Car engine exploded view

The GM Ecotec engine , also known by its codename L , is a family of all-aluminium inline-four engines , displacing between 1. While these engines were based on the GM Family II engine , the architecture was substantially re-engineered for the new Ecotec application produced since The engine uses aluminum pistons and cast iron cylinder liners. Vibration is reduced with twin balance shafts. The first engine in the Ecotec Gen I line-up was Ecotec 2. The current Ecotec line is manufactured in Tonawanda, New York ,. LK9 is a turbocharged 2. The engine features a five-bearing forged steel crankshaft, strengthened connecting rods, redesigned pistons, piston oil cooling jets, reprofiled camshafts and an integrated oil cooler. All vehicles using this engine feature Saab's Trionic 8 T8 engine management system as well as a revised valve train. The timing chain and timing gears are also new, along with Saab's Direct Ignition system. The reinforcements, turbocharging, intercooling, internals, dual overhead camshaft, and such were developed by GM Powertrain Sweden Saab Automobile Powertrain. Maximum boost is The LSJ shares many of its components with the LK9 such as: piston cooling jets, oil cooler, pistons, connecting rods, crankshaft, oil pan, sodium-filled exhaust valves and cylinder head. Unlike its notably harsh predecessor, the engine was designed for smoothness. The oil filter housing was cast into the block with a removable cover and replaceable paper element. It did not use an EGR valve. The L61 is a 2. The Ecotec 2. There are a few variations to the standard L The Saturn L-Series has a high output version with higher compression and more aggressive camshaft. The â€" Chevrolet Malibu uses a version with electronic throttle control and a special unitized exhaust manifold and catalytic converter. The Malibu and Saturn versions also use return-less fuel injection. For , introduced an updated version of the L61 based on the Gen II design. The supercharger and inlet manifold from the 2. A direct injection version of the 2. In these applications, the engine is mounted longitudinally. Displacement is 2. Compression is 9. The sodium filled exhaust valves were based on technology developed for the Corvette V8 powertrains. The sodium fuses and becomes a liquid at idle, which improves conductivity and draws heat away from the valve face and valve guide towards the stem to be cooled by the engine oil circulating in this area. The "Gen II" block is similar to the 2. The Gen II block was developed using data from racing programs and computer simulations. The bore walls and bulkheads were strengthened with a weight increase of 2. The coolant jackets were expanded to improve heat transfer, resulting in a coolant capacity increase of 0. The kit is covered by the cars' existing GM warranties. This was the final Stage 2 performance tune the Ecotec family, to date. With the demise of the GM Performance Division , performance tunes like this have been relegated to the aftermarket sector. This despite newer engines being more durable, and tuned to lower horsepower levels in numerous sport-car applications. Unique LNF features [7] include:. An updated variant of the LNF also with 9. In , the L61 received a multitude of changes, that originated from the LE5. It switched to the higher-strength Gen II block and received a revised cylinder head enlarged exhaust ports and camshaft design increased exhaust valve duration. The engine also switched from wasted spark ignition to individual coil-on-plug ignition; this forced the cam cover to be redesigned. It was also switched to an E37 engine controller with new crank and cam sensors replacing timing sensor previously found in ignition cassette. These changes increase horsepower slightly and allow the engine to meet PZEV standards. The LAP is a 2. Compression ratio is Major features that set it apart from the 2. The LE8 is an E85 compatible 2. The LE5 is a larger 2. Compression is The engine uses a reinforced "Gen II" block. C70 Powered Metal from July on. The LE5 or a close variant is also used in the Polaris Slingshot announced July 27, , coupled with a 5-speed manual transmission and a final belt drive. The Slingshot is a three-wheeled side-by-side street vehicle, classed as a motorcycle. The LAT is the designation used for the 2. The LE9 is an E85 compatible version of the 2. The LAF is a direct injected 2. It uses technology based on GM's other four-cylinder direct injection applications, but with unique features designed for its specific application. This includes an Bore, stroke, and compression ratio all remain the same. Bore and stroke are both Peak output is lower than the LTG, but is achieved at lower rpm for both power and torque. Bore is The new combustion system developed with GM's proprietary computational fluid dynamics CFD analysis software features a higher compression ratio which helps improve fuel efficiency and has improved knock resistance. The balance shafts are relocated from the cylinder block to oil pan module. The two-piece steel-aluminum oil pan features in-pan integrated oil-pump assembly driven by the balance shaft with a shorter inverted-tooth chain. Other improvements include inverted-tooth chain driving the camshaft, forged steel crankshaft, cast aluminum bedplate with main bearing cap inserts made of iron, high-pressure fuel rail with rubber-isolated assembly, acoustically shielded plastic cover for the intake manifold, and structurally enhanced aluminum camshaft cover and front cover. The engine also uses a variable-displacement oil pump and an actively controlled thermostat. Displacement for the 2. Continuously commanded by engine control unit , the valve rocker arm switches between high-lift and low-lift profiles on

