

Chapter 1 : Toyota 1NZ-FE Engine | Reliability, tuning, supercharger

1NZ-FE ENGINE DESCRIPTION The 1NZ-FE engine is a in-line, 4-cylinder, liter, valve DOHC engine. The VVT-i (Variable Valve Timing-intelligent) system, DIS (Direct Ignition System) and ETCS-i (Electronic Throttle Control System-intelligent) are used on this engine in order to realize high performance, quietness, fuel economy and clean.

An equivalent hatchback model is also retailed under the Corolla nameplate, but this is actually a rebadged Auris released earlier in For the sedan version, which is imported from Thailand, there are three different variants: The Corolla sedan and hatchback Auris were together in the top selling car in Australia. All engines are mated to a standard six-speed manual transmission while a CVT is available for the 1. At the rear the chrome strip is thinner and the tail lamps adopt new LED clusters. This design was adopted from the Furia concept. North-American models were announced first on June 6, ; European models, announced the day after, differed mostly outside with their front-end treatment. Hints of the swept windshield and sloped roofline suggest the brand will follow the industry trend toward raked rear ends and more aerodynamic body shapes. The components of the tilt, telescopic-steering structure help improve steering rigidity and reduce vibration. A more structurally-rigid intermediate shaft increases the direct feel of steering. Smart Stop Technology brake-override system will also be included standard, as well as electronic tire pressure monitoring system. Different inch aluminum alloy wheels are offered on the LE, and LE Eco, and inch alloy wheels are offered on the S. With the exception of the LE Eco trim, the 1. Valvematic offers a broader range of continuously variable valve timing lift and phasing over VVT-i, providing more optimal intake valve not on exhaust side operation relative to engine demands conferring a five-percent improvement in fuel economy and engine output. The six-speed manual is also available in the Corolla S. A six-speed manual transmission is available on the Corolla L and S grades. Drive modes that offer re-calibrated throttle, transmission and steering responses are available on the Corolla LE Eco and Corolla S. For ECO drive mode on the LE Eco, the initial throttle inputs are less sensitive to help encourage more fuel-efficient driving and eliminate sudden starts. A transmission fluid warmer was added, reducing warm-up time, and lower viscosity CVT fluid improves efficiency. Its new fluid pump reduces parasitic loss at high speeds. The S trim offers a manual-mode shift gate in the console shifter, or paddle shifters on the steering wheel allowing sequential "shifts" through 7 speeds, addressing complaints that earlier pulley-type CVTs had a "rubber band" feel when accelerating because of the lag as the transmission entered its power band. Hydraulic pressure was reduced to an optimal point to protect against belt slippage, while conserving drive effort to limit excess pumping losses in the new design; also, the oil pump features a coaxial 2-port design that enables a percent reduction in pump drive torque, lowering its parasitic draw on the engine. The air conditioning operation is also controlled, with compressor power reduced, and the utilization of recirculation mode, as well as increasing the time to reach a desired temperature. S trim models with CVTi-S have steering wheel mounted paddle shifters, while the console shifter also offers a manual gate M-position that also allows drivers to make brisk upshifts or downshifts using the shift lever. An appropriate shift will automatically be engaged if the engine revolutions become high enough or down shifted if they become low enough. The spring rates on Corolla are relaxed, but the S model equipped with inch wheels includes unique coil, damper, and bushing tuning to offering stiffer handling. The unibody has been made more rigid, featuring additional unibody bracing tunnel brace and rear floor brace to complement suspension tuning. It makes extensive use of high-strength steel to improve the rigidity of the structure, keeping vehicle curb weight under 2, pounds for all grades. High tensile-strength steel allows for reduced thickness and optimized shape of structural panels and increases strength to improve collision performance. Corolla is expected to perform very well in collision safety ratings test. The rear passenger floor was also made flatter by re-routing exhaust pipes beneath the vehicle to offer better middle position foot room. Rear seat comfort is also enhanced with the use of denser urethane pads and foam inserts within the seats. The Corolla will be available in four trim levels L, LE, LE Eco, and S that offer a wide range of popular features to help distinguish each trim level. It has gloss black-painted inch alloy wheels, red stitching on its black steering wheel, shift knob, door trim, and seats, Special Edition floor mats and trunk

emblem. In Canada, this model is called the 50th Anniversary Limited Edition. The interior added a new seven-inch touch screen and four-inch multi-information display. The lower intake is trapezoidal-shaped like the regular non-sport grade North American Corolla, but for China features a chrome surround. However, the reshaped trunk lid has the Toyota logo moved upwards to make way for the dominating chrome strip that bridges the tail lamps. However, the inner portion that sit upon the trunk lid are resigned.

