2021 Polaris RZR Pro XP Turbo model – Stock and oversized tires. Adjustable kit.
-This kit can be used on some other 2021 RZR Turbo XP models that come with these new type clutches, however, **non-PRO XP** versions can use all instructions for install, but **not the set-up guide**. For versions that are not Pro XP see pg.11 at the end for flyweight set up.

Description:
Adjustable clutch kit for the **2021 Polaris PRO XP Turbo (181 HP) models**. (See notes in new back pages section for 2021 non-ProXP)

One clutch kit that can be set up for different terrain and conditions means accurate clutch tuning for your situation. Improved acceleration, back shifting, and belt performance. The kit is adjustable, making it possible to optimize the clutch calibration for different tire sizes and situations.

This kit includes Dalton's "Quick Adjust" flyweight system that allows you to add or subtract weight from the flyweights, without even removing the flyweights from the drive clutch.
-Set up manual includes "set up instructions" for different applications.

Components: 1) Dalton **Grey/Blue/ primary** spring (DPPS-GY/BL)
1) primary **spring spacer** (optional use), see set up info (DPS- SPCR)
1) Dalton **Dark Green secondary** clutch spring (DPSS-DGN)
1) set of Dalton **Quick Adjust flyweights**/hardware (DP PX1)*
Including:

- **¼" fine gold set screws** for the main **Quick Adjust passage**:
  3 x ¼" long (0.8g)
  3 x 3/8"long (1.5g)
  3 x ½" long (2.1g)
  3 x ¾" long (3.4g)
- **¼" fine Black set screws for tip weight adjustment**: (use blue thread locker with black tip screws)
  3 x 1/4" long
  3 x 3/8" long
  3 x ½" long
- **Extra tip weight** for future mods (gold button head)
  3 x ¼" long gold button head screw (2.6g)
- **1/8" T-handle** Allen key

- **6) gold hardened steel flyweight thrust washers** (for the sides of the flyweights)

- The Quick adjust hardware includes a selection of ¼" UNF set screws with pre-applied Nyloc material.
  These flyweights are designed differently. The base weight is 94.5g, however, they are bored a different dimension for the use of a special pivot bushing material, and machined differently for the use of thrust washers. They also have different location of mass. **The total "grams" of these flyweights are not related to stock or other flyweights.**

Tools/ acc: (dealer installation)
Secondary clutch compression tool, Polaris tool to hold clutch from turning, Blue thread locker.

Please take the time to thoroughly read and understand all of these pages before continuing. Belts are expensive, proper installation and knowledge of the system are key to best performance and belt life. (Some of the pages that look boring are most important)

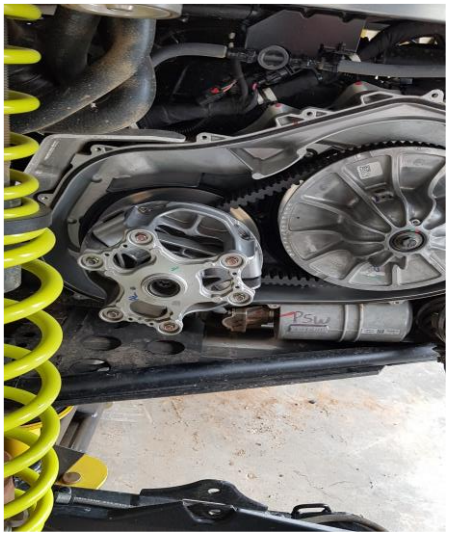
WARNING

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 and require special tools and procedures. 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. Dalton Industries has no control over the use, misuse, or installation of these components and assumes no responsibility for any injury or damage.

