



6G Rectifiers Simplified

Choosing the correct rectifier has never been as important as it is with the Ford 6G series alternators. This guide will attempt to explain the characteristics that separate the different part numbers.

Ford has used no less than 12 different rectifiers on 6G's through 2006. Four of them fit large frame, 135 amp units, and eight of them fit small frame 105/110 amp units.

Differences include stator configuration (delta or wye), clock-position of the thru-bolts in relation to the B+ post, diode rating and diode type. By consolidating some numbers, the aftermarket has narrowed the choices to three for the large-frame and six for the small-frame.

Large-Frame Rectifiers - 149mm diameter body							
Clock	Diodes	Config	Notes	Ref #			Used in
				Transpo	Regitar	Rand	
R	8	Wye		FR602	RF12	32.602	7795, 8253, 8315
R	8	Wye	2mm lower profile	FR604			8478
R	8	Wye	2mm lower profile Avalanche Diodes	FR605			8408

Table 1 – Large-Frame Rectifiers as of 04/2008

Small-Frame Rectifiers - 136mm diameter body							
Clock	Diodes	Config	Notes	Ref #			Used in
				Transpo	Regitar	Rand	
R	8	Wye		FR600	RF10	32.600	7788,7796,7797,7798,7799,8252 8261, 8262
R	8	Wye	Avalanche Diodes	FR603	RF10A	32.602	8316, 8317
L	8	Wye		FR601	RF11	32.601	8250, 8260
R	6	Delta		FR606	RF13	32.606	
R	6	Delta	3.3mf HD Capacitor	FR607	RF13	32.607	8254, 8256, 8259, 8263, 8266, 8268
L	6	Delta		FR608	RF15	32.608	8260, 8264

Table 2 – Small-Frame Rectifiers as of 04/2008

Up through the early 1990's, almost every stator was wound with three phases in either a delta or wye configuration, all visually identifiable. Then Ford brought out the 3G series in 1991, with stators which were wound with open phases. The connections that make them wye-configuration were inside the lead frame of the rectifier and were not visible. **All** 3G and 4G rectifiers are wye-configured, at least through 2006.

All large-frame 6G rectifiers are wye-configured. However, Ford used **both** wye- and delta-configured rectifiers on the small-frame. **All** delta-configured rectifiers have six diodes. **Most** wye-configured rectifiers have eight diodes, but be aware that Ford used a wye-configured rectifier with only six diodes on a few applications. If you replace this rectifier, be sure to replace it with a wye-configured rectifier.

