

DK750 B12M

Dalton Pro ATV Clutch Kit

Model: 2012 Kawasaki Brute Force 750 EFI 4x4 -28" Agressive Mud and larger tires , as well as high elevation applications.

Kit #: DK750 B12M

Componets: 1 Dalton Orange/blue primary spring	(DPSS-O/BL)
1 Dalton Aqua Secondary spring	(DPSS-AQ)
1 set of 4 Dalton Quick Adjust flyweights/hardware	(DPKA-68C)
2 pkg hollow steel rivets (2.4gram)	(DFRH-Y)
2 pkg hollow aluminum rivets (.85g)	(DFRA-Y)

Tools: *Primary clutch puller bolt* is required. Kawasaki dealers have them or can order Dalton part # DCP-G.(dealer installation recommended),also a shop press or clutch compression tool for secondary. Also, a LARGE shop vise for compressing mass rivets.

Description :

Kit is designed specifically to fit the 2012 750 Brute Force. 2012 is a different engine configuration than previous year models. This kit was developed to help recover performance lost from installing large aggressive tires and mud conditions with **28"and larger aggressive tires**. Improved acceleration and back shifting under load . Also offers flexibility to tune your clutch to rider preference and conditions. This kit uses Dalton's Quick adjust Cam Arm flyweights ,which make adjusting for conditions/tire sizes ,etc easier. **One adjustable kit covers a lot of applications !**

Although it is well known that oversize tires DO hurt both acceleration and speed, This kit can help bring your ATV back to life after putting on the agressive mud tires.. If you are running 25-28" tires for regular 0-4000 ft elevation trail applications use part # **DK750 B12** (see www.daltonindustries.com for details) There are settings in this kit that allow for the use of smaller, more typical **26-28" aftermarket tires for sand use or high elevation.**

***This kit is NOT for use on the 750 Teryx utility vehicle.** People may wrongly assume that this kit may be applicable to the Teryx side X side utility vehicle, and it is not. The Teryx vehicle has different clutch calibration from the factory than a Brute because it is a simply different body weight and application. See www.daltonindustries.com for details.

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

ATV 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 atv 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.

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INSTALLATION: (dealer recommended)

Important: Always remove the KEY from the ignition before working on clutches. If the electric servo motor is activated for the engine brake system while the cover is removed it will have to be re set by a factory technician.

1) Remove the cover bolts to remove the plastic cover shroud. There should be enough slack in the servo wiring to swing the whole cover assembly up onto the seat and out of the way of your work.(use caution, do not pull or damage any wires.)

2)****Take note of Belt Deflection before** removing the clutches. Belt deflection is a critical adjustment on this model. **Proper belt tension is relative to the start off ratio of the clutches** and critical to good belt life. **Belt Deflection** should be within factory specification of 22-26mm(approx 7/8 inch). If the belt is too loose or not in spec (sometimes from factory), your secondary pulley clutch will have to be disassembled to remove shim/shims to adjust before re-installing . Consult factory service manual.

Note: Our testing has shown best results on Kawasaki V-Twin models with the factory belt , and calibration for this kit is associated with that factory belt compound.

3)Remove the center bolt from the primary(motor) clutch. ATTENTION...this drive clutch center bolt is **left hand thread** After removing center bolt, use the proper puller bolt (Dalton part # DCP-G or Factory Kawasaki puller) to remove the drive clutch from the engine **Important...** start the puller bolt in by hand to insure proper threading. *Take note of the direction of the belt. It should be installed with the letters on the belt so that you can read them .*

4)With the clutch removed, remove the cover from the primary clutch by removing the 10mm bolts. NOTE: take note of the alignment marks on the cover itself and the spider for re-installation .

5)Remove stock flyweights and primary spring.

6)AFTER setting up the provided flyweights ***properly for your application** (READ all pages before continuing) install the new flyweights into the clutch and install the new primary spring. Set the primary (motor) clutch aside for now and remove the secondary clutch..

7)Using a shop press or clutch compression tool, compress the spring retainer cap on the secondary clutch and remove the snap ring and slowly release the retainer cap.

**** THIS is when you would completely disassemble the secondary to remove/ adjust shims as necessary to set BELT DEFLECTION (look for the little roller pucks inside the secondary clutch center, and consult service manual).** Install the supplied AQUA secondary spring and re-install secondary clutch onto the vehicle as per service manual. Be sure that NO GREASE or foreign substance is on clutch surfaces, clean with non residue cleaner like Brake cleaner.

8)Re-install the belt first on the secondary clutch and then install the primary clutch (after flyweights are set up and installed) onto the crankshaft and torque to proper specification.

***see attached “ Flyweight set- up “** for recommended set up of the adjustable flyweights for the motor clutch..

Torque specifications: Primary center bolt= 69 ft/lbs.

Primary cover bolts= 113 in/lbs.

