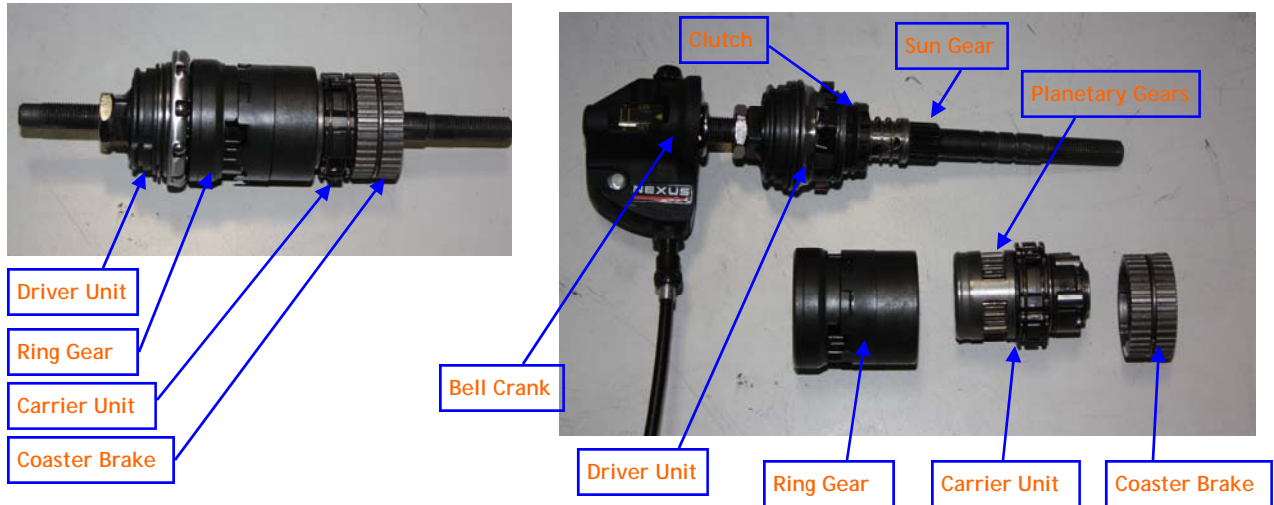


## *Basic Structure of a 3 Speed Hub*



## *Route of Power Transmission for 3 Speed Hubs*

### 1st Gear (0.733)



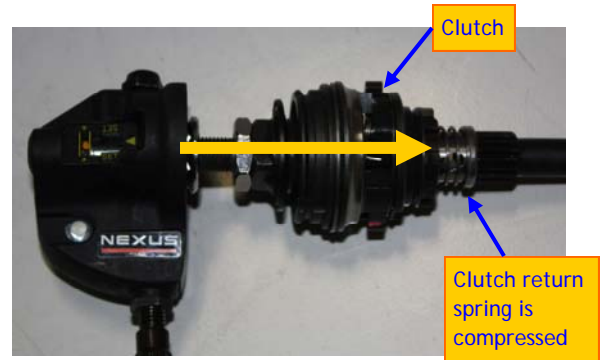
- Cog turns the driver unit. The pawls on the driver unit turn the ring gear.
- The ring gear turns the carrier unit from the outside.
- Planetary gears on the carrier unit reduces the gear ratio to 0.733 so the hub turns slower than the cog.
- Pawls on the carrier unit turn the hub shell.

## *Route of Power Transmission for 3 Speed Hubs*

### 2nd Gear (1.0)



*1st Gear*



*2nd Gear*



- As the hub is shifted from 1st to 2nd gear, the push rod pushes the clutch inward away from the driver.
- The only function of the clutch in 2nd gear is to push the pawls on the ring gear into the active position.
- Now the ring gear pawls are driving the hub shell instead of the carrier pawls.
- Since the cog and the ring gear turn at the same speed, the hub turns at a 1 to 1 ratio.
- The carrier unit is still turned at the same speed as in 1st gear but since the ring gear is rotating the hub shell faster than the carrier unit is moving the pawls on the carrier unit ratchet and do not function. This is why there is a ratcheting noise in 2nd gear.

## *Route of Power Transmission for 3 Speed Hubs*

### 3rd Gear (1.364)



*2nd Gear*



*3rd Gear*



- As the hub is shifted from 2nd to 3rd gear, the push rod pushes the clutch all the way forward which engages the carrier unit from the inside.
- The carrier unit is turning in the opposite direction as it was in 1st gear, it now increases the gear ratio to 1.364 so the hub turns faster than the cog.
- The planetary gears on the carrier unit turns the ring gear.
- The pawls on the ring gear turn the hub shell just like in 2nd gear.
- The pawls on the carrier unit are moving much slower than the hub shell now so the ratcheting noise will speed up.
- The ring gear is moving faster than the driver unit so the pawls between those two pieces are now ratcheting as well.