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# ENGINE BUILDER

## THE UPSIDE TO DOWNSIZING

How Smaller Engines  
Can Mean Bigger Profits



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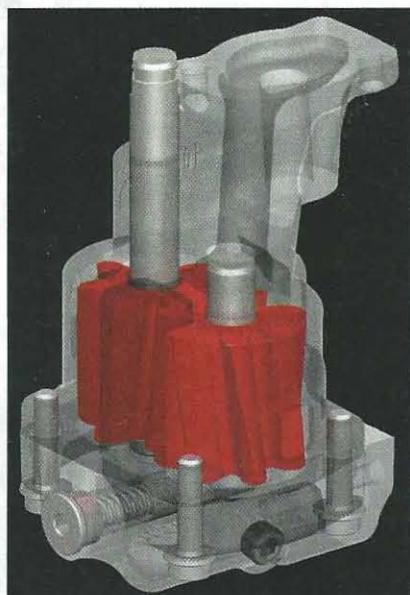


## SCHUMANN'S ULTIMATE SERIES OIL PUMP

Schumann's Ultimate Series Oil Pumps work with both small block and big block Chevys. The oil pumps have a cylindrical body shape, five gear volumes, an aeration bumper valve, and two and three ball valve oil modulated volume/PSI control.

The Ultimate Series Oil Pumps control internal pressure locking, provide less intake reversion, lower oil temps, and use available energy recovery and gear pressure balance.

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## MELLING PERFORMANCE SHARK OIL PUMP

Melling has improved the heart-beat of the traditional internal gear pump. It is now significantly smoother through the use of new helical asymmetrical gears. The new gear design provides the engine with an improved flow of oil without the usual pulsing found in traditional gear pumps. The reduction in the pressure ripple from the pump will also provide benefits to the distributor and camshaft drive.

The Shark oil pump offers a significant reduction in pressure ripple (pulsing), a reduction in torque ripple in pump drive, an improved distributor operation – reduction in spark scatter, and an improved distributor gear wear & intermediate shaft wear.

The oil pump is also tighter, providing an improved sealing of gear tips to housing, a reduced internal leakage and improved efficiency and performance.

The Shark is also quicker, with an increased inlet vacuum and faster priming.

STAGE 1 – Part # 10550ST & 10551ST

- \* New cast iron housing and cover
- \* 25% increase in volume over stock
- \* 5/8Ø & 3/4Ø traditional press fit screens

STAGE 2 – Part # 10552ST & 10555ST

- \* New cast iron housing & cover
- \* 10% & 25% increase in volume over stock
- \* Patented design
- \* 3/4Ø traditional press fit and exclusive bolt-on screens

[www.melling.com](http://www.melling.com)

## AMSOIL SIGNATURE SERIES 5W-50 SYNTHETIC MOTOR OIL FOR FORD MUSTANGS

AMSOIL has expanded its premium Signature Series line by adding a 5W-50 synthetic motor oil specially formulated for high-horsepower Ford Mustang engines requiring the Ford WSS-M2C931-C performance specification. AMSOIL Signature Series 5W-50 Synthetic Motor Oil provides anti-wear protection. It is fortified with a robust additive package, including top-quality detergents and dispersants to help prevent sludge deposits and keep engines clean. It withstands the stress of high horsepower and heat, resisting viscosity loss due to mechanical shear and maintaining protection in metal-to-metal contact regions for maximum engine life. AMSOIL Signature Series 5W-50 Synthetic Motor Oil excels in extreme temperatures. It resists thermal breakdown to maintain protection in high heat and it contains no wax, allowing it to remain fluid in the low temperatures for improved oil flow and protection at startup. Signature Series 5W-50 is designed for maximum efficiency. It exhibits an extremely low volatility rate to control oil consumption and emissions.

[www.amsoil.com](http://www.amsoil.com)



# Features

## Choosing the Right Oil Pump

Original equipment oil pumps are usually adequate for most stock applications – but some are not, especially if an engine is being modified for more power or RPMs. Larry Carley gives you all you need to know about choosing the right oil pump for your engine and application.



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## Ford's 1.0L EcoBoost Engine

Ford's EcoBoost, a 1.0L turbocharged, direct-injection powerplant, delivers 123 hp and 125 lb.-ft. of torque. Named the 2014 International Engine of the Year, Ford's EcoBoost gets a breakdown from John Gunnell.