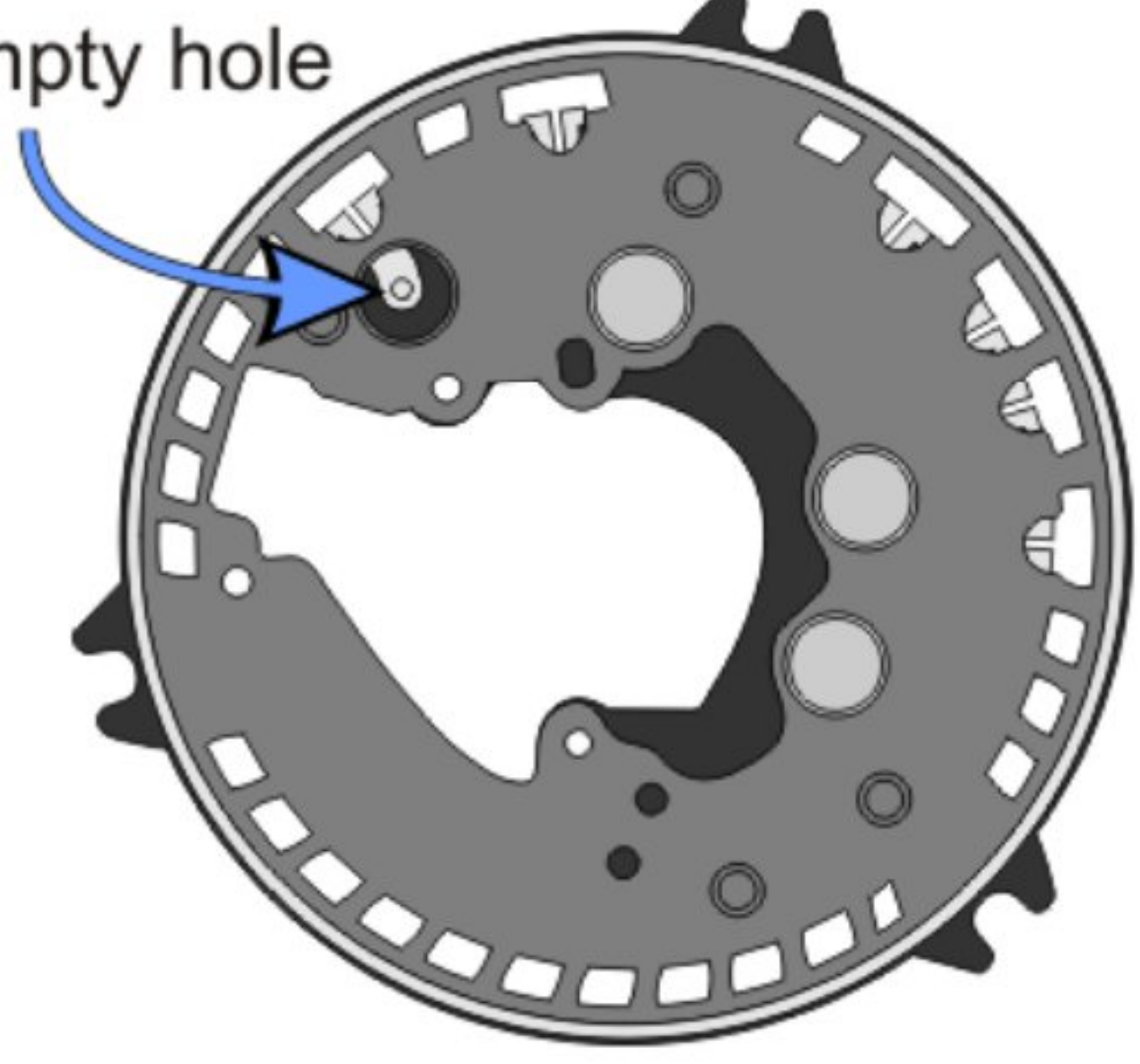
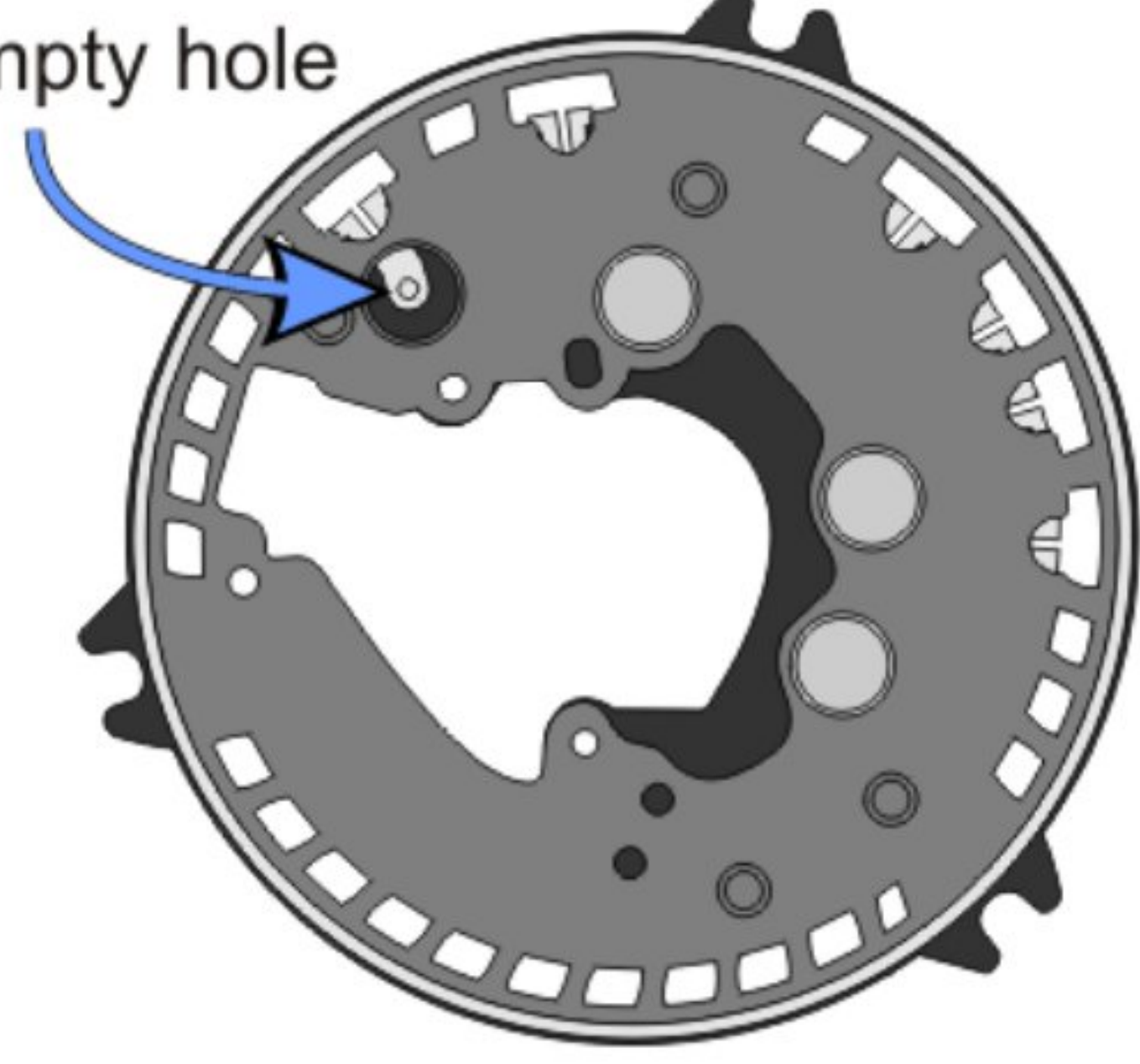
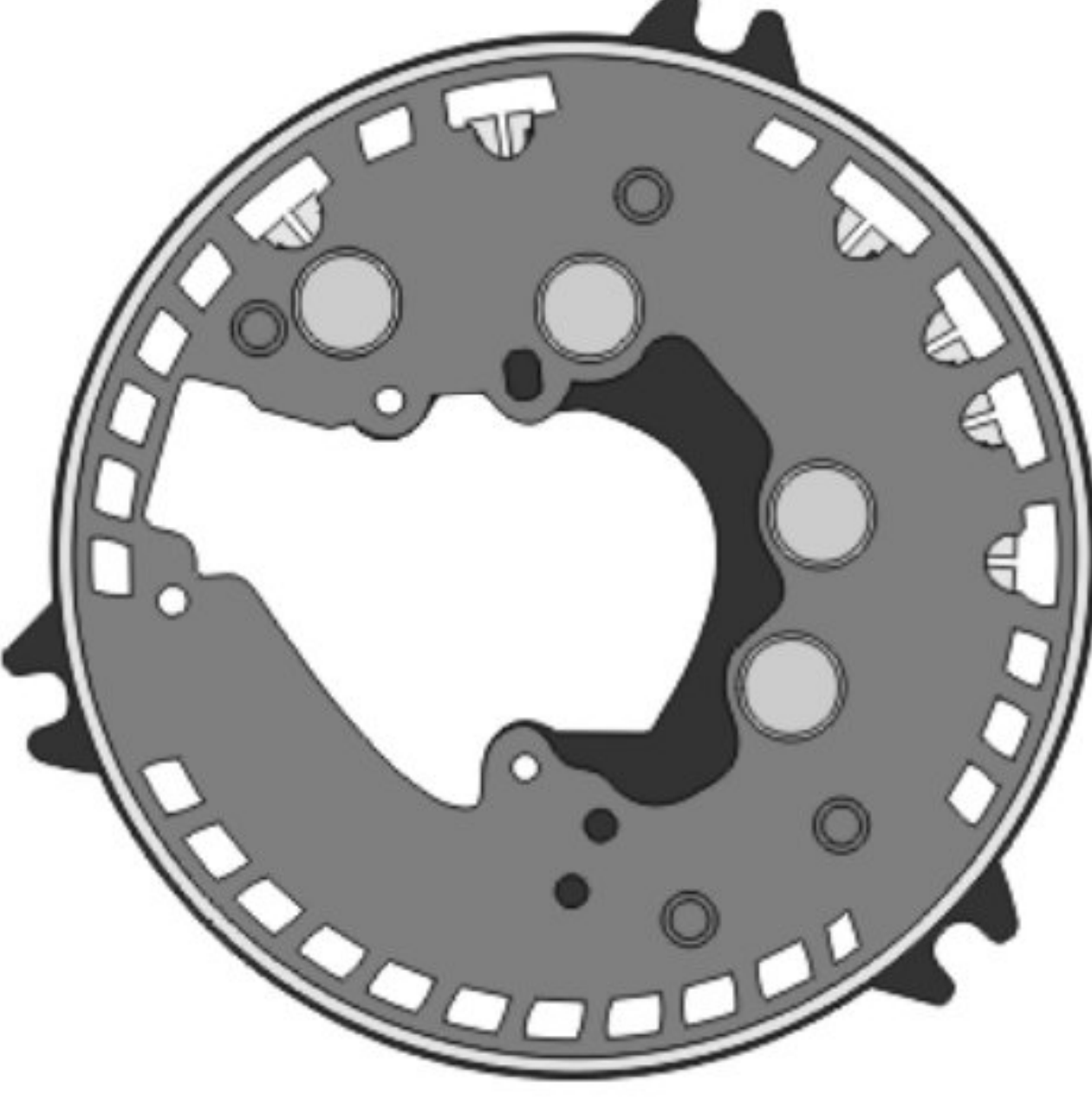
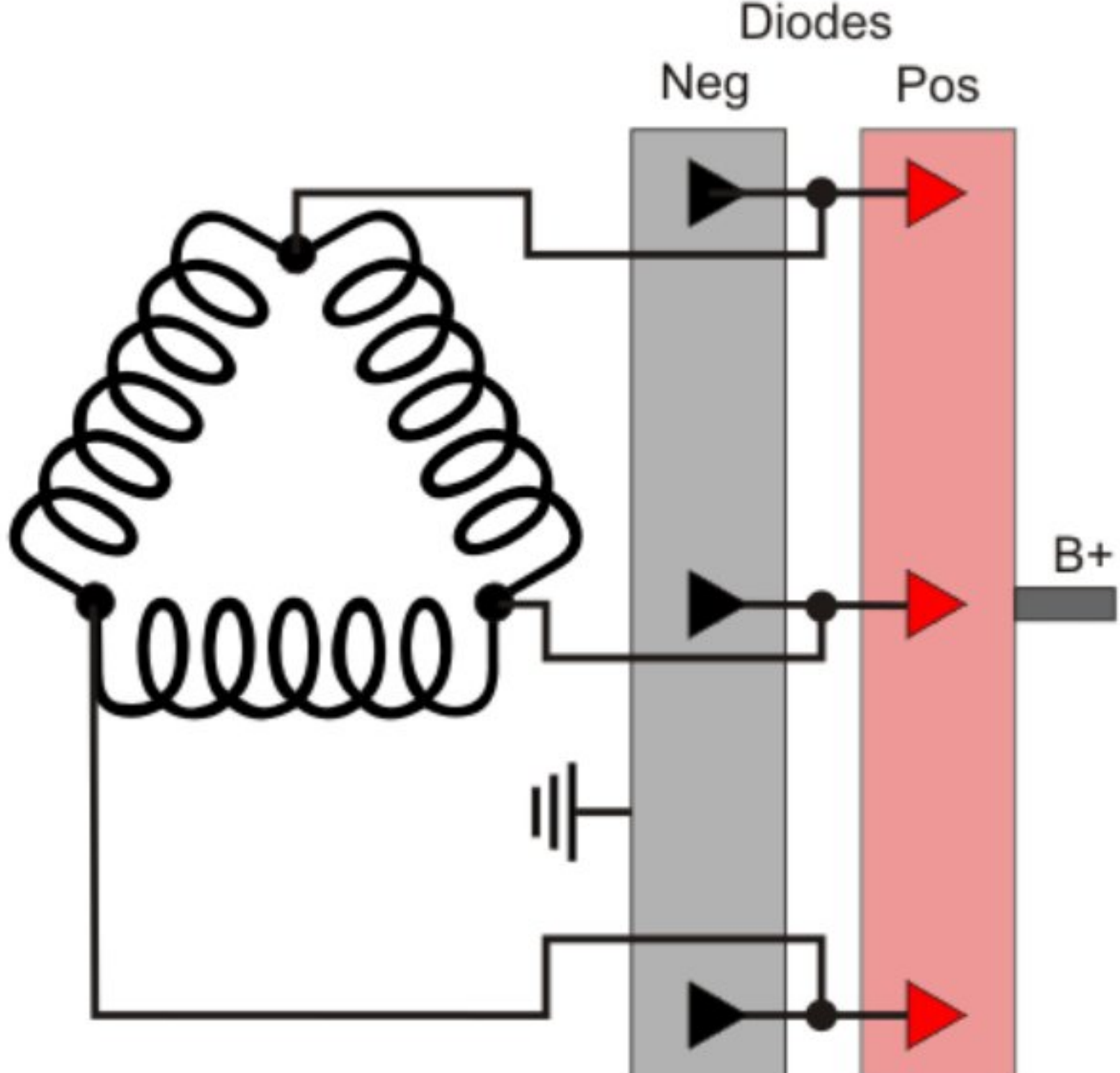
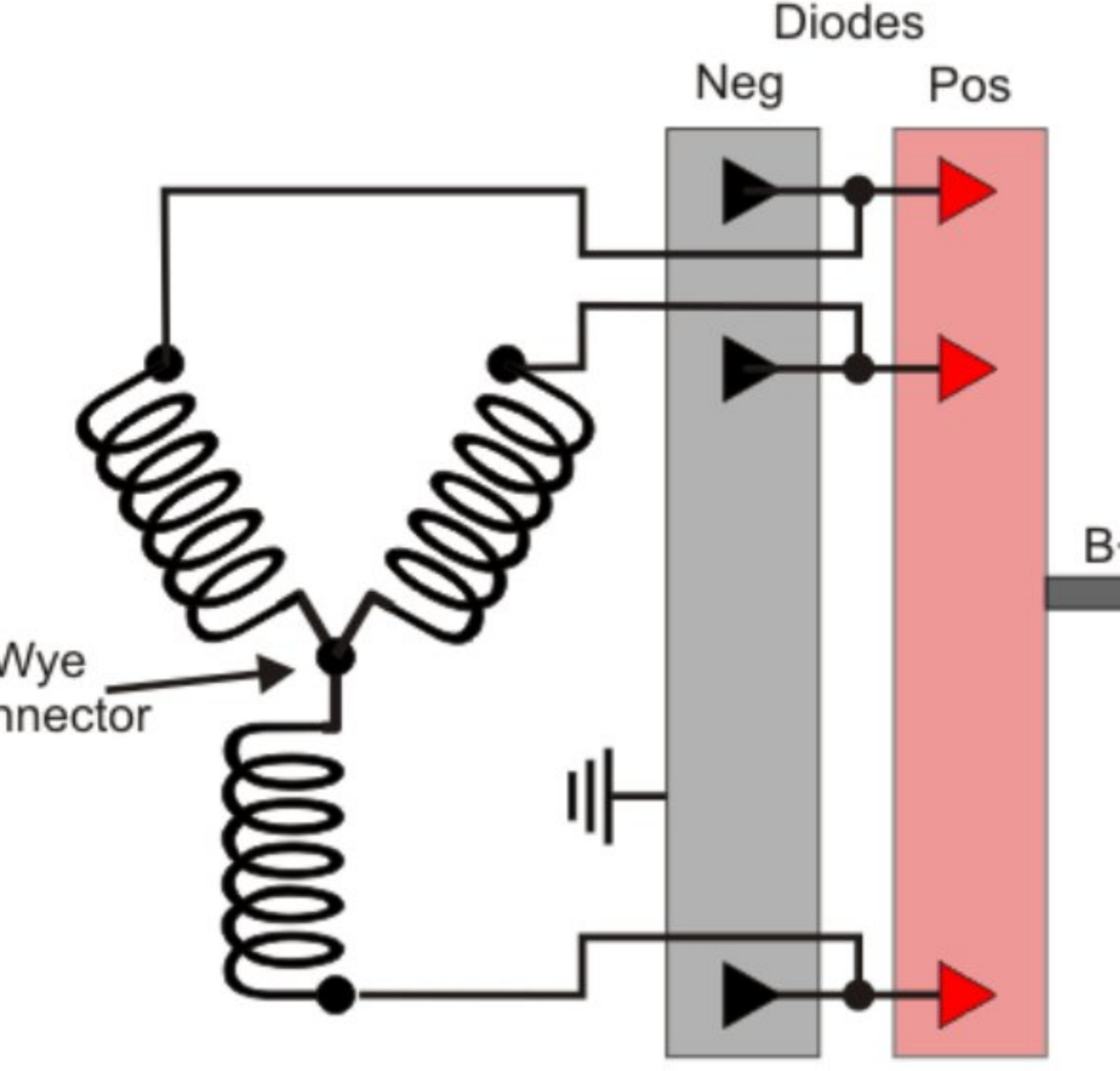
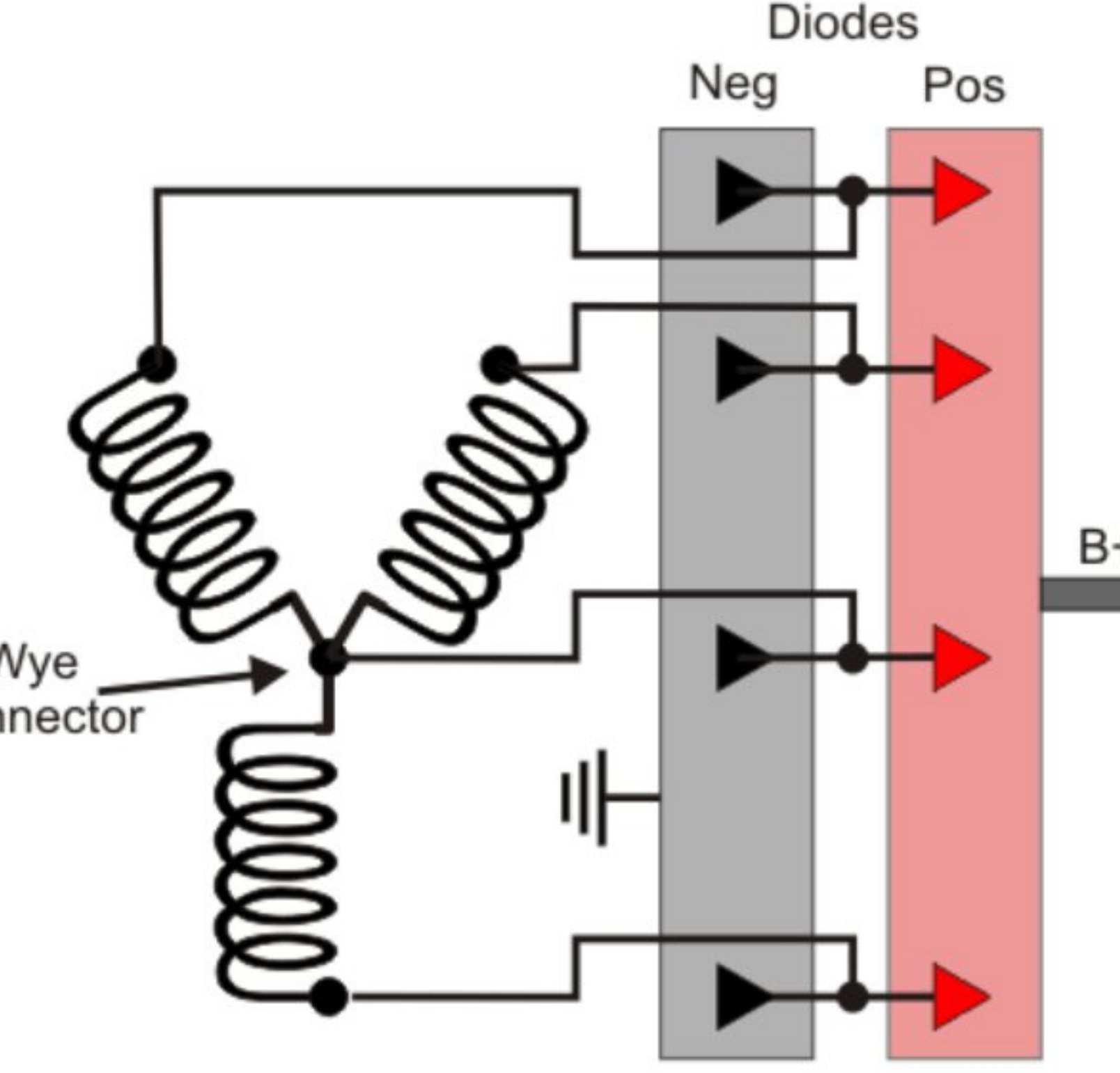
DELTA-Configured 6-Diodes	WYE-Configured 6-Diodes	WYE-Configured 8-Diodes
Up through the 2006 model year, most all 6-diode rectifiers are used with 6-lead, single-wound stators and are Delta configured. There are a few exceptions - (see panel to immediate right)	XR8U-10300-CE is a 6G small-frame alternator and the rectifier is wye, but it has only 6 diodes and a 12-lead tan stator. There are a few other units where Ford early on used this rectifier, but the alternator was superseded to a Delta 6-diode rectifier type with a 6-lead tan stator.	Up through the 2006 model year, all 8-diode rectifiers are used with 12-lead double-wound stators and are Wye configured.
 Empty hole 6-diode rectifier	 Empty hole 6-diode rectifier	 8-diode rectifier
 One lead per phase	 Two leads per phase	 Two leads per phase
 Diodes Neg Pos B+ Delta-Connected Stator and Diodes	 Diodes Neg Pos B+ Wye-Connected Stator and Diodes	 Diodes Neg Pos B+ Wye-Connected Stator and Diodes

