

## Starters for Forklifts

Forklift Starters - The starter motor nowadays is typically either a series-parallel wound direct current electric motor that consists of a starter solenoid, that is similar to a relay mounted on it, or it could be a permanent-magnet composition. When current from the starting battery is applied to the solenoid, mainly via a key-operated switch, the solenoid engages a lever that pushes out the drive pinion that is located on the driveshaft and meshes the pinion using the starter ring gear that is seen on the flywheel of the engine.

The solenoid closes the high-current contacts for the starter motor, that starts to turn. Once the engine starts, the key operated switch is opened and a spring within 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, like for instance since the driver did not release the key as soon as the engine starts or if the solenoid remains engaged in view of the fact that there is a short. This actually causes the pinion to spin separately of its driveshaft.

The actions mentioned above would stop the engine from driving the starter. This vital step prevents the starter from spinning so fast that it will fly apart. Unless modifications were done, the sprag clutch arrangement would stop the use of the starter as a generator if it was used in the hybrid scheme mentioned earlier. Normally an average starter motor is designed for intermittent utilization that would prevent it being used as a generator.

Thus, the electrical parts are designed to be able to work for just about less than thirty seconds to be able to avoid overheating. The overheating results from very slow dissipation of heat due to ohmic losses. The electrical components are designed to save weight and cost. This is truly the reason nearly all owner's manuals used for automobiles suggest the operator to pause for at least 10 seconds right after each ten or fifteen seconds of cranking the engine, when trying to start an engine that does not turn over instantly.

The overrunning-clutch pinion was launched onto the market during the early part of the 1960's. Previous to the 1960's, a Bendix drive was utilized. This particular drive system operates on a helically cut driveshaft that has a starter drive pinion placed on it. As soon as the starter motor starts spinning, the inertia of the drive pinion assembly allows it to ride forward on the helix, therefore engaging with the ring gear. When the engine starts, the backdrive caused from the ring gear enables the pinion to exceed the rotating speed of the starter. At this moment, the drive pinion is forced back down the helical shaft and thus out of mesh with the ring gear.

During the 1930s, an intermediate development between the Bendix drive was made. The overrunning-clutch design that was made and introduced in the 1960s was the Bendix Folo-Thru drive. 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 as the average Bendix drive used to disengage from the ring once the engine fired, even though it did not stay running.

As soon as the starter motor is engaged and starts turning, the drive unit is forced forward on the helical shaft by inertia. It then becomes latched into the engaged position. As soon as 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 next the flyweights pull outward in a radial manner. This releases the latch and permits the overdriven drive unit to become spun out of engagement, therefore unwanted starter disengagement can be avoided before a successful engine start.