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## V6s and Four Bangers

For engine builders these days, V6s and four-cylinder engines are becoming a budding surge of potential income as they gain more popularity. John Carollo tells you how to do more work with these engines.



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## Marine Engine Market

For those unfamiliar with marine engines, there is a common misconception that these are highly unique devices. However, if you can rebuild an automobile engine, you can rebuild a marine engine. Chris Sunkin investigates the keys to success as well as the pitfalls of marine engines.



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## ON THE COVER

### The Upside to Downsizing

The V8 isn't dead yet, but storm clouds are brewing on the horizon that may endanger its long-term viability. Concerns over global warming, CO2 emissions and dependence on foreign oil led the EPA to mandate new Corporate Average Fuel Economy nearly double current requirements. To achieve these higher requirements automakers may have to abandon the V8 altogether or restrict it to a handful of limited production applications. Automakers are also opting for V6 and four-cylinder engines.



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Photo courtesy of Ford Racing

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# SCHUMANN'S DYNAMIC PERFORMANCE™

Industry Engine Parts Supplier Since 1970!



modular body



multi ball valve



burper valve

## REVOLUTIONARY ENGINEERING "ULTIMATE SERIES" PATENTS APPLIED FOR:

- One pump part number application for Small Block and Big Block Chevys, will fit stock OEM pans.
- Module cylindrical body shape construction
- Five gear/rotors volumes are purpose driven
- Module volume changes accomplished on same main body
- Oil aeration control with burper valve
- Multi mode ball valve volumetric control
- Two mode racing: First ball valve operates regulates idle P.S.I. Second ball valve controls maximum volume of G.P.M. and high R.P.M. / P.S.I.
- Three mode street performance: First mode idle, second mode cruise, third mode wide open R.P.M.
- 140% ball valve modulation prevents: internal pressure locking, intake reversion, distributor gear loading, oil temperature build-up, stable ignition timing events and smoother oil flow at all R.P.M. levels.
- Gear pressure balance: mechanical and hydraulic design balances offset gear masses. Directs oil pressure volume for lubrication of five lobe rotor ring O.D. and lubricates driven shaft and bore.
- "Schumann's Energy Recovery: option available on "Ultimate Series".
- Anyone interested in a modulated vacuum pump section of the "Ultimate Seires" oil pump????

### LS Extreme High Performance

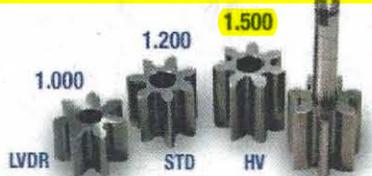
LS engines developing 1,200/1,500 or 2,000+ horsepower with turbochargers, superchargers or multi-stage nitrous successfully race on Schumann's PRO MAX wet sump system

#### Features are:

- Highest volume available, period.
- Longevity of all critical thrust points.
- Three leg external control of volume P.S.I.
- Ball valve override emergency protection.
- True alignment of pump to crankshaft.
- O-ring sealed to block mounting.
- Energy recovery turbocharged intake stream, vacuum pan friendly.
- Schumann's LS Energy Recovery R&D pump proven at 2013 Engine Masters with SAM's School LS winning entry.
- This technology now available to you.

### Energy Recovery Pro Series

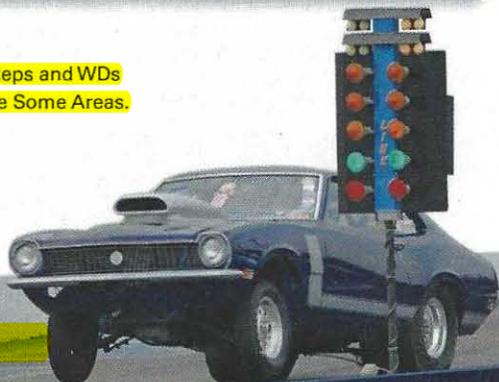
- Vacuum pan friendly.
- Wheel stand friendly.
- Truck off-road friendly.
- Oval-track G-Force friendly.



- Now available for Small Block Chevy, Big Block Chevy, LS Chevy, Small Block Ford, and most others on special order.
- Most engines can be ordered as external three-leg control with adjustable oil volume pressure on dyno or at the track.