Figure 1 – Rectifier and Stator Configurations

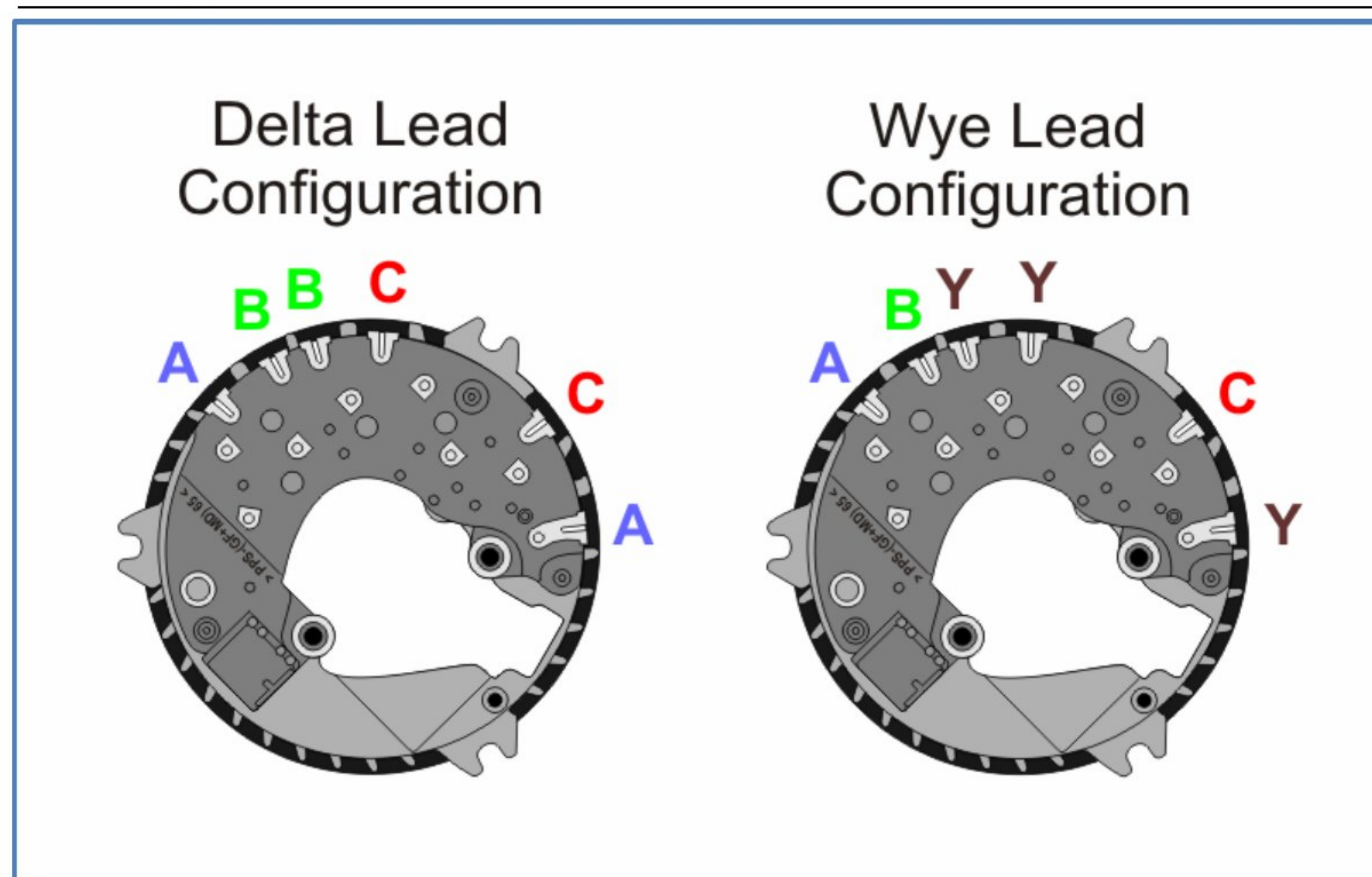


Figure 2 – Rectifier Test Points

It should also be noted that, up through the 2006 model year, all stators used with wye-configured rectifiers are double-wound and have six double-wire leads. All stators used with delta-configured rectifiers are single-wound and have six single-wire leads. (see *Figure 1*) Swapping stators will cause problems in the output curve and may result in serious performance problems on the vehicle, even though they may seem to work OK on a test bench. Always be sure to match the correct stator with the correct rectifier. See *Figure 2* for rectifier testing points that will allow you to determine which configuration rectifier you are working on.

