



## INSTALLATION AND TUNING GUIDE

### KWI ULTRASHIFT POLARIS RZR PRO R PRIMARY CLUTCH

**PART NUMBER(s):** *ULTRASHIFT P5.4 PRO R / FUSION V4 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 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.
- Apply anti seize to the primary clutch puller end and thread then thread into the clutch bolt hole and tighten using an impact driver (or breaker bar with a bar through the clutch to hold it) until clutch is removed from the crankshaft taper. If it wont come off easily then remove the puller and insert 1/2 slice of rolled up bread (yes bread) into the hole, reinstall the puller and try again- this works 100% of the time for stuck clutches.
- 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.

## ULTRASHIFT P5.4 PRO R ADJUSTMENT:

### 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 configurations
  - 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

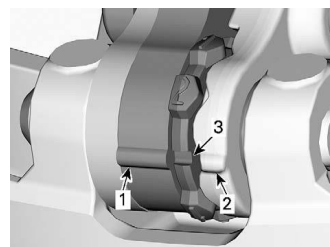
### Clicker cam adjustment steps:

#### 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.



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

# ULTRASHIFT P5.4 PRO R ADJUSTMENT:

## 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						
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					8400 RPM +/- 100 RPM )	

### 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 WHITE	2500	2300

## FUSION V4 PRO R ADJUSTMENT:

### 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:**
  - 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 to compress the cover with high engagement springs that have higher pressures is included with your clutch if needed.)
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 weight pins and nuts to remove the cam arms. **NOTE THERE IS A THRUST WASHER THAT MUST BE INSTALLED ON THE SAME SIDE AS IT WAS REMOVED!**

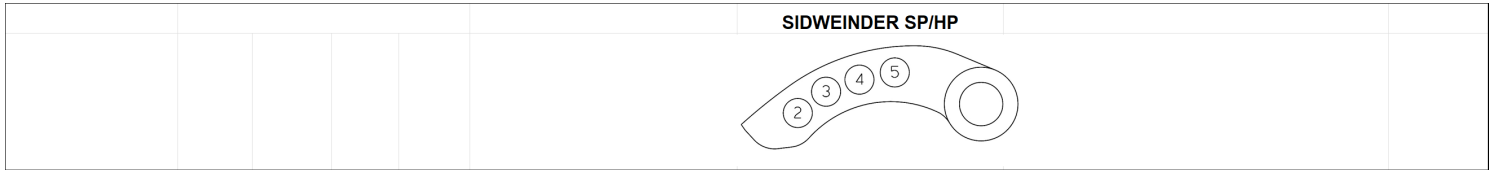
### RPM ADJUSTMENT- Refer to tuning chart on page 4

- The weight of the added screws affects RPM. The more screws that are installed the lower the RPMS will be. 1 screw in each cam arm will change Full Throttle RPM approx 150 RPM
- Depending on your HP level your clutch is set up for you may have 2, 3, 4 or 6 cam arms installed. BALANCE IS CRITICAL!
  - 2 cam arms installed-- ALL cam arms MUST have identical screw configurations
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#### 1. Reinstall cam arms and cover:

- Install the cam arm in the appropriate slot
- Slide the weight pin thru the clutch, thrust washer and cam arms. 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.
- Torque screws to 10 ft/lbs.

# FUSION V4 PRO R ADJUSTMENT:



**FUSION V4 PRO R 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)

Crankshaft horsepower (CHP) /Wheel horsepower (WHP)	# of Cam Arms	Screw Configuration	Primary spring	Secondary spring / Helix	Belt Recommendation	Full throttle RPM at 55mph
225CHP/184WHP	3	SP arms 0 screws	7045112 IS STANDARD 1750 RPM LOW ENGAGEMENT SPRING KWI KWI WHITE IS 2900 RPM HIGH ENGAGEMENT SPRING	KWI BLACK/ORANGE SECONDARY SPRING- OEM HELIX OR- FUSION XR SECONDARY WITH DR3 HELIX- DK BLU/PK spring	OEM POLARIS BELT	8200 RPM +/- 100 RPM )
240CHP/205WHP	3	SP arms 2,5				
310CHP/270WHP	3	SP arms 2,3,4,5				
360CHP/310WHP	4	SP arms 0 screws	KWI MAROON IS STANDARD RPM LOW ENGAGEMENT SPRING KWI WHITE IS 2600 RPM HIGH ENGAGEMENT SPRING (HIGH ENGAGEMENT SPRINGS RAISE SHIFT RPM AND NEED ADDITIONAL MAGNETS INSTALLED IN THE CAM ARMS TO COMPENSATE FOR THE INCREASE IN SPRING PRESSURE)			8400 RPM +/- 100 RPM )
450CHP/410WHP	4	SP arms 2,5 screws				
650CHP/550WHP	6	SP arms 2,3,4,5				
825CHP/750WHP	6 HP	HP arms 2,5				8900 RPM +/- 100 RPM )

