

Rekluse Motor Sports

The z-Start™ Clutch

KTM RFS 250

KTM RFS 400

KTM RFS 450

KTM RFS 525

(2003 – 2005)

Installation Guide

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z-Start Revision 3.000

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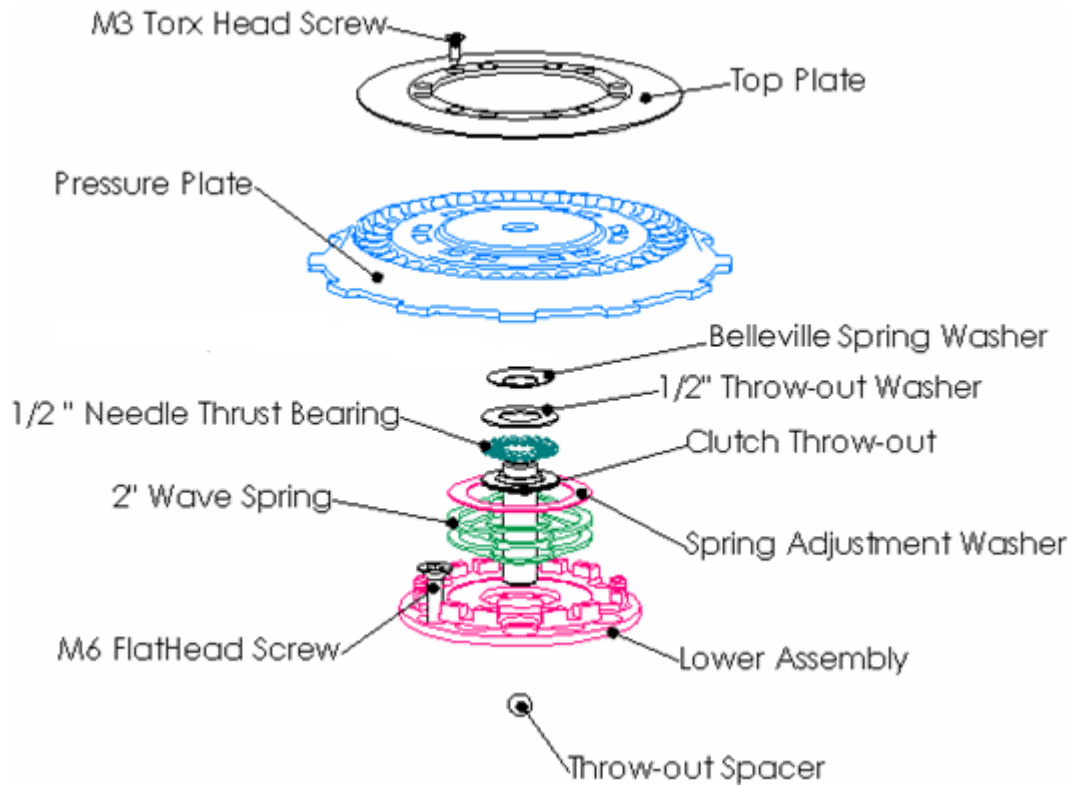
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Required Tools

8mm socket	Fine tooth metal file
10mm socket	2 Sets of feeler gauges
27mm socket	Inch Pound Torque Wrench
4mm allen key socket	Torx T10 driver tip (included)
3mm allen	Blue Loctite 243 (oil resistant)
1/4 inch driver (for included Torx T10 driver tip)	

Z-Start Overview



Note: The Lower Assembly is packaged underneath the Pressure Plate and held in place with two screws through the Top Plate.

