

June 29, 2007

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Bosch Long Haul Alternators Frequently Asked Questions

For more information contact your local Bosch representative.

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Q: What are the main benefits of the 160A and 200A alternators?

A: Superior performance and reliability

A: Increased battery life

A: Improved fuel economy

A: High temperature resistance

Q: What other benefits do the 160A and 200A alternators offer?

A: Less noise

A: Lower weight

A: "One size fits all"

Q: What does "turn-on speed" mean? How do the 160A and 200A Alternators perform?

A: The Alternator RPM at which it initially supplies current when the engine is turned on.

The turn-on speed of the Long Hauls and the SB200 is about 1500 alternator rpm (Engine rpm approx. 500), if the L terminal is not connected.

The turn-on speed of the Long Haul Alternators is about 1200 alternator rpm (Engine rpm around 400) if the L-terminal is connected.

Q: What does "cut-in speed" mean? How do the 160A and 200A perform?

A: The minimum Alternator RPM at which the output is available after the alternator has turned-on. The cut-in speed of the Bosch alternator is as low as 1200 alternator rpm. This means once the turn-on speed has been reached, even if it is only for a millisecond, the alternator is working in cut-in speed mode.

Q: What does temperature resistance mean? How do the 160A and 200A perform?

A: This refers to maximum surrounding temperature in which the alternator still performs without failure. High temperatures can damage bearings, increase brush wear or destroy electronic components like diodes or regulators. The higher the temperature resistance of an alternator the less the chance of a failure due to high temperatures.

The Bosch alternators can survive surrounding temperatures of up to 125C without being damaged.

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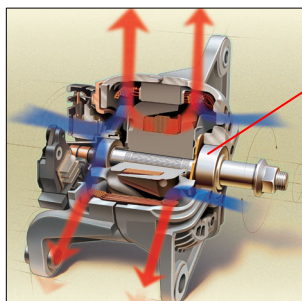
Q: How do the 160A and 200A achieve their high temperature resistance?

A: The Alternators have a high temperature resistance due to:

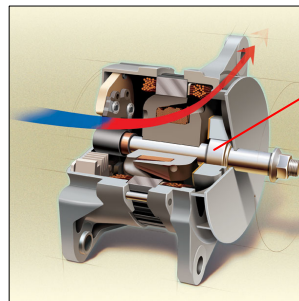
- World class Bosch electronic components, diodes that work up to 200C(392F), and the regulator up to 140 C (266F)
- An excellent cooling system with two aerodynamically shaped internal fans which provide significant cooling air flow through the alternator.
- World class efficiency. The mechanical energy carried from the engine over the belt to the alternator is mostly transformed into electrical energy. This minimizes the heat generated by losses and thereby the temperature level of the alternator.

Cooling Mechanism

Dual Internal Fan Alternator



External Fan Alternator



A-side Bearing

A-side Bearing

Advantage of the Bosch Long Haul Alternator:

Most effective bearing cooling!

Ambient Temp	A-side Bearing Temperature		
	Internal Fan	Internal Fan	External Fan
	Bosch	Competitor 1	Competitor 2
25°C	67	75	84
80°C	115	120	128
90°C	124	130	139
100°C	130	135	146

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Q: How does an alternator influence battery life?

A: Many trucks spend 30% to 40% of their operating time at idle speed. Most Alternators provide only 30-40% of their rated output under these conditions and the batteries must provide what the alternator cannot. This drains the batteries significantly, requiring them to be recharged by the alternator while driving. This deep draining/recharging process constitutes a deep cycle for the battery which drastically reduces the battery life:

higher output at idle = less battery cycling = longer battery life

A: At engine idle, the 160A and 200A provide significantly higher output than the alternators they replace. Batteries are not drained as much, deep cycling of the batteries and thereby damage to batteries is reduced significantly.

Q: How else does the alternator influence battery life?

A: Conventional alternators experience a significant performance drop under high temperature conditions. This decreases output over the whole rpm range under real life conditions and leads to a lower charging level of the batteries that eventually damages the batteries.

