

Forklift Starters

The starter motor nowadays is normally either a series-parallel wound direct current electric motor which consists of a starter solenoid, that 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, mainly via a key-operated switch, the solenoid engages a lever which pushes out the drive pinion that is located on the driveshaft and meshes the pinion with the starter ring gear that is found on the engine flywheel.

As soon as the starter motor starts to turn, the solenoid closes the high-current contacts. Once the engine has started, the solenoid has a key operated switch which opens the spring assembly in order to pull 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 permits 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 example for the reason that the operator did not release the key once the engine starts or if there is a short and the solenoid remains engaged. This causes the pinion to spin separately of its driveshaft.

This above mentioned action prevents the engine from driving the starter. This is actually an essential step for the reason that this particular kind of back drive will enable the starter to spin so fast that it can fly apart. Unless adjustments were done, the sprag clutch arrangement would preclude the use of the starter as a generator if it was used in the hybrid scheme discussed prior. Usually an average starter motor is designed for intermittent use that would preclude it being utilized as a generator.

The electrical parts are made to be able to operate for more or less 30 seconds to avoid overheating. Overheating is caused by a slow dissipation of heat is because of ohmic losses. The electrical parts are intended to save weight and cost. This is really the reason nearly all owner's guidebooks used for vehicles suggest the driver to stop for a minimum of ten seconds right after each 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. Previous to that time, a Bendix drive was utilized. The Bendix system works by placing the starter drive pinion on a helically cut driveshaft. As soon as the starter motor begins spinning, the inertia of the drive pinion assembly enables it to ride forward on the helix, hence engaging with the ring gear. When the engine starts, the backdrive caused from the ring gear allows the pinion to go beyond the rotating speed of the starter. At this point, the drive pinion is forced back down the helical shaft and thus out of mesh with the ring gear.

In the 1930s, an intermediate development between the Bendix drive was developed. The overrunning-clutch design which was developed and introduced during the 1960s was the Bendix Folo-Thru drive. The Folo-Thru drive consists of a latching mechanism along with a set of flyweights within the body of the drive unit. This was a lot better since the typical Bendix drive used to disengage from the ring once the engine fired, even if it did not stay running.

Once 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. Once 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 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, therefore unwanted starter disengagement can be prevented prior to a successful engine start.