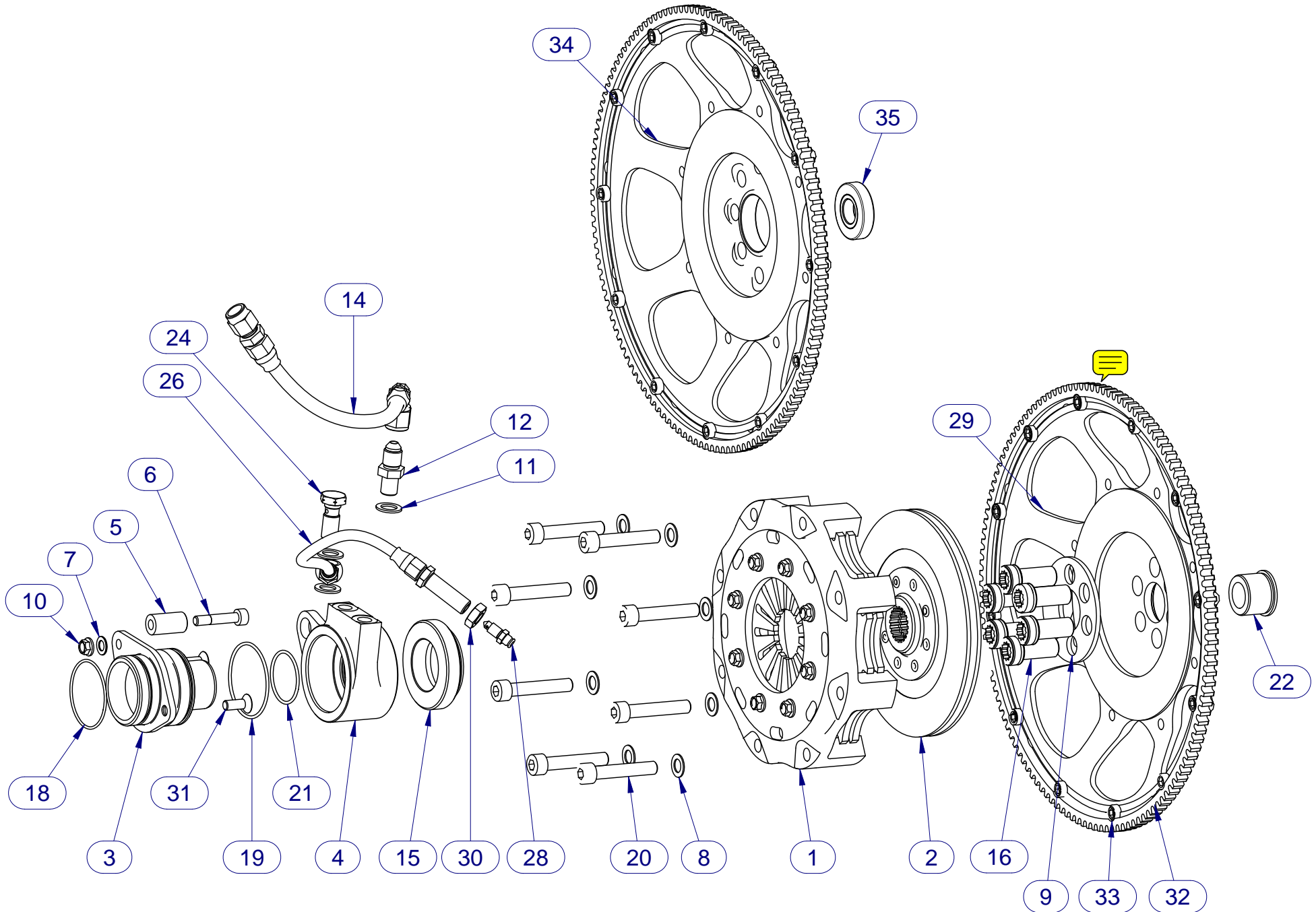


# WEVO Superlite 915 Hydraulic



# **WEVO Superlite 915 Hydraulic**

| ITEM | PART #         | PART NAME                                      | QTY. | IN KIT ? |
|------|----------------|------------------------------------------------|------|----------|
| 1    | 67-002 HG      | TILTON 5.5" Ø CLUTCH COVER                     | 1    | YES/NO   |
| 2    | 64140-9-AC-25  | TILTON 2 PLATE DISC PACK - SUIT 915            | 2    | YES/NO   |
| 3    | XT_089         | GUIDE TUBE - 915 - WEVO HYD. RELEASE           | 1    | YES      |
| 4    | XT_090         | T.O.B CARRIER - WEVO HYD. RELEASE              | 1    | YES      |
| 5    | XG_010         | GUIDE BUSH - WEVO HYDRAULIC RELEASE            | 1    | YES      |
| 6    | ZP1C76180      | CAP HEAD BOLT - M6 x 30                        | 1    | YES      |
| 7    | W34-6          | M6 SPRING WASHER - THIN                        | 1    | YES      |
| 8    | AN-960-516L    | WASHER - CLUTCH COVER BOLT                     | 8    | YES      |
| 9    | 901 102 162 04 | FLYWHEEL BOLT WASHER                           | 1    | NO       |
| 10   | 6PH135M        | M6 K-NUT                                       | 1    | YES      |
| 11   | 177003         | ALUMINUM CRUSH WASHER 3/8"                     | 3    | YES      |
| 12   | 592045         | -4 TO M10 x 1.25 STEEL ADAPTOR                 | 1    | YES      |
| 14   | N/A            | -4 SUPPLY HOSE ASSEMBLY                        | 1    | YES      |
| 15   | 62-008         | TILTON 38mm Ø THROW OUT BEARING                | 1    | YES/NO   |
| 16   | 911 102 171 00 | PORSCHE FLYWHEEL BOLT - 6 BOLT CRANK           | 6    | NO       |
| 18   | 999 701 359 40 | O-RING 40 x 1.5 mm                             | 1    | YES      |
| 19   | E1000-031      | O-RING FOR GUIDE TUBE                          | 1    | YES      |
| 20   | 75582452       | M8 x 45 CAP HEAD BOLT - 10.9                   | 8    | YES      |
| 21   | E1000-025      | O-RING FOR T.O.B. CARRIER                      | 1    | YES      |
| 22   | 901 102 025 01 | CRANKSHAFT PILOT BEARING                       | 1    | YES/NO   |
| 24   | 977515         | BANJO BOLT M10 x 1.25                          | 1    | YES      |
| 26   | N/A            | -3 BLEED HOSE ASSEMBLY                         | 1    | YES      |
| 28   | N/A            | BLEED NIPPLE - EARLE'S                         | 1    | YES      |