Included Parts for the z-Start Clutch

Note: spare screws, balls and shims may be included with your clutch

Top Plate	2" (51mm) Wave Spring (C200L2)
Pressure Plate	2" (51mm) Wave Spring (CS200L1)
Lower Assembly	2 x 2" (51mm) Wave Sprg Adjustment Wshr
Clutch Throw-out	12 x M3 #10 torx screws
6 x .047 (1.2mm) Drive plates	30 x 3/8" (9.53mm) balls
6 x M6 Threaded Studs (to assist mounting)	5 x 3/8" (9.53mm) Tungsten Carbide balls
6 x M6 Flat Head Screws	18 x .010" (0.25mm) Mounting Shims
1/4" (6.35mm) ball Throw-out Spacer	KTM RFS Gasket
1/2" (12.7mm) Throw-out Needle Thrust Brg	0.045" (1.14mm) Center Clutch Guide
1/2" (12.7mm) Flat Throw-out Thrust Washer	M18—1.5 Panel Nut
1 x 0.625" (15.9mm) Bellville Spring Washer	External Tab Lock Washer
	12 x M6 – 1.52mm washers (back to stock)

Basic z-Start Clutch Operation

The z-Start Auto Clutch functions through centrifugal force. As engine RPM increases, the balls contained in the z-Start Pressure Plate travel up the ball ramps and push against the Top Plate. This action forces the Pressure Plate to engage the clutch pack.

Installation Tips

In order for the z-Start Clutch to perform properly, it must be mounted properly.

- Measuring and maintaining the Installed Gap is **critical**. If the Installed Gap is too big the clutch will slip excessively and cause rapid clutch wear. If the Installed Gap is too small, the clutch will drag and cause engine stall.
- Recognize that the Pressure Plate travels along the tabs of the Lower Assembly as it engages and disengages. Anything preventing this travel will prevent full engagement and cause the clutch to slip excessively.
- The z-Start only applies pressure to the hydraulic clutch system when the engine is running. ***Pulling the clutch lever repeatedly during installation or when the motorcycle is off and the z-Start is installed can damage the slave cylinder of your clutch system.***
- ***Be very careful not to drop any screws, washers or springs into the crankcase opening!*** It is surprisingly easy to drop a little screw or washer down into your crankcase. It is not always so easy to get it out. Make sure all parts going in and coming out are accounted for before you finish the installation. A strong magnetic probe can often be used to retrieve little parts if you happen to drop something in.

Bike Preparation and Disassembly

1. Turn the gas petcock to the off position and route the gas cap vent tube into the air. When you lay the bike over on it's side, the gas in the bowl will drain out of the overflow tube. Be prepared to catch the gas in a suitable container to prevent a fire hazard.
2. Carefully lay the bike on its left side so the clutch-cover faces up.
3. Remove the kickstart and rear brake pedal. Remove the right side case cover bolts with an 8mm socket and carefully remove the clutch cover.
4. Using a 5mm allen wrench, remove the 6 bolts holding the stock pressure plate to the inner clutch hub. Lift off the pressure plate and the clutch lifter assembly. The clutch lifter assembly consists of the **Clutch Throw-out**, a **bearing**, and a **washer**.

Pressure plate, 6 bolts and springs, and stock clutch lifter assembly are not reinstalled.

5. Remove your clutch pack and set it aside. Try to keep it in order because it will be re-installed.

Modifying the Stock Center Clutch

- Remove the center clutch using a 27 mm socket. Take the center clutch to a place where no filings can be dropped into the crankcase opening. Place the included *0.045" Center Clutch Guide* over the studs on the center clutch and use a fine tooth file to file the studs down smooth with the Center Clutch Guide. Remove the guide and use some emery cloth to smooth the studs' edges.

Note: 12 x M6 x 0.06 washers are provided so the clutch can be re-assembled to the stock configuration.

File studs down so they are flush with the included Center clutch guide.



- Reinstall the center clutch using the thinner *Rekluse Multiple External Tab Washer* and the *Rekluse 18mm Panel Nut* with the machined side of the nut facing up. To help keep the tab washer centered it is easiest to center it on the transmission shaft and then fold one of the tabs down against the flat edge of the inner hub of the center clutch. Make sure the machined side of the nut is facing up, apply blue loctite 243, and torque to 50 foot pounds.