the camshaft, actuated by an oil control valve through a two-feed stationary hydraulic lash adjuster , allowing for either 4. From Wikipedia, the free encyclopedia. Motor vehicle engine. Sequential multi-point fuel injection Gasoline direct injection. Gasoline CNG E Low-pressure Garrett GTs. Mid-pressure Garrett GTs. Gasoline E Archived from the original DOC on 27 October Retrieved 22 December The Auto Channel. Pontiac, Michigan. Retrieved 15 March Retrieved 16 April Toyota Motor Corporation. Archived from the original on Retrieved Retrieved April 4, Retrieved 30 July General Motors. Platforms Transmissions Hybrids Vehicles. William C. Category Commons. Namespaces Article Talk. Views Read Edit View history. Help Learn to edit Community portal Recent changes Upload file. Download as PDF Printable version. Wikimedia Commons. Italiano Edit links. Chevrolet Cavalier. Chevrolet Malibu. Saturn L-Series. Pontiac Solstice GXP. Chevrolet Cobalt SS. Buick Regal Turbo. Buick Regal Turbo Hirsch Performance. Saab NEVS. Buick Verano Turbo [9]. Buick Lacrosse China. Saturn Aura Green Line Hybrid. Buick Lacrosse hybrid China only. Chevrolet Malibu Hybrid. Chevrolet Malibu fleet only. Buick Verano [15]. Chevrolet Camaro. Holden Commodore. Chevrolet Malibu XL. Buick Lacrosse Chinese market. Buick Regal GS Chinese market. Chevrolet Blazer. Wikimedia Commons has media related to Ecotec engine. The Offenhauser Racing Engine , or Offy , is a racing engine design that dominated American open wheel racing for more than 50 years and is still popular among vintage sprint and midget car racers. The Offenhauser engine, familiarly known as the "Offy", was developed by Fred Offenhauser featuring an array of design attributes learned from his teacher [failed verification] and employer Harry Arminius Miller. Variations of this design were used in midgets and sprints into the s, [2] with a choice of carburetion or Hilborn fuel injection. They and former Miller employee, draftsman Leo Goossen , further developed the Miller engines into the Offenhauser engines. Then in the name and engine designs were sold to Louis Meyer and Dale Drake. Meyer was bought out by Drake, his wife Eve and their son John in From then until Drake's son John sold the shop to Stewart Van Dyne, the Drake family designed and refined the engine until its final race days. It was under Meyer and Drake that the engine dominated the Indianapolis and midget racing in the United States. One of the keys to the Offenhauser engine's success and popularity was its power. A Another reason for the engine's success was its reliability. Its monobloc construction made it immune to head gasket or cylinder stud problems, and allowed for higher cylinder pressures. From through the s, the Offenhauser engine dominated American open wheel racing , winning the Indianapolis 27 times. From through , Offenhauser-powered cars won the Indianapolis and achieved all three podium positions, winning the pole position in 10 of the 11 years. In Lime Rock Park held a famous Formula Libre race, where Rodger Ward shocked the expensive and exotic sports car contingent by beating them on the road course in an Offenhauser powered midget car , which was normally considered competitive on oval tracks only. On the strength of this performance, the car was entered in the Formula 1 US Grand Prix at Sebring where it was totally uncompetitive, setting a qualifying time of When Ford came onto the scene in , with much increased competition and sanctioning body rule changes, [failed verification] the Offy began to lose its domination over Indy car racing, although it remained a competitive winner through the mids even with the advent of turbocharging. The final 2. The last time an Offy-powered car raced was at Pocono in for the Domino's Pizza Pocono , in an Eagle chassis driven by Jim McElreath , although two Vollstedt chassis with Offenhauser engines failed to qualify for the Indianapolis The Offenhauser shop began to do machine work for Lockheed in , as the arms build-up for anticipated war began. The last prewar engine was shipped on July 17, After the Pearl Harbor attack , the plant worked overtime on hydraulic systems, getting Fred Offenhauser the money and the fatigue to retire. In , Leo Goossen finally became a full-time Offenhauser employee. Offenhauser produced engine blocks in several sizes. These blocks could be bored out or sleeved to vary the cylinder bore, and could be used with crankshafts of various strokes, resulting in a wide variety of engine displacements. Offenhauser and Meyer-Drake, in later years frequently made blocks, pistons, rods, and crankshafts to specific customer requests. However, certain engine sizes were common, and could be considered the "standard" Offenhauser engines: [4]. See Indianapolis Motor Speedway race results for a more complete list. In their 11 world championship years, the Meyer-Drake Offenhauser engine partnered for at least one race with the following 35 constructors :. From Wikipedia, the free encyclopedia. This article is about the racing engine. For speed parts company, see Offenhauser Sales Corporation. This article needs additional citations for verification. Please help improve this article by adding citations to reliable sources. Unsourced material may be challenged and removed. Archived from the original on Retrieved Hidden categories: Articles needing additional references from September All articles needing additional references All articles with failed verification Articles with failed verification from September Namespaces Article Talk. Views Read Edit View history. Help Learn to edit Community portal Recent changes Upload file. Download as PDF Printable version.