Two different battery-post positions have been used. To simplify this, we'll call them left and right. With the battery post straight up at 12:00, there will be a thru-bolt position either to the right side at 1:00 or to left side at 11:00 (see *Figure 3*).

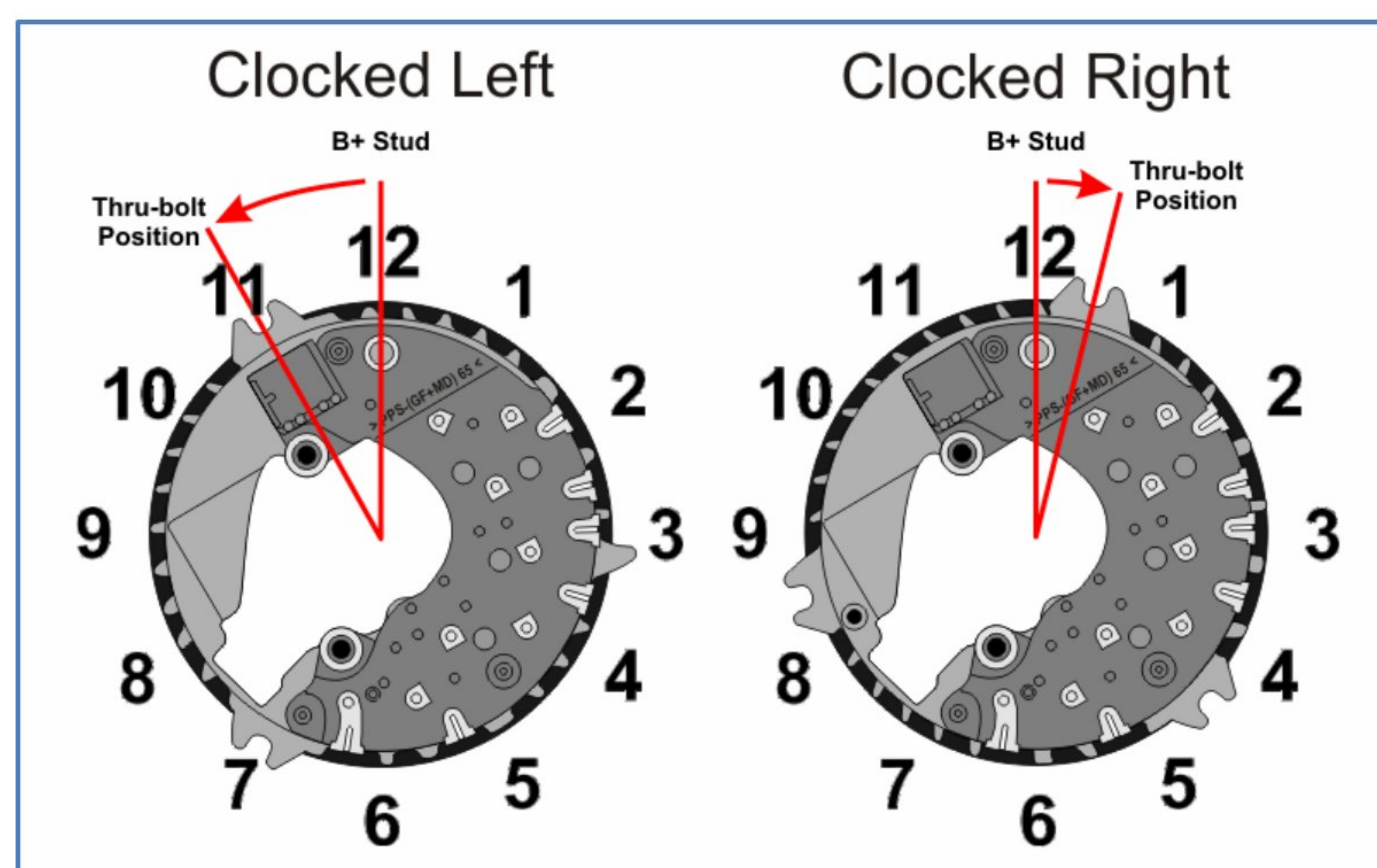


Figure 3 – Rectifier Clocking Positions

Some 6G rectifiers utilized standard diodes in various ratings from 50 to 70 amps. However, others were manufactured with avalanche diodes. In applications utilizing avalanche diodes, Ford removed voltage-spike protection devices from some electronic modules. If the application calls for a rectifier with avalanche diodes, it is imperative that they be used. The use of a standard-diode rectifier in those applications could cause damage to electronic modules. On OE rectifiers, avalanche diodes can be identified by their color, either green or blue. Notice that standard diodes are used to rectify the wye-connection on these OE rectifiers, but be aware that some aftermarket manufacturers have used avalanche diodes on the wye-connection.

One small-frame 6G rectifier utilizes a 3.3mf capacitor, a higher rating than other rectifiers. This is for enhanced voltage-spike suppression. If the application calls for this rectifier, it is important to use it. Ford did not use avalanche diodes in this rectifier.

