INSTALLATION AND TUNING GUIDE

KWI ULTRASHIFT POLARIS RZR PRO R PRIMARY CLUTCH

PART NUMBER(s): *ULTRASHIFT PRO R*

TOOLS NEEDED

- 1/2" Drive Impact Gun
- T60 TORX - 1/2" Drive Socket
- 11/16 12 point - 1/2" Drive Impact Socket
- 1/2" Torque Wrench (140Ft/Lbs)
- 5mm Allen Wrench
- 6mm Allen Wrench
- 10mm wrench and socket
- Pro primary clutch puller
- 15mm 1/2" Drive Socket
- ARP Fastener lube
- UltraShift primary holding tool (or equivalent)
- Long 3/8" or 1/4" drive extension

ESTIMATED INSTALL TIME

60 MINUTES

We are not responsible for any damage caused during installation. Follow these steps carefully to prevent damaging your clutch.

IMPORTANT NOTES- PLEASE READ

1. ***Your ULTRASHIFT is a balanced assembly when you receive it. All parts are individually balanced. The inner sheave assy balancing is done with the balance screws on the back of the primary fixed sheave. DO NOT REMOVE THE BALANCE SCREWS FOR ANY REASON.***

2. ***Your ULTRASHIFT comes with a pre-Installed baseline calibration determined by your car info that you provided in your order. You are responsible for verifying that the cam arms and spring is configured properly for your application determined by your final testing and adjustment for proper RPM.***

Installation Steps:

1. **Remove Belt Cover:**
   - Use a 10mm wrench and socket to remove the screws securing the top of the belt box cover. Undo the quick turn fasteners on the bottom side of the cover. Lift the cover off and set it aside.
2. **Remove Secondary Clutch and CVT Belt:**
   - Use a 15mm socket to safely remove the Secondary clutch bolt, washer, shim washers (your clutch may or may not have one or more shim washers installed, please retain these for installation) secondary clutch outer half, CVT belt and secondary inner half from the gearbox shaft. Set these aside as they will be used later on.
3. **Unbolt the Primary Clutch:**
   - Use a T60 TORX - 1/2" Drive Socket to remove the primary clutch bolt. This bolt won't be reused.
4. **Detach Primary Clutch From The Crankshaft:**
   - Remove the six 3/8" head bolts holding the primary clutch outer cover in place. This has only a small amount of spring tension and can be removed easily by hand, this allows access the 2 piece center shaft (black) that you will twist and pull out.
   - Grease the primary clutch puller end and thread into the clutch bolt hole and tighten using an impact driver (or breaker bar with a pry bar through the clutch to hold it) until clutch is removed from the crankshaft taper.Take the primary clutch out of its position and put it aside. We will not re-use the OEM primary clutch or any of its components.

Critical Steps: Failure to follow these carefully may result in damage.

5. **Clean Crankshaft Bolt Hole:**
   - Use the supplied wire brush and brake cleaner to remove any debris, oil, or rust from the hole. You can use the OEM clutch bolt to chase the threads if needed. Make sure the threads are clean and the ARP stud can thread in by hand easily.
6. **Clean Crankshaft and Clutch Taper:**
   - Wipe down the crankshaft and the taper on your new ULTRASHIFT clutch with brake cleaner or acetone to remove all residues.
7. **Prepare ARP Stud:**
   - Clean all threads with brake cleaner. Lightly apply the supplied ARP lubricant ONLY to the stud threads labeled GREASE at the Allen key end, as well as to the nut and washer. DO NOT apply any grease to the crankshaft threads! Screw the washer and nut onto the greased end of the stud for just two turns.
8. **Install the UltraShift Primary Clutch:**
   - Place the ULTRASHIFT clutch onto the crankshaft taper. Using a 3/16 Allen Wrench, screw in the ARP stud until it lightly bottoms out, then back it out by 5 turns.
9. **Torque Down the UltraShift Primary Clutch:**
   - Hold the ULTRASHIFT from turning with the Ultrashift clutch holding tool, strap wrench or equivalent. Use a 1/2" Torque Wrench set to 140 ft/lbs (190Nm) to tighten the nut. Re-check torque on the nut after the first 5 mminutes of riding.
10. **Install the KWI Secondary spring**
    - Use a compression tool such as the KWI Threaded Rod thru the secondary clutch Inner sheave and helix assy to hold the spring pressure. Remove the 3 helix bolts. Unscrew the compression tool to slowly relax the spring pressure. Remove the OEM spring. Install the Supplied KWI secondary spring and reassemble the secondary clutch inner sheave and helix assy using the compression tool. Install the Helix bolts with blue Loc-Tite and torque to 32 ft-lbs (44 Nm).

