High Flow Oil Pumps

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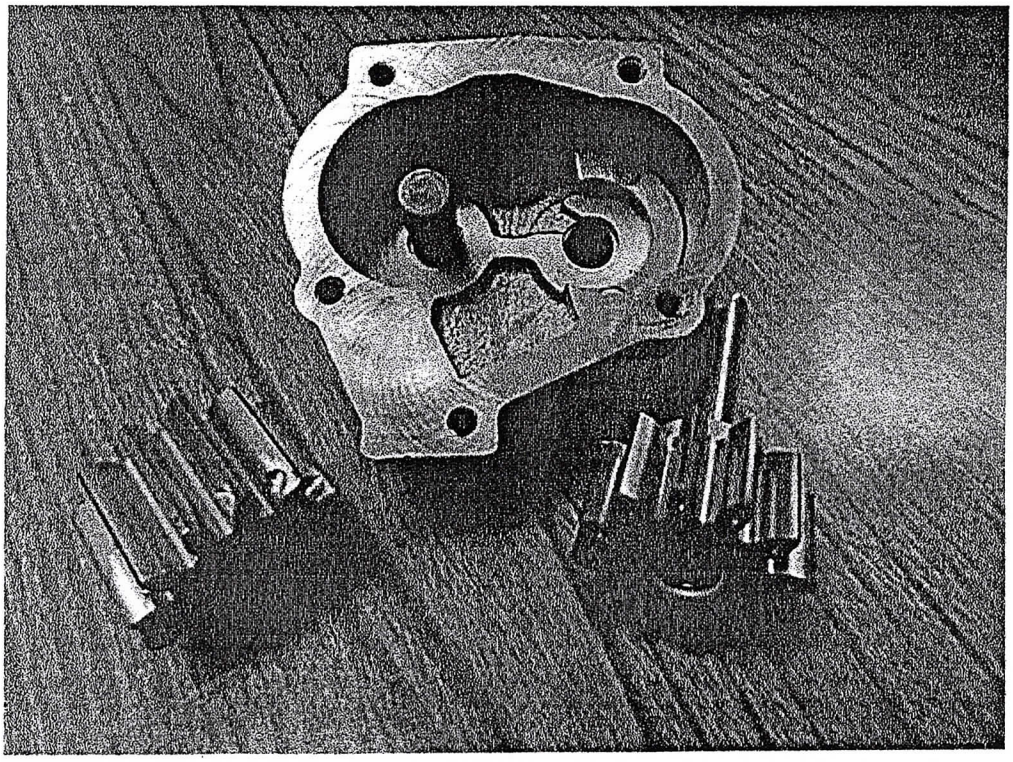
One thing every performance engine needs is a reliable oil supply. Starve the engine for oil and the end result is usually a spun bearing or a connecting rod failure.

The problem with many stock oil pumps is that they tend to cavitate and aerate the oil at higher engine RPMs. The engine speed at which this happens depends on the inlet tube diameter of the pump, the internal flow characteristics of the pump, the length and design of the gears, and the outlet flow characteristics. Obviously, the more restrictive the inlet tube and pump housing, the lower the RPM at which oil flow can't keep up with the speed of the gears, resulting in cavitation and aeration of the oil (air bubbles in the oil). This prevents oil flow from keeping up with engine speed, or worse yet, a sudden drop in oil pressure!

Replacing a stock oil pump with a high flow oil pump is no guarantee the pump will provide enough oil at higher engine speeds. Taller gears in a twin gear pump will move more oil, assuming there is time for the oil to flow the length of the gears. But again, if the pump inlet or housing is restrictive, it will limit the pump's output above a certain speed. Increasing the size of the inlet and outlet ports in the pump housing, and contouring and smoothing the inlet and outlet port entry and exit points inside the housing to eliminate sharp corners will also improve flow. Select fitting the gears to minimize internal clearances also helps improve pump efficiency and flow. It's not that different from porting a cylinder head to improve airflow. The only difference is that oil is much thicker than air and is harder to push through restrictive openings and around corners.

