INSTALLATION AND TUNING GUIDE

KWI ULTRASHIFT CAN AM X3 V2 PRIMARY CLUTCH

***PART NUMBER(s)**: ULTRASHIFT X3 V2*

TOOLS NEEDED

- 1/2" Drive Impact Gun
- 22mm - 1/2" Drive Impact Socket
- 11/16 12 point - 1/2" Drive Impact Socket
- 1/2" Torque Wrench (140Ft/Lbs)
- 5mm Allen Wrench
- 6mm Allen Wrench
- T30 Torx
- KWI Can Am UltraShift primary clutch puller
- Belt removal tool
- ARP Fastener lube
- Vorhees Vise 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. ***The UltraShift X3 uses a GATES REDLINE 49R4313 belt. The OEM belts for the CanAm X3 are too short and will not fit with the UltraShift Installed.***

2. ***The UltraShift is larger than your OEM clutch so the NEW style 420212508 clutch housing cover from the turbo RR and 420450405 white sealing gasket must be used or the clutch may rub the cover.***

3. ***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.***

4. ***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.***

Remove OEM primary clutch:

1. **Remove Belt Cover:**
   - Use a T30 Torx driver to remove the screws securing the belt box cover. Lift the cover off and set it aside.
2. **Remove CVT Belt:**
   - Use a Belt Removal Tool to safely remove the CVT belt from the clutches, you will not re-use the OEM length belt with the CanAm X3 UltraShift as it uses a longer GATES REDLINE 49R4313 belt.
3. **Unbolt the Primary Clutch:**
   - Use a 22mm - 1/2" Drive Impact Socket to remove the primary clutch bolt. This bolt won't be reused.
4. **Detach Primary Clutch:**
   - Lubricate the Puller threads and hand-thread the KWI PUL1 Can Am X3 OEM Clutch Puller or an equivalent a few turns into the clutch. Then, tighten it with a strong 1/2" impact gun until the clutch disengages from the shaft.
5. **Remove Primary Clutch:**
   - Take the primary clutch off and put the KWI PUL-1 primary clutch puller away, you wont be needing these again unless you switch back to the OEM clutch.

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

6. **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 fully by hand easily.
7. **Clean Crankshaft and Clutch Taper:**
   - Wipe down the engine crankshaft and the taper inside your new UltraShift clutch with brake cleaner or acetone to remove all oils, dust residues.
8. **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.
9. **Install New 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 1/2 turn.
10. **Torque Down:**
    - Hold the ULTRASHIFT from turning with the Vorhees Vise clutch holding tool or equivalent. Use a 1/2" Torque Wrench set to 140 ft/lbs to tighten the nut. Re-check torque on the nut after the first 5 minutes of riding.

Final Steps:

12. **Adjust Belt Shimming:**
    - If you have a KWI Float Mod, refer to its specific instructions for proper belt centering.
13. **Re-Install Belt and Cover:**
    - Put the new correct length CVT belt on (refer to **SETUP CHART** below) and reattach the belt box cover.
14. **Test Drive:**
    - Drive the vehicle and check and adjust for proper RPM at 100% throttle between 20 and 70 MPH according to the adjustment instructions on page 3 and tuning chart on page 4.

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 configurations
  - 3 cam arms installed-- ALL cam arms MUST have identical magnet configurations
  - 4 cam arms installed-- ANY 2 OPPOSING cam arms MUST have identical magnet configurations
  - 6 cam arms installed-- ANY 2 OPPOSING cam arms MUST have identical magnet configurations

1. Remove the cam arms from the clutch. (SEE "Primary clutch disassembly and reassembly" ABOVE)
2. There are 3 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 0-20 MPH.
   - Magnets in the center hole will affect RPM's from 20-50 MPH.
   - Magnets in the hole farthest to the cam arm pin will affect RPM's at 50+ MPH.
3. Magnets MUST be distributed so that the clutch is balanced. Make sure arms have identical magnets installed. Do not overfill magnet slots!

