is here to aggressively overheat belts, particularly when operating at LOW SPEEDS in HIGH RANGE. Any time this vehicle is operated at low speeds it should be in LOW range.

Some operators,who may be simply uninformed, may state things like.... "It has all kinds of power and I should be able to leave it in high!" Although that may sound logical, it is simply not so. This is not a hydrostatic or oil pressure automatic,..it is not even a wet clutch type of CVT, it is, like some other brands, a system that engages the belt each time the vehicle is required to move. With this type of system, it is important to understand the way the system functions, so you can maximize FUN and avoid belt problems.

The important thing to know here is that in LOW range the belt travels farther up the clutch at a given speed. So,for example, if you are riding at 10 mph in HIGH, the belt may still be very low in the primary clutch (close to the hub). If you switch to LOW range and travel the same mph...the belt rides up at a higher point on the primary clutch, offering MUCH more belt grip and substantially lower belt temperature. When going slow, use low. This is fact, and this simple fact, if not understood , can aggrevate the belt wear , and temperature dramatically.

Another mistake that is sometimes done is to hold the brake and rev up the engine past engagement . This will only burn a flat spot on the drive belt and make it unuseable, and should not be done on this type of system.

When straying from normal tire sizes and trail operation to other surfaces like mud and sand , it can become increasingly important to have proper clutch calibration to help compensate for the changes. Clutch calibration does one main thing...it changes the rate of shift of the belt. The way to help eliminate unnecessary slippage and (thus heat) is to have the belt in the correct ratio on the pulleys for the loads present. We can manipulate that shift pattern with Clutch tuning components.

You cannot make tires that are too big (and mess up the final drive ratio even more) smaller, or the sand dunes flatter or more firm with less rolling resistance, etc. but by calibrating clutches we can help to compensate and make these situations easier on the drive belt and improve vehicle performance.

Clutch tuning

Before setting up and installing your clutch kit, take a moment to read a bit of basic Clutch tuning theory. CVT tuning can get very involved and there are books written on theory of operation itself . There are various ways to change the way the system reacts from 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. If the curvatures, profile, and location of mass are not the same,...then the "grams" are irrelevant. 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 and UTV'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 tuning components can't change the actual gear ratio resulting, but by re-calibrating the cvt drive system ,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), based on what you set it up to do. If you were to install larger tires, and 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.The belt would also not be in the proper ratio for the loads present with the bigger tires resulting in more slippage and heat....causing delamination and failure of the drive belt.

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 on the clutch pulleys. ATV's and UTV's are not like snowmobiles,..on ATV's / UTV'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. After that "fully shifted" point (with stock tires on hardpac) the engine will often start to overrev, but it is because the belt can shift no farther to control the rpm. It is important to remember that clutch components are not the controlling factor for rpm after that belt is fully shifted. For Clutch RPM testing it is good to use short distances(200 ft and 400 ft) to determine clutch rpm. **Dalton adjustable flyweights** help make it flexible.

The Components

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.

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 .
Some people prefer different "ENGAGEMENT" rpm than others, for various reasons. There are load rating charts available on www.daltonindustries.com under "components"

It is very important to realize that springs have different characteristics when used with other different components. The springs in this clutch kit may engage at very different rpm when used with other flyweights,etc. For instance: if the green /yellow primary spring (part # DPPS-G/Y) was used in this clutch kit it engages at approximately 1650 RPM, which is LOWER than the stock engagement. That same Green /yellow engages at 2000 + rpm in a Outlander 800 configuration,..because the other components play a role in it. Each atv is specific.The Green/yellow a favorite in the 800cc models is not as favorable , and not really suitable in this application.

The primary spring in this kit:

STOCK 1000 primary spring engages at around *1800 rpm
Yellow/Red (included) engages around *2050 rpm

** there is some variance in engagement based on total flyweight mass,belt wear, etc. but the Primary SPRING is the principal control of engagement rpm.*

Secondary Springs- Secondary clutch springs are a component that has some 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 as well. 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. **For the Outlander and Renegade 1000, the stock secondary is the most suitable for most typical use,** however, when operating in heavy mud with extreme large mud tires (29.5+) there is benefit to adding the optional Black/Violet Secondary spring part # DPSS-B/V. (and adjust flyweights according to the above "flyweight set up" guide).

Thank you for choosing Dalton Industries !

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