| 29   | XT_267         | 915 - 6 BOLT FLYWHEEL 5.5" CLUTCH - LOOSE RING | 1    | YES/NO   |
| 30   | AN316-6        | 3/8 -24 UNF JAM NUT                            | 1    | YES      |
| 31   | 87092          | M6 x 16 CSK SCREW                              | 2    | YES      |
| 32   | XT_253         | 915 / 901 BOLT-ON WEVO STARTER RING GEAR       | 1    | YES      |
| 33   | 67826123       | M6 x 8 LOW HEAD CAP SCREW - 10.9               | 12   | YES      |

| ITEM | PART #         | PART NAME                                      | QTY. | IN KIT ? |
|------|----------------|------------------------------------------------|------|----------|
| 34   | XT_254         | 915 - 9 BOLT FLYWHEEL 5.5" CLUTCH - LOOSE RING | 1    | YES/NO   |
| 35   | 931 102 111 00 | CRANKSHAFT PILOT BEARING - 9 BOLT              | 1    | YES/NO   |

# ***WEVO Superlite 915 Hydraulic 2009***

## ***Flywheel / Clutch kit***

This kit is a high performance competition system that is not suited for continuous road traffic conditions. The parts are engineered for the use conditions prescribed by the Clutch manufacturer; use of the clutch under other conditions might damage any of the parts in the system.

The manufacturer instructions for the clutch must be observed at all time, particularly the information about clutch installation, clutch stop and release mechanisms free play measurements.

This kit is designed to be installed with a standard 1974 onwards, 915 transmission, in any chassis that can provide a hydraulic master cylinder system from the pedals. Call Windrush Evolutions Inc with any questions about suitability for your application.

This kit includes every part that will be replaced inside the bellhousing during the conversion from an O.E. stock clutch package to the WEVO Superlite 915 Hydraulic unit – except the 3 parts from Tilton Engineering. See the exploded diagram for illustration of each part and part number information that will be referenced in these instructions.

These instructions assume an experienced level of technical capability, including execution under good working conditions and performed with accepted good work practices.

### **FLYWHEEL**

The new WEVO Superlite Flywheel (29 or 34) can be installed in the condition it is supplied, the Starter Ring gear (32) is already correctly mounted using the M6 x 8 low head socket head cap screws (33). The Flywheel already has a new Pilot bearing (22 or 35) installed.

