DaltonPro Clutch kit DBM-X3T

Model: **2017-18** Can-Am **Maverick X3 Turbo "R" models. (172 HP version w/ intercooler)**

- **Oversized tires. Also used for stock tires in sand/load applications.**

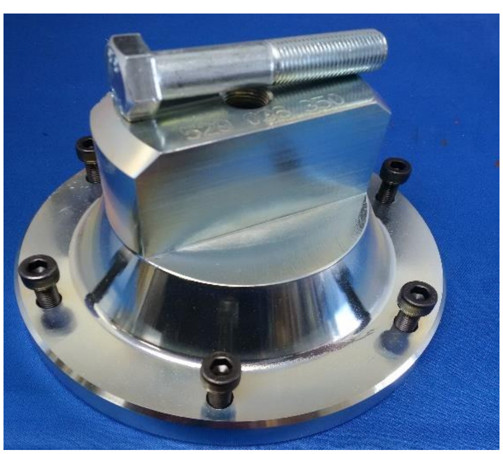
Description: **Better belt grip and improved performance.** The X3 turbo R is calibrated fairly well for *stock tires* and. typical hard packed surfaces and *trail riding*. This kit is primarily developed to help recover power losses and belt performance when using oversized tires. However, even stock tire performance can be improved in soft terrain load situations.
Larger or heavier tires hurt performance everywhere. Rotating weight and added gearing from larger tires hurt acceleration and top speed. This kit improves bottom end performance and improves belt grip without further loss of top speed. Throttle response is improved and better back shifting of the belt when the vehicle senses load form soft terrain or hills. A better clutch re-calibration for controlling "rate of shift of the belt" with these tire sizes.

Components: 1) Dalton Tan/Yellow primary clutch spring (DPPS-TN/Y)
1) Dalton Green/White secondary clutch spring (DPSS- G/W-T)
1) **set of 6** custom adjustable flyweights with hardware* (Part# DB X3T)
1) includes **Instruction manual and "CVT clutching overview"**

* Flyweight hardware includes: 6) ¼ UNF x 3/8" (3.2g) button head screws
(**2 pkgs of screws**) 6) ¼ UNF x 1/4" (2.6g) button head screws
6) ¼ UNF x 3/8" (1.5g) cup point set screw
Also: 6) m6 x 1.5mm thick plated flat washer (.8g)
2x6 pc 12) Composite(dark) thrust washers for sides of flyweight

Tools / Products required:

1. **Can Am Clutch holder (hold clutch from turning when torque install)**
2. **** Governor Cup Puller part# 529 036 350 – "critical tool" to separate the primary on this model**
3. **Clutch puller Can Am part# 529 035 746 (or Dalton part number DCP-L) Note, we also use DCP-E puller from Skidoo snowmobile 800 engine models and this part has a stronger shaft section.**
4. **#708200720 Driven pulley extractor/adapter (vehicle tool kit to spread the secondary and belt removal)**
5. **Pulley spring compressor tool Can Am part # 529 036 012 to compress the secondary change** helix and spring
6. **Blue Loctite 243**
7. **brake parts cleaner**



WARNING !

This is a dealer installation. There are references to the factory service manual. The proper tools are essential. Failure to use the proper tools, or the use of other presses and pulling tools/devices will most likely result in broken or non-usable clutch. This job should only be done by qualified service personnel with the proper tools for the job. This vehicle also has different clutches than other previous Outlander/Maverick Can Am models.

** Governor Cup Puller BRP part# 529 036 350 is shown.

<u>Installation Instructions</u> (Dealer Installation)

<u>IMPORTANT:</u> Always remove the key from the ignition when working around clutches.
This is a dealer installation. There are procedures listed in the Can Am service manuals for drive clutch service. There are BRP holding tools and special tools required for these clutches as well. The following is only a basic guideline, always consult your dealer service manual for more detailed description.