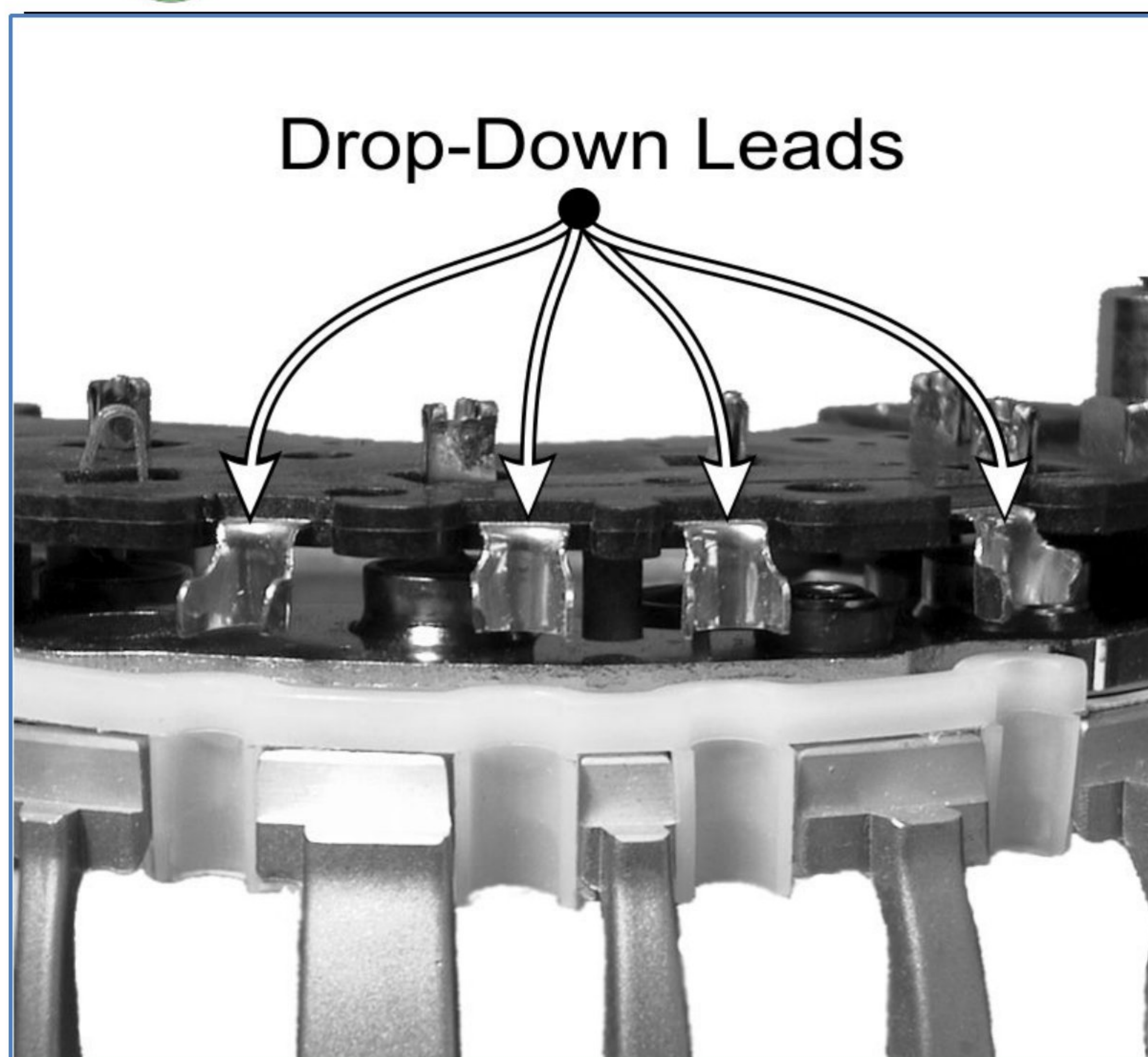


Figure 4 – Drop-Down Leads

The aftermarket has also made an improvement in the location of the stator-to-rectifier connection points by dropping them down, closer to the windings, making it easier to get good solder connections. (see *Figure 4*) Most aftermarket rectifiers today are manufactured with drop-down stator connections, which can be used with either a short-lead or a long-lead stator. However, when reclaiming an early-style or OE rectifier, you won't be able to use a short-lead stator. Most new aftermarket and rewound stators are made with long leads which can be used with either style rectifier.

For a few late applications using large-frame 6G's, the rectifier has been shortened by 2mm. These lower-profile rectifiers were used to help compensate for a taller stator lamination stack. The stators used in these applications are 32mm tall, as opposed to the more common 28mm stack. (see *Figure 5*) At the end of the 2006 model year, only two unit numbers utilized the lower-profile rectifier. They were used on the Ford Freestyle, Mercury Monterey and heavy-duty pickups with the 6.0L diesel engine. Note that the DE housings on these applications have a bore that is 2mm deeper to accommodate the 4mm-taller stator.