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

****Reminder: did you note BELT DEFLECTION?** - this is a critical element of calibration and controls the proper start off ratio of the cvt system. This kit is calibrated to proper belt deflection and should be taken as a serious element.

Please read “Clutching Overview, flyweight set up”, and on the following pages.

OVERVIEW - DK750 kits 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 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 .

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 700 feet at wide open throttle, or around 55 mph. **After** which ...the clutch components are open all the way ,and have little effect on speed or acceleration, 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.**

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 or fast os one with stock lightweight tires, clutch tuning can help compensate for some of the losses and help restore performance to acceptable levels.*

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 clutch phase. Upshifting the belt slower means it does not gear up as fast and creates higher rpm during the clutch phase.

** never compare flyweights by “grams” alone, the weights in this kit are different curvature.*

Springs - Stiffer springs slow the up shift. Softer springs up shift faster. Sometimes a stronger spring in the primary and/or secondary clutch can allow the use of more weight in the flyweights and the combination is effective for a situation, but not all situations are the same. A spring is another type of tuning component.

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 (rivets 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 . Using the set screws in the passage allows weight adjustment without removing the flyweights....but sometimes rivets are needed to keep mass in the correct “zone”.

Each flyweight 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 can sometimes 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. There are guidelines here, but some experimentation can be done. For some applications the whole flyweight still needs to be removed for a rivet change, but at least this one kit can offer many adjustments and reduce the need for having many versions of clutch packages. 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 1-4 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 – 2012 Kawasaki Brute Force 750 EFI

Primary springs- Orange/Blue(part # DPPS-O/BL) spring provided is the ”**principal**” spring for the kit, meaning it is not only the preferred spring of most our test riders, but also that it exhibited slightly better performance characteristics in more situations. Primary spring is a multifunction tuning part and controls rate of shift as well as engagement rpm. The “engagement” rpm is slightly higher with the Orange/Blue, and it is not necessarily that we prefer the slightly higher engagement, but the stronger early load rating on the spring controls up shift a bit differently and many seem to like the low speed response a bit better with it , particularly with heavier tires. You can, however, order optional primary springs with a lower engage that have an acceptable fully compressed load rate by contacting us.

Secondary springs- The Aqua (DPSS-AQ) is the spring this clutch kit is calibrated to for this application and is **always used for this package**.

Flyweight Set -Up Guide **DK750 B12M**

DK750 12M 0-4000 ft elevation - Extreme mud tires and tires larger than 28”

28” Extreme mud tires- DPKA-68C flyweights w/ **2.4 g rivet**, and *one set screw.

- *if you are using this kit with a less aggressive mud tire, or have intention of more trail use, add one more additional (2 total) set screw and test for preference. More weight will lower cruise rpm at the expense of mud performance.

29.5-30” Mud or Trail mix tires- DPKA-68C w/**2.4g rivet**, and **0 -1 set screw.

-** This can be a mixed use application. For more mud use/ mud tires, just the 2.4g rivet and use no set screws. If it is a less aggressive trail orientation or partly trail, use 1 set screw.

30-32” Extreme Mud Tires/ Pure Mud Use- DPKA-68C w/ **aluminum rivet** and *** 1-3 set screws. *** As you can see this can be speculative and is definitely a “tunable kit”. Very many different TIRES and sizes,...and things like “MUD” itself can be very different from place to place. Most often start with 2 set screws and test. More weight will upshift the belt faster on the pulleys and lower the full throttle operating rpm, while less weight will slow the upshift and raise rpm. Mud conditions and rider preference involved.

SAND / HIGH ALTITUDE (above 4000')- Normally riding in 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.

On this 2012 model , **at low elevation** with typical 26-28” tires you should use our other clutch kit DK 750 B12 (springs only), ..but for **26-28” trail mix type tires at Higher Elevations** the flyweights and adjustability of this kit offers a better calibration.

26-28” Trail/Mud mix tires at 4-6000 ft elevation.- DPKA-68C w/**2.4g rivet**, and *one set screw.

* testing-, heavier/larger tire size, and specific conditions may result in removal of the screw for more rpm. Also, some light 26” versions may req. 1 more additional set screw if closer to the 4000' elevation. -If mostly above 6000' use aluminum rivet and 1-2 set screw. Testing may be required for specifics.

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 a bit less (sometimes 1-2 grams) flyweight mass than listed above to achieve a higher rpm during the “clutch phase”. Longer duration Cams make peak hp at higher rpm.

*****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 or intended use in the market.** There are excellent guidelines above for common situations.*

The wide range of adjustability makes this a great kit for ease of fine tuning on custom mod atv's .In application that are not stock, field testing is to be expected.

Installation and removal of Mass Rivet



- 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 4 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. (caution- be careful not to cross thread).
- 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 marker from 1-4 to be sure you install the same amount of set screws in each hole.