

## Forklift Starters and Alternators

Forklift Starters and Alternators - Today's starter motor is typically a permanent-magnet composition or a series-parallel wound direct current electrical motor with a starter solenoid mounted on it. Once current from the starting battery is applied to the solenoid, basically through a key-operated switch, the solenoid engages a lever that pushes out the drive pinion that is situated on the driveshaft and meshes the pinion utilizing the starter ring gear that is found on the flywheel of the engine.

The solenoid closes the high-current contacts for the starter motor, which starts to turn. After the engine starts, the key operated switch is opened and a spring inside the solenoid assembly pulls the pinion gear away from the ring gear. This action causes the starter motor to stop. The starter's pinion is clutched to its driveshaft by means of an overrunning clutch. This permits the pinion to transmit drive in just a single direction. Drive is transmitted in this manner through the pinion to the flywheel ring gear. The pinion remains engaged, for example as the operator did not release the key when the engine starts or if the solenoid remains engaged since there is a short. This actually causes the pinion to spin independently of its driveshaft.

This aforesaid action prevents the engine from driving the starter. This is an important step in view of the fact that this type of back drive would allow the starter to spin so fast that it will fly apart. Unless modifications were done, the sprag clutch arrangement would prevent using the starter as a generator if it was used in the hybrid scheme mentioned prior. Usually a standard starter motor is meant for intermittent use that will preclude it being used as a generator.

Hence, the electrical components are meant to work for approximately less than thirty seconds so as to prevent overheating. The overheating results from very slow dissipation of heat because of ohmic losses. The electrical components are designed to save weight and cost. This is the reason the majority of owner's guidebooks intended for automobiles suggest the operator to stop for at least ten seconds right after each and every 10 or 15 seconds of cranking the engine, when trying to start an engine that does not turn over at once.

In the early 1960s, this overrunning-clutch pinion arrangement was phased onto the market. Prior to that time, a Bendix drive was utilized. The Bendix system functions by placing the starter drive pinion on a helically cut driveshaft. Once the starter motor starts turning, the inertia of the drive pinion assembly enables it to ride forward on the helix, thus engaging with the ring gear. As soon as the engine starts, the backdrive caused from the ring gear enables the pinion to exceed the rotating speed of the starter. At this point, the drive pinion is forced back down the helical shaft and therefore out of mesh with the ring gear.

The development of Bendix drive was made in the 1930's with the overrunning-clutch design called the Bendix Folo-Thru drive, developed and introduced during the 1960s. The Folo-Thru drive consists of a latching mechanism together with a set of flyweights in the body of the drive unit. This was much better in view of the fact that the standard Bendix drive utilized to be able to disengage from the ring once the engine fired, even if it did not stay running.

When the starter motor is engaged and begins turning, the drive unit is forced forward on the helical shaft by inertia. It then becomes latched into the engaged position. When the drive unit is spun at a speed higher than what is achieved by the starter motor itself, for example it is backdriven by the running engine, and after that the flyweights pull outward in a radial manner. This releases the latch and permits the overdriven drive unit to become spun out of engagement, thus unwanted starter disengagement could be avoided previous to a successful engine start.