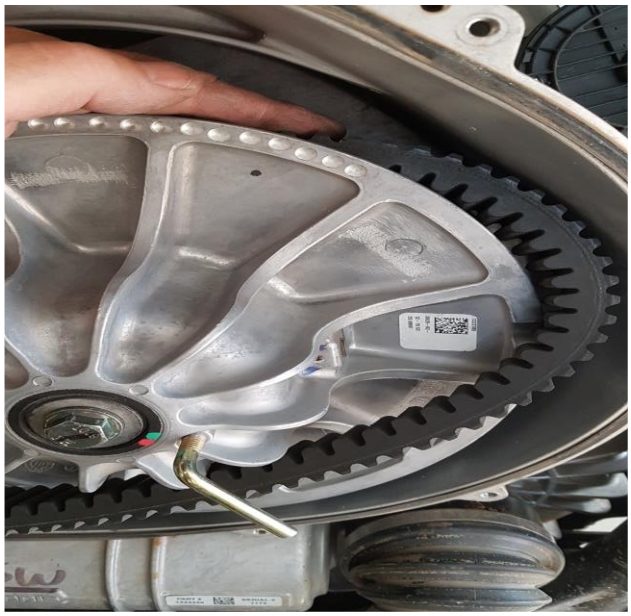
INSTALLATION: (dealer installation)



Important: Always remove the KEY from the ignition before working on clutches.

1) Remove left rear wheel to access CVT clutch area. Remove the clamps on the clutch duct and remove the duct. Remove the cover bolts to remove the plastic cover shroud.

2) Take note of direction of belt before removal. Remove belt. Note the "L" shaped tool from the tool kit. Thread the tool into the threaded hole in the secondary clutch. This will spread the sheaves apart to allow easy removal of the drive belt.



3) Next, remove primary clutch center bolt. (Torx T-60) It may be easier to remove the rear shock. With the center bolt removed, remove the **outer half** of the primary clutch. This part of the clutch is mounted on splines on the shaft.
It can be hard to remove, especially the first time you remove it. (See factory service manual). If you push and pull on it, you will note it is loaded by the spring and it will eventually come off. Next time it will come off the splines easier.

Remove the 6 bolts and clutch cover plate. Be sure to look for alignment marks on cover plate (X on the cover and spider), 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) Remove the cover and spring.

Raise the spider up a little so that you can remove the stock flyweights. Remove the flyweight pivot pin (note direction) and the stock flyweights. ****Take note that with the new adjustable flyweights in this kit you will be using a GOLD COLORED hardened <u>thrust washer</u> on each side of the flyweight.**

5)* **<u>Set up the flyweights</u>** as described in this instruction manual for your desired application **See the proper "Set-Up Guide" for your vehicle** (for versions other than PRO XP see back section). Take note of your set up guide and **set up the flyweights**, then install the flyweights into the drive clutch. Use Blue Loctite on the flyweight pivot bolt nuts. <u>Be sure to read the complete document before continuing.</u>

**** Install thrust washer on each side of the new supplied flyweights. (see next page)**

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.

<u>Install Thrust Washers</u>**- 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 <u>designed to be used with these washers</u>. These washers are a durable wear surface.

With stock clutches it is very common to see the side of the clutch wearing from the flyweight pivot end gouging into the aluminum, even with only low miles.

**** These thrust washers are a little slow to install but very important!**

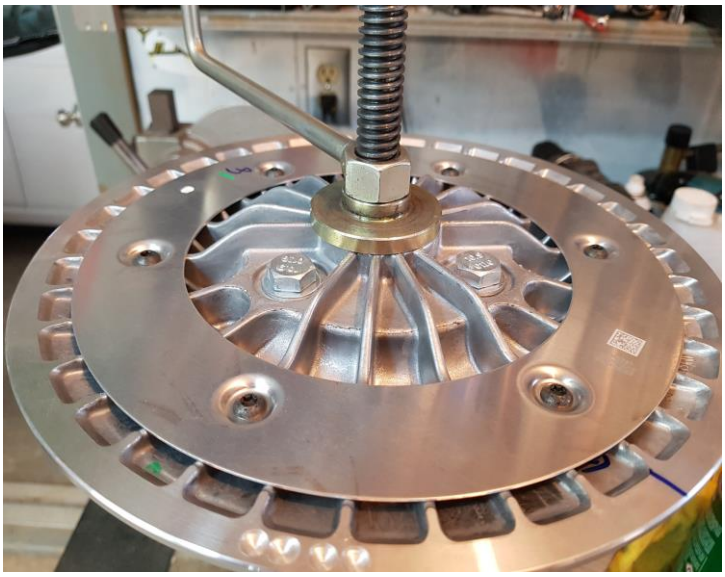
Take your time and install the thrust washers properly. They offer better, more accurate flyweight movement, and improve durability of the clutch.