Final Steps:

11. **Re-Install Secondary clutch, CVT Belt and adjust Belt Shimming:**
    - Install the secondary clutch inner sheave and helix assy on the gearbox shaft. Install a NEW drive belt. Install the Secondary clutch outer sheave and secure with bolt/washer/shims as required. (spin the secondary clutch as you tighten the bolt to seat the belt) Torque the secondary clutch bolt to 55 ft-lbs (75 Nm). Verify belt is centered in primary clutch and add or remove the Polaris shims under secondary clutch bolt washer as necessary for proper belt centering.

12. **Re-Install cover:**
    - Put the belt box cover back on with oem screws and cam locks.

13. **Test Drive:**
    - Drive the vehicle and check and adjust for proper full-throttle RPM according to your tuning chart below.

Cam Arm removal steps:

1. **Remove CVT Belt:**
   - Use a Clutch Belt Removal Tool to safely remove the CVT belt from the clutches.
2. **Remove the primary clutch cover:**
   - ***Mark the cover and outer half with a marker*** so you can ensure they are put back together in the same location for balance purposes.
   - Remove cover using a 5mm Allen key to remove all the cover bolts BY HAND. Do not use power tools or you may strip the screws. The standard primary spring that comes with the UltraShift has a mild amount of spring tension and can be removed by hand. (A cover compression tool is available from KWI separately to compress the cover with high engagement springs that have higher pressures)
3. **Remove the cam arms **No need to remove the primary clutch from the crankshaft**:**
   - Slide the sheave all the way in toward the motor which will allow the cam arms to swing free.
   - Using a Allen wrench and a long socket, remove the pins holding the primary weights in place. The pins fit may tightly in the outer half and may need to be tapped lightly to remove them - being careful to not damage the threads) Remove the 6 weight pins and nuts to remove the cam arms.

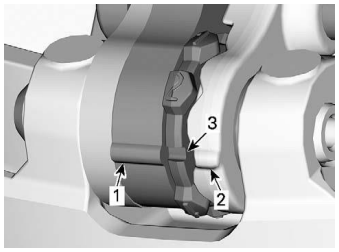
RPM ADJUSTMENT- Refer to tuning chart on page 4

- The weight of the added magnets affects RPM. The more magnets that are installed the lower the RPMS will be. 1 thick magnet from each cam arm will change Full Throttle RPM approx 100 RPM

- Depending on your HP level your UltraShift may have 2, 3, 4 or 6 cam arms installed. BALANCE IS CRITICAL!
  - 2 cam arms installed-- ALL cam arms MUST have identical magnet and clicker configurations
  - 3 cam arms installed-- ALL cam arms MUST have identical magnet and clicker configurations
  - 4 cam arms installed-- ANY 2 OPPOSING cam arms MUST have identical magnet and clicker onfigurations
  - 6 cam arms installed-- ANY 2 OPPOSING cam arms MUST have identical magnet and clicker configurations

- Remove the cam arms from the clutch.
- There are 2 holes in the arms to place magnets- you can place magnets in holes as required.
  - Magnets in the hole closest to the cam arm pin will affect RPM's from 0-50 MPH.
  - Magnets in the hole farthest to the cam arm pin will affect RPM's at 50+ MPH.
- Magnets MUST be distributed so that the clutch is balanced. Make sure arms have identical magnets installed. Do not overfill magnet slots!

The right lever has a notch and the ramp cam has 5 positions numbered 1 to 5. Each number modifies maximum engine RPM by about 250 RPM. Lower numbers decrease engine RPM in steps of 250 RPM and higher numbers increase it in steps of 250 RPM.
For example: Ramp cam is currently at position 3 and is changed to position 4 so maximum engine RPM is increased by about 250 RPM



2. Right lever
3. Ramp cam (here #3 - factory setting, no number)

Clicker cam adjustment steps:

1. **Loosen the pivot bolt.**
   - Using a 6mm Allen key loosen the cam arm pivot Allen bolt.
2. **Move right lever aside and adjust the cam position.**
   - Turn cam to the desired position and align with corresponding notch.
   - Put BLUE Loctite on pivot bolt then tighten.

