

Mitsubishi engine 4b11

Mitsubishi Engine 4B11: A Comprehensive Guide to Performance, Features, and Applications

The Mitsubishi engine 4B11 has gained significant recognition among automotive enthusiasts and industry professionals alike. Known for its innovative design, impressive performance, and adaptability, the 4B11 engine is a cornerstone of Mitsubishi's modern engine lineup. Whether you're considering a vehicle upgrade, seeking maintenance insights, or simply interested in understanding this engine's technical prowess, this article offers a detailed overview of the Mitsubishi 4B11 engine, its features, applications, and why it continues to be a popular choice.

Overview of the Mitsubishi 4B11 Engine

The Mitsubishi 4B11 is a turbocharged, inline-4 engine that belongs to the company's 4B1 engine family. Introduced in the late 2000s, this engine marked a significant step forward in Mitsubishi's engine technology, emphasizing efficiency, performance, and environmental friendliness. It is primarily used in models such as the Mitsubishi Lancer Evolution X, Outlander, and other Mitsubishi vehicles, making it a versatile powertrain option.

Technical Specifications of the Mitsubishi 4B11

Understanding the technical specifications of the 4B11 engine provides insight into its capabilities and design philosophy. Here are some of the key specifications:

- Engine Type:** 2.0-liter inline-4, turbocharged
- Displacement:** 1998 cc
- Maximum Power:** Approximately 291-300 horsepower (varies by application and tuning)
- Maximum Torque:** 300-400 Nm (depending on the version and tuning)
- Fuel System:** Multi-point fuel injection (MPFI)
- Cooling System:** Water-cooled
- Valvetrain:** DOHC (Dual Overhead Camshaft) with 16 valves
- Turbocharger:** Sequential twin-scroll turbocharger for improved spool time and response

The engine's design emphasizes high-revving performance combined with fuel efficiency, making it suitable for sporty driving as well as daily commuting.

Design Features and Innovations

The Mitsubishi 4B11 is distinguished by several innovative features that enhance its performance and reliability:

- 1. Dual Overhead Camshaft (DOHC) Configuration**
The DOHC setup allows for optimal valve timing and better airflow, contributing to higher power output and smoother operation. The 16-valve design ensures efficient combustion and fuel economy.
- 2. Turbocharging with Sequential Twin-Scroll Turbo**
The turbocharger is a core component of the 4B11's performance. The twin-scroll design improves exhaust gas flow, reducing turbo lag and increasing responsiveness. This setup ensures a quicker spool time, providing robust power delivery across the rev range.
- 3. Variable Valve Timing (VVT)**
VVT technology adjusts valve timing dynamically based on engine load and speed, optimizing power, efficiency, and emissions.
- 4. Lightweight Construction**
Engine components are designed with lightweight materials to reduce overall weight, enhancing vehicle handling and fuel efficiency.
- 5. Advanced Cooling System**
Effective cooling prevents overheating during high-performance driving, ensuring durability and longevity.

Performance Capabilities of the Mitsubishi 4B11

The 4B11 engine is renowned for its impressive performance metrics. Its turbocharged design allows for exhilarating acceleration and high top speeds, especially in sporty models like the Mitsubishi Lancer Evolution X.

- 0-60 mph** in approximately 4.5 to 5 seconds (varies based on vehicle setup)
- Top speed** exceeding 155 mph in tuned configurations
- Power-to-weight ratio** optimized for rally and street performance
- High responsiveness** thanks to turbo and VVT technologies

The engine's ability to produce substantial

torque at relatively low RPMs enhances drivability, especially during overtaking or spirited driving.

Applications of the Mitsubishi 4B11 Engine

The 4B11 engine has been used across various Mitsubishi models, primarily focusing on performance-oriented and utility vehicles.

- 1. Mitsubishi Lancer Evolution X** The most iconic application of the 4B11, the Evolution X, utilizes this engine to deliver rally-inspired performance. It features a twin-clutch SST transmission and a sophisticated all-wheel-drive system, making it a favorite among enthusiasts.
- 2. Mitsubishi Outlander** In the Outlander, the 4B11 provides a balance of power and efficiency for crossover versatility, suitable for family trips and daily commuting.
- 3. Other Mitsubishi Models** The engine has also been used in limited editions and special variants, emphasizing its adaptability across different vehicle types.

Maintenance and Troubleshooting of the 4B11

Proper maintenance ensures the longevity and optimal performance of the Mitsubishi 4B11 engine. Here are some essential tips:

- Regular Oil Changes:** Use high-quality synthetic oil and adhere to manufacturer-recommended intervals to maintain engine health.
- Turbocharger Care:** Ensure the turbocharger is free of debris and lubricated properly; inspect for leaks or abnormal noises.
- Cooling System Checks:** Regularly inspect coolant levels and radiator health to prevent overheating.
- Fuel System Maintenance:** Use quality fuel and consider periodic fuel system cleaning to prevent deposits.
- Engine Diagnostics:** Use OBD-II scanners to identify potential issues early, such as misfires or sensor problems.

Common issues reported by owners include turbo lag, sensor failures, and, in some cases, oil consumption. Addressing these issues promptly can prevent costly repairs.

Aftermarket and Performance Upgrades

For enthusiasts seeking to enhance their Mitsubishi 4B11 engine, numerous aftermarket options exist:

- Performance Exhaust Systems:** Improve airflow and sound.
- ECU Tuning:** Optimize fuel maps and boost levels for increased power.
- Intercooler Upgrades:** Enhance cooling efficiency for higher boost pressures.
- Strengthening Internal Components:** Upgrading pistons, rods, and valves for high-boost applications.

However, it's essential to work with professionals to avoid compromising engine reliability.

Conclusion: Why Choose the Mitsubishi 4B11?

The Mitsubishi engine 4B11 stands out as a versatile, high-performance powertrain that balances power, efficiency, and durability. Its advanced turbocharging technology, combined with features like VVT and lightweight construction, makes it suitable for a wide range of applications—from rally-inspired sports sedans to family crossovers. Furthermore, its popularity in tuning communities underscores its potential for customization and performance enhancement. Whether you're an automotive enthusiast looking to maximize your vehicle's capabilities or a casual driver seeking reliable performance, the Mitsubishi 4B11 engine offers a compelling mix of technology, power, and adaptability. Proper maintenance and thoughtful upgrades can extend its lifespan and unlock even more of its impressive potential. By understanding the intricacies of the Mitsubishi 4B11 engine, you can make informed decisions about your vehicle, whether it's for daily driving, performance tuning, or restoration projects. Its reputation as a robust, innovative, and capable engine continues to solidify its place in Mitsubishi's engineering legacy.

Mitsubishi Engine 4B11: An In-Depth Review

The Mitsubishi 4B11 engine stands as a testament to

Mitsubishi Motors? engineering prowess, blending performance, efficiency, and reliability in a compact package. As a turbocharged inline-four engine, the 4B11 has powered several Mitsubishi models, notably the Lancer Evolution X, and has established a reputation among enthusiasts and everyday drivers alike. In this comprehensive review, we will delve into every aspect of the 4B11, exploring its design, specifications, performance characteristics, common issues, modifications, and maintenance considerations.

