



## ***Backgrounder***

### **EVINRUDE® E-TEC™ V4 AND V6 ENGINES LEAD THE INDUSTRY WITH INNOVATION**

#### **BRP expands engine line to include two new platforms**

Four innovative and distinct benefits of the Evinrude E-TEC engine technology continue to set its performance apart from current industry offerings to truly make it unique:

- Easy-to-Own and Operate
- Cleaner and Quieter
- Durability, Quality and Reliability
- Power, Performance & Styling

#### **“Easy- to-Own and Operate”**

**300 Hours No Dealer-Scheduled Maintenance** – For each 300 hours or three years of normal recreational operation, Evinrude E-TEC outboards require NO dealer-scheduled maintenance. With Evinrude E-TEC, there is no oil filter or crankcase oil to change or dispose of, no belts or chains to adjust or replace, and no valve or throttle linkage adjustments required - **ever**. E-TEC engines are so well-engineered and precision-built that no break-in period is required. While competitive models require as much as ten hours of break-in time, E-TEC customers can run wide-open throttle right out of the box. Without having to make a 20-hour check, E-TEC owners will spend more time on the water and less time at the dealership for service.

All E-TEC models feature self-flushing cooling systems that purge the system of debris each time the throttle is applied. Compare this to designs that require back-flushing by a garden hose when operated in muddy or turbid conditions. E-TEC models even feature a self-winterization sequence that can be easily initiated by the customer to prepare for off-season storage.

All of these innovative and consumer oriented benefits make Evinrude E-TEC engines far easier and much less costly to own and operate than comparable four-stroke engines.

**Easy Adjust Linkage** - On all Evinrude E-TEC outboard engines, the throttle cable simply hooks to the linkage pin. There is only one way the components can be assembled in the factory, which eliminates the need for adjustments made at the factory or at the dealership. Idle speed is controlled by the EMM (Electronic Management Module), not the throttle cable, and the idle speed can be electronically adjusted for the customer by the dealer with diagnostic software to precisely set the ideal motor speed for each particular application. No adjustments, no sync and link at the dealer.

**High Capacity Alternator** – The high capacity alternator output is significantly higher at low rpm than existing DI and 4-stroke engines. The 60-degree V4 and V6 Evinrude E-TEC engines produce 15 amps of battery charging available at 500 rpm or idle, and 50 amps from 2000 rpm to wide open throttle. The 50 amps of available output is up to two and a half times that of competitive offerings and is the net available amperage for charging boat related accessories. While the competition often quotes gross alternator output, typically as much as 50% higher than their available amperage, Evinrude E-TEC delivers the amperage that today's boaters want.

Another aspect in this component is true-battery isolation, which means a battery can be charged separately from the main-cranking battery. In other words, if one battery is completely discharged and the other full, then the alternator will send power to the uncharged battery.

If a boater desires battery-isolation, a simple accessory kit, available from Evinrude/Johnson Genuine Parts, can be installed so there is a full 25 amp (net) charging system for each of the two batteries.

**Easy Rigging Capability** – In current large outboard engines, it often takes considerable rigging time to bring the cables in and through the motor covers. The Evinrude E-TEC models provide an easier alternative with a more intuitive and simplistic rigging system developed by BRP. Cables are brought in through one location, connected with clamps, and directed up the side of the engine. There, the battery cables and boat connections are all connected in one location. A colored diagram located on the inside of the engine panel guides technicians to properly rig the engine.

**Fuse Box** –The engine has one fuse positioned in an easily-accessible location. Some engines use many fuses, which are often difficult to find and change because of inconvenient locations behind other components or wires.

**CAN Bus Connectivity** – This forward-thinking feature is part of every new 60-degree V4 and V6 E-TEC engine, allowing boat builders and boaters to utilize the NMEA 2000 open industry standard for instrumentation and navigation equipment, enhancing the display of engine and boat performance data. This state-of-the-art feature, based on the NMEA 2000 standard, permits a simpler and faster transfer of complex information from engine and boat sensors, providing the operator a more efficient and useful method of monitoring vital information. Traditional connectivity is also provided for those applications where CAN Bus is not utilized.

### **“Cleaner and Quieter”**

#### **The E-TEC Signature Sound**

**Air Intake Silencer** - One of the benefits of the E-TEC air intake silencer design is that the intake openings are located high on the silencer cover which prohibits any water that may find its way inside the motor cover from entering the engine.

The air intake silencer has also been designed using CFD (Computational Fluid Dynamics) analysis to create an air box that has a two chamber acoustic-type system that allows air to enter through the back chamber and expand into a large volume. It then contracts itself and

moves into a front chamber before it enters the throttle body itself. Designing an air silencer with two large volumes that can contract between each volume without losing power is an important feature. This air box design is beneficial for acoustics and ensures good power.

