

Direct Injection System For A Two Stroke Engine

A practical guide to modifying and tuning modern electronic fuel injection (EFI) systems, including engine control units (ECUs). The book starts out with plenty of foundational topics on wiring, fuel systems, sensors, different types of ignition systems, and other topics to help ensure the reader understands how EFI Systems work. Next the book builds on that foundation, helping the reader to understand the different options available: Re-tuning factory ECUs, add on piggyback computers, or all out standalone engine management systems. Next Matt and Jerry help the reader to understand how to configure a Standalone EMS, get the engine started, prep for tuning, and tune the engine for maximum power and drivability. Also covered is advice on tuning other functions-- acceleration enrichments, closed loop fuel correction, and more. Finally, the book ends with a number of case studies highlighting different vehicles and the EMS solutions that were chosen for each, helping to bring it all together with a heavy emphasis on how you can practically approach your projects and make them successful!

Common Rail Fuel Injection Technology in Diesel EnginesWiley

The familiar yellow Technical Instruction series from Bosch have long proved one of their most popular instructional aids. They provide a clear and concise overview of the theory of operation, component design, model variations, and technical terminology for the entire Bosch product line, and give a solid foundation for better diagnostics and servicing. Clearly written and illustrated with photos, diagrams and charts, these books are equally at home in the vocational classroom, apprentice's toolkit, or enthusiast's fireside chair. If you own a European car, you have Bosch components and systems. Each book deals with a single system, including a clear explanation of that system's principles. They also include circuit diagrams, an explanation of the Bosch model numbering system, and a glossary of technical terms. This reference book provides extensive information on state-of-the-art diesel fuel-injection technology. Designed to be a single reference source for diesel engine and fuel-injection systems, Diesel Fuel Injection provides detailed descriptions of the diesel engine's principles of operations and its fuel-injection components, including: -- Diesel combustion -- Diesel engine -- Diesel cycle and operation -- Diesel fuels -- Fuel management -- In-line injection pumps -- Fuel-injection systems -- PE in-line injection pump -- Diesel engine governors -- Electronic Diesel Control (EDC) -- Single-cylinder injection pumps -- Distributor injection pumps -- Add-on modules and shutoff devices -- Peripheral equipment -- Nozzles and nozzle holders -- Start-assist systems

The main goal of the book is the presentation of the last theoretical and experimental works concerning fuel injection systems, mainly in small power two-stroke engines as well as in marine engines. This book includes thirteen chapters devoted to the processes of fuel injection and the combustion that takes place in a stratified charge within the cylinders of two-stroke engines. In the first two chapters, the division into different injection systems in two-stroke engines and each injection system is briefly described. Various theoretical and practical solutions of fueling system designs are described. In Chapter Three, mathematical models, the spatial movement of gas in the cylinder and the combustion chamber are introduced, taking into account the turbulence of the charge. Chapter Four relates to the behavior of fuel injected into the gaseous medium, including evaporation processes, disintegration and processes occurring while the fuel drops connect with the wall. The next section describes the zero-dimensional model of fuel injection in two-stroke engines along with examples of numerical calculations. The sixth chapter is devoted to CFD multi-dimensional models of movement and evaporation of the fuel in a closed gaseous medium, occurring also in other engine types. Chapter Seven describes a two-zone model of the combustion process and the effect of the geometry of the combustion chamber on the flame propagation with a simplified verification model of combustion. Chapter Eight compares the propagation phase of gas and liquid fuels concerning direct fuel injection as well as the direct fuel injection from the cylinder head and the thermodynamic parameters of the charge. The formation of the components during the combustion process in the direct fuel injection two-stroke engine was obtained by numerical calculations and results are discussed in Chapter Nine. Chapter Ten describes the parameters of the two-stroke engine with a direct fuel injection carried out at the Cracow University of Technology. Additionally, the chapter presents CFD simulations of fuel propagation and combustion processes, taking into account the formation of toxic components and exhaust gas emission. The processes of two direct rich mixture injection systems FAST and RMIS developed in CUT are presented in Chapter Eleven. Miscellaneous problems of direct fuel injection, such as characteristics of fuel injectors, problems of direct gaseous fuel injection, and the application of fuelling systems in outboard engines and snowmobile vehicles are presented in Chapter Twelve. A comparison of working parameters in two- and four stroke engines is also mapped out. The last chapters contain the final conclusions and remarks concerning fuel injection and emission of exhaust gases in small two-stroke engines. This book is a comprehensive monograph on fuel injection. The author presents a series of theoretical and design information from his own experience and on the basis of the works of other authors. The main text intends to direct fuel injection with respect to gas motion in the combustion chamber and influence the injection parameters for exhaust emission. The book presents its own theoretical work and experimental tests concerning a two-stroke gasoline engine with electrically controlled direct fuel injection. The book describes the processes of a general nature also occurring in other types of engines and presents a comparison of different injection systems on working parameters and gas emission. The book contains 294 images, 290 equations and 16 tables obtained from the CFD simulation and experimental works.