Vern Schumann of Schumann Sales & Service, Blue Grass Iowa has long been a pioneer in high performance oil pump innovations. Over the years he has patented a number of unique pump designs that improve pump reliability and delivery. Schumann does not sell his products direct to the public but distributes them through aftermarket suppliers such as Jeggs and Speedway.

One of Schumann's recent designs is called the 140 Series Paddle Wheel Pumps. These are designed for the most demanding high RPM racing applications, including drag racing and circle track. They can also be used on the street. The Paddle Wheel Pumps are available for small block and big block Chevy V8s, Oldsmobile and Pontiac big block V8s. These are a simple bolt-on replacement for the stock pumps and will deliver a steady, reliable oil supply through 8000 RPM or higher.

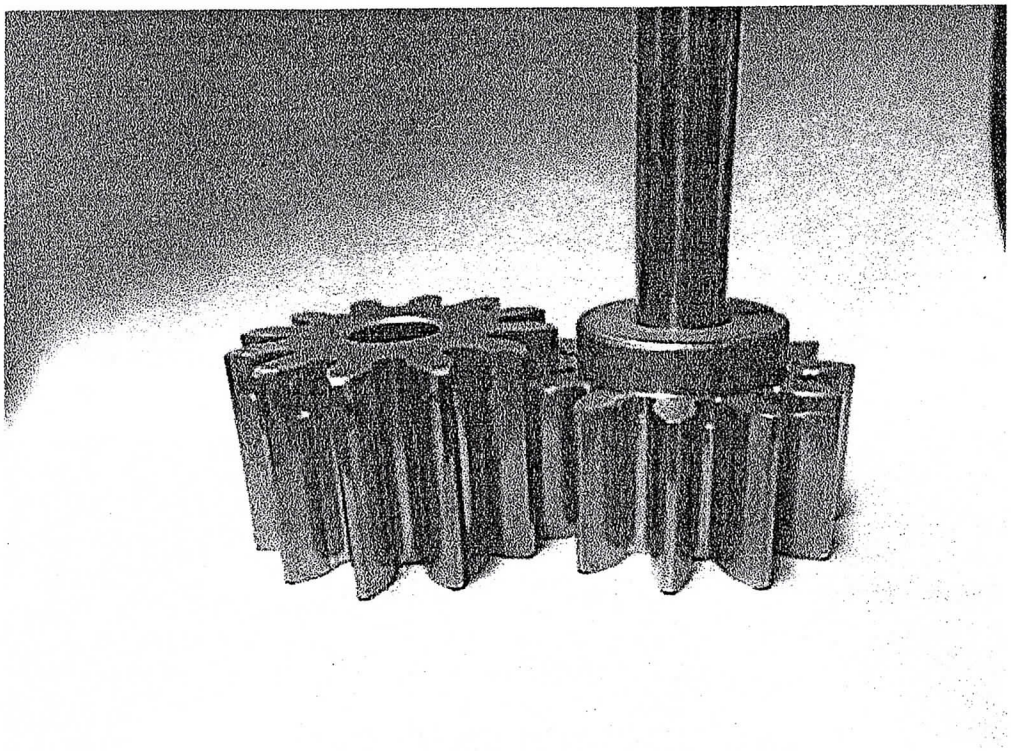


Schumann Paddle Wheel Oil Pump housing and gears.

What makes these pumps different from other high volume racing pumps on the market is their unique gear arrangement inside the pump housing. The shaft driven drive gear is about a quarter inch shorter than the driven gear. It sits on a small riser inside the pump housing. The longer driven gear has a small scallop machined into the lower face of each gear tooth. This creates a paddle wheel effect that gives extra velocity to the oil as it moves through the pump.

Small scallops machined into the face of each gear tooth on the driven gear gives oil an extra push as it reaches the pump outlet port.

He says the teeth on the oil pump gears is the primary means of moving oil through the pump, the same as any other standard oil pump. However, the paddle wheel scallops on the driven gear teeth provide a secondary push to the oil, increasing its flow velocity in feet per second at the outlet port. The end result is the pump moves more oil with less effort (horsepower saved) than other twin gear pumps.



Here you can see the difference in the length of the drive and driven gears.