Introduction to the Mitsubishi 4B11 Engine

The Mitsubishi 4B11 engine was introduced in the late 2000s as part of Mitsubishi?s series of turbocharged engines aimed at providing high performance while maintaining fuel efficiency. It is a member of the 4B1 engine family, which includes naturally aspirated and turbocharged variants.

Key highlights:

- Type: 2.0-liter inline-four turbocharged engine
- Displacement: 1998 cc (2.0L)
- Configuration: Inline-4
- Valvetrain: DOHC (Dual OverHead Camshaft)
- Valves: 16 valves (4 valves per cylinder)
- Turbocharger: Yes, twin-scroll turbocharger
- Fuel System: Multi-point fuel injection
- Compression Ratio: Typically around 9.0:1 to 9.5:1, depending on the model

This engine was primarily utilized in the Mitsubishi Lancer Evolution X (2008-2016), and also found in other models like the Outlander and ASX, depending on markets and specific configurations.

Design and Engineering Aspects

Block and Cylinder Head

The 4B11 features a robust cast iron or aluminum block (depending on the specific version or market), designed to withstand high boost pressures and aggressive driving conditions. The aluminum cylinder head is lightweight and helps optimize weight distribution.

Design features:

- Twin-scroll turbocharging: Designed to optimize exhaust flow and improve throttle response.
- Reinforced pistons and connecting rods: To handle increased power output.
- Integrated exhaust manifold: Designed for efficient exhaust gas flow and heat dissipation.

Valvetrain and Combustion Chamber

The DOHC setup with 16 valves ensures efficient airflow and combustion. The valves are operated via hydraulic lash adjusters, reducing maintenance needs.

Features include:

- Variable valve timing (VVT): Mitsubishi implemented VVT in some versions to optimize performance and fuel economy.
- Combustion chamber design: Optimized for better flame propagation, contributing to more complete combustion and lower emissions.

Turbocharging and Intercooler

The twin-scroll turbocharger is a key feature, providing:

- Faster spool-up times
- Improved boost response
- Enhanced low-end torque

An air-to-air intercooler cools the compressed air, increasing its density for more efficient combustion.

Performance Specifications

The 4B11 engine's performance varies slightly depending on the application, but typical figures include:

- Power Output: Ranges from 237 hp (177 kW) in the Evolution X (with the Evo's specific tuning) up to about 280-300 hp in certain special editions.
- Torque: Approximately 350 Nm (260 lb-ft), providing strong mid-range acceleration.
- Power-to-Displacement Ratio: Around 118-150 hp per liter, reflecting its sporty tuning.

Performance highlights:

- Excellent throttle response due to twin-scroll turbo
- Strong mid-range torque, making it suitable for spirited driving
- Capable of high-speed performance with proper tuning

Driving Dynamics and Handling

The 4B11 engine, particularly in the Evolution X, offers exhilarating driving experiences:

- Acceleration: Rapid, thanks to turbocharging and direct injection
- Throttle sensitivity: Precise, enabling aggressive driving
- Responsiveness: The twin-scroll turbo reduces turbo lag significantly
- Fuel efficiency: When driven conservatively, can deliver respectable fuel economy for a turbocharged engine

The engine?s integration with Mitsubishi?s All-Wheel Drive (AWD) systems enhances handling and traction, especially during high-performance

driving. Common Issues and Reliability While the 4B11 is generally regarded as a reliable and durable engine, certain issues have been reported by owners and mechanics:

1. Carbon Buildup Due to direct injection, carbon deposits can accumulate on intake valves. Regular intake cleaning or decarbonization is recommended for long-term health.
2. Timing Chain Tensioner Problems Some models experienced tensioner failures, leading to timing chain noise or, in rare cases, timing issues. Regular inspection and replacement of timing components are advised after certain mileage.
3. Turbocharger Wear The turbo can develop wear or oil leaks over time. Proper warm-up and cool-down procedures can prolong turbo life.
4. Oil Consumption Occasional reports of increased oil consumption, often linked to piston ring wear. Using high-quality oil and regular oil changes can mitigate this.
5. Cooling System Overheating issues due to coolant leaks or radiator problems. Regular coolant checks and radiator maintenance are essential.

Reliability Summary: With proper maintenance, the 4B11 can easily surpass 150,000 miles. Many owners report trouble-free operation well beyond that mileage.

Performance Enhancements and Tuning The 4B11's robust design lends itself well to aftermarket modifications:

- Common upgrades include: ECU remapping/tuning: To increase horsepower and torque, improve throttle response, and optimize boost levels.
- Turbo upgrades: Larger or more efficient turbos for higher boost and power.
- Exhaust systems: Aftermarket exhausts enhance sound and reduce backpressure.
- Intake modifications: Cold air intakes or high-flow filters to improve airflow.
- Fuel system upgrades: Larger injectors and fuel pumps for higher power builds.

Potential gains: Power levels can be increased to 350+ hp with extensive modifications. Improved spool times and response with upgraded turbochargers and intercoolers.

Caution: Tuning should be performed by professionals to avoid engine damage, especially considering the stress placed on internal components.

Maintenance and Servicing Keeping the 4B11 in optimal condition requires routine maintenance:

- Basic maintenance tasks: Regular oil changes with high-quality synthetic oil.
- Periodic inspection and replacement of timing chain/tensioner.
- Checking and replacing coolant, air filters, and spark plugs.
- Monitoring turbocharger health and oil lines.
- Intake and exhaust cleaning to prevent carbon buildup.

Recommended service intervals:

- Oil change: Every 5,000-7,500 miles (8,000-12,000 km)
- Spark plugs: Every 30,000 miles (48,000 km)
- Timing chain inspection: Every 60,000 miles (96,000 km)
- Turbo inspection: Annually or as per manufacturer guidelines

Proper warm-up and cool-down procedures are critical to prolong turbocharger and engine life.

Applications and Popularity The 4B11 engine gained popularity primarily because of its role in the Mitsubishi Lancer Evolution X, where it delivered impressive performance in a relatively compact size. Its success in motorsport, especially rallying, further cemented its reputation. Other models utilizing the 4B11 include Mitsubishi Outlander Mitsubishi ASX. Some special editions and regional variants.

The engine's adaptability and tuning potential have made it a favorite among tuners and enthusiasts seeking a high-performance yet reliable platform.

Conclusion The Mitsubishi 4B11 engine exemplifies a well-engineered turbocharged powerplant capable of delivering exhilarating performance while maintaining commendable reliability when properly maintained. Its twin-scroll turbocharger, modern valvetrain, and versatile design make it suitable for a variety of applications, from daily driving to high-performance racing. While it faces some common issues typical of turbocharged direct-injection engines, proactive maintenance, and careful tuning can maximize its lifespan and performance. Whether you are an enthusiast looking to extract more

power or a daily driver seeking reliable performance, the 4B11 offers a compelling balance of technology, power, and efficiency. In summary, the 4B11 remains a significant engine in Mitsubishi's lineup, appreciated for its engineering, tuning potential, and performance heritage. With appropriate care, it can continue to serve owners well beyond the 150,000-mile mark, making it a noteworthy choice in the realm of modern turbocharged engines.