Wikimedia Commons. Fred H. Offenhauser and. Racing engines. Jack McGrath. Pat Flaherty. Pat O'Connor. For most people, a car is a thing they fill with gas that moves them from point A to point B. But have you ever stopped and thought, How does it actually do that? What makes it move? Unless you have already adopted an electric car as your daily driver, the magic of how comes down to the internal-combustion engine â€"that thing making noise under the hood. But how does an engine work, exactly? Specifically, an internal-combustion engine is a heat engine in that it converts energy from the heat of burning gasoline into mechanical work, or torque. That torque is applied to the wheels to make the car move. And unless you are driving an ancient two-stroke Saab which sounds like an old chain saw and belches oily smoke out its exhaust , your engine works on the same basic principles whether you're wheeling a Ford or a Ferrari. Engines have pistons that move up and down inside metal tubes called cylinders. Imagine riding a bicycle: Your legs move up and down to turn the pedals. Pistons are connected via rods they're like your shins to a crankshaft, and they move up and down to spin the engine's crankshaft, the same way your legs spin the bike'sâ€"which in turn powers the bike's drive wheel or car's drive wheels. Depending on the vehicle, there are typically between two and 12 cylinders in its engine, with a piston moving up and down in each. What powers those pistons up and down are thousands of tiny controlled explosions occurring each minute, created by mixing fuel with oxygen and igniting the mixture. Each time the fuel ignites is called the combustion, or power, stroke. The heat and expanding gases from this miniexplosion push the piston down in the cylinder. Almost all of today's internal-combustion engines to keep it simple, we'll focus on gasoline powerplants here are of the four-stroke variety. Beyond the combustion stroke, which pushes the piston down from the top of the cylinder, there are three other strokes: intake, compression, and exhaust. Engines need air namely oxygen to burn fuel. During the intake stroke, valves open to allow the piston to act like a syringe as it moves downward, drawing in ambient air through the engine's intake system. When the piston reaches the bottom of its stroke, the intake valves close, effectively sealing the cylinder for the compression stroke, which is in the opposite direction as the intake stroke. The upward movement of the piston compresses the intake charge. In today's most modern engines, gasoline is injected directly into the cylinders near the top of the compression stroke. Other engines premix the air and fuel during the intake stroke. In either case, just before the piston reaches the top of its travel, known as top dead center, spark plugs ignite the air and fuel mixture. The resulting expansion of hot, burning gases pushes the piston in the opposite direction down during the combustion stroke. This is the stroke that gets the wheels on your car rolling, just like when you push down on the pedals of a bike. When the combustion stroke reaches bottom dead center, exhaust valves open to allow the combustion gases to get pumped out of the engine like a syringe expelling air as the piston comes up again. When the exhaust is expelledâ€"it continues through the car's exhaust system before exiting the back of the vehicleâ€"the exhaust valves close at top dead center, and the whole process starts over again. In a multicylinder car engine, the individual cylinders' cycles are offset from each other and evenly spaced so that the combustion strokes do not occur simultaneously and so that the engine is as balanced and smooth as possible. But not all engines are created equal. They come in many shapes and sizes. Most automobile engines arrange their cylinders in a straight line, such as an inline-four, or combine two banks of inline cylinders in a vee, as in a V-6 or a V Engines are also classified by their size, or displacement, which is the combined volume of an engine's cylinders. There are of course exceptions and minute differences among the internal-combustion engines on the market. Atkinson-cycle engines, for example, change the valve timing to make a more efficient but less powerful engine. Turbocharging and supercharging, grouped together under the forced-induction options, pump additional air into the engine,

predator 4000 generator parts diagram
2001 chevrolet tracker fuse diagram
3 way switch 3 switches wiring diagram

 which increases the available oxygen and thus the amount of fuel that can be burnedâ€"resulting in more power when you want it and more efficiency when you don't need the power. Diesel engines do all this without spark plugs. But no matter the engine, as long as it's of the internal-combustion variety, the basics of how it works remain the same. And now you know them. New Cars. Buyer's Guide. Type keyword s to search. Today's Top Stories. Specs Detailed. Getty Images. The Best. You may be able to find the same content in another format, or you may be able to find more information, at their web site. Buy Now. Meguiar's Ultimate Quik Detailer. Meguiar's Water Magnet Microfiber Towel. Meguiar's Ultimate Interior Detailer. This content is created and maintained by a third party, and imported onto this page to help users provide their email addresses. You may be able to find more information about this