

1: Hino Service and Repair Manuals

hino eh diesel engine workshop service manual This PDF service manual will show you every nut and bolt on your vehicle. With hundreds of pages, it will show you how to distinguish any problem (from an oil change to a transmission swap) and how to fix it on your own.

About Hino The diesel engine also known as a compression-ignition engine is an inner combustion engine that uses the heat of compression to initiate ignition and burn the fuel that happens to be injected into the combustion chamber. This contrasts with spark-ignition engines such as a petrol engine gasoline engine or gas engine using a gaseous fuel as opposed to gasoline , which use a spark plug to ignite an air-fuel mixture. The diesel engine gets the greatest thermal efficiency of any standard internal or external burning engine due to its very high compression ratio. Diesel engines are manufactured in two-stroke and four-stroke versions. They were originally used as a much more efficient replacement for stationary steam engines. Because the s they have been used in submarines and ships. Use in locomotives, trucks, hefty gear and electric generating plants followed later on. In the s, they slowly began to be made use of in a couple of automobiles. Since the s, the use of diesel engines in larger on-road and off-road vehicles in the USA increased. Diesel engines have the lowest specific fuel consumption of any large internal combustion engine employing a single cycle, 0. Two-stroke diesels with large pressure forced induction, particularly turbocharging, make up a large percentage of the very largest diesel engines. In North America, diesel engines are primarily used in large trucks, where the low-stress, high-efficiency period leads to much longer engine life and lower working costs. These advantages also make the diesel engine ideal for use in the heavy-haul railroad environment. The nozzle opening had been closed by a pin valve lifted by the camshaft to initiate the fuel injection before leading dead centre TDC. This is called an air-blast injection. Driving the three stage compressor used some power but the effectiveness and net power output ended up being even more than any other combustion engine at that time. Diesel engines in service today raise the fuel to extreme pressures by mechanical pumps and provide it towards the combustion chamber by pressure-activated injectors without compressed air. With direct injected diesels, injectors spray fuel through 4 to 12 small orifices in its nozzle. The early air injection diesels always had a superior burning without the sharp increase in pressure during combustion. With much higher pressures and high technology injectors, present-day diesel engines make use of the so-called solid injection system used by Herbert Akroyd Stuart for his hot bulb engine. The indirect injection engine could be considered the newest development of these low speed hot bulb ignition engines. A vital component of all diesel engines is mechanical or digital governor which regulates the idling speed and maximum speed of the engine by controlling the rate of fuel delivery. Unlike Otto-cycle engines, incoming air is not throttled and a diesel engine without a governor cannot have a stable idling speed and can easily overspeed, leading to its destruction. These systems use a combination of springs and weights to control gas delivery relative to both load and speed. Modern electronically controlled diesel engines control fuel delivery by use of an electronic control module ECM or digital control unit ECU. Controlling the timing of the beginning of injection of fuel into the cylinder is a key to minimizing emissions, and maximizing fuel economy efficiency , of the motor. The timing is measured in degrees of crank angle of the piston before top dead centre. Optimal timing will rely on the engine design as well as its load and speed, and is generally BTDC in 1., HP, net, "medium speed" locomotive, marine and stationary diesel engines. Advancing the start of injection injecting prior to the piston reaches to its SOI-TDC results in greater in-cylinder pressure and temperature, and greater efficiency, but also results in increased engine noise due to faster cylinder pressure rise and increased oxides of nitrogen NOx formation due to higher burning temperatures. Delaying start of injection causes incomplete combustion, decreased fuel efficiency and an enhance in exhaust smoke, containing a considerable amount of particulate matter and unburned hydrocarbons. The term Indirect injection, in an internal burning engine, refers to fuel injection where fuel is not directly inserted into the combustion chamber. Gasoline motors are generally equipped with indirect injection systems, wherein a fuel injector delivers the fuel at some time before the intake valve. An indirect injection diesel engine delivers gasoline into a chamber off the combustion chamber, called a prechamber,

