



## RennShift Shifter Installation

### Applications:

- 911 '65-'86 with 901/911/915 Gearbox
- All 912
- 914/4 '70-'72 with Tail-Shift
- 914/6 with factory gearbox/linkage
- 914 with 915 conversion (all brands)

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### Remove Existing Parts

If reusing your existing shift knob, remove it first. The factory shift knob is retained by friction. Remove it by placing a 15mm open-end wrench under the knob. Hit the wrench as illustrated so it pushes the knob up and off the shifter shaft. Don't let it fly up and hit you in the forehead! Aftermarket knobs are often retained by one or more socket head setscrews which are often covered by a threaded bezel.

Place the shifter in neutral. Remove the three shifter hold-down bolts and the two smaller bolts that secure the shifter to the shift rod bracket (depending on the year these can be socket or hex-head bolts). The shifter will now be free to lift off the floor.



### Evaluation

Ensure that all of your shifter bushings are in good shape. Any slop in the linkage will reduce the precision of your new shifter.

The RennShift comes with the ball cup bushing [30] pre-installed.

Under the shifter is a shift rod "ring" bushing [31]. This bushing is hourglass shaped to prevent binding as the rod moves in and out and the angle between the shifter and transmission changes. Attempts to make custom bushings that are longer and tighter typically result in binding and poor shifting. This bushing has a substantial impact on the side-to-side play of the shifter and any looseness is magnified by the length of the shifter stick. [JWest offers an updated aluminum bracket \[28\] to hold the factory bushing, which grips tighter while still allowing bind-free out-of-plane motion.](#)

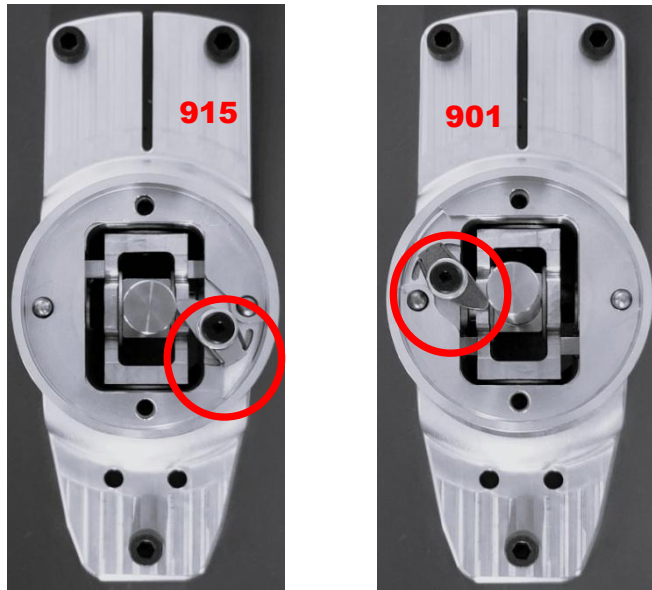
Clean out the old bushing remnants and grease from the shift rod cup [29]. Make sure the small air hole low on the side of this cup is clear, as it is often plugged with dried grease. Check the shift rod cone screw [32] (on the left side of the socket) to be sure it is tight. The ball cup can also be replaced with the [Aluminum Upgraded JWest Cup, which tightens shifting in all directions.](#) The weld at the front of the shift rod tube can fail, so this is a good time to check that the cup is solid relative to the rod when the cone screw is tight.

The shift coupler resides at the rear of the linkage where the shift rod attaches to the transmission (under the cover plate in front of the rear seats). The factory 911 coupler is an aluminum cage with oblong bushings. At a minimum, we recommend replacing these bushings with [JWest "round hole" bushings for no slop.](#) [The ultimate upgrade is a precision u-joint from JWest](#) that offers free movement with no free-play. Metal bushings or bearings with a single pivot axis coupler are not recommended. There is ~4° angle between the gearbox shift rod and the tunnel shift rod. When the shift rod rotates, the pivot is angled to the side and drives the front of the shift rod left or right. Binding and wear of the gearbox shift rod and the shift rod bushing result, along with stiff shifting. The oblong holes in the factory bushings allowed for additional freedom of motion but with compromised shift feel due to the play. Our replacement bushings have "give" to compensate for the misalignment while our u-joint coupler is the perfected solution (with the downside being transmitted noise and vibration).