**Muffler** – The new idle relief system was designed to ensure smooth running, while keeping the exhaust quiet at idle, by eliminating high back pressure inside the engine when the engine is at low speed, and when the water level is high. Evinrude E-TEC outboards send all exhaust straight through the idle relief muffler when the boat is off plane.

BRP also designed the muffler box to be tuned for volume at a low idle speed – 500 rpm. The exhaust sound enters the chamber, bounces off the wall and resonates into the chamber, where the exhaust gas flows, then goes through the grillwork and out the sound system.

**Low Idle Speed** – The 60-degree V4 & V6 E-TEC engines idle at 500 rpm, while competitive engines idle around 700-750 rpm. The slower idle speed provides a distinct advantage for trolling, fuel economy, and docking maneuverability, while keeping sound levels extremely low.

**Idle Air Bypass** – All Evinrude E-TEC outboard engines have closed throttle plates at idle. From idle up to approximately 1500 rpm, air comes through a tube with a metered restrictor instead of the throttle plates which remain closed. When running at higher than 1500 rpm, the air is brought in through the throttle plates. This is a tremendous advantage for low speed sound.

**Quiet Injector Switching** – The injector clicking sound in the moving coil on E-TEC engines has been eliminated. The extreme efficiency of the E-TEC injectors allow the current that is delivered to the injector to be adjusted so at low speeds the reverse pulse moves “slower” and the click is eliminated.

**CARB 3-Star** - E-TEC engines are well below the CARB (California Air Resources Board) 2008 3-star levels and EU 2006 compliance. The E-TEC injector reduces time for spray to get to cylinder by 50 percent, which ultimately decreases emissions.

### **Durability, Quality and Reliability**

**Motor Cover** - One of the many E-TEC design elements was the introduction of less auxiliary ports where air is allowed to enter the engine. The E-TEC motor cover has no vacuum effect during a following sea at these ports. It also serves as a drain path and is designed so a rush of water can continue its momentum straight out the ports on the top sides of the cover.

Inside the cover, there are air inlets with deflectors that keep any water that may enter the cover flowing through the engine cover, away from the powerhead.

**Spark Plugs and Low Voltage** – The new spark plug used in E-TEC engines now has extended life and greater durability thanks to use of a smaller platinum-tipped rivet rather than a pad. BRP was able to lengthen spark plug life expectancy to 300 hours by reducing the primary voltage from 300 to 200 V in the ignition system, reducing spark plug gap erosion.

**Lubrication System** – This is the same component from the 90 degree V6 E-TEC providing a compact and efficient package that uses only one oil line running from the tank to the engine. There is no return line in the system. The oil system uses a pressure transducer rather than a pressure switch. This sensor is much smarter than a switch, automatically monitoring oil pressure and adjusting levels accordingly. It can quickly detect any issues in the oil line or system, which immediately puts the engine in the S.A.F.E. (Speed Adjusting Failsafe Electronics) mode, reducing engine speed to a maximum of 1200 RPM. In S.A.F.E. mode, an E-TEC engine is capable of running up to five hours with no oil.

**Reed Box** – The new reed box is larger and more efficient than typical direct injection outboards, increasing power and efficiency of the engine while making throttle setting changes smooth and responsive.

### **Power, Performance & Styling**

**E-TEC Direct Injection** – E-TEC technology provides up to double the fuel efficiency of conventional two-stroke and super-charged four-stroke engine technologies, and provides an extended operating range, requires fewer fill-ups and lower operating costs. E-TEC's unique direct injection system provides increased power and better fuel consumption at all throttle settings, and makes starting the engine fast and easy.

**Variable Exhaust Control** – The new Evinrude E-TEC 60-degree 130hp and 200hp models feature an exclusive variable exhaust control valve. This innovative industry first delivers even more low-end power and top speed performance than ever before. The EMM (Electronic Management Module) electronically controls a valve in the motor's exhaust housing. At slow speeds, the exhaust is tuned for maximum torque and low-end punch, providing for great hole shots and the power to plane heavy loads or pull multiple skiers. At higher speeds, the valve is electronically manipulated to re-tune the exhaust pulses for high speed running, providing additional top end speed to get to the other side of the lake first or to out-run a brewing storm on the horizon. This electronic control of the motor's exhaust tuning has the additional benefit of improving overall efficiency for added fuel economy and increased range and is exclusive to Evinrude E-TEC.

**Fuel Economy** - Superior power and performance is the product of better fuel economy and lighter weight. E-TEC technology utilizes stratified combustion for unsurpassed fuel economy at low engine speeds and a fuel injector that is more efficient than previous direct injection technologies. With E-TEC, fuel is injected into the combustion chamber for increased efficiency. The exclusive Engine Management Module (EMM) receives constant input from various sensors to provide precise fuel delivery resulting in instant starts, smooth operation, strong performance and excellent fuel efficiency.