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 V2 X3 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 X3) (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 KWI HIGH ENGAGEMENT primary spring with the correct enaggement for your application. (SOLD SEPARATELY AND LISTED BELOW)

Crankshaft horsepower (CHP) /Wheel horsepower (WHP)	# of Cam Arms	# of Magnets IN HEEL OF EACH CAM ARM	# of Magnets IN MID OF EACH CAM	# of Magnets IN TIP OF EACH CAM	Primary spring	Secondary spring / Helix / hole	Belt Recommendation	Full throttle RPM at 55mph
152CHP/130WHP	2	0	1	1	**7045112 IS STANDARD 1750 RPM LOW ENGAGEMENT SPRING** KWI SILVER PURPLE IS 2900 RPM HIGH ENGAGEMENT SPRING KWI SILVER IS 3500 RPM HIGH ENGAGEMENT SPRING (HIGH ENGAGEMENT SPRINGS RAISE SHIFT RPM AND NEED ADDITIONAL MAGNETS INSTALLED IN THE CAM ARMS TO COMPENSATE FOR THE INREASE IN SPRING PRESSURE)	**OEM TURBO RR HELIX-** OEM TURBO RR Black/Green secondary spring in hole #3 (60 degrees wrap) **KWI DR3 GROOVIX -** OEM TURBO RR	CANAM X3 USES A LONGER BELT THAT IS COMMERCIALLY AVAILABLE FROM MANY MANUFACTURERS- SEE RECOMMENDATIONS BELOW GATES – 49R4313 - FIRST CHOICE AND MOST DURABLE BELT BY FAR, THE ONLY CHOICE FOR AGGRESSIVE RIDING AND RACING, EASILY WITHSTANDS 260 DEGREE BELT TEMPS.	7950 RPM +/- 100 RPM (ALL OEM TURBOS)
175CHP/165WHP	2	0	2	2				
195CHP/175WHP	2	3	2	2		**OEM TURBO RR HELIX-** OEM TURBO RR Black/Green secondary spring in hole #4 (30 degrees wrap) **FOR KWI DR3 GROOVIX-** OEM TURBO RR Black/Green secondary spring in hole #2 (35 degrees wrap)		
215CHP/185WHP	2	3	3	3				
225CHP/195WHP	3	0	0	0				
255CHP/225WHP	3	0	0	1				
290CHP/250WHP	3	0	1	1				
330CHP/275WHP	3	4	4	4		**WITH DR3 GROOVIX-** KWI Dark Blue Pink secondary spring in hole #2 (35 degrees wrap)	ULTIMAX - USX804 – THIS IS THE GOTO BELT FOR DRAG RACING WITH YOUR ULTRASHIFT! DAYCO – XTX5041 – A GOOD ALTERNATIVE IF THE ABOVE ARE NOT AVAILABLE	8250 RPM +/- 100 RPM (AFTERMARKET TURBO)
360CHP/310WHP	4	0	0	0	**KWI MAROON IS STANDARD 1750 RPM LOW ENGAGEMENT SPRING** KWI SILVER PURPLE IS 2900 RPM HIGH ENGAGEMENT SPRING KWI SILVER IS 3500 RPM HIGH ENGAGEMENT SPRING (HIGH ENGAGEMENT SPRINGS RAISE SHIFT RPM AND NEED ADDITIONAL MAGNETS INSTALLED IN THE CAM ARMS TO COMPENSATE FOR THE INREASE IN SPRING PRESSURE)			
400CHP/350WHP	4	1	1	1				
500CHP/450WHP	4	3	3	3				8750 RPM +/- 100 RPM (AFTERMARKET TURBO)
600CHP/550WHP	6	2	2	2				

PRIMARY SPRING ENGAGEMENT RPMS

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

STANDARD SPRING	1700-1900
KWI SILVER PURPLE	2700-2900
KWI SILVER	3000-3500

PARTS INCLUDED

	PART DESCRIPTION	QTY	OEM PART #	OUR PART #
	ULTRASHIFT V2 PRIMARY CLUTCH	1	—	ULTRASHIFTX3PRI
	ARP STUD, NUT, WASHER AND LUBE	1	—	-
	(INCL IN CLUTCH ASSY) STD SPRING	1	—	-
	(INCL IN CLUTCH ASSY) PROR WEIGHTS	AR	—	-
	(INCL IN CLUTCH ASSY) MAGNET PACK	1	—	-
	SWAG	1	—	-
	WIRE BRUSH	1	—	-