Also in the area of the coupler is a clamp that facilitates the alignment between the shifter and the transmission. Factory clamps are usually distorted and difficult to release, and require 2 wrenches to tighten the nut and bolt. [JWest offers a billet clamp](#) with a single clamping bolt to make adjustment less of a chore.

## Install RennShift

Bolt the shifter base onto the housing. The housing can go two ways - position the reverse lockout in the same quadrant as reverse gear when viewed from the top (right rear for the 915, left front for the 901).



Grease the shift rod cup [29] (silicone grease is best as most petroleum products will attack the plastic over time) and lower the new shifter into position, inserting the ball cup bushing [30] into the cup [29]. Insert the two new M6 socket head capscrews [23] with flat washers [24] through the shifter base [1] and loosely thread into the rod bracket holes [28]. Install the three new M8 capscrews [21] with flat washers [22] to attach the shifter to the floor. Tighten all the fasteners.

Slide the upper stick onto the lower shaft [15] and rotate to adjust the position where the knob will sit. Straight back is default, but you can pivot the stick to move the knob left or right to your preference. Lightly tighten for now. The setscrews have serrated tips and will bite into the stick for retention once you tighten after determining final position. After adjustment (below), run through the gears and get a feel for the stick position, then rotate as desired and tighten the screws. After a few drives, check that the screws are still tight.

## Adjust Shift Pattern

To adjust, engage 2nd gear (901) or 3rd gear (915). If you replaced the linkage and need to set the position at the coupler, loosen the coupler clamp, center the rotation of the coupler (make the set screw at the back of the coupler point straight up) and push the coupler rearward into the gearbox. With the shift coupler clamp loose, the shifter will self-center, automatically aligning itself with the engaged gear. Move the shifter moved forward to approximate the in-gear position, tighten the coupler clamp, and shift back to neutral. Fore-aft adjustment is correct when the lower shifter lever is vertical when viewed from the side. To avoid guesswork, use the two threaded stud stop studs [25] in the tuning kit as measuring guides. Shift forward into gear and hold forward pressure on the knob. Screw a stop stud [25] (without the nut) into the rear hole at the base of the shifter until it lightly contacts the internal shifter stick. Now shift rearward into gear and hold while installing the front stop stud until it lightly contacts the internal shift stick. Measure the amount each stop stud is protruding from the housing. The goal is to make them equal. If the front stud has more sticking out, loosen the coupler clamp and push the shift rod further onto the coupler (unscrew the stop stud to allow the shifter to move further). Pull the shift rod further out on the coupler if the front stud is shorter. Be sure to unscrew the stop studs enough so the gears can be fully engaged before checking the adjustment again.

Lateral adjustment is made in 2nd gear (901) or 3rd gear (915). **While the gear is fully engaged**, move the shift knob left and right against the spring tension. There is minimal play between the left and right shifter springs, however there is clearance in the shifter forks inside the gearbox. The goal is to center the shifter in this clearance. The shift knob should move the same amount (a few mm) left and right. Most often there will be no movement on one side (you are up against the side of the fork) and too much in the other direction. While maintaining the fore-aft position of the coupler, loosen the coupler clamp and slightly rotate the coupler to center the rotation. This is a bit tricky to get perfect and you might want a helper to hold the shift knob. Our one-handed coupler clamp makes this step easier.

Adjusting the reverse lockout: This is not needed as the above adjustment sets the shifter in position for the lockout.

### OPTION: Install Over-Travel Stops

Leave the stops (stop studs [25] with locknuts [26] at the bottom of the shifter housing cylinder) out of the shifter until after the adjustment is fully complete. **The stops are recommended for RACING ONLY. Improper adjustment could lead to gears not fully engaging and synchronizer damage. Only install if you understand how and why these function.** After screwing in the setscrews without the locknut, hold the gearshift as far as it will go in a forward gear and turn the rear socket head screw until it just touches the shift stick. Back the screw away to leave a slight clearance and tighten the lock nut. Repeat in a rear gear position using the front setscrew. These are OVER-travel stops -- be sure they do not interfere with full engagement of the gears. Clearance must be left to compensate for shifting of the engine/transmission under acceleration and braking. It is recommended that you drive the car for a while to be sure the shifter is adjusted properly before adding the stops to the shifter.