READ AND UNDERSTAND THIS ENTIRE DOCUMENT BEFORE INSTALLING!

Figure 1- spread secondary(rear) pulley

1) Remove the drivers' side rear wheel.
Remove cover bolts and plastic cover to expose CVT clutch system. Sometimes it is easier to remove cover if the vehicle is jacked up slightly in the center rear to extend suspension.

2)Using the clutch **<u>driven pulley adapter</u>** (shown)**,** spread the secondary to make slack to remove the belt.
Using the spreader in the tool kit, remove the belt.

<u>NOTE DIRECTION OF BELT</u> (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.

3) Remove the secondary pulley (rear clutch) by removing the center bolt.

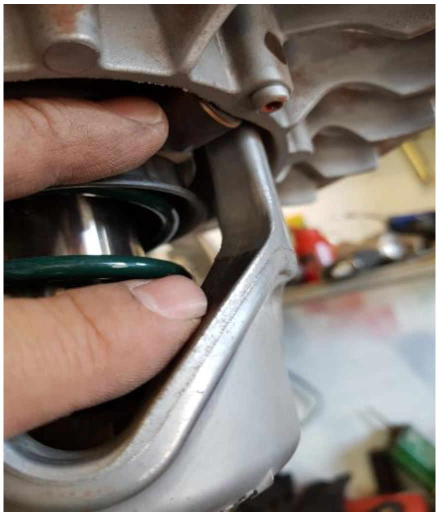
4) **<u>Change the helix and secondary spring</u> using the Pulley Spring Compressor Tool (part# 529036012)**
First, remove the stock helix using the compressor tool.

Mark the clutch and take note of both halves and the helix…and <u>position of the roller</u> in the helix for re-assembly. Often, it is best to <u>heat the 3 bolts slightly</u> to release the thread locker before removing.

When you assemble the new helix and spring, the helix and pulleys that must be aligned. It is important to have the **"roller" of the clutch in the <u>proper slot</u> of the helix and the torsion spring set correctly.**

<u>Do not remove the four helix bolts without the compressor tool in place to hold the unit together</u>. With the compressor tool in place, remove the 3 helix bolts and slowly release the compressor to allow the pressure to come off the helix and spring assembly. Pay attention BEFORE you take it apart. **Make some reference marks.**
-Also take note of the hole position of the <u>TANG on the end of the spring where it goes through the helix</u>. Some models have multiple holes.

It is important to note the position of the roller/helix ramp relationship as you release the helix when you take it all apart. Hold the parts and watch carefully as you take it apart.



The helix will need to be twisted the proper direction to get the roller in the correct position. The new spring tang will be installed in the same **#4 position on the helix**, but the spring itself is slightly different torsion value and compressed load. The helix and spring must be turned to that same position when you re-install the helix with the new supplied secondary spring.

The new helix must be installed using the compressor tool.

It is very important to make sure the shaft is through the helix bushing before compressing the tool all the way. With the compressor tool installed, it is best to partially compress by hand first and **<u>make certain that the shaft is started through the helix bushing</u>** before using the tool to compress all the way.

Apply BLUE LOCTITE #243 to the threads of the helix bolts and torque to specification (45 ft lbs +/-4) <u>while the compressor tool is still holding the assembly together</u> all the way. Once the helix bolts are installed, the compressor tool can be removed. (BRP recommend using new bolts)

5) You can now install the secondary clutch back onto the machine. Be sure that the secondary clutch assembly is seated all the way in properly on the shaft of the transmission. Sometimes it requires moving it around and putting the trans in gear to get it to drop all the way on to the shaft.

6) The clutch center bolt must always be torqued to the manufacturers torque procedure. The torque must be done while using the proper holding fixture to properly hold the clutch and torque the bolt. Torque secondary clutch center bolt to (**52 ft/lbs +/-4**).