Chapter 2 : Toyota Echo Engine | eBay

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The facelift version was launched in April. This model does not have airbags, ABS or power windows. It is only offered in two colours, black and white. The GLi is offered with the same 1. No airbags are offered on this model. Metallic colours are available in the GLi. The Corolla diesel has 2 trim levels: The model does not have airbags, ABS or power windows. The model is only available with a 5-speed manual. Optional extra on the model is the sunroof. The facelift for the Corolla was launched on 11 April. Initially only the XLi and GLi trims were available, with modifications to the front and rear lights, front grill, and bumpers, along with a revised interior colour scheme. The facelift Altis was launched in May. The Altis comes equipped with sideskirts, wooden inserts in the interior, optitron speedometer, 5-spoke alloy rims, fog lamps, power windows, power seats, ABS with EBD, driver side SRS airbag and a 6-speed forward manual transmission. Optional on the Altis is a 4-speed super ECT automatic transmission and sunroof. This version of the GLi is the same as the 1. It has three variants, the 2. All variants have a slight increase in power and are equipped with Dual VVT-i technology. It now has a redesigned front and rear fascia and updated wheel designs. It now has powered windows and central-locking doors as standard. It has 4 variants: It has a mesh grille instead of the bar-type, smoked High Intensity Discharge HID headlamps with Manual Levelling and rear combination lamps, wipers with Auto Rain Sensor, Leather Seats, powered seats, mirrors and windows, and sports package pre-installed. It is only available with a 4-speed Automatic Transmission. Has the same specs as the V variant without leather seats. Singapore Corolla Altis 1. Only automatic transmissions were available to meet Euro IV emissions standards. In September, the facelifted model of the Altis was introduced and it is the same as the Thai and Malaysian models utilising the latest Dual VVT-i engines. The Altis in Singapore are marketed in both 1. Grades available are the standard X variant and the higher-spec G variant. The petrol version is offered with the 1. Thailand is currently the only country that offers all existing grades of the new Altis, whilst export markets are only given a fraction of the Thai range in varying combinations. The XRS also has a spoiler and underskirts like the S, but it has a larger 2. The base standard and CE and S trims are available with either a five-speed manual or four-speed automatic transmission, while the LE unlike the previous generation and XLE are automatic only. The XRS grade is equipped with the 2. Toyota carried over the

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Toyota 2NZ-FE engine reliability, problems and repair. The 2NZ-FE appeared in and replaced the Toyota 4E engine. That new engine uses a modified 1NZ cylinder block. It is of a diminished height.

They were designed specially for small class vehicles. The NZ consists of only two motors: The engine is designated for 5A-FE replacing. In contrast to its predecessor, a light aluminium cylinder block, a brand new crankshaft, pistons, connecting rods and others were used here. While making all that, a cylinder head with a VVTi variable valve timing system was run on the inlet camshaft. Since the 1NZ hydraulic lifters have started to be assembled. It was necessary to adjust the valves at all the previous motors each 12,000 miles, 20,000 km of mileage. The 5A engine was fitted with a timing belt. The 1NZ engine has got a single-row timing chain with a 8-mm pitch of chain. In general, the engine is more like Toyota ZZ models. Nowadays the 1NZs are still being produced. The 1NZ-FE model present is a basic motor. It works by Atkinson cycle with a little bit delayed inlet valve closure. An updated model possesses a compression ratio of 10.5. After running more than 100,000 miles, 160,000 km of mileage, 1NZ engines can start excessively consuming oil. If that happens, you need to replace valve stem seals and piston rings. It is also typical of the 1ZZ motor. If any, your timing chain has been strained. That is common with engines running more than 100,000 miles, 160,000 km of mileage. In order to handle the problem, you must get a new timing chain. One also should inspect the timing chain tensioner. If any, the problem can be solved by cleaning a throttle body unit and idle control valve. It is induced by a worn-out 1NZ alternator belt. You should check it. You should check engine mounts, especially the anterior one. If everything is alright, clean injectors and replace the fuel filter. That will help to eliminate vibrations. Apart from the above-mentioned things, the oil pressure switch is frequently disarranged, and the rear crankshaft oil seal leaks time after time. So, after running 100,000 miles, 160,000 km, you will probably have to purchase a new 1NZFE engine. Protecting yourself from all these troubles is easy as a piece of cake. You should use a high quality engine oil suggested by a manufacturer and do a regular maintenance of your 1NZ. The 3rd and 4th cylinders are located there. You can assemble such a kit on your own. At 9 psi 0. In any case, a 1. Besides, one can perform NA tuning, get performance camshafts JUN, springs, valves, cold air intake, do port and polish, replace the intake manifold, throttle body, purchase a header, and adjust the ECU. These upgrades help us intensify maximal engine rpm and reach higher rate of capacity. The most popular and cheapest Blitz is bolt on the stock internals and develops about 100 horsepower at 7 psi 0. If these things are added with forged pistons fitted to a compression rate of 9 and JUN camshafts duration deg, lift 9.