### OPTION: Adjust Spring Gate Load



The side gate springs [11] are delivered in a medium configuration. The table below shows the load for each spring combination. Up to two of the included thick washers [12] may be installed under each spring to increase the stiffness. Additional spacers beyond this can lead to spring coil bind and shifter damage. The left spring controls right stick motion and vice-versa. The springs are independent, so any combination of stiffness (including complete spring removal) may be used with no effect on the other spring.

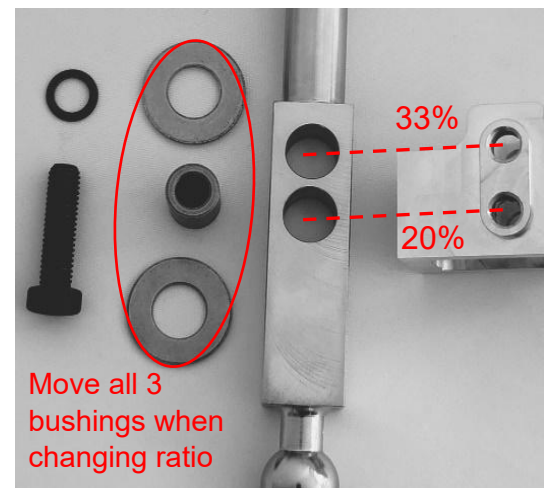
| Spring                 | Blue | Blue | Blue | Gold<br>As-delivered | Gold | Gold |
|------------------------|------|------|------|----------------------|------|------|
| Shims                  | 0    | 1    | 2    | 0                    | 1    | 2    |
| Short Stick Load (lbs) | 2.5  | 3    | 4    | 4.5                  | 7    | 9    |
| Long Stick Load (lbs)  | 2    | 2.5  | 3    | 3.5                  | 5    | 7    |

If installing the spacers to stiffen the springs, place them under the spring, but do not remove the button [3] from the bottom of the spring hole. If they get removed, when replacing make sure the button is positioned with the extended dome downward so that the flat side faces up against the shims and/or spring. If using no spring so that the shifter flops between gates like the factory shifter, the button must be removed from that spring hole.

### OPTION: Adjust Shifter Throw

The RennShift is delivered with 20% throw reduction (exact percent is dependent on stick length and knob height). Additional reduction can be achieved in the fore-aft plane (side-to-side remains 20% reduction from stock). Note that heavier shifting and reduced resolution will result, which is typically detrimental to Porsche servo synchronizer operation.

Remove the shifter from the car and remove the upper stick. Remove the lower shaft pivot bolt [5] and washer [6] using an allen wrench through the access window in the shifter housing. Extract the lower shaft [15] through the bottom of the shift housing, being sure to capture the two thrust washers [8] and the pivot bushing [7]. Replace the bushings in the desired hole, lower for 20% and upper for 33%. Reinsert the lower shaft, **align both holes with the pivot**, and install the pivot bolt in the chosen position. **Important: The shaft must remain at the same height in relation to the housing/linkage. The pivot bushings and bolt move, but both holes in the shaft and the carrier must remained aligned vertically or the shifter will not function.**