Primary Clutch

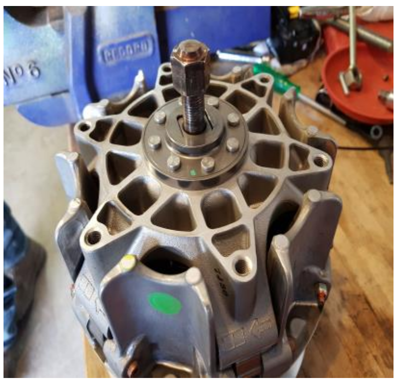
Removing the primary clutch from the vehicle.
Using the holding tool to hold the clutches from turning, remove the center bolt from the primary clutch. Take note of washers on the bolt and keep it and washers all together and set aside.

1) Install the primary **clutch puller**. Screw the clutch puller through the clutch and it will press against the crankshaft to remove the primary clutch assembly. Have someone help hold the **holding fixture** in place so the clutch will not turn and tighten puller to remove the primary clutch.

2) **Separating the primary**

Different Can Am models have procedures in the factory service manuals and it should be consulted individually for each model. For this type, Leave the puller protruding from top of sheave shaft to a maximum protrusion of 2.5” and use the **Governor Cup Puller BRP** part# 529 036 350 to press apart the two halves of the primary clutch.

The puller is left protruding to work with the Governor cup puller to separate the primary clutch so that you can change primary springs or flyweights. This is a required tool. Do not proceed without the proper tool. The following diagram shows the tool pictured along with the primary clutch and puller still assembled.

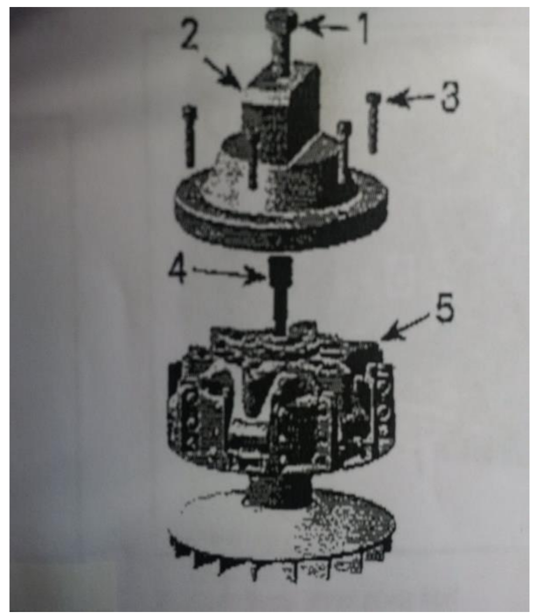


- Part#4 pictured is the puller head extended 2.5” (it goes up into the tool)--- Part#2 is the governor cup puller

- Part#3 is the M8 x 35 puller screws that mount the tool to the clutch

- Part#1 is the screw part of the tool that is turned against the head of the puller to separate the clutch.

You tighten the puller tool retaining screws to 15 ft lbs. (part#3)

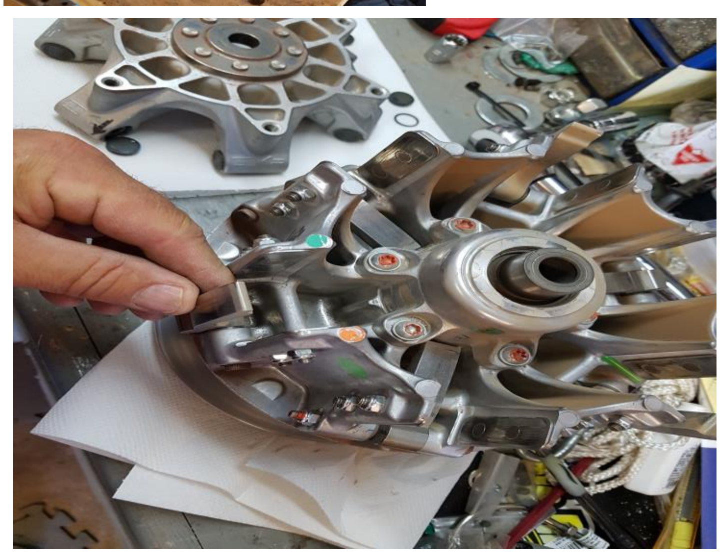


The governor cup puller is used in a vise. Be sure to follow the procedures in the service manual.

