

Forklift Starters and Alternators

Forklift Starters and Alternators - A starter motor today is normally a permanent-magnet composition or a series-parallel wound direct current electrical motor with a starter solenoid installed on it. When 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 positioned on the driveshaft and meshes the pinion with the starter ring gear that is seen on the engine flywheel.

The solenoid closes the high-current contacts for the starter motor, which starts to turn. When 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 permits the pinion to transmit drive in only one direction. Drive is transmitted in this particular manner through the pinion to the flywheel ring gear. The pinion continues to be engaged, for instance in view of the fact that the driver did not release the key once the engine starts or if there is a short and the solenoid remains engaged. This actually causes the pinion to spin independently of its driveshaft.

The actions discussed above will prevent the engine from driving the starter. This vital step stops the starter from spinning so fast that it can fly apart. Unless adjustments were done, the sprag clutch arrangement would preclude making use of the starter as a generator if it was used in the hybrid scheme discussed prior. Usually a standard starter motor is designed for intermittent use that would prevent it being used as a generator.

Therefore, the electrical parts are intended to be able to work for approximately under 30 seconds to avoid overheating. The overheating results from very slow dissipation of heat due to ohmic losses. The electrical parts are meant to save cost and weight. This is the reason nearly all owner's instruction manuals utilized for vehicles suggest the operator to pause for at least 10 seconds after each 10 or 15 seconds of cranking the engine, if trying to start an engine that does not turn over at once.

In the early part of the 1960s, this overrunning-clutch pinion arrangement was phased onto the market. Before that time, a Bendix drive was used. The Bendix system operates by placing the starter drive pinion on a helically cut driveshaft. Once 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. As soon as 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 that was made and introduced during the 1960s was the Bendix Folo-Thru drive. The Folo-Thru drive has a latching mechanism along with a set of flyweights in the body of the drive unit. This was better in view of the fact that the standard Bendix drive utilized so as to disengage from the ring once the engine fired, even if it did not stay running.

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. When the drive unit is spun at a speed higher than what is achieved by the starter motor itself, 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 allows the overdriven drive unit to become spun out of engagement, hence unwanted starter disengagement could be prevented previous to a successful engine start.