6) After installing the adjustable flyweights re-assemble the primary with the Dalton primary spring, and the cover. Use caution to keep the primary cover square and even as you compress it down on the spring so not to hurt the bushing in the center of the cover. **Torque the 6 bolts to 9 ft/lbs.**

7) Re-install the primary clutch onto the splines on the other half that is still on the vehicle. **Torque the primary together at 140 ft/lbs.**

8) Remove secondary clutch.

Remove the center bolt (15mm) **WATCH for the thin shims** under the bolt. Keep all shims and bolt together as a unit.
These thin shims are used for belt alignment. We have seen many models that come from the factory that are not in perfect alignment. These thin shims are available from Polaris. If the vehicle is hard to shift it may be this misalignment here that is the culprit.



(see service manual)
9) One half of the secondary has the helix. This half will be dis-assembled using the clutch **compression tool to contain** it as you slowly release the spring.

Once the tool is in place, loosen the three Torx bolts to let the pressure off slowly. Remove the spring. Replace with the supplied secondary spring.

When compressing back together do it slowly and take note of the bushing and alignment, settle the parts together nicely and install the three bolts. Use Blue thread locker on the three bolts.

Torque the helix bolts to 32 ft/lbs.

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Installing the secondary

10) Put vehicle into PARK gear.
Install inner half of the secondary clutch. Then install the outer half. You will notice that you need to take your time and get the inner parts all aligned and the shaft through them all before it will fully seat onto the shaft. Spin the outer half around until the outer half drops into the inner part correctly. Be sure the clutch is fully seated (see service manual).
Install the secondary center bolt and torque using a holding tool for the clutch.

Torque Secondary Clutch to: 26 ft./lbs.
11) Install the belt. Inspect cover shroud and gasket and install cover. If Shock was removed re-install.

Note: Our testing was done with the factory belt, and calibration for this kit is associated with the factory belt.

There are books written on CVT clutch tuning. 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 500-600 feet on hard pack at wide open throttle, or around 55 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.*

When testing for clutch RPM, it is important to check rpm at around <u>400 ft</u> of distance on a wide open throttle run (while the clutches are still not fully shifted). approximately 50-55 mph on a wide open test run in high.

***** - The <u>STOCK</u> PRO XP Turbo operates best in the zone of 7900-8500 RPM.*** *The conditions, state of tune and mods can dictate different requirements. 8200-8400 is usually best. Some modified versions with aftermarket programming like a little higher 8300-8500. Higher is not better.*

Be certain to properly warm up the vehicle belt and clutches before testing rpm.

Heavier Weights- Generally speaking, when you add heavier weights to a vehicle with the same HP, it will up shift quicker and thus **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.
If you add HP and the machine starts to over rev, you may have to add flyweight mass to upshift faster and control rpm.
Lighter weights- Slower up shift during the **clutching phase**. Slower up shift **results in 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 shape and distribution of mass of two flyweights are the same***.
The flyweights in this kit have a different weight distribution, as well as machining for different bushings and materials, this makes the grams irrelevant to stock or others.

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 initial load (first part of the compression)** of a **primary spring** controls **engagement RPM.** Primary motor clutch springs are the principal control of engagement rpm.

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.*

Dalton Pro Quick Adjust Cam Arms - Adjustable flyweights.
Dalton's quick adjust method means that you can add to and subtract from the flyweight mass from the main body of the flyweight without removing the weights from the drive clutch.

Do not turn the engine backwards during work on the primary clutch!. There have been claims that the timing can jump.

Grams can be added to or subtracted from the flyweights by simply turning the clutch so that the desired flyweight is in a position that you can use the T-handle, ALWAYS turn the clutch forward in the direction it turns when running only. Add or subtract set screws thus changing the total mass of the flyweight. **Never add screws so that the set screws are protruding past the curve of the flyweight**!

Primary spring – Grey/Blue (DPPS-GY/BL**)** This is the proper primary spring for this kit.