Chapter 4 : Toyota NZ engine - Wikipedia

Toyota 4A-5A-7A Engine Repair Manual - Manual for maintenance and repair of Toyota engines models 4A-F / 4A-FE / 4A-GE / 5A-F / 5A-FE / 7A-FE. Toyota 4AGE Engine Repair Manual - Manual for maintenance and repair of the Toyota 4A-GE engine.

The VVT-i controller was installed on the front of the intake camshaft and consisted of: The housing driven from the timing chain; and, The vane coupled with the intake camshaft. The camshaft timing oil control valve controlled the position of the spool valve according to signals from the ECU – this enabled hydraulic pressure to be applied to the VVT-i controller advance or retard side and cause rotation in the VVT-i controller vane circumferential direction. The ECU used signals from the camshaft position sensor and crankshaft position sensor to detect actual valve timing, thus providing feedback control to achieve the intended timing. When the engine was stopped, the intake camshaft would be in its most retarded pressure for easy starting. When hydraulic pressure was not applied to the VVT-i controller immediately after the engine was started, the lock pin prevented movement of the VVT-i controller. Intake and throttle The 2NZ-FE engine had a plastic intake manifold to reduce mass and limit heat transfer from the cylinder head. Furthermore, the intake manifold had a mesh type gasket to reduce intake noise. Injection and ignition The 2NZ-FE engine had sequential fuel injection via hole injectors that were fitted in the intake port in the cylinder head. The 2NZ-FE engine had pentroof-type combustion chambers and operated at a compression ratio of The 2NZ-FE engine used long-reach iridium-tipped spark plugs to increase the thickness of the surrounding cylinder head and so that the water jacket could be extended near the combustion chamber. The iridium-tipped spark plugs had , kilometre replacement intervals. Exhaust and emissions The 2NZ-FE engine had a long branch-type stainless steel exhaust manifold to improve torque at low to medium engine speeds. Furthermore, the 2NZ-FE engine had a rearward exhaust layout and double-wall construction for the exhaust pipe which connected to the three-way catalytic converter TWC – this contributed to faster warm-up of the TWC. Ball joints were used for coupling the exhaust manifold to the front pipe and the exhaust pipe to the main muffler. The muffler included a spring control valve that could vary the length and resistance of exhaust gas flow. The valve opened steplessly when exhaust gas pressure overcame spring pressure. As a result, the valve would be closed at lower engine speeds to reduce exhaust noise and open at higher engine speeds to reduce back pressure and increase power output. To reduce emissions, the 2NZ-FE engine had a returnless fuel system to reduce evaporative emissions. To reduce emissions, The Toyota XP10 Echo had three vacuum switching valves VSVs and a vapor pressure sensor that were used to detect any evaporative emission leakage between the fuel tank and charcoal canister by measuring changes in fuel tank pressure. As a result, Piston shape was changed; The shape of the exhaust manifold was modified; Construction of the three-way catalytic converter was changed; An additional three-way catalytic converter was fitted; Cooling fan control was added; and, A 32 bit ECU was introduced previously 16 bit.

Chapter 5 : Toyota 2NZ-FE Engine | Specs, turbo, oil capacity, problems

Toyota's 2NZ-FE was a litre four-cylinder petrol engine that was first introduced in the Toyota XP10 Echo. A member of Toyota's 'NZ' engine family, the 2NZ-FE was closely related to the litre 1NZ-FE engine.