Installing the Lower Assembly

- Insert the included *M6 Threaded Studs* into the bike's center clutch stand-offs 2-3 turns. Carefully place 2 *Mounting Shims* over each of the studs. **See picture below**

Install M6 studs and carefully place exactly 2 Mounting Shims over each stud.



- Place the z-Start *Lower Assembly* over the M6 studs. (There are two sets of 6 holes in the *Lower Assembly*. Use the inner set of holes to mount on the KTM).
- Carefully remove M6 studs one at a time and replace them with an *M6 flat head screw*—**apply blue Loctite 243 to each screw when installing**. Make sure none of the *Mounting Shims* fall out from under the z-Start *Lower Assembly*. Torque the M6 screws to 96 inch pounds. After the screws are torqued-down, the *Rotating Hub* should spin freely.
- Follow the following charts when re-installing the clutch pack.

Drive Plate Configuration

12. It is necessary to exchange some of the stock steel drive plates in your clutch pack with the Rekluse .047" (1.2mm) drive plates. The drive plate configuration for the '03 models is different than the '04 models. Refer to the appropriate model year.

'03 Models - The stock clutch pack has two .039" (1mm) drive plates followed by four .055" (1.4mm) drive plates followed by two .039" (1mm) drive plates. The revised clutch pack setup, from top to bottom, will be four Rekluse .047" (1.2mm) drive plates followed by four .039" (1mm) drive plates. The top stock .039" (1mm) drive plate removed and stacked further down in the clutch pack. **When finished, the top of the clutch pack should be a friction disk.** Refer to the following charts:

Stock Clutch Pack Configuration from top to bottom:

.039" Stock Drive Plate (note: this plate is removed and stacked further down in the pack)
.070" Friction Plate
.039" Stock Drive Plate
.070" Friction Plate
.055" Stock Drive Plate
.070" Friction Plate
.055" Stock Drive Plate
.070" Friction Plate
.055" Stock Drive Plate
.070" Friction Plate
.055" Stock Drive Plate
.070" Friction Plate
.055" Stock Drive Plate
.070" Friction Plate
.039" Stock Drive Plate
.070" Friction Plate
.039" Stock Drive Plate

New Clutch Pack Configuration from top to bottom:


<i>.070" Friction Plate</i>	Top (outer most) ↓ Bottom (inner most)
.047" Rekluse Drive Plate	
<i>.070" Friction Plate</i>	
.047" Rekluse Drive Plate	
<i>.070" Friction Plate</i>	
.047" Rekluse Drive Plate	
<i>.070" Friction Plate</i>	
.047" Rekluse Drive Plate	
<i>.070" Friction Plate</i>	
.039" Stock Drive Plate	
.039" Stock Drive Plate	
<i>.070" Friction Plate</i>	
.039" Stock Drive Plate	
<i>.070" Friction Plate</i>	
.039" Stock Drive Plate	

'04-05' Models - The stock clutch pack uses .039" (1mm) drive plates and .078" (2mm) Friction Plates. The revised clutch pack setup will remove the top most .039" (1mm) drive plate and exchange two of the stock .039" (1mm) drive plates with Rekluse .047" (1.2mm) drive plates. **When finished, the top of the clutch pack should be a friction disk.** Refer to the following charts:

Stock Clutch Pack Configuration from top to bottom:

- .039" Stock Drive Plate (note: this plate is removed permanently)
- .078" Friction Plate
- .039" Stock Drive Plate
- .078" Friction Plate
- .039" Stock Drive Plate
- .078" Friction Plate
- .039" Stock Drive Plate
- .078" Friction Plate
- .039" Stock Drive Plate
- .078" Friction Plate
- .039" Stock Drive Plate
- .078" Friction Plate
- .039" Stock Drive Plate
- .078" Friction Plate
- .039" Stock Drive Plate

New Clutch Pack Configuration from top to bottom:

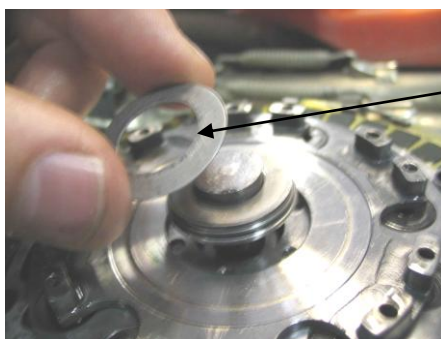
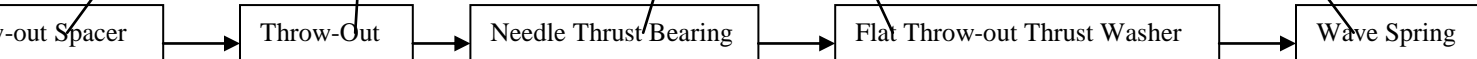
- | | |
|----------------------------------|---|
| <i>.078" Friction Plate</i> | Top (outer most) |
| .047" Rekluse Drive Plate |  |
| <i>.078" Friction Plate</i> | |
| .047" Rekluse Drive Plate | |
| <i>.078" Friction Plate</i> | |
| .039" Stock Drive Plate | |
| <i>.078" Friction Plate</i> | |
| .039" Stock Drive Plate | |
| <i>.078" Friction Plate</i> | |
| .039" Stock Drive Plate | |
| <i>.078" Friction Plate</i> | |
| .039" Stock Drive Plate | |
| <i>.078" Friction Plate</i> | |
| .039" Stock Drive Plate | |
| <i>.078" Friction Plate</i> | |
| .039" Stock Drive Plate | Bottom (inner most) |

Assembling the Rekluse Throwout, Pressure Plate, and Top Plate

13. Guide the 0.25" **Rekluse throw-out spacer ball** followed by the **Rekluse Clutch throw-out** over the stock throwout rod. Be sure that the spacer is in place between the Rekluse Clutch throw-out and the throw-out shaft.

Place the ½" **Needle Thrust Bearing** on top of the Rekluse *Throw-out* followed by the ½" **Throw-out Thrust Washer**. Place the Belleville Spring washer, curve side down, on top of the flat Thrust Washer.

Place the 2" **C200L2 Wave Spring** on top of the Lower. The **C200L2 Wave Spring** is the taller of the two wave springs provided with the kit. This is our recommended setting for engagement RPM—refer to the chart on the last page of these instructions for other adjustment settings.



Belleville Spring Washer

Warning: Perform the next step away from the bike to keep the balls from falling into the transmission.

14. Place a small amount of oil in each of the *Pressure Plates* ball grooves. Place 1 **Tungsten Carbide ball** followed by 5 **steel balls**. Repeat the pattern until all slots contain a ball. **It is very important to have the Tungsten Carbide balls spaced evenly around the pressure plate.**

Note: The remaining 5 steel balls are used for adjustment. See the chart on the last page of these instructions.

Note: Tungsten Carbide balls are twice as heavy as steel balls and are duller gray in color.

15. Place the z-Start *Pressure Plate* over the z-Start *Lower Assembly*. Index the outer tabs of the *Pressure Plate* into the “half-moon windows” of the clutch basket. **The outer tabs of the *Pressure Plate* do not rest in the same clutch basket windows as the outer tabs of the friction disks.**