QuestionAnswer

What are the common issues associated with the Mitsubishi 4B11 engine?

Common issues with the Mitsubishi 4B11 engine include timing chain tensioner failure, oil consumption problems, and occasional coolant leaks. Regular maintenance and timely part replacements can help mitigate these issues.

How does the Mitsubishi 4B11 engine perform in terms of fuel efficiency?

The Mitsubishi 4B11 engine is known for good fuel efficiency, especially in models like the Mitsubishi Lancer Evolution and ASX. Its turbocharged design provides a balance of power and economy when properly maintained.

What are the recommended maintenance practices for the Mitsubishi 4B11 engine?

Routine maintenance for the 4B11 includes regular oil and filter changes, checking and replacing the timing chain tensioner as needed, inspecting coolant levels, and ensuring the turbocharger and intercooler are clean and functioning properly.

Can the Mitsubishi 4B11 engine be tuned for more performance?

Yes, the Mitsubishi 4B11 engine can be tuned for increased performance by upgrading the turbocharger, ECU remapping, and installing aftermarket exhaust and intake systems. However, it's important to ensure proper supporting modifications and professional tuning to maintain engine reliability.

Which Mitsubishi models come equipped with the 4B11 engine?

The Mitsubishi 4B11 engine is found in several models, including the Mitsubishi Lancer Evolution X, ASX, and Outlander Sport, among others. It is appreciated for its balance of power and efficiency in these vehicles.

Related keywords: mitsubishi 4b11, 4b11 engine specifications, 4b11 turbo, 4b11 problems, 4b11 parts, 4b11 performance, 4b11 upgrade, mitsubishi engine repair, 4b11 vs 4b12, 4b11 tuning

Mitsubishi s4s engine parts manual

Mitsubishi S4S engine parts manual is an essential resource for mechanics, car enthusiasts, and Mitsubishi S4S engine owners seeking detailed information on engine components, maintenance procedures, and troubleshooting techniques. The S4S engine, renowned for its durability and performance, powers a variety of Mitsubishi trucks and commercial vehicles. Proper knowledge of its parts and their functions is crucial for effective repairs, optimal performance, and extending the engine's lifespan. This comprehensive manual serves as a vital guide, providing in-depth insights into each component, their specifications, and replacement procedures.

Understanding the Mitsubishi S4S Engine

Overview of the Mitsubishi S4S Engine

The Mitsubishi S4S engine is a 4-cylinder, water-cooled diesel engine widely used in Mitsubishi vehicles, especially in trucks and commercial applications. Known for its robustness and fuel efficiency, the S4S engine has become a popular choice among fleet operators and owners who prioritize reliability and longevity.

Key features include:

- Displacement:** Approximately 4.9 liters
- Configuration:** Inline 4-cylinder
- Turbocharged and naturally aspirated variants**
- Common rail fuel injection system**
- Mechanical and electronic components designed for heavy-duty use**

Importance of a Detailed Parts Manual

Having access to a comprehensive Mitsubishi S4S engine parts manual is vital for:

- Accurate identification of engine components**
- Proper maintenance and servicing**
- Efficient troubleshooting and repair**
- Sourcing genuine replacement parts**
- Ensuring compatibility and optimal engine performance**

Key Components of the Mitsubishi S4S Engine

Major Engine Parts and Their Functions

Understanding the core components is fundamental for maintenance and repairs. Below is a detailed list of essential parts:

- Engine Block:** The core structure housing cylinders, pistons, and crankshaft.
- Cylinder Head:** Contains the combustion chambers, valves, and injectors.
- Pistons:** Move within cylinders to convert combustion energy into mechanical motion.
- Connecting Rods:** Connect pistons to the crankshaft, transferring motion.
- Crankshaft:** Converts reciprocating motion into rotational motion to drive the vehicle.
- Camshaft:** Controls valve timing for intake and exhaust valves.
- Fuel Injection System:** Delivers diesel fuel into combustion chambers, critical for engine efficiency.
- Turbocharger (if equipped):** Increases air intake for improved power output.
- Cooling System Components:** Includes the radiator, water pump, and thermostat to prevent overheating.
- Lubrication System:** Ensures smooth operation of moving parts with oil pumps, filters, and galleries.

Auxiliary Parts and Accessories

In addition to core components, the manual details auxiliary parts such as:

- Alternator**
- Starter motor**
- Timing belt/chain**
- Sensors (temperature, pressure, position)**
- Exhaust components**
- Gaskets and seals**

How to Use the Mitsubishi S4S Engine Parts Manual

Locating Specific Parts

The manual typically provides:

- Part numbers for each component**
- Diagrams illustrating**

assembly and disassembly
 Descriptions of each part's function and specifications
 Step-by-step removal and installation instructions
 Identifying Genuine Replacement Parts
 Using the manual ensures:
 Correct part identification
 Sourcing authentic Mitsubishi parts
 Avoiding compatibility issues
 Maintaining warranty and performance standards
 Maintenance and Troubleshooting
 The manual offers guidance on:
 Routine inspection schedules
 Common issues and symptoms
 Diagnostic procedures
 Repair and replacement procedures
 Benefits of a Mitsubishi S4S Engine Parts Manual for Different Users
 For Mechanics and Service Centers
 Accelerates repair times with detailed diagrams
 Ensures accurate parts replacement
 Helps in training new technicians
 Reduces error and rework
 For Vehicle Owners and Enthusiasts
 Empowers owners to perform basic maintenance
 Provides a better understanding of engine health
 Assists in sourcing parts during repairs
 Enhances overall vehicle care
 For Fleet Managers
 Facilitates preventive maintenance scheduling
 Reduces downtime by quick repairs
 Extends engine life and reduces costs
 Where to Find the Mitsubishi S4S Engine Parts Manual
 Accessing an authentic Mitsubishi S4S engine parts manual is crucial. Resources include:
 Official Mitsubishi dealership and service centers
 Authorized parts distributors
 Certified online manuals and digital repositories
 Mitsubishi official website (if available)
 Specialty automotive manuals and repair guides
 Ensure that the manual matches your engine's specific model and year to avoid discrepancies.
 Tips for Maintaining Your Mitsubishi S4S Engine Using the Parts Manual
 Regular Inspection and Maintenance
 Follow the recommended service intervals outlined in the manual
 Check key components such as filters, belts, and seals
 Monitor fluid levels and replace as specified
 Using Proper Tools and Genuine Parts
 Use recommended tools to avoid damaging components
 Always replace worn parts with genuine Mitsubishi parts listed in the manual
 Documenting Repairs and Maintenance
 Keep records of all procedures
 Note part numbers and replacement dates for future reference
 Conclusion
 A comprehensive Mitsubishi S4S engine parts manual is an indispensable resource for anyone involved in maintaining, repairing, or understanding this robust diesel engine. It ensures that repairs are performed accurately, parts are sourced correctly, and the engine continues to operate at peak performance. Whether you are a professional mechanic, a vehicle owner, or a fleet manager, having access to detailed diagrams, specifications, and procedures will significantly enhance your ability to care for your Mitsubishi S4S engine. Investing in or acquiring the right manual not only saves time and money but also prolongs the lifespan of your engine, ensuring reliable operation for years to come.

