

## Starters for Forklifts

Forklift Starters - The starter motor nowadays 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 could 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 located on the driveshaft and meshes the pinion with 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 begins 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 particular 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 manner via the pinion to the flywheel ring gear. The pinion remains engaged, like for instance in view of the fact that the operator fails to 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 causes the pinion to spin independently of its driveshaft.

This aforesaid action prevents the engine from driving the starter. This is an essential step since this particular type of back drive would enable the starter to spin very fast that it could fly apart. Unless modifications were made, the sprag clutch arrangement will prevent utilizing the starter as a generator if it was employed in the hybrid scheme mentioned earlier. Typically an average starter motor is designed for intermittent use which would prevent it being used as a generator.

The electrical parts are made to be able to function for roughly 30 seconds so as to avoid overheating. Overheating is caused by a slow dissipation of heat is because of ohmic losses. The electrical parts are meant to save cost and weight. This is the reason most owner's guidebooks meant for automobiles recommend the driver to stop for at least 10 seconds after each ten or fifteen seconds of cranking the engine, whenever trying to start an engine that does not turn over right away.

During the early part of the 1960s, this overrunning-clutch pinion arrangement was phased onto the market. Previous to that time, a Bendix drive was used. The Bendix system functions by placing the starter drive pinion on a helically cut driveshaft. When the starter motor starts spinning, the inertia of the drive pinion assembly enables it to ride forward on the helix, therefore engaging with the ring gear. Once the engine starts, the backdrive caused from the ring gear allows the pinion to exceed the rotating speed of the starter. At this moment, 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 developed in the 1930's with the overrunning-clutch design known as the Bendix Folo-Thru drive, developed and introduced in the 1960s. The Folo-Thru drive consists of a latching mechanism along with a set of flyweights inside the body of the drive unit. This was better since the standard Bendix drive utilized so as to disengage from the ring when the engine fired, even if it did not stay functioning.

When 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. Once the drive unit is spun at a speed higher than what is achieved by the starter motor itself, like for example it is backdriven by the running engine, and afterward the flyweights pull outward in a radial manner. This releases the latch and permits the overdriven drive unit to become spun out of engagement, hence unwanted starter disengagement could be prevented prior to a successful engine start.