1. **Reinstall cam arms and cover:**
   - Install the cam arm in the appropriate slot
   - Slide the weight pin thru the clutch, cam arms and weight then tighten nut to 40 in/lbs. Make sure all pins are installed the same direction for balance purposes and torque weight pin nuts to 20 in-lb (2 Nm).
   - Install spring with both steel shims on bottom.
   - Install cover with screws and blue loctite.
   - Torque screws to 10 ft/lbs.

ULTRASHIFT P5.4 PRO R AOP-1 SETUP CHART

The chart below is a guideline with very close start points with 32" tires riding at Sea Level elevation. (choose the Crankshaft horsepower/Wheel horsepower that best matches your vehicle) (Identical cars may have HP differences of up to 10 HP due to engine manufacturing tolerances so clutch kit calibration adjustments are necessary in most cases)

For High Altitudes- subtract 15% from the Published HP range of your tune to get actual effective HP. **Example - 200 CHP (at sea level) x .85 = 170CHP (use the 175CHP line in the chart below as your baseline setting)**

For sand dunes or large tires (35"+)- subtract 8% from the Published HP range of your tune to get actual effective HP. **Example - 200 CHP x .92 = 184CHP (use the 175CHP line in the chart below as your baseline setting)**

For tires 28" and smaller- Add 8% from the Published HP range of your tune to get actual effective HP. **Example - 200 CHP x .1.08 = 216CHP (use the 215CHP line in the chart below as your baseline setting)**

For Launch Control - Install the HIGH ENGAGEMENT primary spring (Sold Separately) as it is a high engagement spring and will raise engagement RPMS. Add 2 magnets to the suggested settings in the chart below compensate shift RPM for additional HIGH ENGAGEMENT spring pressure.

Crankshaft horsepower (CHP) /Wheel horsepower (WHP)	# of Cam Arms	# of Magnets per Cam arm	Pivot bolt	Clicker setting	Primary spring	Secondary spring / Helix	Belt Recommendation	Full throttle RPM at 55mph
225CHP/184WHP	3	2 in mid 0 in tip	25mm ONLY! ANY LONGER BOLT WILL JAM CAUSING DAMAGE	Position #3 (Factory Setting)	STANDARD	OEM HELIX- KWI Black/Orange secondary spring	OEM POLARIS BELT	8150 RPM +/- 100 RPM)
240CHP/205WHP	3	4 in mid 2 in tip		POSITION #2				
310CHP/270WHP	3	4 in mid 4 in tip						
360CHP/310WHP	4	2 in mid 2 in tip						8400 RPM +/- 100 RPM)
450CHP/410WHP	4	3 in mid 4 in tip						
510CHP/460WHP	4	4 in mid 4 in tip						
600CHP/550WHP	6	2 in mid 1 in tip						

PRIMARY SPRING ENGAGEMENT RPMS

(ENGAGEMENT RPM MAY VARY DUE TO SPRING MANUFACTURE TOLRANCES, SPRING AGE OR VEHICLE SPECIFIC CAM ARM CONFIGURATION)

	ENGAGEMENT WITH 3 ARMS INSTALLED	ENGAGEMENT WITH 4 ARMS INSTALLED
BLACK PURPLE	1850	1700
STANDARD SPRING	2100	1950
SILVER PURPLE	2300	2150
KWI SILVER	3000	2700

PARTS INCLUDED

	PART DESCRIPTION	QTY	OEM PART #	OUR PART #
	ULTRASHIFT PRIMARY CLUTCH	1	—	ULTRASHIFTPRORPRI
	ARP STUD, NUT, WASHER AND LUBE	1	—	-
	(INCL IN CLUTCH ASSY) STD SPRING	1	—	-
	(INCL IN CLUTCH ASSY) AOP-1 WEIGHTS	3	—	-
	(INCL IN CLUTCH ASSY) MAGNET PACK	1	—	-
	COVER REMOVAL SCREWS/NUTS	2	—	-
	WIRE BRUSH	1	—	-
	BLACK / ORANGE SECONDARY SPRING	1	—	-