Secondary springs are tested for efficiency for the application. All components work together in a clutch package. For this kit the secondary spring supplied is **Dark Green** (DPSS-DGN)

Primary Spring Spacer – This is a "optional" part. The spacer is only to be used on the primary clutch spring, and only if you desire slightly higher engagement RPM. It is only for YOU to decide**. It is preference of engagement,** it is not "better" with or without it. It is split decision among riders (that's why it is here) but it is for you to try or decide for your own preference. Some like the RPM to stall up a bit more (approx.100 more with spacer). It is NOT a high engagement. When using the spacer it is actually similar to stock engagement, and with no spacer it is just slightly lower engagement rpm than stock. It does vary depending on how the weights are set up.

Some like sooner engagement and prefer no spacer (**rock crawlers** like low engagement and no spacer).
Note: *as a rule of thumb, most prefer it with no spacer if not running the weights too heavy in the heel. Example, If running a fairly heavy heel set screw like the ¾"long one, it lowers the engagement, and thus some prefer to add the spacer. It is, however, fine to use with or without. If often in low range and rock crawling, many like to not have the spacer, and in this case would be lower than stock.*

Note: When is stock form, the engine seems to make best performance around 7900-8500 rpm, Most often we had best repeated results for trail at approx. 8200-8400, and clutching to rev higher was not as good. In some cases, like re-programmed aftermarket ECU tuning, the engine may be ok up a little higher but it is better to not run more rpm than you need to. Many engine crankshaft dynos will prove that more rpm is not always better.
With those aftermarket ECU programs expect to test. Sometimes you may find that the new HP level will pull the same clutching up to a desired rpm range on its own with the same clutch kit settings as stock HP level. Different tunes from different aftermarket suppliers make the modified versions all a little different, as well as, of course, the different terrains these vehicles are use in. If too much RPM add weight. Added HP of approx. 20 HP may require a gram or so heavier. Dalton quick adjust weights make it easy to fine tune. Start with the settings below and test rpm* during the "clutch phase" as described in this manual (pg.5). Make sure that you understand "clutch phase" rpm. (overview page)

Some notes on the flyweight adjustment hardware:
The set screws used for flyweight mass adjustment are ¼" UNF thread and some have a pre-applied nyloc compound on them. After repeated use, use a drop of blue removeable Loctite on the threads when finished tuning if doing adjustments for mods. The tip screws should have blue removeable Loctite added.
- **Use the supplied Allen T-handle to install the set screws**. Bottom each one out to the bottom of the threads until it stops. Do not over tighten, you just bottom it out and snug it up. You can use additional screws, just add and bottom against the one that is in there. (do not use combinations that protrude outside the flyweight)
- **Always add the exact same screws to each flyweight** the clutch must remain balanced.
- **Always install the supplied thrust washers as shown** This improves durability of the primary clutch to better than stock.

Flyweight Set Up Guide- **Pro XP only** ..(for other model applications Pg.11 at the back).

Go by TIRE SIZE FIRST, then the provided info. **Always use both springs,** and the flyweight set up for your application as described below. With turbos, terrain differences, and modified versions there can be a fair bit of variation. Dalton "Quick Adjust" flyweights make it easy to fine tune. The following is a basic guideline.

Main instruction are for **2 seat** version, ***see note:*** *(++ for **4 seat versions** for some instances noted)*

30" Trail/mixed use tires (including stock) – **Most typical mixed use/ AT type tire**

DP PX1 flyweights with:
- one 3/8" long black set screw in the tip of each flyweight. (2 and 4 seat), and
- one ½" long gold set screw in the Quick Adjust passage of each flyweight. If you are low on RPM due to common soft terrain where you ride, change to a 3/8" long in the quick adjust passage. (++ *4 seat always use a 3/8" in the quick adjust passage)* ***Test RPM* see pg.5***
- some sport-oriented riders use the engagement spacer, but all have different preference for engagement rpm.

Most often soft sand type terrain with stock tires (soft terrain riding or with sand dunes)– use a ¼" long black set screw in the tip of each flyweight, and a ½" long in the Quick adjust passage of each.

Note: Sand, HP, different paddle tires and soft terrain riding can have a lot of variables. Daltons quick adjust makes it easy to fine tune. For sand dune riding be sure to allow for belt cooling time in your riding style. It is sometimes best to go for a little higher rpm around 8400 or so for dunes (sometimes a bit higher if modified turbo boost level etc.). Adjust flyweights as necessary for rpm.