Mitsubishi S4S Engine Parts Manual: An In-Depth Review and Guide
 The Mitsubishi S4S engine parts manual serves as an essential resource for mechanics, enthusiasts, and fleet managers working with Mitsubishi's renowned S4S engine series. As a comprehensive guide, it provides detailed information about engine components, maintenance procedures, troubleshooting tips, and replacement parts. In this review, we will explore the manual's structure, content quality, usability, and overall value to users seeking to understand or work on Mitsubishi S4S engines.
 Overview of the Mitsubishi S4S Engine Series
 Before delving into the manual itself, it's important to understand the

significance of the Mitsubishi S4S engine series. The S4S engines are a range of diesel engines produced primarily during the late 20th century, known for their durability, efficiency, and widespread use in trucks, buses, and industrial applications. Key features of Mitsubishi S4S engines include: Four-cylinder diesel configuration Common rail or direct injection systems (depending on the model) Designed for heavy-duty applications Known for robust performance and longevity The manual tailored for this engine series is indispensable for those looking to maintain, repair, or overhaul these engines effectively.

Structure and Content of the Manual

Comprehensive Coverage The Mitsubishi S4S engine parts manual is structured to provide a logical flow from general engine overview to specific component details. It typically includes: Engine specifications and technical data Exploded views of engine assemblies Parts lists with diagrams Maintenance and service procedures Troubleshooting guides Repair instructions Original part numbers and cross-reference information This organized approach helps users locate necessary information efficiently, reducing downtime and errors during repairs.

Detailed Diagrams and Illustrations One of the standout features of the manual is its high-quality diagrams. These visual aids include: Exploded views of engine components Cross-sectional diagrams Wiring and electrical schematics Assembly and disassembly instructions The clarity of these illustrations makes it easier for technicians to identify parts, understand their placement, and perform precise repairs or replacements.

Parts Identification and Ordering The manual provides detailed parts lists with corresponding illustrations, which are crucial for: Accurate identification of replacement parts Verifying part numbers Ensuring compatibility Facilitating efficient ordering processes This feature minimizes errors that might arise from misidentification, especially for complex assemblies.

Features and Benefits of the Mitsubishi S4S Engine Parts Manual

Ease of Use and Accessibility **User-Friendly Layout:** Clear headings, indexed sections, and logical flow make it simple to navigate. **Comprehensive Indexing:** Quick access to specific parts, procedures, or diagrams. **Compatibility:** Usually available in printed and digital formats, allowing flexibility for users. **Technical Accuracy and Reliability** The manual is created by Mitsubishi or authorized publishers, ensuring the information is accurate and authoritative. **Up-to-date** with factory specifications and part numbers, which is critical for effective maintenance. **Cost-Effectiveness** Having a detailed parts manual reduces the risk of ordering incorrect parts. Proper maintenance prolongs engine life, decreasing long-term repair costs. **Facilitates DIY repairs** for knowledgeable enthusiasts, saving labor costs.

Pros and Cons of the Mitsubishi S4S Engine Parts Manual

Pros **Comprehensive Documentation:** Covers all engine components with detailed diagrams and instructions. **Accurate Part Information:** Ensures correct ordering and replacement, reducing errors. **Versatile Format Options:** Available in print and digital formats for convenience. **Facilitates Maintenance and Repairs:** Helps both professional mechanics and experienced DIYers. **Supports Troubleshooting:** Offers guides to diagnose common engine issues.

Cons **Technical Complexity:** May be overwhelming for beginners without prior mechanical knowledge. **Limited to Specific Models:** Primarily covers S4S series, so not suitable for other Mitsubishi engines. **Availability:** Original manuals might be costly or hard to find outside authorized channels. **Potential for Outdated Information:** Older manuals may not reflect recent engine modifications or updates.

How to Use the Mitsubishi S4S Engine Parts Manual Effectively

Preparation Gather necessary tools and safety equipment. Identify the specific engine

model and serial number to ensure compatibility. **Locating Information** Use the index to find the section relevant to your task. Refer to diagrams for visual confirmation of parts. **Performing Repairs or Maintenance** Follow step-by-step procedures outlined in the manual. Cross-reference part numbers before ordering replacement components. Use illustrations to verify correct assembly during reinstallation. **Troubleshooting** Utilize diagnostic guides to identify issues. Confirm part conditions and connections as per manual instructions. **Additional Tips for Maximizing the Manual's Value** Keep a digital copy: For quick searches and easy sharing. Update regularly: Stay informed about revisions or updates from Mitsubishi. Supplement with other resources: Use service bulletins, forums, and professional advice for complex issues. **Maintain an organized workspace:** Keep manuals accessible for ongoing maintenance. **Conclusion: Is the Mitsubishi S4S Engine Parts Manual Worth It?** The Mitsubishi S4S engine parts manual is undeniably a valuable asset for anyone involved with these engines. Its detailed diagrams, precise parts information, and comprehensive maintenance procedures make it a must-have for professional technicians and dedicated DIY enthusiasts alike. While it may present a learning curve for newcomers, its benefits in ensuring accurate repairs, reducing downtime, and extending engine life are significant. Investing in this manual can lead to cost savings, improved engine reliability, and a deeper understanding of Mitsubishi's engineering. Whether you are maintaining an existing fleet of Mitsubishi trucks or restoring an older engine, this manual provides the guidance necessary to perform quality work with confidence. In summary, the Mitsubishi S4S engine parts manual stands out as an essential reference that aids in the proper care and repair of these durable diesel engines, ultimately ensuring their optimal performance for years to come.

QuestionAnswer

What does the Mitsubishi S4S engine parts manual cover?

The manual provides detailed information on all components, parts lists, assembly instructions, and maintenance procedures for the Mitsubishi S4S engine.

Where can I find a digital copy of the Mitsubishi S4S engine parts manual?

You can access the manual through authorized Mitsubishi service centers, official dealerships, or reputable online parts and manual providers.

Are the parts listed in the Mitsubishi S4S engine manual interchangeable with other Mitsubishi engines?

Some parts may be compatible with other Mitsubishi engine models, but it is essential to consult the manual or a professional to verify compatibility before substitution.

How often should I refer to the Mitsubishi S4S engine parts manual for maintenance?

The manual should be consulted regularly during routine maintenance, repairs, or when replacing parts to ensure correct procedures and part specifications.

Does the Mitsubishi S4S engine parts manual include troubleshooting guides?

Yes, it contains troubleshooting sections that help identify common issues and provide recommended solutions for the Mitsubishi S4S engine.

Can I use the Mitsubishi S4S engine parts manual to identify the correct replacement parts?

Absolutely, the manual provides detailed part numbers, diagrams, and descriptions to help you identify and order the correct replacement parts.

