

## Starters for Forklifts

Forklift Starter - The starter motor these days is typically either a series-parallel wound direct current electric motor that includes a starter solenoid, which is similar to a relay mounted on it, or it can be a permanent-magnet composition. Once current from the starting battery is applied to the solenoid, basically via a key-operated switch, the solenoid engages a lever which pushes out the drive pinion which is situated on the driveshaft and meshes the pinion utilizing the starter ring gear which is found on the engine flywheel.

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 in 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 an overrunning clutch. This allows the pinion to transmit drive in only one direction. Drive is transmitted in this method via the pinion to the flywheel ring gear. The pinion remains engaged, like for instance since the driver did not release the key as soon as the engine starts or if there is a short and the solenoid remains engaged. This actually causes the pinion to spin separately of its driveshaft.

This aforesaid action stops the engine from driving the starter. This is an important step in view of the fact that this kind of back drive would allow the starter to spin really fast that it will fly apart. Unless modifications were done, the sprag clutch arrangement would preclude utilizing the starter as a generator if it was used in the hybrid scheme discussed prior. Usually an average starter motor is meant for intermittent use which will preclude it being used as a generator.

Thus, the electrical components are intended to function for about under thirty seconds in order to prevent overheating. The overheating results from very slow dissipation of heat due to ohmic losses. The electrical parts are designed to save cost and weight. This is the reason the majority of owner's handbooks for automobiles recommend the driver to stop for a minimum of 10 seconds after each and every ten or fifteen seconds of cranking the engine, whenever trying to start an engine which does not turn over right away.

In the early 1960s, this overrunning-clutch pinion arrangement was phased onto the market. Before that time, a Bendix drive was utilized. The Bendix system works by placing the starter drive pinion on a helically cut driveshaft. When the starter motor begins turning, the inertia of the drive pinion assembly enables it to ride forward on the helix, hence engaging with the ring gear. As soon as the engine starts, the backdrive caused from the ring gear enables the pinion to surpass the rotating speed of the starter. At this instant, the drive pinion is forced back down the helical shaft and hence 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, made and launched during the 1960s. The Folo-Thru drive has a latching mechanism together with a set of flyweights in the body of the drive unit. This was a lot better since the standard Bendix drive used to disengage from the ring when the engine fired, even though it did not stay running.

The drive unit is forced forward by inertia on the helical shaft when the starter motor is engaged and starts turning. Next the starter motor becomes latched into the engaged position. Once the drive unit is spun at a speed higher than what is achieved by the starter motor itself, like for instance 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 prior to a successful engine start.