30-32" when often Rock Crawling applications – Use a ¼" long black set screw in the tip of each flyweight, and a ¾" long gold in the quick adjust passage. Engagement spacer not recommended.
If you do both trail riding and rock, but often do crawling, this set up can be used for both.

32" tires – Most **typical mixed trail riding**
DP PX1 Flyweights with:
- One 3/8" long black set screw in the tip of each flyweight. (++ 4 seat use ¼" long black set screw in tip) and also
- One 3/8" long gold set screw in the quick adjust passage of each. (2 and 4 seat)
- Test rpm* Adjust RPM if required (as described for "clutch phase test" on page 5)
- Engagement spacer is optional. Rider preference only. It is quick to test and change.

29.5-32" Pure mud tires (Outlaws, etc), - Start off with the 30-32" rock crawling set up, but most add the engagement spacer for this application.

33" and larger tires – 33" and larger tires will most often require lift kits, etc. to have clearance on this model and are not the norm. Some of the heavy/large versions start to get outside the envelop for gearing and could create more belt troubles, and often some type of gear reduction is helpful. However, if using tires in this range you can start with the settings for 32" and test. The heavier springs and adjustable weights will be better than stock clutching for these tires. Test RPM*(see pg.5)

We have given you the guidelines for many applications. Individual vehicles themselves vary in output. With turbo units, there can be other things like "boost leak", or etc. Slight problems can lower HP level and effect clutch calibration to get proper rpm. Try to ensure proper HP as a variable if you have problems with rpm.

Special modifications? – There are heavier set screws included for things like extra HP add ons, or smaller tire sizes, etc..but if doing mods, expect to test.

ECU re-programming- Modified boost programs vary. Start off with the standard settings for tire size. Some boost programs like to operate at slightly higher RPM (check with your aftermarket program supplier) but often it is similar clutching. More HP may pull to a higher rpm on its own with that same set up. With these flyweights it is easy to adjust and test for your own application.

Fine Tuning - See page 6 for a quick review of the components and how they effect RPM.

Using the Quick Adjust set screws

This should be done on the bench for initial set up, as mentioned earlier in the set up guide. Some of the weight (quick adjust passage) can be easily adjusted to fine tune later without even removing the flyweights from the clutch. Adjustments to the tip weight will require removing the flyweights from the clutch.

Using the quick adjust passage:

1) **Carefully** install the set screw into the threaded passage. Be careful to start threads properly. Thread the set screw all the way in until it is snug at bottom of threads. Snug but do not over tighten
2) Add additional screws as required, always bottoming on the one inside. After repeated use add a drop of blue removeable Loctite to the threads to secure them.

3) **Adjusting the tip weight (**cross hole at the tip of the flyweight)

Use the **Black** set screws in the tip with a drop of blue thread locker.

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 in each flyweight.

For later adjustments to the "quick adjust" flyweights, you can fine tune by adding or subtracting the set screws without removing the flyweight base weight from the clutch with the use of the supplied Allen key.

Some notes on this model

Belt Burning

This vehicle is fast, and a very popular model for sport use. Power is good, but proper operation, and calibration of the CVT can help certain situations.

Before we ever tested this model, we had already heard of quite a few people seeming to have early belt issues. The factory sends the clutching for what they refer to as general purpose, but there is a wide variety of uses for the vehicle. Case specific clutch tuning can help make the CVT system more efficient for what you do. This is a very flexible kit that allows adjustment. There is a detailed guide to get you started.

Some people have some experience and like to do their own clutch tuning. There is certainly nothing wrong with that, but we sometimes hear that they only consider rpm or drag race results, etc.

Care must always be taken to consider the side effects of changing clutch calibration.

It is important not to neglect things like "back shifting of the belt as the vehicle comes under load".

Proper calibration of the CVT system for your application can reduce belt temperatures and belt problems. This kit is adjustable in and allows you to be better calibrated for different situations.

If you are having belt problems, proper CVT calibration like this kit can help.

Using Low Range- There are also other things that could contribute to belt life issues, things like "not using **low range**" when you should is a **#1 cause** in most CVT belt problems.