Torque the Flywheel bolts to the original specification for your Flywheel configuration.

### **CLUTCH SPLINE LUBRICATION**

It is important that the spline on the input shaft is thoroughly – not excessively – lubricated with anti-seize paste prior to final installation of the transmission. The clutch plates (2) have no axial damping like an O.E. friction plate and therefore disengagement of the clutch relies upon the plates being able to “float” along the length of the spline on the input shaft.

### **CLUTCH**

The Clutch cover (1), Throw out bearing (15) and Disc pack (2) are not automatically included in this kit. Request that Windrush Evolutions Inc. supply these parts in your order, or contact local or national Tilton re-sellers and purchase the exact Tilton part #'s identified on the parts list.

Assemble the clutch pack per the Tilton instructions and use a clutch plate-aligning tool, during the attachment of the clutch assembly to the Flywheel.

The 915 requires the use of “A” & “C” clutch plates to achieve the correct positioning over the spline of the input shaft. Note the correct arrangement of the plates to ensure that no interference with the pilot bearing exists, or contact between the two friction plates hubs exists. There are 8 possible arrangements for the 2 plates - only one arrangement of the parts is correct.

Refer to the Tilton instructions to familiarize yourself with the process of tightening the Clutch cover bolts in a criss-cross fashion. Use the M8 x 45 Socket head cap screw (20) with a Washer (8). Tighten the Clutch cover bolts to 22 lbs./ft of torque using red Loctite. Perform all the checks described in the Tilton instructions to establish that the installation of your clutch is without defect.

This completes the preparation of the engine side of the installation.

## **PEDALS**

The pedal assembly must provide a suitable hydraulic master cylinder. The WEVO Superlite 915 Hydraulic kit is designed to use a 19 mm Ø master cylinder (or ¾" Ø = 19.05 mm). The piston in this master cylinder will stroke approximately 18 - 19mm to achieve the fluid displacement required to disengage the correct Tilton clutch.

The stock 1987 – 1989 911 pedal assembly uses a 19 mm Ø master cylinder and the WEVO parts have been designed to function correctly with the mechanical pedal ratio of the stock 911 hydraulic clutch pedal assembly.

Any after market or custom made pedals should use a pedal ratio of approximately 4:1 (pedal travel : master cylinder travel) to have a comfortable pedal weight and pedal travel length. If the pedal design is fixed by other packaging constraints, then use the information above to re-calculate the size of master cylinder that will achieve the best solution for your pedals.

A STURDY and positive pedal stop is required to limit the travel of the clutch pedal and therefore the travel of the slave cylinder piston in the hydraulic release mechanism. Failure to correctly install and adjust a clutch pedal stop will lead to poor clutch performance and probable damage to the clutch components. The Slave cylinder piston can be “over-traveled” and this will cause the hydraulic seals to breach and hydraulic fluid will leak in the bell housing.

## **HYDRAULIC LINES**

The supply line from the master cylinder to the release mechanism needs to be –4 hose or ¼" bore hard line to ensure that fluid can move quickly and unrestricted during rapid pedal operation. Do not use –3 line or 3/16" bore hard line.

The –3 bleed line (26) can be anchored in a convenient location to access the bleed nipple.

The –4 straight fitting (on 14) is the connection where the car hydraulic system line can attach to the release mechanism and is the join where the system will be detached for transmission removal from the chassis.

## **RELEASE BEARING MECHANISM**

The Hydraulic release mechanism design is unique to Windrush Evolutions and while in principal the same as many other hydraulic release mechanisms, use these instructions to achieve the designed performance of your WEVO parts.

This WEVO 915 Hydraulic release mechanism is configured for use with the WEVO XT\_267 (29) and XT\_254 (34) series flywheels with a Tilton 67-002HG clutch cover and Tilton 38mm Ø Throw Out Bearing. The assembly is for use in an un-modified 1976 to 1986, 915 bellhousing with the flywheel mounted to a stock 6 bolt or 9 bolt crankshaft. Any deviation

from this complete package of components might mean that the hydraulic release mechanism would be dimensionally incorrect for proper functionality.

The two major components of the release mechanism (3 & 4) are hard anodized aluminum with an additional special low friction coating.

The “O”-rings (19 & 21) used as seals in the release mechanism are made from EPDM material that is compatible with all brake fluid types, use the same fluid as the brake system on your car, DO NOT use any other type of hydraulic fluid.