Is the Mitsubishi S4S engine parts manual suitable for DIY repairs?

Yes, the manual offers detailed instructions that can assist experienced DIY enthusiasts in performing repairs and maintenance safely.

What are the common issues addressed in the Mitsubishi S4S engine parts manual?

Common issues include fuel system problems, overheating, oil leaks, and timing belt replacements, with detailed guidance on troubleshooting and repairs.

How can I ensure I am using the most updated Mitsubishi S4S engine parts manual?

Always obtain the manual from official Mitsubishi sources or authorized distributors to ensure you have the latest version with updated part information.

Are there online resources or forums for questions related to the Mitsubishi S4S engine parts manual?

Yes, many automotive forums and online communities discuss Mitsubishi engines, where you can find tips, shared manuals, and advice from experienced technicians.

Related keywords: Mitsubishi S4S engine diagram, Mitsubishi S4S engine specifications, Mitsubishi S4S rebuild kit, Mitsubishi S4S engine repair, Mitsubishi S4S parts catalog, Mitsubishi S4S engine

service manual, Mitsubishi S4S cylinder head, Mitsubishi S4S piston parts, Mitsubishi S4S valve components, Mitsubishi S4S engine troubleshooting

Mitsubishi engine specifications

Understanding Mitsubishi Engine Specifications: A Comprehensive Guide

Mitsubishi engine specifications are a critical aspect of understanding the performance, efficiency, and reliability of Mitsubishi vehicles. Whether you're a car enthusiast, a potential buyer, or a mechanic, knowing the details of Mitsubishi engines helps in making informed decisions and performing accurate maintenance. This article delves into the various types of Mitsubishi engines, their specifications, technological features, and what sets them apart in the automotive industry.

Overview of Mitsubishi Engines

Mitsubishi Motors Corporation has a long-standing history of producing engines that combine durability, performance, and innovation. From small city cars to powerful SUVs and sports cars, Mitsubishi offers a diverse range of engine options tailored to different needs.

Types of Mitsubishi Engines

Mitsubishi engines can primarily be categorized into:

- Gasoline (Petrol) Engines
- Diesel Engines
- Hybrid and Electric Powertrains

Each type has unique specifications suited for different applications and market segments.

Key Mitsubishi Engine Specifications

Understanding core specifications helps evaluate engine performance. Below are the critical parameters:

- Displacement** Displacement refers to the total volume of all cylinders in an engine, usually expressed in liters (L) or cubic centimeters (cc). Typical Mitsubishi petrol engines: 1.2L to 3.8L. Common diesel engines: 2.0L to 4.0L.
- Power Output** Expressed in horsepower (hp) or kilowatts (kW), power indicates the engine's capability to generate force. Example: Mitsubishi Outlander 2.4L engine produces approximately 167 hp. Turbocharged variants often produce higher horsepower with similar or smaller displacements.
- Torque** Torque, measured in Newton-meters (Nm) or pound-feet (lb-ft), reflects the engine's rotational force, essential for acceleration and towing capacity. Typical torque range: 150 Nm to 430 Nm depending on engine and model.
- Compression Ratio** The compression ratio affects efficiency and power; higher ratios typically improve thermal efficiency but require higher-octane fuel. Mitsubishi engines often feature ratios between 9.0:1 and 10.5:1.
- Fuel System** Multi-Point Fuel Injection (MPFI) Direct Injection (used in newer models for increased fuel efficiency)
- Valvetrain** DOHC (Dual OverHead Camshaft) SOHC (Single OverHead Camshaft) Most modern Mitsubishi engines utilize DOHC for better airflow and performance.

Popular Mitsubishi Engine Models and Their Specifications

Let's explore some of Mitsubishi's most notable engines across different vehicle types.

- Mitsubishi 4G63T Engine**
 - Type: 2.0L turbocharged inline-4 petrol engine
 - Displacement: 1997 cc
 - Power: Up to 210 hp (in some versions)
 - Torque: 300 Nm
 - Applications: Mitsubishi Eclipse, Lancer Evolution IX
 - Highlights: Renowned for its durability and tuning potential, making it popular among car enthusiasts.
- Mitsubishi 4N1 Engine Series**
 - Type: 2.4L MIVEC inline-4 petrol engine
 - Displacement: 2378 cc
 - Power: Approximately 167 hp
 - Torque: 222 Nm
 - Applications: Mitsubishi Outlander, ASX
 - Features: Variable Valve Timing (MIVEC) technology for improved efficiency and performance.
- Mitsubishi 4D56 Diesel Engine**
 - Type: 2.5L turbocharged

diesel engine Displacement: 2477 cc Power: Ranges from 73 hp to 109 hp depending on version Torque: 147 Nm to 280 Nm Applications: Mitsubishi Pajero, L200 Highlights: Known for its robustness and fuel efficiency in off-road and utility vehicles.

4. Mitsubishi 4J1 Engine Type: 1.8L MIVEC inline-4 petrol engine Displacement: 1798 cc Power: Around 140 hp Torque: 175 Nm Applications: Mitsubishi ASX, Outlander Sport Features: Emphasis on balance between performance and economy.

Technological Features in Mitsubishi Engines

Mitsubishi has integrated several advanced technologies to enhance engine performance and efficiency:

- MIVEC (Mitsubishi Innovative Valve timing Electronic Control):** Variable valve timing system that optimizes valve operation based on engine load and speed. Benefits include improved fuel economy, reduced emissions, and enhanced power.
- Turbocharging:** Many Mitsubishi engines, especially in performance models like the Lancer Evolution, feature turbochargers to boost power output without increasing engine size.
- Direct Injection:** Introduced in newer models to improve combustion efficiency, leading to better fuel economy and lower emissions.
- Cylinder Deactivation:** Some engines employ cylinder deactivation technology to shut down cylinders during light-load conditions, saving fuel.

Engine Compatibility and Maintenance Tips

Understanding the specifications of Mitsubishi engines is vital for maintenance and repairs.

Common Maintenance Tasks

- Regular oil changes using manufacturer-recommended oil grades.
- Checking and replacing timing belts or chains as per schedule.
- Monitoring coolant levels and ensuring proper cooling system function.
- Using authorized parts for replacements to maintain engine integrity.

Troubleshooting Common Issues

- Engine misfires in turbocharged engines may indicate boost leaks or sensor problems.
- Diesel engines might face injector or glow plug issues.
- Oil consumption in older engines could require valve seal inspection.

Upgrades and Tuning

Many enthusiasts tune Mitsubishi engines for increased performance, especially the 4G63T. Upgrades may include intercoolers, exhaust systems, and ECU remapping.

Conclusion: Why Mitsubishi Engine Specifications Matter

Mitsubishi engine specifications are more than just numbers; they represent the engine's capabilities, technological advancements, and suitability for various driving needs. Whether you are choosing a vehicle for daily commuting, off-road adventures, or performance driving, understanding these specifications helps you select the right model and maintain it properly for longevity and optimal performance. By keeping abreast of Mitsubishi's technological innovations and engine offerings, consumers and enthusiasts can appreciate the engineering excellence behind each vehicle. From the legendary 4G63T turbocharged engine to modern MIVEC systems, Mitsubishi continues to deliver engines that balance power, efficiency, and durability.