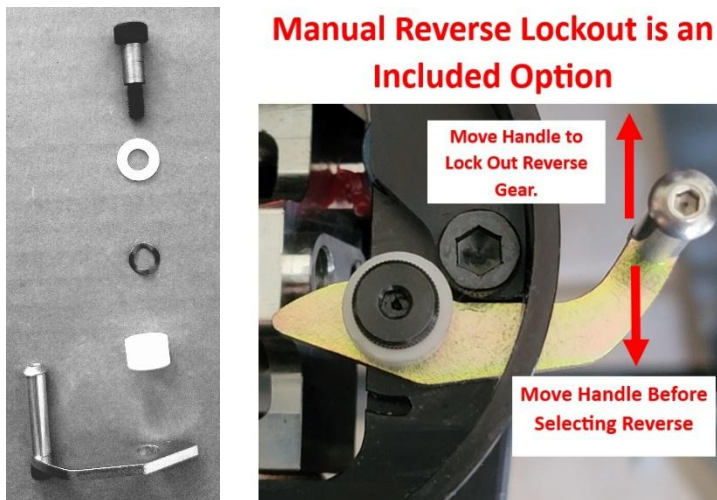
## OPTION: Reverse Lockout

The reverse lockout can be configured for automatic or manual operation. Note that the automatic version may not operate reliably in the 33% throw setting.

**Automatic:** Install the (top to bottom) flat steel washer [17], spring [27], nylon washer [18], pawl [19], and second nylon washer [18]. Grease the tip of the pawl where it contacts the shift stick. **The lockout works when coming from the opposing gear in the gate (1st with 901, 5th with 915).** To enter reverse, first select neutral in the center plane prior to shifting to reverse.



**Manual lockout installation:** Install the (top to bottom) thin nylon washer [18], spring washer [35], thick nylon spacer [34], then lockout pawl [33]. Grease the tip of the pawl where it contacts the shifter stick. The manual lockout only works with no boot or the small RS boot. The full 915 boot or leather boot will cover the lockout lever.