### 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

112 STANDARD 3 ARM	1750	N/A
MAROON STANDARD 4+ ARM	1950	1750
SILVER WHITE	3000	2700

### PARTS INCLUDED

	PART DESCRIPTION	QTY	OEM PART #	OUR PART #
	PRIMARY CLUTCH	1	---	-
	PRIMARY CLUTCH ARP BOLT	1	---	-
	SCREW PACK	1	---	-
			---	-
			---	-
			---	-
			---	-
			---	-

#### LIABILITY STATEMENT

As defined by the Magnuson-Moss warranty Act. Do not install any performance parts or services unless you have the technical ability to properly set-up the entire machine to compensate for the installation of those parts. The necessary work and expertise needed to install different product varies. Instructions, where provided, are given to assist in installation only; they are not a substitute for mechanical experience in setting up racing vehicles. References to performance gains, reliability, ease of installation, etc. are based on our and outside customer's experiences. This is not a guarantee of similar performance in every installation. While we sell proven products, in the end it's up to the individual to make the most of the product. Kris Werth Inc. d.b.a. KWI Clutching or its associated corporations are not responsible for any personal or property damages caused by this product. Kris Werth Inc. d.b.a. KWI Clutching or its associated corporations assumes no responsibility for damage or injury of any kind because of misuse, improper installation or improper application of any parts in anyway, by any person. Contact your local dealer to schedule installation of this kit if you are not a qualified ATV or UTV mechanic. USE OF PRODUCTS, BUYER SHALL USE, AND REQUIRE ITS EMPLOYEES, CONTRACTORS, AND AGENTS TO USE, ALL AVAILABLE SAFETY PRECAUTIONS, IN ADDITION TO ANY SPECIFICALLY SET FORTH IN ANY MANUALS, MATERIAL SAFETY DATA SHEETS, TECHNICAL DATA SHEETS, INSTRUCTION SHEETS, IF ANY, FURNISHED BY SELLER (OR AVAILABLE FROM RAW MATERIAL SUPPLIERS) RELATING TO SELLER'S PRODUCTS. IF BUYER DOES NOT RECEIVE ANY REQUIRED MATERIAL SAFETY DATA SHEETS FOR ANY PRODUCT FROM SELLER, BUYER WILL REQUEST THEM FROM SELLER. IF BUYER FAILS TO STRICTLY OBSERVE EACH AND EVERY ONE OF THE OBLIGATIONS SET FORTH IN THIS SECTION 22 OR IF BUYER'S USE OF ANY OF SELLER'S PRODUCTS IS IN VIOLATION OF ANY STANDARD OR RULE OF THE AMERICAN NATIONAL STANDARDS INSTITUTE OR OCCUPATIONAL HEALTH AND SAFETY ACT, OR OTHER APPLICABLE WORKPLACE LAW, REGULATION, OR STANDARD, BUYER WILL INDEMNIFY, DEFEND, AND HOLD HARMLESS SELLER AND SELLER AND ITS EMPLOYEES, OFFICERS, DIRECTORS, AGENTS, AFFILIATES, SUCCESSORS AND ASSIGNS FROM AND AGAINST ANY AND ALL CLAIMS, DEMANDS, DAMAGES, ACTIONS, AND CAUSES OF ACTION, AS WELL AS ANY AND ALL LIABILITY, LOSS, OR EXPENSE OF ANY KIND, INCLUDING REASONABLE ATTORNEYS' FEES ARISING FROM, CONNECTED WITH OR IN ANY WAY PERTAINING TO ANY SUCH FAILURE BY BUYER. NOTIFICATION. BUYER SHALL NOTIFY SELLER PROMPTLY, AND IN ANY EVENT WITHIN 30 DAYS, AFTER ANY ACCIDENT OR FAILURE INVOLVING SELLER'S PRODUCTS THAT RESULTS IN PERSONAL INJURY OR DAMAGE TO PROPERTY AND SHALL COOPERATE FULLY WITH SELLER IN INVESTIGATING AND DETERMINING CAUSES OF SUCH ACCIDENT OR FAILURE. ATTORNEYS' FEES AND COSTS. BUYER WILL PAY SELLER'S REASONABLE ATTORNEYS' FEES AND OTHER COSTS AND EXPENSES FOR ANY LEGAL OR EQUITABLE ACTION UNDERTAKEN BY SELLER TO ENFORCE THESE TERMS OR THE PROVISIONS OF ANY SUPPLY AGREEMENT.