Schumann says the increase in oil velocity is on the order of 30 to 40 percent, which means the pump can push more gallons of oil per minute to the engine at any given speed. And the faster the oil moves through the pump, the less chance there for cavitation and oil aeration that could cause fluctuations in oil pressure gauge readings or a sudden drop in oil pressure inside the engine.

Schumann's Paddle Wheel Oil Pump output at various engine speeds is as follows:

(Engine RPM).....(Pump Output in Gallons Per Minute)
2800 RPM .....1.9 GPM
3300 RPM ..... 2.6 GPM
4000 RPM ..... 3.5 GPM
4700 RPM ..... 5.5 GPM
5400 RPM ..... 7.6 GPM
6000 RPM ..... 8.8 GPM
7000 RPM ..... 11.1 GPM
8000 RPM ..... 13.9 GPM

There is no flattening of the output flow as RPMs go up, and no sudden or dangerous drops in oil pressure than could blow an engine. What's more, the pump's output responds more quickly to changes in engine RPM than conventional oil pumps. A standard Chevy SB/BB oil pump may take two

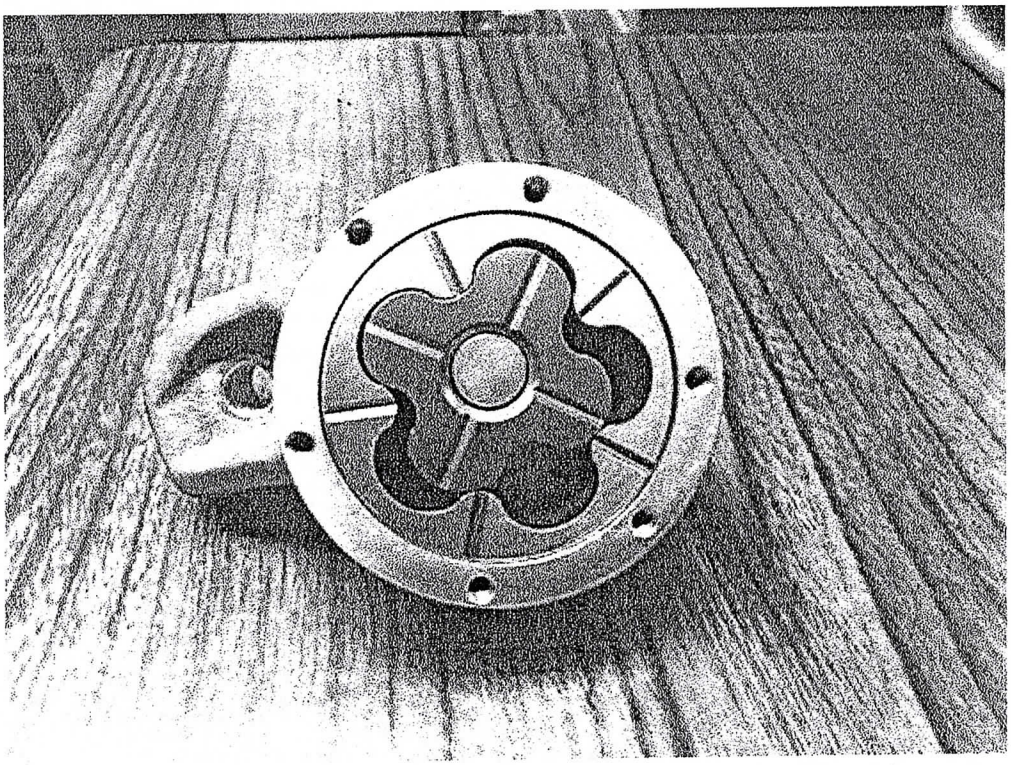
to four seconds to respond to a sudden increase in engine speed whereas the Paddle Wheel Pump responds within half a second!

Schumann also uses steel ball valves for the relief valve. Piston-style relief valves are slower acting, especially when it comes to closing, and are more prone to sticking open if any debris is sucked into the pump. A relief valve that sticks open means you've just lost most or all of your oil pressure!

The pressure at which the relief valve opens to vent excess pressure is adjustable by replacing the spring behind the ball valve.