A wide-ranging and practical handbook that offers comprehensive treatment of high-pressure common rail technology for students and professionals In this volume, Dr. Ouyang and his colleagues answer the need for a comprehensive examination of high-pressure common rail systems for electronic fuel injection technology, a crucial element in the optimization of diesel engine efficiency and emissions. The text begins with an overview of common rail systems today, including a look back at their progress since the 1970s and an examination of recent advances in the field. It then provides a thorough grounding in the design and assembly of common rail systems with an emphasis on key aspects of their design and assembly as well as notable technological innovations. This includes discussion of advancements in dual pressure common rail systems and the increasingly influential role of Electronic Control Unit (ECU) technology in fuel injector systems. The authors conclude with a look towards the development of a new type of common rail system. Throughout the volume, concepts are illustrated using extensive research, experimental studies and simulations. Topics covered include: Comprehensive detailing of common rail system elements, elementary enough for newcomers and thorough enough to act as a useful reference for professionals Basic and simulation models of common rail systems, including extensive instruction on performing simulations and analyzing key performance parameters Examination of the design and testing of next-generation twin common rail systems, including applications for marine diesel engines Discussion of current trends in industry research as well as areas requiring further study Common Rail Fuel Injection Technology is the ideal handbook for students and professionals working in advanced automotive engineering, particularly researchers and engineers focused on the design of internal combustion engines and advanced fuel injection technology. Wide-ranging research and ample examples of practical applications will make this a valuable resource both in education and private industry.

The proceedings of a seminar organised by the Combustion Engines Group of the Institution of Mechanical Engineers, held at the Institute of Mechanical Engineers in October 1989.

This Bosch Bible fully explains the theory, troubleshooting, and service of all Bosch systems from D-Jetronic through the latest Motronics. Includes high-performance tuning secrets and information on the newest KE- and LH-Motronic systems not available from any other source.

This complete manual includes basic operating principles of Bosch's intermittent fuel injection systems; D-L- and LH-

Jetronic, and LH-Motonic tuning and troubleshooting intermittent systems; and high-performance applications.

Inject lags were determined for a common-rail fuel injection system for a compression-ignition engine. The system investigated consisted of a high-pressure reservoir, a timing valve, an injection valve tube, and an automatic injection valve. The injection lag time was the time interval between the opening of the timing valve and the start of the fuel spray from the automatic injection valve.

A guide to modifying and tuning modern electronic fuel injection (EFI) and electronic control unit (ECU) systems. Includes sections on standalones, an overview of EFI systems components and basic operation, and much more.

Stratified Charge Combustion in a Spark-Ignition Engine With Direct Injection System.

Please note that the content of this book primarily consists of articles available from Wikipedia or other free sources online. Pages: 33. Chapters: Anti-dribble valve, Digifant Engine Management system, Electronic control unit, Engine control unit, Envirofit International, Fuel injection, Fuel rail, Gasoline direct injection, Indirect injection, Injection pump, Jacketed fuel injection pipe, Jetronic, Kugelfischer, Lucas 14CUX, MegaSquirt, Motronic, Orbital Corporation, Powertrain control module, SDI (engine), SPICA, Turbocharged Direct Injection, VEMS. Excerpt: Fuel rail connected to the injectors that are mounted just above the intake manifold on a four-cylinder engine. Fuel injection is a system for admitting fuel into an internal combustion engine. It has become the primary fuel delivery system used in automotive engines, having replaced carburetors during the 1980s and 1990s. A variety of injection systems have existed since the earliest usage of the internal combustion engine. The primary difference between carburetors and fuel injection is that fuel injection atomizes the fuel by forcibly pumping it through a small nozzle under high pressure, while a carburetor relies on suction created by intake air accelerated through a Venturi tube to draw the fuel into the airstream. Modern fuel injection systems are designed specifically for the type of fuel being used. Some systems are designed for multiple grades of fuel (using sensors to adapt the tuning for the fuel currently used). Most fuel injection systems are for gasoline or diesel applications. The functional objectives for fuel injection systems can vary. All share the central task of supplying fuel to the combustion process, but it is a design decision how a particular system is optimized. There are several competing objectives such as: The modern digital electronic fuel injection system is more capable at optimizing these competing objectives consistently than earlier fuel delivery systems (such as...