Remove the governor cup puller tool from the drive clutch

Make sure the governor and sliding sheave are **marked for index**.

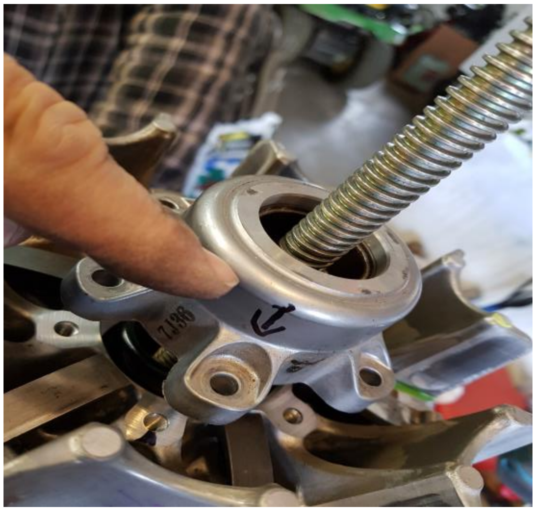
3) Carefully lift the governor assembly from the moveable sheave. Be careful not to lose or damage the sliders on the sides off each arm. The slider pucks often fall out and there are special o-rings under them. It is critical that the **o-rings** get placed back in the groove correctly to re-assemble later. If not it will be too tight when sliding the assembly back together.



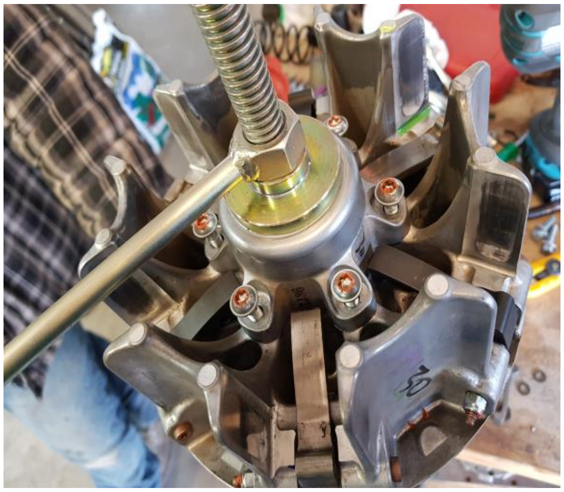
temporarily fold the flyweight lever arms to be out of the way for removal of the primary spring.

Mark the spring retainer cup and the clutch sheave surface with a marker for re-alignment later.

Change primary spring. Using the threaded compressor tool, close the tool down onto the spring retainer cap to contain the spring while the screws are removed. Do not over tighten the tool onto the retainer.

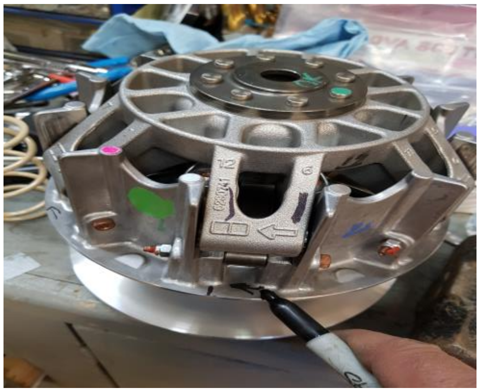


4) After removing the bolts, use the compressor tool to let pressure off the primary spring retainer cap. Install the new primary spring**.** Using the compression tool, carefully compress the new spring. <u>Be careful when it gets close to seated that the rim edge is in proper position to seat correctly</u>. It should go into place easily. Use blue removeable thread locker on the threads of the bolts for the spring retainer cap. Torque primary spring cap screws to (**89 inch/lbs**) or 10 N.m



5) **Change out the flyweights.** In this case, we will be removing and replacing all 6 of the flyweights with Dalton adjustable flyweights provided.