Aqua 10, Prius Oddly enough, but the first in NZ series was the specific "hybrid" modification, which had quite a few differences from the followed traditional versions - from "Atkinson cycle" and compression ratio to initially implemented ETCS. However, we will not change out principle in relation to the hybrids - "aut nihil". Engine mechanical The cylinder block - aluminum "open deck" with thin cast iron liners. The liners are fused into block and their special rough outer surface promotes strong connection. Of course, no overhaul with reboring provided. The massive alloy crankcase mounted to block also performs the function of the sump upper part. Forged steel crankshaft with 5 journals and 4 balance weights is held by individual main bearing caps. The axis of the crankshaft has been shifted by 12 mm relative to the cylinder axis lines "desaxage", thus reducing the lateral component of the force exerted by the piston to the cylinder wall, reducing wear. Disadvantage - press-fit piston pins, not full-floating type, although in practice it is still not caused real problems. Cylinder head of traditional design, with standard valve seats and holes for injectors. Timing drive - valve DOHC, driven by single-row roller chain pitch 8 mm, with hydraulic tensioner with ratchet mechanism and lubricated by separate oil nozzle. The valve clearance is adjusted by a set of tappets, without adjusting washers or lash adjusters. For some regions specific modifications of 2NZ-FE was produced - for leaded gasoline, without VVT, without converter and relative components. Lubrication system Trochoid oil pump in chain cover is driven directly by the crankshaft. The oil filter is located vertically under the engine. Cooling system The cooling system is classic for the 3rd wave engine: A - from radiator, B - to radiator, C - from heater, D - to heater, E - to throttle body. Intake and exhaust New manifolds location: Fuel injection - traditional multipoint, sequential under normal conditions. In some conditions low temperature and low speed paired injection can be performed. In addition, injection can be also performed synchronized once per cycle at the same position of the crankshaft, with managed time of injection or unsynchronized by all injectors simultaneously. Fuel system - without a return line, with the pressure regulator and the fuel filter built in pump module, the fuel pressure - about kPa. Pulsation damper mounted on fuel rail. The injectors with multi-hole nozzle are used to improve dispersion of fuel. Throttle drive - mechanical, idle speed control - classic "rotary solenoid". Oxygen sensor installation variants - upstream catalyst domestic market or upstream and downstream catalyst overseas markets. Ignition system - DIS-4 separate coil with integrated igniter for each cylinder. Auxiliary drive - by single serpentine belt, without tensioner tension adjusting - by alternator moving. DC motor, dual-channel contactless position sensor Hall effect, separate accelerator pedal position sensor. A - "flat" type, B - resonance type. The fuel rail serves as a pressure pulsation damper. System is used to reduce combustion temperature, decrease content of nitrogen oxides in the exhaust gases, reduce pumping losses at the inlet. Exhaust gases from the exhaust manifold pass through a cooler and via channel in the cylinder head flows to the valve. EGR valve is driven by a stepper motor. Exhaust gases from the valve flows into EGR manifold, which uniform stream of gases in each cylinder. This "well-forgotten old" solution was serious deterioration for 1NZ-FE. Technology of engine self-poisoning by exhaust gas and soot deposits in the intake - is unambiguous evil, especially for small-displacement gasoline engine. At the first opportunity in almost any car EGR line should be plugged, but in this case simple solution will not work - Toyota provided the system operation control by EGR temperature sensor. Overhaul with replacement of piston rings and valve seals makes sense in case of indecent oil burning ml. Strange related defect - oil leaks inside the crankshaft position sensor and then to sensor connector cause signal missing recall issued for early s engines. Note, early actuator modification was recognized as subject to replacement by modified Together with chain replacement it would be appropriate also replace other components sprockets, tensioner, guides. Another note is not directly related to the design features of these motors. Gradually increasing weight of cars the influence of passive safety requirements and expanding standard equipment list, increasing pressure of emission standards, significantly changed the unspoken standards of thrust-weight ratio And once conditionally tolerant specs of

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2NZ-FE does not correspond to modern requirements for power and torque, while 1NZ-FE specs can be considered normal only for light-weight B-class cars. However, even for C-class or domestic D-class these engines can no longer provide adequate dynamics. Well, all those for whom 1NZ-FE power is enough, can be satisfied - they have one of so rare successful modern engines under the hood.

Chapter 6 : 2NZ-FE Toyota engine

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