Instantaneous successive spectral infrared (IR) images were obtained from a spray plume in a direct injection (DI) type compression-ignition (CI) engine during the compression and combustion periods. The engine equipped with a high pressure electronic-controlled fuel injector system was operated by using D-2 Diesel fuel. In the new imaging system used for the present study, four high-speed IR cameras (with respective band filters in front) were lined up to a single optical arrangement containing three spectral beam splitters to obtain four spectral images at once. Two band filters were used for imaging the water vapor distribution and another two band filters were placed for capturing images of combustion chamber wall or soot formation. The simultaneous imaging was successively triggered by signals from an encoder connected to the engine. The fuel injection parameters were precisely controlled and the pressure-time (p-t) history was obtained for individual sets of images. The start of fuel injection was varied through four different crank angle positions. Mentioning some results from the study, the spectral IR images had no resemblance with the ones obtained using a visible-range camera from a comparable engine system as reported by others. In general, the present spectral images taken at the same crank angle were not mutually comparable.

The process of fuel injection, spray atomization and vaporization, charge cooling, mixture preparation and the control of in-cylinder air motion are all being actively researched and this work is reviewed in detail and analyzed. The new technologies such as high-pressure, common-rail, gasoline injection systems and swirl-atomizing gasoline fuel injections are discussed in detail, as these technologies, along with computer control capabilities, have enabled the current new examination of an old objective; the direct-injection, stratified-charge (DISC), gasoline engine. The prior work on DISC engines that is relevant to current GDI engine development is also reviewed and discussed. The fuel economy and emission data for actual engine configurations have been obtained and assembled for all of the available GDI literature, and are reviewed and discussed in detail. The types of GDI engines are arranged in four classifications of decreasing complexity, and the advantages and disadvantages of each class are noted and explained. Emphasis is placed upon consensus trends and conclusions that are evident when taken as a whole; thus the GDI researcher is informed regarding the degree to which engine volumetric efficiency and compression ratio can be increased under optimized conditions, and as to the extent to which unburned hydrocarbon (UBHC), NO_x and particulate emissions can be minimized for specific combustion strategies. The critical area of GDI fuel injector deposits and the associated effect on spray geometry and engine performance degradation are reviewed, and important system guidelines for minimizing deposition rates and deposit effects are presented. The capabilities and limitations of emission control techniques and after treatment hardware are reviewed in depth, and a compilation and discussion of areas of consensus on attaining European, Japanese and North American emission standards presented. All known research, prototype and production GDI engines worldwide are reviewed as to performance, emissions and fuel economy advantages, and for areas requiring further development. The engine schematics, control diagrams and specifications are compiled, and the emission control strategies are illustrated and discussed. The influence of lean-NO_x catalysts on the development of late-injection, stratified-charge GDI engines is reviewed, and the relative merits of lean-burn, homogeneous, direct-injection engines as an option requiring less control complexity are analyzed.

Direct injection enables precise control of the fuel/air mixture so that engines can be tuned for improved power and fuel economy, but ongoing research challenges remain in improving the technology for commercial applications. As fuel prices escalate DI engines are expected to gain in popularity for automotive applications. This important book, in two volumes, reviews the science and technology of different types of DI combustion engines and their fuels. Volume 1 deals with direct injection gasoline and CNG engines, including history and essential principles, approaches to improved fuel economy, design, optimisation, optical techniques and their applications. Reviews key technologies for enhancing direct injection (DI) gasoline engines Examines approaches to improved fuel economy and lower emissions Discusses DI compressed natural gas (CNG) engines and biofuels