In summary: Mitsubishi offers a diverse range of engines tailored for different markets and vehicle types. Core specifications include displacement, power, torque, compression ratio, and fuel system. Technological features like MIVEC, turbocharging, and direct injection enhance engine performance. Proper maintenance aligned with engine specifications ensures longevity and optimal operation. Understanding Mitsubishi engine specifications empowers you to make informed decisions and appreciate the engineering marvels that drive Mitsubishi vehicles forward.

Mitsubishi Engine Specifications: An In-Depth Look at Performance, Design, and Innovation

Introduction Mitsubishi engine specifications embody a blend of advanced engineering, innovative design, and a commitment to reliability. As one of Japan's most renowned automotive manufacturers, Mitsubishi has established a reputation for producing engines that balance power, efficiency, and durability. Whether powering compact cars, SUVs, or performance vehicles, Mitsubishi engines are designed with meticulous attention to detail, incorporating cutting-edge technology to meet the evolving demands of drivers and the automotive industry. This article delves into the core aspects of Mitsubishi engine specifications, exploring their architecture, performance metrics, technological features, and the latest developments that keep Mitsubishi at the forefront of engine innovation.

Understanding Mitsubishi Engine Architecture

Engine Types and Configurations Mitsubishi manufactures a diverse range of engines, primarily focusing on gasoline, diesel, and hybrid powertrains. Their engine lineup features various configurations, each optimized for specific vehicle segments and performance goals.

Major Engine Types:

- Inline-4 (I4):** The most common configuration, known for its compact design and efficiency. Mitsubishi's I4 engines are used in a wide array of models, from small sedans like the Mirage to SUVs like the Outlander.
- V6 Engines:** Less common but found in higher-performance models such as the Mitsubishi Outlander GT and some older performance vehicles, offering a balance of power and smoothness.
- Diesel Engines:** Predominantly inline-4 turbocharged units, optimized for fuel economy and torque, especially in markets where diesel is popular.
- Hybrid Powertrains:** Combining internal combustion engines with electric motors, Mitsubishi's hybrid systems aim to enhance efficiency and reduce emissions.

Engine Displacement and Power Output Mitsubishi's engines vary widely in displacement, typically ranging from 1.0 liters to 3.8 liters in their gasoline lineup, with diesel variants spanning similar sizes. Some notable examples include:

- 1.2L MIVEC Turbo:** Found in models like the Mirage, producing around 78 horsepower.
- 2.0L MIVEC Inline-4:** Used in Outlander and Eclipse Cross, delivering approximately 148-168 horsepower depending on the tuning.
- 3.0L V6:** Present in older models like the Mitsubishi 3000GT, producing up to 222 horsepower.
- 2.2L DI-D Turbo Diesel:** Common in SUVs and pickup trucks, generating high torque figures suitable for towing and off-road use.

Power Output Ranges:

- Compact engines:** 70-100 horsepower
- Midsized engines:** 130-170 horsepower
- Performance-oriented engines:** Up to 300+ horsepower in specific models

Technological Features and Innovations

MIVEC Variable Valve Timing A cornerstone of Mitsubishi's engine technology is the Mitsubishi Innovative Valve timing Electronic Control (MIVEC). This system adjusts valve timing and lift to optimize performance, efficiency, and emissions. Key benefits of MIVEC include:

- Improved power delivery at higher RPMs**
- Enhanced fuel economy during light-load conditions**
- Reduced emissions through precise control of combustion**

MIVEC technology has evolved over the years, with newer versions offering seamless transition between different cam profiles, contributing to smoother acceleration and better overall engine response.

Turbocharging and Direct Injection Mitsubishi has incorporated turbocharging extensively across its engine lineup to boost power without significantly increasing engine size. Turbocharged engines deliver higher torque and better acceleration, especially at lower RPMs. Features include:

- Turbos with Variable Geometry:** Optimizing airflow at different engine speeds.
- Direct Fuel Injection:** Precise fuel delivery that improves combustion efficiency, reduces fuel consumption, and lowers emissions.

For example, the

1.2L turbocharged MIVEC engine in the Mirage offers impressive performance for its size, making it a popular choice for city driving and fuel-conscious consumers.

Stop & Start System

Many Mitsubishi engines are equipped with Stop & Start technology, designed to shut off the engine during idling and restart it seamlessly when needed. This feature enhances fuel economy and reduces idle emissions, aligning with global environmental standards.

Performance Specifications in Detail

Power and Torque Figures

Understanding an engine's power and torque is crucial to grasping its performance capabilities. Mitsubishi engines are engineered to deliver a balanced combination of these metrics:

- Power (Horsepower):** Indicates the engine's maximum work output, influencing acceleration and top speed.
- Torque (Nm or lb-ft):** Reflects the engine's twisting force, vital for towing, hauling, and low-speed responsiveness.

Examples from Mitsubishi's lineup:

- 2.4L MIVEC Engine:** Approximately 165 horsepower and 22.8 kg·m (about 158 lb-ft) of torque.
- 2.2L DI-D Turbo Diesel:** Around 150 horsepower with 400 Nm (295 lb-ft) of torque, ideal for heavy-duty applications.

Fuel Efficiency

Mitsubishi emphasizes fuel economy, with many engines achieving impressive figures thanks to technologies like MIVEC, turbocharging, and direct injection.

- Mirage 1.2L MIVEC:** Up to 21 km/l (approx. 49 mpg) in combined cycles.
- Outlander 2.4L:** Around 10-12 km/l (roughly 23-28 mpg), depending on driving conditions and transmission.

Emissions Standards

Mitsubishi engines comply with strict emissions regulations worldwide, including Euro 6 standards in Europe and EPA standards in the United States. Technologies like catalytic converters, EGR systems, and variable valve timing contribute to cleaner combustion.

Transmission and Drivetrain Compatibility

The engine specifications are complemented by various transmission options, including:

- 5- and 6-speed manual transmissions:** Offering driver engagement and control.
- CVT (Continuously Variable Transmission):** Providing smooth acceleration and improved fuel economy.
- 6- and 8-speed automatic transmissions:** For refined performance and efficiency.

Drivetrain configurations include front-wheel drive (FWD), all-wheel drive (AWD), and four-wheel drive (4WD), optimized for different driving environments and engine outputs.

Notable Mitsubishi Engines in Recent Models

Model	Engine	Power (hp)	Torque (Nm)	Highlights
Mitsubishi Mirage	1.2L MIVEC Turbo	78	100	Compact, lightweight, with excellent fuel economy, and suitable for urban commuting.
Mitsubishi Outlander	2.0L MIVEC Turbo	168	258	Combines performance with efficiency, offering a lively driving experience in crossover SUVs.
Mitsubishi L200 pickup	2.2L DI-D Turbo Diesel	150	400	Robust torque delivery, ideal for towing and off-road adventures.