A: Under hot – real life - conditions, the alternator performance drop is only about half of its competitors, which results in a higher charging level of the batteries under hot temperature even if the competitor has the same nominal output.

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Q: How do the 160A and 200A increase fuel economy?

A: The 160A and 200A are much more efficient than the alternator they replace. Efficiency is the percent of mechanical energy supplied by the engine that is converted to electricity. The alternator requires less mechanical energy from the engine to produce the same electrical output, resulting in less power from the engine, hence less fuel consumption.

Depending on driving conditions, fuel cost, electrical usage, this could mean a fuel savings of up to \$400/100,000 miles. Under certain conditions like idle, low rpm and low to average electrical load, the influence of the efficiency and therefore the fuel saving impact is the highest.

Alternator Efficiency – Fuel Savings

Engine:

Injection Share [%]	100%
Average consumption	200
Fuel density [l / g]	0.001190
Specific fuel consumption in g/kWh	0.23

Input	Example 1	Example 2	Example 3
Average speed [mph]	25	35	45
Yearly	100,000	110,000	130,000
Fuel price	\$2.90	\$2.90	\$2.90
Voltage	14	14	14
Average power consumption [in A]	100	100	100
Average efficiency competitor	53	53	53
Average efficiency Bosch alternator	68	68	68

Calculation:

Power requirements competitor alternator	2642	2642	2642
Power requirements Bosch alternator	2059	2059	2059
Power saving	583	583	583
Fuel consumption saving [gal/h]	0.04	0.04	0.04
Fuel consumption savings [gal/100miles]	0.14	0.10	0.08
Saving/year in	142	111	102
Saving/year in	\$411	\$323	\$297

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Q: What about noise?

A: The 160A and 200A alternators have superior mechanical and magnetic noise characteristics.

The mechanical noise is significantly reduced in comparison to an external fan alternator due to the use of aerodynamically shaped internal fans.

The magnetic noise has been kept low due to the special shape of its claw poles.

Q: How is the Bosch alternator repaired?

A: Bosch Alternators have a replaceable regulator which also houses the brushes. The regulator component can be easily removed and replaced with standard shop tools.

Q: How about the bearing?

A: Our bearings have a smaller inside diameter than you see on other alternators. The smaller diameter has the advantage that the velocity of the rollers is reduced which allows higher maximum speeds (18,000 alternator rpm) of the bearing. This has the potential benefit of using a higher pulley ratio to increase idle output above what can be done with today's standard size bearings.

The dynamic load rating is comparable to larger inside diameter bearings. This means they are as or more durable than the larger bearings due to the special grease, steel and manufacturing process used to build them.

Q: What contributes to the 160A and 200A quality?

A: It's the combination of state of the art design, highly reliable components and world class manufacturing processes.

- Highest quality ball-bearings, long lasting slip rings and brushes
- Bosch manufactured diodes
- Diodes are welded to the rectifier not soldered
- Bosch manufactured high quality regulator
- High temperature resistance

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Q: What about ease of installation?

A: The 160A and 200A - J180 mount easily replace other SAE J180 alternators. It has both M6 (1/4") and M8 (5/16") connections for B+. It also has a universal R-terminal and in case a two-wire system is required, it has an I-terminal (M5 bolt) connection.

There is no risk of short circuit between the two B+ bolts since they have the same potential. It is even possible to connect both B+ bolts in parallel.

The pulley is being fixed with a metric nut. This nut is delivered with the alternator.

Q: What about pulley ratio and max. speed?

A: This is another outstanding feature of the 160A and 200A. Conventional alternators are limited to a max. rpm of about 12,000. The Bosch alternator can easily be operated up to 18,000 alternator rpm.

This is especially helpful for situations that require high output at low engine rpm. In these cases, a higher pulley ratio is possible than with other alternators. The already high idle output can be increased to more than 150Amp (with 3.6:1 Pulley ratio @ 700 engine rpm). When using a higher pulley ratio it must be assured that the belt coverage angle is at least 120 degrees.

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