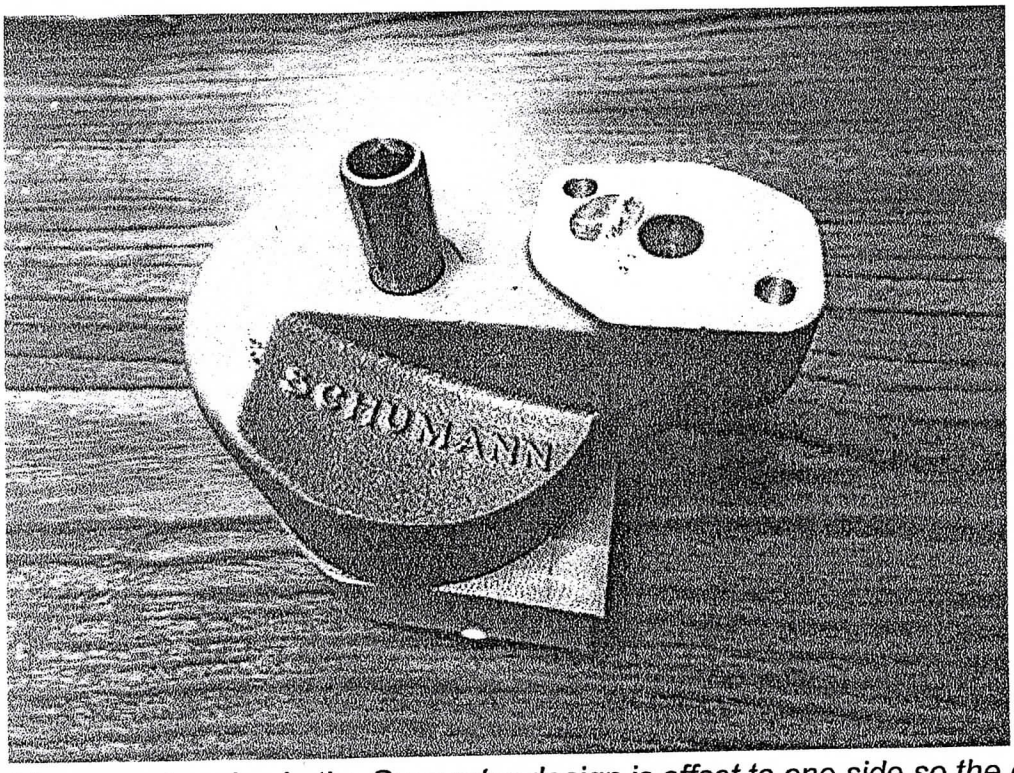
ANOTHER NEW OIL PUMP DESIGN

Another high performance oil pump design Schumann has patented is a Gear Rotor High Velocity Pump. Imagine adapting a gear rotor pump like the front-mounted oil pumps used on many late model GM, Ford and Chrysler V8 engines to a pan-mounted pump configuration that could replace a stock twin gear SB/BB Chevy pump. One of the advantages of a front-mounted gear rotor pump is that it is driven directly by the crankshaft, so it turns at engine speed. Chevy SB/BB oil pumps, by comparison, are mounted inside the oil pan on the bottom of the block and are driven off the distributor shaft or camshaft. This means the pump gears rotate at half engine speed. The faster the pump rotates, the more oil it flows (up to a point) so using a gear rotor design instead of twin gears can provide more flow at the same engine speed. The driven gear inside Schumann's Gear Rotor pump still turns at half engine speed because it is driven off the distributor shaft or cam same as before, but the rotor is spinning around inside the housing at a faster clip than what you see with just a pair of normal gears. So the faster the rotor spins, the more oil it moves through the pump.



Schumann Gear Rotor style oil pump for SB/BB Chevy. The driven gear in the center causes the outer rotor to spin inside the pump housing.

To make this configuration work properly, Schumann's Gear Rotor pump housing is offset to the side somewhat compared to a conventional twin gear pump. This requires a slightly wider oil pan to provide additional clearance. The pump inlet tube is also oriented differently than a stock pickup tube so additional modifications are required there too.



The pump housing in the Gear rotor design is offset to one side so the design will work. This requires a modified oil pan and relocated pickup tube.

Schumann says he's like an oil pan supplier to create a new oil pan design that would work with his new pump so the conversion could be a simple bolt-on installation.

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