The EPDM “O”-rings are sensitive to solvents and cleaners. When handling the “O”-rings, do not let them come into contact with mineral based solvents or brake clean solutions. If necessary clean the “O”-rings with a gentle household cleaner like dish washing liquid.

If the “O”-rings are inadvertently splashed with solvent cleaner, the dimensions of the “O”-ring will swell as a reaction occurs. The hydraulic release mechanism can not function correctly unless the “O”-rings are correct size and in good overall condition. 2 spare “O”-rings are included in the kit to allow for immediate replacement if and when required.

The fluid ports on the release mechanism are marked with their correct purpose. Attach the -4 hose (14) to the “INLET” port and the -3 line (26) to the “BLEED” port, refer to the exploded diagram to see the correct arrangement of parts.

Install the “O”-rings into the correct location and lubricate the “O”-rings with brake fluid. Gently slide the Throw Out Bearing Carrier onto the Guide Tube and check that full travel is available. There will be some friction, but not so much that the parts can not be assembled or disassembled by hand. If you receive an assembled release mechanism, this has been assembled with a compatible grease. After some time the grease may have set and the unit will require more force to disassemble. Put a small amount of brake fluid into the inlet port and allow this to soak and soften the grease. If the system still requires more than hand pressure to disassemble, use car and wood or plastic drifts to knock the two pieces apart. Lubricate with brake fluid to reassemble.

Once satisfied that the release mechanism will work as intended, fasten the Guide Tube (3) to the transmission. Ensure that the new O.E. “O”-ring (18) is fitted to the guide tube. Apply a small amount of non-setting sealant (we recommend HYLOMAR) to seal the “O”-ring into the transmission. Install the guide tube and use the two M6 x 16 CSK screws (31) with Loctite 242 to retain the guide tube.

Fit the two hydraulic hoses as described above, but do not tighten them at this stage.

Slide the T.O.B. Carrier (4) onto the Guide Tube (3) as tested previously – being sure to register the anti-rotation guide bush (5) and push it all the way home on the guide tube. At this position you must arrange the hoses to exit the Window in the bellhousing – at about 11 o'clock, looking into the bellhousing.

The -3 bleed line (26) will be the closest to the bellhousing and rotated to almost touch the surface. The -4 delivery line (14) should be positioned (“clocked”) so that in this position the hose is near to the furthest edge of the window. This will allow the hose an unencumbered travel towards the engine as the clutch is disengaged.

Be aware that the hoses are moving back and forwards as the clutch is operated and therefore clearance between all the parts needs to be maintained over the full range that the T.O.B. Carrier can move on the guide tube.

Once you are satisfied that the position of the hoses is correct, tighten all the hydraulic fittings inside the bellhousing.

Some hydraulic fittings may vary in appearance to those in the photo's, the operation will be the same even if not identical in design.



VARIANCE 1972 – 1975 inc.

The 1972 through 1975, 915 transmissions did not use a removable T.O.B. guide tube. In these model years, the guide tube was integral with the casting of the final drive housing. It will not be possible to install the WEVO Superlite 915 Hydraulic kit into a 915 transmission from these two years.

### **CLUTCH PEDAL STOP - SET UP – TECHNICAL BACKGROUND**

The clutch stop needs to be set to a position that will allow the clutch to fully disengage – yet not travel so far that the release travel dimensions prescribed by Tilton are exceeded.

With a 19 mm Ø master cylinder the ratio of travel between the master cylinder and the slave piston in the Release Mechanism is 3.12:1. Tilton prescribe a release travel limit of 5.08mm.

Therefore  $3.12 \times 5.08 = 15.8$  mm

The 15.8 mm figure is the theoretical travel (at 100% efficiency) of the master cylinder to achieve the Tilton prescribed travel of the Throw Out Bearing to release the clutch and have small margin of additional travel.

In practice we have several other factors that will increase the 15.8 mm figure and by experience we can say that a figure of about 18 mm will be the final number.

Master cylinder “port timing” – the distance that the piston in the master cylinder will travel before the hydraulic pressure system closes from the fluid supply in the master cylinder reservoir. This can be anywhere between .5 and 2.0 mm of master cylinder piston travel. Only after the “port timing” is complete and the pressure system is closed, will the system begin to deliver fluid down the line to the slave cylinder.

Bearing “knock-back” – much like a brake pad, the Throw Out Bearing is “knocked” away from the fingers on the spring diaphragm by vibration and deflection. This “knock back” figure is the free travel prior to beginning to disengage the clutch, even if this is only 0.2 mm, the master cylinder travel is increased by 0.62 mm.