This vehicle comes from factory with very tall final drive gearing that will allow very high top speeds. The side effect of that is the clutch system can strain in load situations from a take off in high range.

ANY time you are operating at low speeds, hills, or in load conditions you should use low range in the gearbox.

Example: The vehicle is being operated in tight woods trails at approximately 10- 14 mph average.

- If you use high range for slowly crawling around at low speeds, the belt stays down on the center hub of the primary a lot of the time. It will hardly up shift the belt at low speed in high range. The belt is wrapped around a small diameter hub on the primary (motor) clutch where there is not as much grip surface.
- if you shift the gearbox to low range and travel that same speed, the belt will be shifted up mid way on the primary motor clutch, where it has a much better (larger diameter) grip surface. This also puts the flyweight in a better leverage position and the result is less slippage of the belt (and thus lower clutch and belt temperatures).

Running around at slow speeds or load conditions in high range can easily overheat the belt, and it may not fail immediately, but may later on. You WILL have better belt life if you practice using low when you should

Extended wide open throttle runs can create excessive heat in CVT systems!

Sand Dunes - Sand dunes can create a different situation. The vehicle is designed to be used in low range in load situations. Sand dune riders use high range a lot in order to have the momentum to climb…then this puts the vehicle in a load situation as you climb, but the trans is in high. This creates belt heat easily, and experienced sand duners learn to turn down soon enough and allow belt cooling time to help maximize belt life.

Thank you for choosing Dalton Industries!

2021 RZR Turbo XP, Turbo "S" (non-pro XP models)- Set Up Guide

2021 Turbo XP models now have the Pro XP type clutches, however, the horsepower output is different, (and sometimes slight gearing differences, like in the Turbo S) thus requiring a bit different required "rate of shift of the belt". Flyweights and the amount of weight in them are the primary control of shift RPM (or clutch phase RPM) on your test run.

It is important to remember that with Turbo models there is some fluctuation in actual HP due to slight boost leaks, etc, and also that the actual body weight, true tire sizes and other factors can cause slight variances in required amount of flyweight mass to get the proper shift RPM.
Be sure to read carefully **page 5 of the main document** to test and determine proper clutch phase RPM after installing the kit. Sometimes slight adjustments are required. Dalton "Quick Adjust" flyweights make it easy to fine tune RPM if required.

2021 XP Turbo 30" Tires
Also for 32" on Turbo "S" model only (Turbo "S" has different gearing)
– **Most typical mixed use/ AT type tire including stock tires for both models**

DP PX1 flyweights with:
- one 1/4" long black set screw in the tip of each flyweight. (2 and 4 seat), and
- one ½" long gold set screw in the Quick Adjust passage of each flyweight. If you are low on RPM due to common soft terrain where you ride, change to a 3/8" long in the quick adjust passage. (++ *4 seat always use a 3/8" in the quick adjust passage)* ***Test RPM* see pg.5***
- some sport-oriented riders use the engagement spacer, but all have different preference for engagement rpm.
- If **sand dune is the principal use**, test first with no screw in the tip, and use only a ¾" in the quick adjust passage…**test RPM** (see page 5) If doing both sand dune and trail riding, use the ¼" in the tip like above with the ½" in the quick adjust passage- the quick adjust passage is easy to adjust.

32" tires- Standard XP Turbo, 33-34" tires TurboS., Most **typical mixed trail riding**
DP PX1 Flyweights with:
- One 1/4"" long black set screw in the tip of each flyweight.
- One 3/8" long gold set screw in the quick adjust passage of each. (2 and 4 seat)
- Test rpm* Adjust RPM if required (as described for "clutch phase test" on page 5)
- Engagement spacer is optional. Rider preference only. It is quick to test and change.
- ***If used for Sand Dune use no set screw in the tip (leave it empty) and use one ½" in the quick adjust passage of each flyweight***

Rock Crawling applications – Engagement spacer not recommended

Note:- if modified ECU or re-flashed for more HP**, most pump gas tunes require approx. 1-1.5grams more weight in the quick adjust passage, use approximately an additional ¼" of set screw length in each flyweight than what is normally called for your tire size on a stock vehicle.* ***Test RPM *(see page5).*