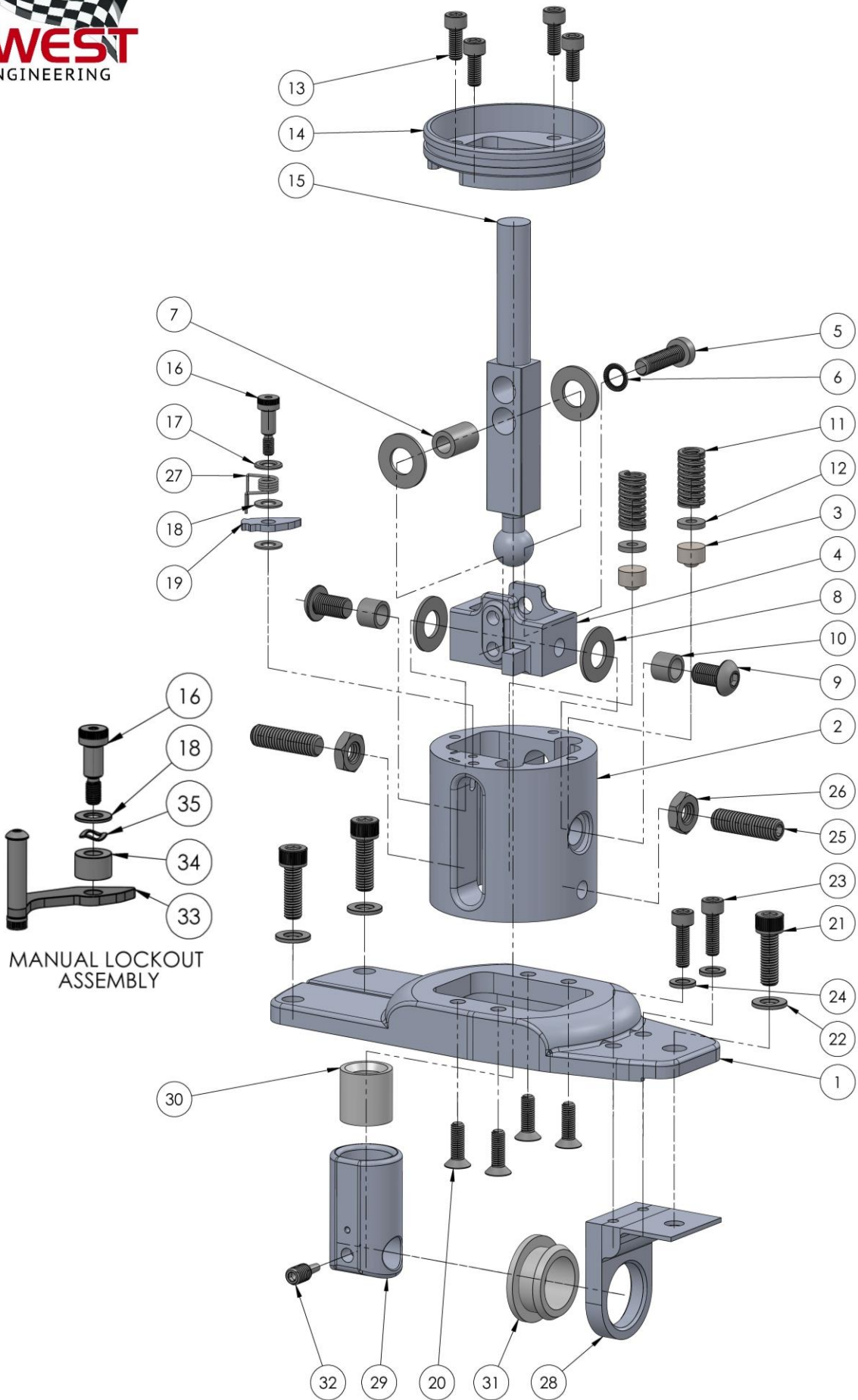


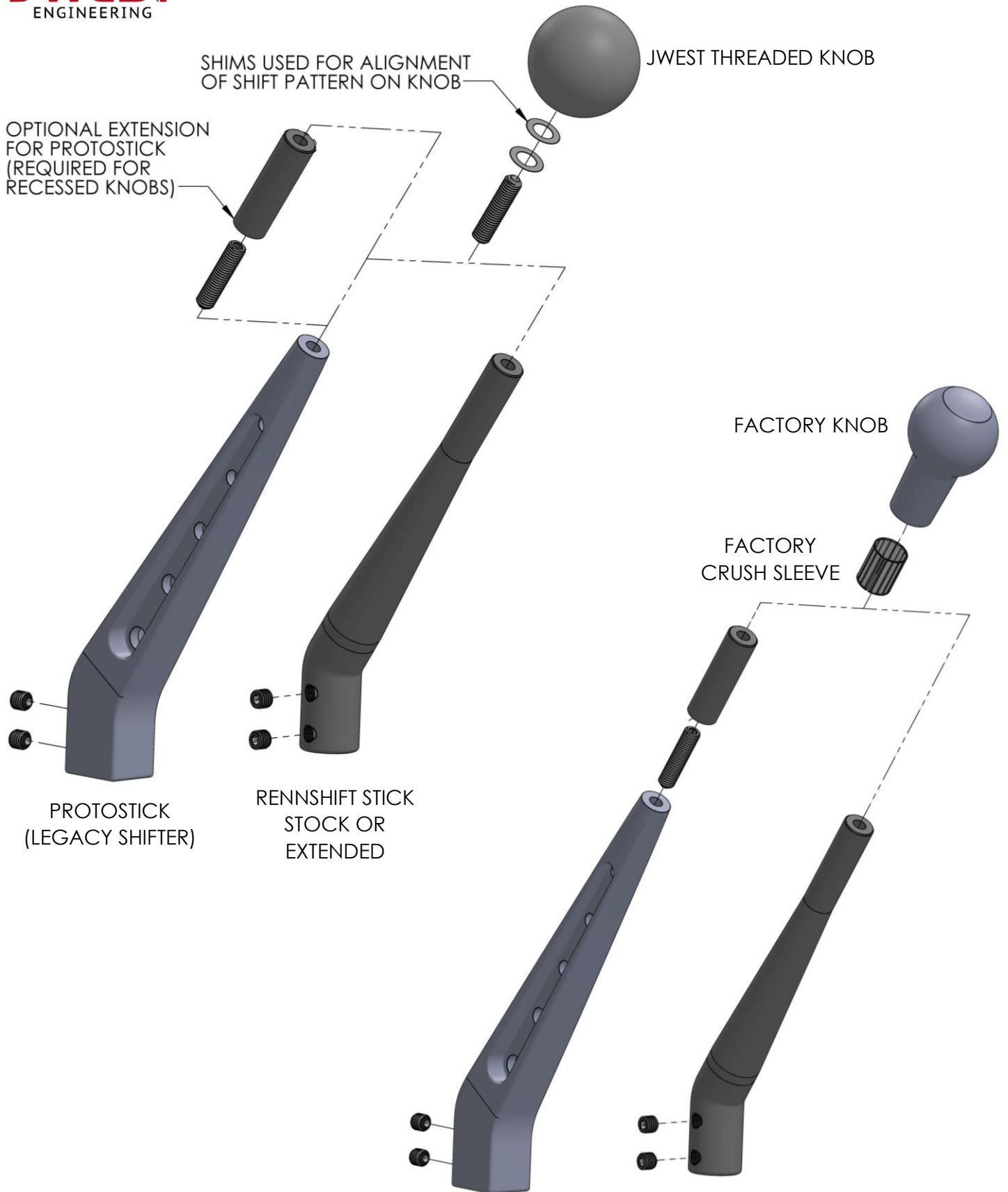
## Shifter Boot

After all adjustments are complete, the shift boot can be installed. It fits into the groove on the outside of the top plate and can be secured with one of the zip ties if desired (a spare tie is included). A factory 915 shifter boot can be used over the entire shifter body if a more original look is desired.

## Shift Knob

Install the shift knob. The factory crush sleeve can be used, or a threaded knob can be screwed into the internal M8-1.25 threads on the stick. See diagram.







## RennShift RSOR Parts List

| ITEM NO. | DESCRIPTION            | PART NO.       | QTY.   |
|----------|------------------------|----------------|--------|
| 1        | BASE PLATE             |                | 1      |
| 2        | SHIFTER HOUSING        |                | 1      |
| 3        | SPRING BUTTON          |                | 2      |
| 4        | LOWER SHAFT CARRIER    |                | 1      |
| 5        | LOWER SHAFT PIVOT BOLT |                | 1      |
| 6        | SCHNOOR WASHER         |                | 1      |
| 7        | PIVOT BUSHING          |                | 1      |
| 8        | THRUST WASHER          |                | 4      |
| 9        | CARRIER PIVOT BOLT     |                | 2      |
| 10       | HOUSING BUSHING        |                | 2      |
| 11       | CARRIER SPRING         |                | 2      |
| 12       | SPRING SHIM            |                | VARIES |
| 13       | BOOT RETAINER BOLT     |                | 4      |