Line expansion, the full pressure in the clutch release system is about 400 psi, the bloating of the hydraulic lines and deflection of “O”-rings under this pressure amounts to another small increment of travel at the master cylinder that is not translated into Throw Out Bearing travel. Depending upon the style of hydraulic line being used (braided –v- hard line) this number can vary from about 2mm up to 4mm of additional master cylinder travel that will be required to achieve the Tilton number of 5.08 mm travel at the Throw Out Bearing after contact with the diaphragm spring fingers.

### **CLUTCH PEDAL STOP - SET UP – THE PRACTICAL EXERCISE**

Set the clutch pedal stop to 18 mm of master cylinder travel.

After the transmission is installed against the engine, bleed the hydraulic system in the same manner you would for any similar system.

Once satisfied that the system is free of entrapped air you can make the first test to adjust the pedal stop.

With the rear wheels in the air, engine OFF, select first gear in the transmission.

Have an assistant attempt to turn the rear wheel by hand (jam one wheel if you have an open diff or Torque Biasing diff), at this point the wheels are connected to the crankshaft and this will not be possible. As you slowly depress the clutch pedal, it might be possible to just turn the wheel as you reach the pedal stop.

If the rear wheels can not be turned freely by hand adjust the pedal stop a small amount at a time until this condition is achieved.

A new 2 plate clutch assembly has a total of 8 fresh surfaces that will be dragging on each other in 4 pairs. Any manufacturing texture on these surfaces will create a significant friction when new.

During the first few minutes of clutch use, these surfaces are burnished smooth and doing so, they slightly reduce the amount of pedal travel required to release the clutch.

Therefore, with new parts, the amount of effort required to turn the rear wheels by hand can be slightly higher, as this will quickly change.

With used plates, the point at which the clutch “breaks –free” and the rear wheels can be turned by hand, is very clearly defined. Set the clutch pedal stop just beyond that point – no more that .5 mm additional master cylinder travel. This will be about 2 mm at the pedal pad.

When the engine is running the torque – even at idle, makes it difficult to judge the “break-free” point of the clutch. We recommend doing the set up by hand, with the engine OFF – always.

Periodically check this procedure. A Hydraulic system is self-adjusting, fluid will be relieved back into the master cylinder reservoir as the clutch friction surfaces are wearing away, but the release height of the pedal should not vary.

## **CLUTCH SLIPPING – DRIVER INDUCED**

This style of competition clutch is sensitive to slipping – driver induced, the type you will create when loading a car on and off a trailer, crawling around the pits, etc.

Treat this clutch as a “torque transfer switch”, engaged – disengaged, and you will have no problems with excessive heat from slipping, warping the stack of thin discs that comprise the friction and clamping surfaces in the clutch assembly.

Low speeds can be maintained by repeated clutch engagement and then disengagement and coasting. Purchase a winch for your trailer – it’s cheaper than purchasing replacement clutch parts. Park your car so you do not pull away up hill if possible, especially if your transmission has a tall 1<sup>st</sup> gear ratio.

Having the clutch pedal stop correctly adjusted will greatly assist with your efforts to fully disengage the clutch and avoid slipping. – it will allow you depress the clutch fully and firmly to the stop.

Once the pedal stop is correctly set, the clutch disengagement position will not alter unless air is introduced to the hydraulic system, or the clutch plates are warped, a change in clutch feel is an indicator of one or both of these conditions.

## **MAINTENANCE**

The WEVO Superlite 915 Hydraulic kit and the Tilton Engineering products that are used in the kit are designed for Motorsports competition.

The Tilton parts should be serviced in the manner disclosed in the instructions from Tilton Engineering.

The Windrush parts should be routinely inspected and kept clean to maintain optimum performance. Parts are protected against corrosion where possible, however wet weather use should be following by drying and light spraying of a water displacing fluid such as WD-40 on the exposed parts.

Adjustments should be maintained per these instructions.

The parts list should be used to locate and re-order any parts used in this kit.

## **CONTACT NUMBERS**

Windrush Evolutions Inc - California                      650 595 5772

Tilton Engineering - California                              805 688 2353

## **CLUTCH STOP – once again !**

The clutch stop configuration is extremely critical for the longevity of your clutch. If the clutch stop does not effectively limit travel of the release mechanism, excess deflection of the spring diaphragm will be possible. This can cause the clamping pressure of the clutch to be reduced and clutch slip will quickly lead to overheating and warping of the clutch component.....