**Torque** - The efficiency of the E-TEC direct injection system provides increased horsepower and torque because of the unique design. In an E-TEC engine, there is a power stroke with every revolution of the crankshaft, as opposed to four-stroke engines designed to have a power stroke every-other revolution. More horsepower and torque means greater acceleration and top speed. High Output (HO) models are available with a high performance gearcase, providing increased performance for tournament fisherman and high-performance boaters.

**Light Weight** - E-TEC outboards are significantly lighter than competitive 4-stroke outboard engines. Less weight means quicker hole shots to get on plane faster and provides superior boat handling.

**Unique Styling** – E-TEC engines are compact but house durable, robust components in a unique design that has a swept back profile and self-aligning hood for easy engine access.

### Evinrude E-TEC Specs

<b>V4 Platform</b>	<b>115 hp</b>	<b>130 hp</b>
<b>Model</b>	<b>115DPL 115DSL 115DPX</b>	<b>130DPL 130DSL 130DPX</b>
<b>Engine Type</b>	V4 60-degree E-TEC	V4 60-degree E-TEC
<b>Shaft Length (in)/color</b>	(20") Blue (25") White	(20") Blue/White (25") White
<b>Weight kgs/lbs</b>	170 kgs / 375 lbs	173 kgs / 380 lbs
<b>Bore x stroke</b>	3.6" x 2.588" 91mm x 66mm	3.6" x 2.588" 91mm x 66 mm
<b>Displacement cc/in</b>	1726cc / 105.4CI	1726cc / 105.4CI
<b>Trim</b>	FasTrak™ Power Trim & Tilt	FasTrak™ Power Trim & Tilt
<b>Propshaft HP</b>	115 hp @ 5500 rpm	130 hp @ 5500 rpm
<b>Full Throttle Operating Range</b>	4500 – 5500 rpm	5000 – 6000 rpm
<b>Gear Ratio</b>	20" - 2:1 / 25" – 2.25:1	20" - 2:1 / 25" – 2.25:1
<b>Fuel Induction</b>	E-TEC	E-TEC
<b>Alternator Output Available @ Battery</b>	50 amp	50 amp
<b>Emissions Rating</b>	CARB 3 Star, EPA 2006 EU 2006	CARB 3 Star, EPA 2006 EU 2006
<b>Oil Delivery System</b>	E-TEC auto lube	E-TEC auto lube
<b>Warranty</b>	3 yr Non-Declining	3 yr Non-Declining

<b>V6 Platform</b>	<b>150 hp</b>	<b>175 hp</b>	<b>200 hp</b>
<b>Model</b>	E150DPL E150DSL E150DHL E150DPX E150DCX	E175DPL E175DSL E175DPX E175DCX	E200DPL E200DSL E200DPX E200DCX
<b>Engine Type</b>	V6 60-degree E-TEC	V6 60-degree E-TEC	V6 60-degree E-TEC
<b>Shaft Length (in)/color</b>	20" Blue/White 25" White	20" Blue/White 25" White	20" Blue/White 25" White
<b>Target Weight kgs/lbs 20" Model</b>	190 kg / 418 lbs	190 kg / 418 lbs	192 kg / 423 lbs
<b>Bore x stroke</b>	3.6" x 2.588" 91mm x 66mm	3.6" x 2.588" 91mm x 66mm	3.6" x 2.588" 91mm x 66mm
<b>Displacement cc/in</b>	2589 cc / 158 CI	2589 cc / 158 CI	2589 cc / 158 CI
<b>Trim</b>	FasTrak™ Power Trim & Tilt	FasTrak™ Power Trim & Tilt	FasTrak™ Power Trim & Tilt
<b>Propshaft HP</b>	150 hp @ 5250 rpm	175 hp @ 5500 rpm	200 hp @ 5500 rpm
<b>Full Throttle Operating Range</b>	4500 – 5500 rpm	4500 – 5500 rpm	4500 – 5500 rpm
<b>Gear Ratio</b>	1.86:1 / 1.85:1	1.86:1 / 1.85:1	1.85:1
<b>Fuel Induction</b>	E-TEC	E-TEC	E-TEC
<b>Alternator Output Available @ Battery</b>	50 amp	50 amp	50 amp
<b>Emissions Rating</b>	CARB 3 Star EU 2006	CARB 3 Star EU 2006	CARB 3 Star EU 2006
<b>Oil Delivery System</b>	E-TEC auto lube	E-TEC auto lube	E-TEC auto lube
<b>Warranty</b>	3 yr Non-Declining	3 yr Non-Declining	3 yr Non-Declining

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