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Volume 2 of the two-volume set Advanced direct injection combustion engine technologies and development investigates diesel DI

combustion engines, which despite their commercial success are facing ever more stringent emission legislation worldwide. Direct injection diesel engines are generally more efficient and cleaner than indirect injection engines and as fuel prices continue to rise DI engines are expected to gain in popularity for automotive applications. Two exclusive sections examine light-duty and heavy-duty diesel engines. Fuel injection systems and after treatment systems for DI diesel engines are discussed. The final section addresses exhaust emission control strategies, including combustion diagnostics and modelling, drawing on reputable diesel combustion system research and development. Investigates how HSDI and DI engines can meet ever more stringent emission legislation Examines technologies for both light-duty and heavy-duty diesel engines Discusses exhaust emission control strategies, combustion diagnostics and modelling

This book provides assistance in choosing and adapting a mixture formation concept for an engine application with known requirements. The book presents both a synthesis of modular concepts based on function characteristics and a system classification following the physical model. Topics are focused on the injection system itself, and specific technical solutions for new concepts are concretely described. Contents Include: Direct Injection as an Element of the Mixture Formation Concept Direct Injection Methods Physical Possibilities and Limits Direct Injection of Liquid Fuel with Damped Speed Influence on the Pressure Wave Direct Injection of Liquid Fuel with Quasi Constant Maximum Pressure Direct Injection of Liquid Fuel with Speed Independent Pressure Modulation Direct Injection of Fuel/Air Pre-Mixture with Mechanical Flow Control Direct Injection of Fuel/Air Pre-Mixture with Electronic Flow Control Injection Law Modulation Injection Systems with Speed Dependent Injection Law Injection Systems with Accumulated Fuel High-Pressure (Common Rail) Injection Systems with Speed Dependent Pressure Wave and Variable Flow Passage Injection Systems with Speed Independent Modulation of the Pressure Wave Injection Systems for Alternative Fuels.

Fuel Injection Systems addresses key issues in fuel delivery and associated technologies which are evolving faster than ever. The rapid technological change has reduced product life cycles resulting in rapid evolution of design and development methods to enable timely delivery of increasingly complex technology. This is vital as the demands on engines are increasingly stringent, especially in the field of emissions, new fuel injection systems are being developed to meet these challenges, not only in passenger cars but also for heavy duty as well as large engine applications. This volume brings together international contributions from the leading experts in industry and the latest research from academia to provide a comprehensive update to all those working in design, development, and manufacturing of fuel injection systems. Contents include: Emission reduction with advanced two-actuator EUI for heavy-duty diesel engines Investigation of a two valve electronically controlled unit injector on a Euro IV heavy duty diesel engine using design of experiment methods Characterization of in-cylinder fuel distribution from an air-assisted fuel injection system using advanced laser diagnostics High contact stress applications of a silicon nitride in modern diesel engines The use of the HLMI (hydraulic leak measurement unit) Komatsu STA 6DI40 water emulsified fuel engine Timely control of diesel combustion using water injection

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The main topic of "Fuel injection in automotive engineering" book is fundamental process that determines the development of internal combustion engines and performances of automotive vehicles. The book collects original works focused on up-to-date issues relevant to improving injection phenomena per se and injection systems as the engine key components.

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Looks at the combustion basics of fuel injection engines and offers information on such topics as VE equation, airflow estimation, setups and calibration, creating timing maps, and auxiliary output controls.

If you want to add one of the slick Holley, ACCEL, or Edelbrock fuel-injection systems to your small-block V-8, or if you want get rid of the black cloud behind your Eclipse after your injector and 20G swap -- you need this book. With information in this book, you'll never have to wonder if your tune is just right -- you'll know it. If it isn't -- you can change it. After a description of what programmable EFI offers its users, author Ben Strader (founder and senior instructor of EFI University) gives a detailed account of what you want to accomplish with your EFI system, then shows you how to get there. You'll learn to: define air and fuel requirements based on horsepower and RPM; set up your base fuel and ignition maps to get things up and running fast; tweak your fuel and timing maps for light- and heavy-load situations; and adjust timing for cold-starting or high-boost conditions In the second section of Building and Tuning High-Performance Electronic Fuel Injection, Strader gives a detailed description of the systems from 11 respected EFI manufacturers. He helps you weigh the info on cost, features, tunability, and ease of installation between the available systems, so you can find the high-performance aftermarket EFI system that's right for you.

Fuel Injection is a key process characterizing the combustion development within Internal Combustion Engines (ICEs) and in many other industrial applications. State of the art in the research and development of modern fuel injection systems are presented in