   After setting up the provided flyweights **<u>properly for your application</u> (* 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 <u>the proper thrust washers</u> supplied with the Dalton flyweights** in this kit (they ARE different from the stock ones) in place on each side of flyweight before putting the pin through the weight.



It is **important** that the **o-rings** get put in place properly so that the governor assembly will slide down into the slots correctly. If o rings are not in the groove it will damage the o-rings and the clutch will not slide correctly. It is normal to be slightly stiff sliding, but if it is tight the o-rings may not be in place correctly.

a. **Install the primary clutch assembly**. The clutch assembly should be carefully held together as a unit and placed on the engine crankshaft. This clutch attaches to the clutch via a set of matching tapers. Be certain the **tapers are clean and dry** (only use quick drying, non-residue cleaner like **brake cleaner**, never lube or oil.

b. Thread in the primary center bolt. Snug it by hand then use the **holding fixture** on both clutches to hold while doing torque. **Torque primary** clutch to **89 ft/lbs (+/- 6 lbs)**

Before installing belt make sure all sheave surfaces are clean and dry using non residue cleaner (Brake Cleaner) on a clean rag first then wipe.

**Install belt. Examine belt for inspection or replacement: (flat spots on edge from burning on take off or holding brake etc)

Note direction arrow on the belt.

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

<u>Flyweight Set-Up</u> (always us supplied proper thrust washers)

<u>Stock tires (28-29" AT type) in sand dune situations</u>

- DBX3T flyweights. Use only the **3/8" button head in each flyweight.** <u>Use both springs</u> provided. Use the green/white secondary spring in the stock #4 position. ** Test RPM. Sand itself is different in regions. See general tuning info for fine tuning info if required.

<u>All 30" AT/Mixed use and Trail with some mud use type tires</u>

- **DBX3T** flyweights. Use **3/8" long button head** screw (3.2g), **plus one of the silver washers(0.8g)** installed in each flyweight. Use the Tan/Yellow primary spring and Green/White secondary springs provided. The Green /White secondary spring gets installed in the stock hole **position #4.** <u>If often in sand dunes</u> with these 30" trail type tires, remove the flat washer.

<u>30" sand paddle tires</u>

- DBX3T flyweights with only the **¼" long button head screw** in each flyweight. Use both springs provided in the kit. Use the green White secondary spring in the stock #4 position.
  ** Test RPM. Sand itself is different in regions, and actual tire size and situation can vary. See general tuning info for fine tuning info if required. Less grams = more rpm, see tuning info page.

<u>29.5 - 30" Extreme mud tires</u> (Outlaws/Outlaw 2, etc) heavier/ pure mud specific competition tires (low range is often used) also use this set up with
<u>**32" AT type** and Trailable tires</u>

- **DBX3T** flyweights with only the **3/8" long button head** screw (3.2g) in each flyweight, use both springs provided in the kit (remember proper thrust washers with flyweights) Secondary spring in stock #4 position. ** Test RPM -Tires and situation is speculative and varies. If you need more rpm use the next shorter screw (1/4" 2.6g button head)

<u>32"+ mud tires</u>

- **DB3XT** flyweights with the **1/4" long button screw** (2.6g) installed in each flyweight. Use both springs provided. Use secondary spring in the stock position #4. (proper thrust washers with the flyweights) ** Test RPM.- See clutch tuning overview. Actual tire size and terrain can vary.

NOTE: The Factory **<u>Can Am belt has been used</u>** for **<u>all testing and set-ups above</u>**. Most Racers we speak to have stated that they have proven the factory Can Am belt superior on this model. Other aftermarket belts also often do not run at the same RPM.