Future Developments and Eco-Friendly Initiatives

Mitsubishi continues to innovate with a focus on sustainability. The company is investing heavily in hybrid and electric powertrains. Their upcoming engines aim to incorporate:

- Plug-in Hybrid Systems:** Combining internal combustion with electric motors for extended range.
- Next-Generation Turbo Engines:** More efficient, lower emissions, and capable of running on alternative fuels.
- Hydrogen Fuel Cell Technology:** Research into hydrogen-powered engines aligns with global efforts to reduce carbon footprints.

Conclusion

Mitsubishi engine specifications reveal a manufacturer dedicated to delivering engines that meet diverse needs – from everyday commuting to off-road adventures and high-performance driving. Their technological innovations, such as MIVEC variable valve timing, turbocharging, and direct injection, exemplify their commitment to efficiency, power, and environmental responsibility. As Mitsubishi continues to evolve

with a focus on hybrid and electric propulsion, their engine offerings remain a testament to Japanese engineering excellence. Whether you prioritize fuel economy, performance, or sustainability, Mitsubishi's engine lineup offers a compelling choice for modern drivers seeking reliability and innovation.

QuestionAnswer

What are the common types of Mitsubishi engines available in the market?

Mitsubishi offers a range of engines including gasoline, diesel, and hybrid options, with popular models like the 4G63, 4G93, and 4B11 engines used across various vehicles.

What is the horsepower and torque of the Mitsubishi 4A91 engine?

The Mitsubishi 4A91 engine typically produces around 117 horsepower and 107 lb-ft of torque, depending on the specific vehicle model and tuning.

What are the displacement and bore specifications of the Mitsubishi 4G63 engine?

The Mitsubishi 4G63 engine has a displacement of 2.0 liters, with a bore of 86 mm and a stroke of 86 mm.

Are Mitsubishi engines known for fuel efficiency?

Yes, Mitsubishi engines like the 4N1 and 4J1 series are designed for better fuel economy, especially in their turbocharged and hybrid models.

What are the key specifications of the Mitsubishi Outlander PHEV engine?

The Mitsubishi Outlander PHEV combines a 2.0-liter MIVEC gasoline engine with twin electric motors, providing a combined output of approximately 221 horsepower.

What is the compression ratio of the Mitsubishi 4G93 engine?

The Mitsubishi 4G93 engine typically has a compression ratio of around 9.0:1, optimized for reliable performance and fuel efficiency.

How does Mitsubishi's turbocharged engine specifications compare to naturally aspirated engines?

Turbocharged Mitsubishi engines, such as the 4B11, offer higher horsepower and torque outputs due to forced induction, compared to naturally aspirated engines of similar size.

What are the maintenance specifications for Mitsubishi diesel engines?

Mitsubishi diesel engines require regular oil changes, timing belt replacements, and fuel system checks. Specific maintenance intervals depend on the model, but typically include oil changes every 10,000 km or 6 months.

Are Mitsubishi engines compatible with aftermarket modifications?

Many Mitsubishi engines, especially popular models like the 4G63 and 4B11, are widely modified for performance enhancements, but compatibility depends on the specific engine and modification type.

What is the typical lifespan of a Mitsubishi engine with proper maintenance?

With regular maintenance, Mitsubishi engines can last over 200,000 miles (approximately 320,000 km), with some engines exceeding 300,000 miles under ideal conditions.

Related keywords: Mitsubishi engine specs, Mitsubishi engine horsepower, Mitsubishi engine torque, Mitsubishi engine size, Mitsubishi engine types, Mitsubishi engine performance, Mitsubishi engine horsepower chart, Mitsubishi engine technical details, Mitsubishi engine model numbers, Mitsubishi engine maintenance

Mitsubishi 4g67 engine

Mitsubishi 4g67 engine is a well-known powerplant that has gained recognition among car enthusiasts, mechanics, and Mitsubishi fans alike. As part of Mitsubishi's legendary lineup of engines, the 4G67 belongs to the 4G family of engines, which have been renowned for their reliability, performance, and durability over decades. This engine has been featured in various Mitsubishi models, especially during the 1990s and early 2000s, and continues to be a popular choice for modifications, replacements, and restorations. In this comprehensive guide, we will explore the specifications, features, applications, common issues, and maintenance tips for the Mitsubishi 4G67 engine, providing valuable insights for current owners and potential buyers alike.

Overview of the Mitsubishi 4G67 Engine

The Mitsubishi 4G67 is a 1.8-liter, inline-four, gasoline engine that belongs to the Mitsubishi 4G family. It was produced primarily during the 1990s and was used across several Mitsubishi models, including the Mitsubishi Lancer, Mirage, and Colt. Known for

its compact size and relatively straightforward design, the 4G67 offers a good balance of performance and fuel efficiency, making it suitable for daily driving and small-scale tuning projects.

Key Specifications

- Engine Type: Inline-4, SOHC (Single Overhead Camshaft)
- Displacement: 1.8 liters (1795 cc)
- Power Output: Approximately 120-130 horsepower, depending on the model and market
- Torque: Around 130-135 Nm (96-99 lb-ft)
- Fuel System: Multi-Point Fuel Injection (MPFI)
- Compression Ratio: Typically around 9.5:1
- Cooling System: Water-cooled
- Fuel Economy: Approximately 25-30 mpg (varies by application and driving conditions)

Design and Construction

The 4G67 features a straightforward SOHC design, which simplifies maintenance and repairs. Its aluminum cylinder head helps reduce weight, while the cast iron block provides durability. The engine's compact size makes it an ideal choice for small cars, and its design emphasizes reliability and ease of tuning.

Performance Characteristics

The 4G67 is appreciated for its smooth operation and decent power output for a 1.8L engine. It delivers responsive acceleration and has sufficient torque for everyday driving. While not a high-performance engine by modern standards, the 4G67's performance is reliable and predictable, making it a favorite among budget-conscious drivers and tuners seeking a solid base for modifications.

Applications and Vehicle Compatibility

The Mitsubishi 4G67 engine was used primarily in various Mitsubishi models, including:

- Mitsubishi Lancer (various models and trims)
- Mitsubishi Mirage
- Mitsubishi Colt
- Mitsubishi Space Runner

These vehicles benefited from the engine's balance of efficiency and performance, suitable for both urban commuting and light rallying or tuning projects.

Popular Models Featuring the 4G67

- Mitsubishi Lancer CE (early 1990s)
- Mitsubishi Mirage (mid-1990s)
- Mitsubishi Colt (late 1990s)
- Mitsubishi Space Runner

Common Issues and Troubleshooting

While the Mitsubishi 4G67 engine is known for its reliability, like any older engine, it can develop certain problems over time. Awareness of these issues can help owners perform timely maintenance and avoid costly repairs.

Typical Problems

- Oil Leaks:** Gaskets and seals can deteriorate, leading to oil leaks, especially around valve cover and oil pan seals.
- Cooling System Failures:** Overheating can occur due to radiator or water pump issues, potentially causing head gasket failure.
- Ignition System Wear:** Spark plugs, ignition coils, and distributor components may wear out, leading to misfires or starting problems.
- Sensor Failures:** Ageing sensors can cause poor engine performance or check engine lights.
- Timing Belt Issues:** The timing belt should be replaced at specified intervals to avoid engine damage.