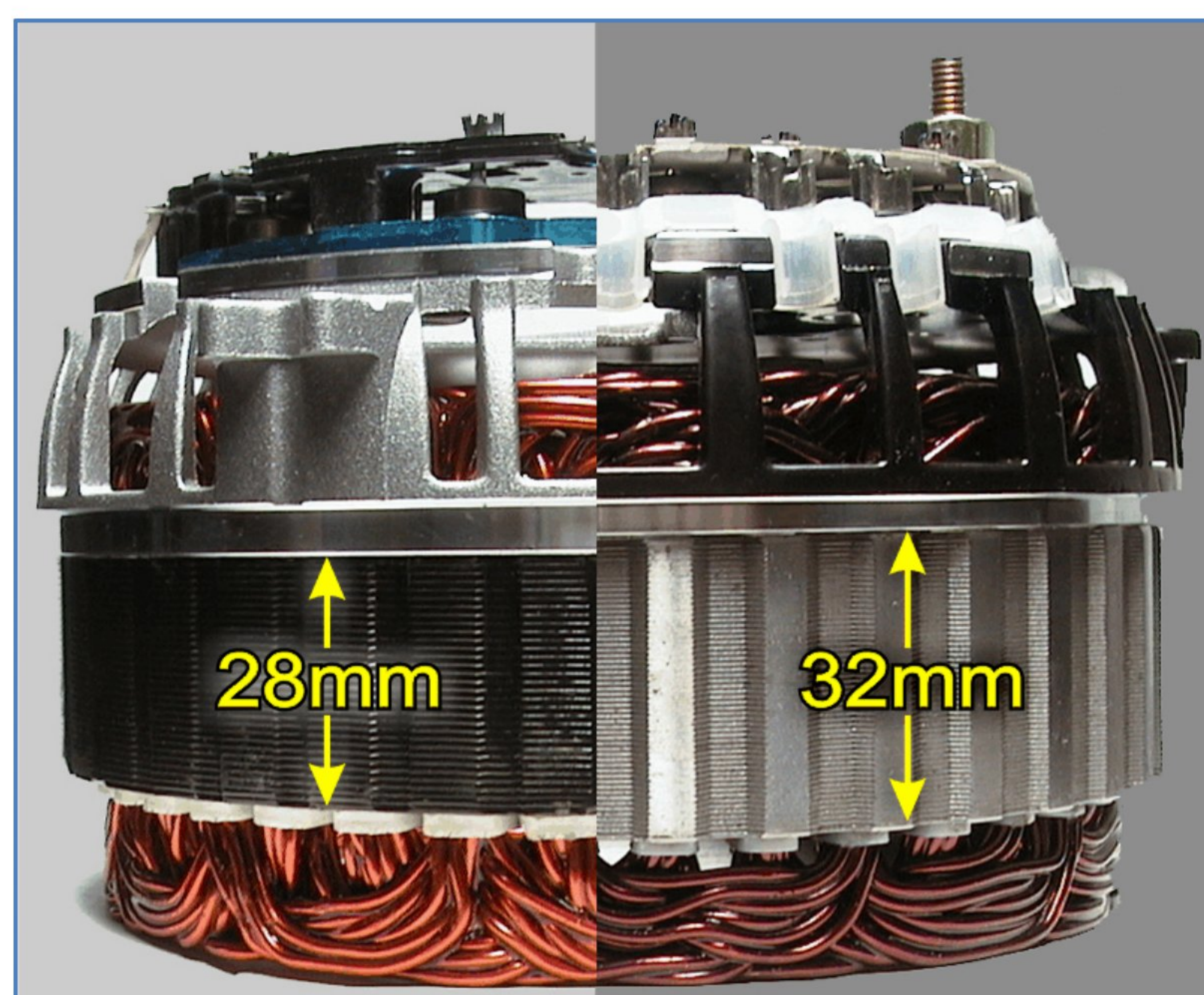


Figure 5 – Different Height Stacks and Rectifiers

Up through the 2006 model year, all 6G rectifiers had 6mm battery posts. However, there is one aftermarket rectifier available for large-frame 6G's utilizing 70A avalanche diodes and an 8mm copper battery post. It was designed for use in the specialized high-output market.

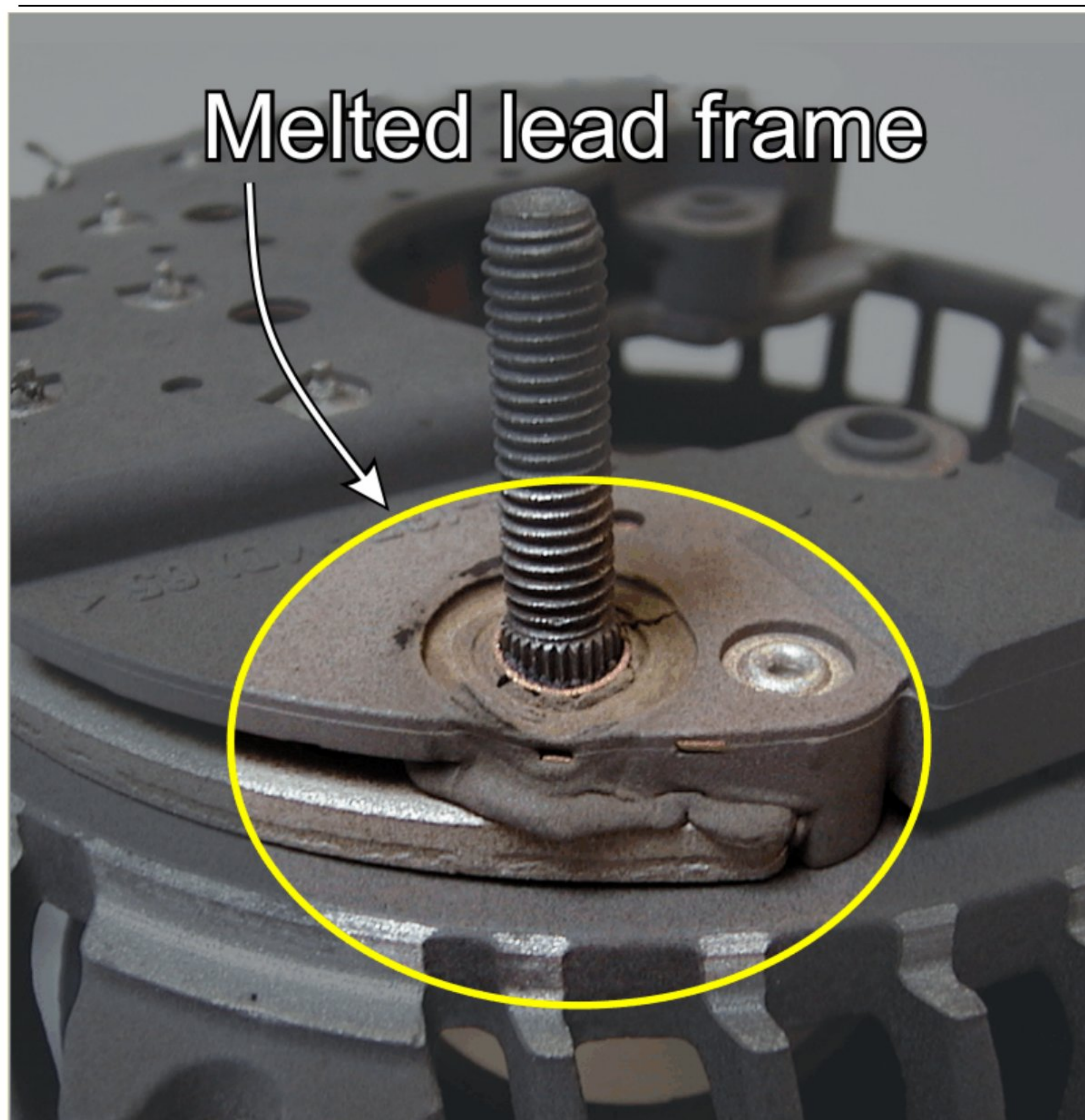


Figure 6 – Melted Lead Frame

When reclaiming 6G rectifiers, as with any component, a good visual inspection should be done first. Not only will you save time by visually identifying 90% of the bad rectifiers without wasting time testing them, but you'll also identify those that might pass an electrical test but could fail within a short time on the vehicle. Look for places where the plastic is melted around the diode connections on the lead frame or near the battery post. (see *Figure 6*) You can then check those that pass the visual inspection by performing voltage drop and leakage tests. Comparative testing with your equipment should give you parameters.

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