** Testing RPM: There are notes in the general info about tuning. There can be variables in actual tire sizes, tire weight, and terrain surfaces. Different types of sand and paddles, etc. can have effect.

<u>Stock Engine and vehicle</u> was used for all testing. Some aftermarket companies and racers use different ECU programming and different levels of boost that can change HP and engine power delivery characteristics including "peak HP rpm".
There are many variations and states of tune for different horsepower levels.
Clutch tuning components control "rate of shift of the belt" on the clutch system. – different HP levels can require a different "rate of shift" to control engine rpm in the proper zone for that engine package. If you have modified engine HP you may need to test.

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.

Maverick X3 Turbo R - General Overview and CVT basics

Clutching, belts, and potential problems.

This vehicle has excellent hp in stock form. This vehicle has plenty of power, along with tall final drive gearing making it capable of reaching high top speeds in high range. 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. 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 simple fact, if not understood, can aggravate 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 un-useable 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 smaller, or the sand dunes flatter or more firm with less rolling resistance. However, by calibrating clutches we can help to compensate and make these situations easier on the drive belt and improve vehicle performance.

Clutch tuning

If you have the interest, take a moment to read a bit of basic clutch tuning theory. 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 (back shifting). 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 to a point **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 and thus 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. 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 the engine will often start to overrev, but it is because the belt can shift no farther to control the rpm.

Operating RPM - CVT tuning is often focused on operation rpm, but remember it is rpm during the "clutching phase" that is affected by clutch tuning components.
Maverick X3 turbo R (stock)– best peak operating rpm is **7400-7900 during the clutching phase.** There can be some variance and some modifications make the vehicle "happy" at higher or lower rpms, but on a STOCK engine this is the best tested rpm zone. Remember that when on a long road run the clutch phase is over in a short distance, and that your rpm may be higher after the belt is fully shifted but on long runs that rpm may not necessarily be a result of clutch components.

The Components

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 7800, then having it calibrated to run at 8200 is probably worse than if set up to run at 7400 or 7500, as many crankshaft engine dynos will easily prove. Some people get wrapped up in thinking "more rpm is always better". Proper peak HP rpm zone is the target. Different components all may overlap but here is a basic guideline to help understand.

Flyweights- Flyweights are the principal control of engine rpm during the Clutching Phase part of a test run.

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. The Maverick X3 has different design flyweights than previous BRP ATV /side x side models.

HEAVIER flyweights upshift FASTER, and thus lower the operating rpm.
LIGHTER flyweights upshift the pulleys SLOWER, thus allowing higher rpm during the clutching phase.

Primary Springs- Primary springs have pressure characteristics and uses. Primary is a principal control of "engagement rpm" but also has other effects on clutching. The springs are usually compared by using their pressure load rating at two intervals.
The ***first load rating*** number on a primary spring is often referred to for ***engagement*** (stall rpm). That first load number on a primary spring is the principal component to control rpm at the point when "engagement" of the belt occurs on take off.
The fully compressed or ***second load rating*** is used as the principal ***opposing force to the flyweights in the primary.*** This number relates more to full shift RPM during the clutch phase of the test run.
The package must all work together.
The **primary in this kit** is **DPPS-TN/Y (tan./yellow**). This is the most popular spring. It engages slightly higher than stock but not a lot. (approx. 200 rpm higher)
There is also an **optional primary spring** **(DPPS-TN/R (tan/red**) - engages close to stock rpm for rider preference.

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 back shifting of the belt to proper ratio on the pulleys when the vehicle senses load. 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 this kit we have included a new secondary spring that the rest of this package is calibrated to.

Helix- The helix is one of the components for control of "rate of shift of the belt" in the secondary clutch. A helix can have different ramp angles or curves. The helix is a component that works in conjunction with the secondary spring. Sometimes one, or the other need to be different for different vehicles and applications.

Thank you for choosing Dalton Industries !