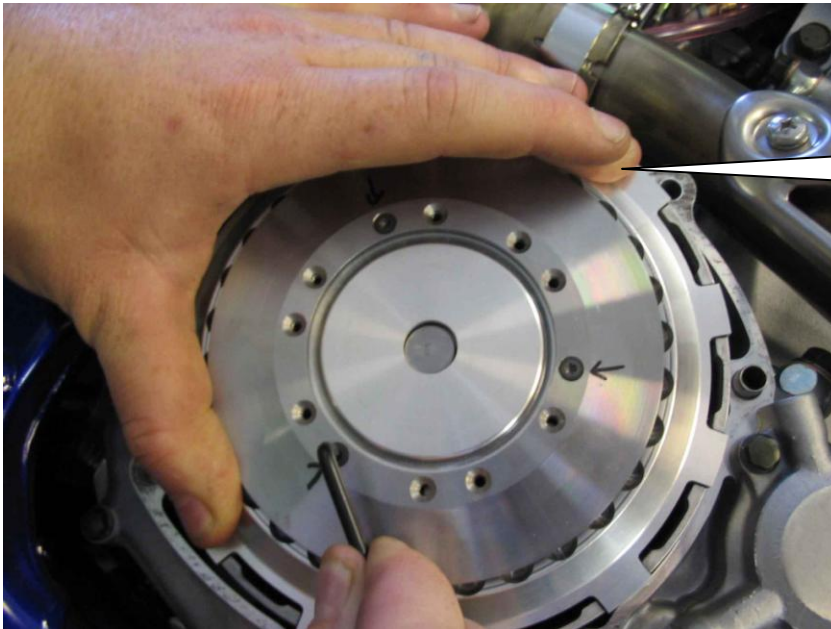
Also insure that the tabs of the *Lower Assembly* pass through the associated cut-outs in the *Pressure Plate*. Make sure the top of the *Rekluse Throw-out* assembly passes through the hole in the center of the z-Start *Pressure Plate*. **See following picture.**

Throw-Out assembly
passing through center of
Pressure Plate



Tabs passing through
Pressure Plate

16. While holding the *Pressure Plate* down place the *Top Plate* over the *Pressure Plate* and fasten it to the tabs of the *Lower Assembly* with three of the M3 screws, through the three marked holes in the *Top Plate*. Lightly tighten each screw using a 1/4 inch driver and the included Torx T10 driver tip. **See following picture.**



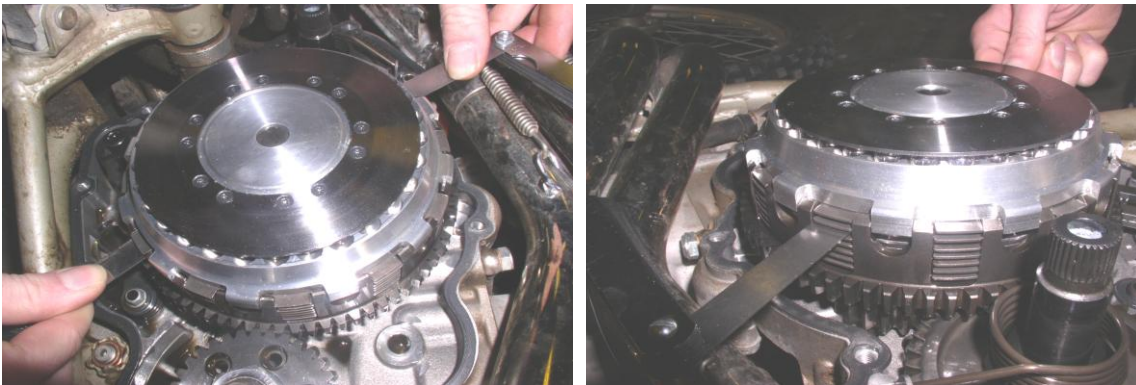
Holding down *Pressure Plate* until *Top Plate* is
securely fastened

Note: You will have to overcome the z-Start *Wave Spring* and hold the *Pressure Plate* down until the 3 screws are securely fastened in order to tighten the *Top Plate* down properly.

Determine the installed gap of the Z-Start

17. Measure the installed gap of the z-Start. Two sets of feeler gauges are required to measure the Installed Gap. The feeler gauges must be placed between the top most **friction disk** and the top-most **steel drive plate** in the clutch pack 180 degrees apart. **See following pictures.**

Note: Insert the 2 sets of feeler gauges directly across from one another (180 degrees apart) to avoid the clutch pack from rocking resulting in an inaccurate measurement. Find the thickest feeler gauge that still slides back and forth with slight resistance.