where combustion begins and then spreads into the primary combustion chamber. The prechamber is carefully made to ensure sufficient blending of the atomized fuel with the compression-heated air. The purpose of this divided combustion chamber is to speed up the combustion procedure, to be able to increase the power output by increasing engine rate. The addition of a prechamber, nevertheless, boosts heat loss to the cooling system and thereby lowers engine efficiency. The engine requires glow plugs for starting. In an indirect injection system the environment moves fast, mixing the fuel and environment. This simplifies injector design and enables the employment of smaller engines and less tightly toleranced designs which are simpler to manufacture and much more reliable. Direct injection, by contrast, uses slow-moving atmosphere and fast-moving fuel; both the design and manufacture of the injectors is more difficult. The optimisation of the in-cylinder air flow is much more difficult than designing a prechamber. There is a great deal more integration between the design of the injector and also the engine. Information technology is for this reason that car diesel engines were nearly all indirect injection until the ready accessibility of powerful CFD simulation systems made the adoption of direct shot practical. Information technology consists of a spherical chamber located in the cylinder head and divided from the engine cylinder by a tangential throat. After combustion, the products return through the exact same throat to the main cylinder at much higher velocity. So more heat loss to walls of the passage takes place. This kind of chamber finds application in engines in which fuel control and engine stability are more important than fuel economy. These are Ricardo chambers. The air cell is a small cylindrical chamber with a hole in a single end. It is mounted more or less coaxially with the injector, said axis being parallel to the piston crown, with the injector firing across a small cavity which is available to the cylinder into the hole within the conclusion of the air cellular. The air cellular is mounted therefore as to minimise thermal contact with the mass associated with the head. A pintle injector with a slim spray pattern is used. At TDC the vast majority of the charge mass is contained in the cavity and air cell. When the injector fires, the jet of fuel enters the air cell and ignites. This leads to a jet of flame shooting back out of the air cell directly into the jet of fuel still issuing from the injector. The turbulence and heat give excellent gas vaporisation and blending properties. Also since the majority of the combustion requires place outside the environment cell within the cavity, which communicates directly utilizing the cylinder, there is much less temperature loss involved in transferring the burning charge to the cylinder. Air cell injection can be looked at as a compromise between direct and indirect injection, gaining a few of the efficiency advantages of direct injection while retaining the ease and simplicity of development of indirect injection. At best such types differ only in the cylinder head and the demand to fit a distributor and spark plugs in the petrol version whilst fitting a shot pump and injectors to the diesel. Such styles allow petrol and diesel versions of the same vehicle to be built with minimal design modifications between them. Higher engine speeds can be reached, since burning continues in the prechamber. In cold weather condition, high speed diesel engines can be difficult to start because the mass of the cylinder block and cylinder head absorb the heat of compression, preventing ignition as a result of the higher surface-to-volume proportion. Pre-chambered engines make usage of small electric heaters inside the pre-chambers called glowplugs, while the direct-injected engines have these glowplugs in the combustion chamber. Many engines use resistive heaters within the intake manifold to warm the inlet air for starting, or until the motor reaches running temperature. Engine block heaters electric resistive heaters in the motor block connected to the utility grid are used in cold environments whenever an engine is turned off for extended periods more than an hour, to reduce startup engine and time wear. Block heaters are also used for emergency power standby Diesel-powered generators which must rapidly pick up load on an energy failure. In the past, a wider variety of cold-start methods were used. Some engines, such as Detroit Diesel engines used a system to present small amounts of ether into the inlet manifold to start burning. Others used a mixed system, with a resistive heater burning methanol. An impromptu method, particularly on out-of-tune motors, is to manually spray an aerosol can of ether-based motor starter fluid into the intake air flow usually through the intake air filter assembly. Most diesels are now turbocharged and some are both turbo charged and supercharged. Because diesels do not have fuel in the cylinder before combustion is initiated, one or more bar kPa of air can be loaded in the cylinder without preignition. A turbocharged engine can produce significantly more energy than a naturally aspirated engine of the same configuration, as having more air in the cylinders allows more

fuel to be burned and thus more power to be produced. Turbocharging can enhance the fuel economy of diesel engines by recovering waste heat from the exhaust, increasing the excess air factor, and increasing the ratio of engine output to friction losses. A two-stroke engine does not have a discrete exhaust and intake stroke and thus is incapable of self-aspiration. Therefore all two-stroke engines must be fitted with a blower to charge the cylinders with air and assist in dispersing exhaust gases, a procedure referred to as scavenging. Sometimes, the engine may additionally be fitted with a turbocharger, whose output is directed into the blower inlet. A few styles employ a hybrid turbocharger a turbo-compressor system for scavenging and asking the cylinders, which device is mechanically driven at cranking and low speeds to act as a blower, but which will act as a true turbocharger at higher speeds and loads. A hybrid turbocharger can revert to compressor mode during instructions for large increases in engine output power. As supercharged or turbocharged engines produce more power for a given engine dimensions as compared to naturally aspirated attention, engines must be compensated to the mechanical design of components, lubrication, and cooling to handle the power. Pistons are usually cooled with lubrication oil sprayed on the bottom of the piston. Large engines may use sea, water water, or oil supplied through telescoping pipes attached to the crosshead. As with petrol engines, there are two classes of diesel engines in current use: It is additionally the most frequently used form, becoming the preferred power source for many motor vehicles, especially trucks and buses. Much larger engines, such as useful for railway locomotion and marine propulsion, are often two-stroke units, offering an even more favourable power-to-weight ratio, in addition to better fuel economic climate. The most powerful engines in the world are two-stroke diesels of mammoth dimensions. Two-stroke diesel engine procedure is similar to that of petrol counterparts, except that fuel is not mixed with air before induction, and the crankcase does not take an active role in the period. The traditional two-stroke design relies upon a mechanically driven positive displacement blower to recharge the cylinders with air before compression and ignition. The charging process also assists in expelling scavenging combustion fumes continuing to be from the previous power stroke. The archetype of the modern form of the two-stroke diesel is the high-speed Detroit Diesel Series 71 motor, developed by Charles F. The extremely much larger medium-speed Electro-Motive Diesel motor is used as the prime mover in EMD diesel-electric locomotive, marine and stationary applications, and was developed by the same team, and is built to the same principle. The environment movement blows the remaining combustion gases from the cylinderâ€™this is the scavenging process. Because the piston passes through bottom centre and starts up, the passageway is closed and compression commences, culminating in fuel injection and ignition. Refer to two-stroke diesel engines for more detailed coverage of aspiration types and supercharging of two-stroke diesel engines. Normally, the number of cylinders are used in multiples of two, although any number of cylinders can be used as long as the load on the crankshaft is counterbalanced to prevent excessive vibration. The inline-six-cylinder design may be the many respected in light- to medium-duty engines, though small V8 and larger inline-four displacement engines are also common. Small-capacity engines generally considered to be those below five litres in capacity are generally four- or six-cylinder kinds, with the four-cylinder being the most common type found in automotive utilizes. Five-cylinder diesel engines have actually also already been created, becoming a compromise between the sleek running of the six-cylinder and the space-efficient dimensions of the four-cylinder. Diesel engines for smaller sized plant machinery, ships, tractors, generators and pumps may be four, three or two-cylinder types, with the single-cylinder diesel engine remaining for light stationary work.

2: Hino 6 Eh EhTi Operators Manual

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