\*Sales Reps and WDS  
Available Some Areas.

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flow and pressure. Some aftermarket oil pump suppliers use stiffer and more durable cast iron covers for many of these front-mounted pumps to significantly reduce or eliminate this kind of leakage.

Crankcase-mounted pumps can also leak pressure where the pump bolts to the main cap or block. On most stock applications, there is no gasket between the pump and engine. A less than perfectly machined mounting surface can leave small gaps that leak oil flow and pressure. The fix for this is to install a thin copper or metal gasket between the pump and engine to provide a leak-free junction.

### New Oil Pump Innovations

Recently, there have been some

innovations in oil pump design that address many of the fundamental issues that plagued traditional oil pumps. Dry sump systems with an external oil reservoir, vacuum pumps and pressure pump are the ultimate setup for high performance applications and racing. These systems eliminate most of the concerns about oil starvation that result from oil sloshing away from the pickup inside an oil pan. Dry sump systems pull the oil out and route it to an external reservoir so the pump always has a steady supply of oil. Dry sumps that use a series of vacuum pumps can also pull enough air out of the crankcase to eliminate windage, drag and oil aeration. But dry sump systems are very expensive compared to wet sump systems and

require a lot of external plumbing.

One way around this has been to develop hybrid wet/dry sump systems. This system uses a scavenge pump to pull oil out of the pan like a dry sump system. The oil is sent to an external reservoir, but it is then routed back into a sump in the oil pan so the front-mounted oil pump can send it to the engine. The Corvette's LS7 hybrid setup keeps oil vapor out of the crankcase to reduce windage and drag, while the external reservoir provides a steady supply of oil to the pump. But when cornering extremely hard, G-forces can sometimes force the oil inside the stock reservoir to flow up and away from the line that connects it to the sump, causing a momentary oil starvation situation. More than one Corvette racer has

## Schumann's New Oil Pumps

Vern Schumann of Schumann Sales & Service has introduced a number of enhancements for traditional crankcase mounted oil pumps, including his recent "Energy Recovery" (ER) oil pump design that reroutes oil from the pump's bypass circuit back into the pump's inlet tube. Recycling the excess oil pressure that would otherwise be wasted reduces the amount of power it takes to drive the pump (up to 30 percent says Schumann) while also making the pump much faster to self-prime because of its siphoning effect. This also reduces the risk of oil starvation when the engine is accelerating hard or is experiencing extreme lateral G-forces.

Another issue that Schumann has addressed is that of oil aeration and oil flow reversion that occurs in circle track engines. Most of these engines are either running full throttle or throttle off. When the driver lets up on the throttle when entering a corner, engine RPM drops. If the pump can't dump the excess pressure, it may lock the pump and damage the distributor drive and/or cause spark scatter. Pressure can also backflow down the inlet tube. When the driver hits the throttle again coming out of the turn, the pump may suck air until the flow can reverse back to the normal direction. This can cause a momentary loss of oil pressure that may damage the engine. Schumann's fix for this was to add a fast-acting ball relief valve to his "140 Series" racing pumps that can dump the excess pressure instantly, eliminating any overloading of the pump or reverse flow back out the pickup tube.

His latest innovation is the "Ultimate Series" oil pumps which are an all-new modular design. One housing fits both small block and big block Chevs. The pump uses a

gerotor gear set rather than spur gears, and has different gerotor sets that can be fitted into the same housing using different end covers. Gear heights include .827, .942, 1.033 and 1.187 inches. This allows the end user to increase or decrease the flow

volume of the pump as needed, even with the pump installed in the engine (after removing the oil pan).

The Ultimate Series pumps can accommodate a standard 5/8-inch oil pickup tube or a larger 3/4-inch tube with a flange and o-ring mount. Another feature is that pumps incorporate a pair of external "staged" oil pressure relief ball valves. Interchangeable springs allow the amount of oil pressure to be adjusted for low and high RPM.

"A single oil pressure relief valve isn't adequate for both low and high RPM oil pressure control," says Schumann. "Adding a second valve allows for much better control at both high and low RPM." A street version of the same pump will have three pressure relief valves, one for idle, mid-range and full throttle, allowing much more consistent oil pressure control across the engine's entire RPM range. "The goal is to have a more consistent flat line oil pressure reading from idle to wide open throttle."