Your installed gap measurement needs to be between .030" (0.76mm) to .042" (1.07mm). 0.032"—0.035" is ideal.

04' and 05' Models If the gap is greater than .042", you need to exchange the next stock .039" (1mm) steel drive plate in the clutch stack and replace it with a *Rekluse .047" (1.2mm) steel drive plate*. Exchange stock .039" (1mm) drive plates with *Rekluse .047" (1.2mm) drive plates* or vice versa as needed to get the correct measurement. Repeat steps 16 and 17 until measurement is within range.

03' Models If the gap is greater than .042", you need to remove one of the *Rekluse .047" (1.2mm) drive plates* in the clutch stack and replace it with a stock .055" (1.4mm) steel drive plate. Exchange stock .055" (1.4mm) drive plates with *Rekluse .047" (1.2mm) drive plates* or vice versa as needed to get the correct measurement. Repeat steps 16 and 17 until measurement is within range.

Final Installation Steps

18. Using a small amount of Blue Loctite 243, install the rest of the M3 torx head screws and torque to 10 inch/pounds. 10 inch-pounds requires a good crank with the included Torx T10 driver tip, but be careful not to bend the head of the T10 driver tip. Remove the three marked M3 screws, add Loctite, and tighten.

Note: Use Loctite 243 (Blue, oil resistant) to secure all M3 Torx screws

19. Re-install your clutch cover **with included KTM RFS gasket**. We recommend threading the 6 Threaded studs, used to install the Lower Assembly, into the engine case to aid in lining up the gasket when installing the clutch cover—the **included gasket must be used or significant clutch damage will result.**

Hand-tighten each of the clutch cover bolts, then torque to 6 to 8 foot/pounds in 2 steps. Replace the kick-start and brake pedal.

WARNING: After a 20 minute break-in period, the clutch plates will seat in and you must re-measure the Installed Gap to guarantee the Installed Gap is within the prescribed range—make drive plate adjustments if necessary. See step 17.

Clutch break-in re-measurement of the Installed Gap is necessary whenever new clutch plates are installed.

WARNING: Refer to the “Safety Warnings” and “Break-in Tuning and Maintenance Guide” before operating the z-Start clutch.

Adjusting the z-Start Engagement RPM

The engine speed at which the z-Start begins to engage the clutch, also called the stall speed, can be adjusted. Included with the z-Start are two 2” *Wave Springs* and two 2” *Spring Adjustment Washers* to fine tune the z-Start stall speed. The *Wave Springs* and *Flat Steel Washers* are located inside the z-Start between the *Pressure Plate* and *Lower Assembly*. To adjust the stall speed, it is necessary to remove the engine side cover and the M3 screws holding the z-Start *Top Plate* to access the *Wave Spring* and *Flat Steel Washers*. Refer to the z-Start Parts View and the installation instructions for detailed information on how to change the *Wave Spring* and *Flat Steel Washer* configuration.

Use the following chart as a guideline for setting the stall speed. Remember many factors can affect the stall speed from bike to bike so the following chart is only a guideline. You can also make fine tuning adjustments by adjusting your idle speed.

CS200L1 Wave Spring	0 x Flat Washers	Very Low Stall Speed (generally below idle)
CS200L1 Wave Spring	1 x Flat Washer	Low Stall Speed (typically just above idle)
CS200L1 Wave Spring	2 x Flat Washers	Medium Stall Speed
C200L2 Wave Spring	0 x Flat Washers	Medium Stall Speed (very near previous setup)
C200L2 Wave Spring	1 x Flat Washers	High Stall Speed

Note: do not use more than 1 Flat Washer with the *CS200L2 Wave Spring*.

Note: If you would like to adjust more slip into the clutch beyond the above spring chart, you can remove the 5 Tungsten Carbide balls from the Pressure Plate and replace them with the 5 extra steel balls.