| 14       | BOOT RETAINER          |                | 1      |
| 15       | LOWER SHAFT            |                | 1      |
| 16       | LOCKOUT BOLT           |                | 1      |
| 17       | LOCKOUT BOLT WASHER    |                | 1      |
| 18       | LOCKOUT PLASTIC WASHER |                | 2      |
| 19       | AUTO LOCKOUT PAWL      |                | 1      |
| 20       | BASE BOLT              |                | 4      |
| 21       | MOUNTING BOLT          |                | 3      |
| 22       | MOUNTING WASHER        |                | 3      |
| 23       | BRACKET BOLT           |                | 2      |
| 24       | BRACKET WASHER         |                | 2      |
| 25       | STOP STUD              |                | 2      |
| 26       | STOP NUT               |                | 2      |
| 27       | LOCKOUT SPRING         |                | 1      |
| 28       | SHIFT ROD BRACKET*     |                | 1      |
| 29       | SHIFT ROD CUP*         |                | 1      |
| 30       | BALL CUP BUSHING       | 911.424.139.01 | 1      |
| 31       | SHIFT ROD BUSHING**    | 914.424.224.00 | 1      |
| 32       | SHIFT ROD CONE SCREW** | 901.424.229.00 | 1      |
| 33       | MANUAL LOCKOUT PAWL    |                | 1      |
| 34       | LOCKOUT SPACER         |                | 1      |
| 35       | LOCKOUT WAVE SPRING    |                | 1      |

\*NOT INCLUDED WITH RENNSHIFT- USE JWEST UPGRADED PARTS OR REUSE FACTORY COMPONENTS

\*\*NOT INCLUDED WITH RENNSHIFT- REPLACE WITH NEW FACTORY PARTS AS NEEDED