Signs of Engine Trouble

- Loss of power or sluggish acceleration
- Unusual noises such as knocking or ticking
- Excessive oil consumption
- Overheating
- Check engine light illumination

Maintenance and Performance Upgrades

Proper maintenance is essential to keep the Mitsubishi 4G67 running smoothly. Regular oil changes, coolant flushes, and timely replacement of wear parts can extend the engine's lifespan and improve performance.

Routine Maintenance Tips

- Change engine oil and filter every 3,000 to 5,000 miles
- Replace timing belt every 60,000 to 100,000 miles
- Inspect and replace spark plugs and ignition coils as needed
- Ensure cooling system components are functioning correctly
- Check for oil and coolant leaks regularly

Performance and Tuning Modifications

Many enthusiasts seek to enhance the 4G67's capabilities through various upgrades:

- Intake and Exhaust:** Upgrading air filters, intake manifolds, and exhaust systems can improve airflow and power.
- ECU Tuning:** Remapping or chip tuning can optimize fuel maps and ignition timing for better performance.
- Camshaft Upgrades:** Installing performance camshafts can increase power at higher RPMs.
- Forced Induction:** Adding a

turbocharger or supercharger is complex but can significantly boost horsepower. Conclusion: Is the Mitsubishi 4G67 Right for You? The Mitsubishi 4G67 engine remains a dependable choice for those seeking a straightforward, durable, and modifiable powerplant. Its widespread availability and proven performance make it a popular option for rebuilds, restorations, or daily driving. Whether you are restoring an old Mitsubishi model or customizing an engine for better performance, understanding the nuances of the 4G67 can help you make informed decisions. In summary, the Mitsubishi 4G67 offers:

- Reliable performance with proper maintenance
- Easy-to-work-with design for DIY enthusiasts
- Potential for tuning and upgrades
- Compatibility with a range of Mitsubishi vehicles

However, like any aging engine, it requires regular care to prevent common issues and ensure longevity. If you own a vehicle equipped with the 4G67 or are considering purchasing one, investing in proper maintenance and periodic upgrades can keep this engine running efficiently for many more miles to come. Final thoughts: The Mitsubishi 4G67 engine embodies a blend of simplicity and reliability, making it a notable part of Mitsubishi's engine history. Whether for everyday commuting or hobbyist tuning, understanding its workings and maintenance requirements ensures you get the most out of this versatile engine.

Mitsubishi 4G67 Engine: An In-Depth Analysis of a Durable Powerplant The Mitsubishi 4G67 engine stands as a notable example of Mitsubishi's commitment to producing reliable, efficient, and versatile powertrains. Widely used across various models and generations, this engine has garnered a reputation for its durability, performance, and adaptability. In this comprehensive review, we will explore the technical specifications, design features, applications, common issues, and maintenance considerations of the Mitsubishi 4G67 engine, providing both enthusiasts and potential owners with valuable insights.

Overview of the Mitsubishi 4G67 Engine The Mitsubishi 4G67 is part of Mitsubishi's 4G6 engine family, which comprises a series of inline-four engines designed primarily for passenger cars and light trucks. Introduced in the late 1980s and produced through the 1990s and early 2000s, the 4G67 is celebrated for its robust construction and performance characteristics.

Key Highlights:

- Displacement:** 1.6 liters (1596 cc)
- Configuration:** Inline-4
- Valvetrain:** SOHC or DOHC, depending on the model
- Fuel System:** Carbureted or Fuel Injection (multi-point or single-point)
- Turbocharged variants:** Available in some models
- Compatibility:** Used in Mitsubishi models such as the Lancer, Mirage, and other compact cars

Technical Specifications and Design Features Understanding the technical nuances of the Mitsubishi 4G67 is crucial to appreciating its capabilities and limitations. Below are detailed specifications and design elements that characterize this engine.

Engine Configuration and Displacement The 4G67 boasts a 1.6-liter (1596 cc) displacement, which strikes a balance between fuel efficiency and adequate power output. Its inline-four configuration is favored for its smoothness and simplicity in manufacturing and maintenance.

Valvetrain and Cylinder Head Depending on the application, the 4G67 features either a Single OverHead Camshaft (SOHC) or a Double OverHead Camshaft (DOHC) setup. The DOHC versions typically provide better airflow, higher RPM potential, and improved performance. SOHC versions: Simpler design, lower manufacturing costs, acceptable performance for basic

applications. DOHC versions: Enhanced airflow, more aggressive tuning, higher power output. Fuel System and Induction Initially, the 4G67 used carbureted fuel delivery systems but later models adopted multi-point fuel injection (MPFI), significantly improving fuel efficiency, emissions, and throttle response. Turbocharged Variants Some versions of the 4G67 were turbocharged, notably in models like the Mitsubishi Mirage Turbo or Lancer Turbo. The turbocharged variants offered increased horsepower and torque, making them popular among enthusiasts and those seeking sporty performance. Power and Torque Ratings Non-turbo models: Typically produce around 90-110 horsepower and 100-110 lb-ft of torque. Turbo models: Capable of 130-150 horsepower, depending on tuning and application. Compression Ratio and Combustion Efficiency The compression ratio varies between models, generally around 8.0:1 to 9.0:1. Higher compression ratios in turbocharged models improve power but require premium fuel and precise tuning. Applications and Vehicle Compatibility The Mitsubishi 4G67 engine's versatility allowed it to be used across several Mitsubishi models, primarily in the compact and subcompact segments. Primary Applications Mitsubishi Lancer (various generations) Mitsubishi Mirage (including models like the Lancer-based Mirage) Mitsubishi Colt Mitsubishi Precis Some models of Mitsubishi Pickup trucks Market Presence and Geographical Distribution The engine was popular in Asian markets, Australia, and parts of Europe, where Mitsubishi's compact cars were well-received. Its reputation for durability made it a popular choice for fleet vehicles and daily drivers. Adaptability in Different Markets The engine's design allowed for easy modifications, making it suitable for tuning, racing, and recreational use. Its compatibility with turbocharging and aftermarket parts further extended its lifespan and performance potential. Performance Characteristics and Driving Experience The Mitsubishi 4G67 offers a balanced driving experience, emphasizing reliability over outright performance but still capable of providing spirited driving when tuned appropriately. Acceleration and Power Delivery The engine provides adequate acceleration, especially in turbocharged variants. Power delivery is smooth at moderate RPMs, with turbo versions offering more aggressive throttle response. The engine's torque curve is favorable for city driving and highway cruising. Fuel Economy Non-turbo models typically achieve 25-30 mpg (miles per gallon) depending on transmission and driving habits. Turbo variants, due to increased power, tend to have slightly lower fuel efficiency but still offer respectable economy for their class. Handling and Compatibility with Vehicle Dynamics The engine's placement in lightweight vehicles contributes to nimble handling. Its moderate weight and compact size make it suitable for small chassis, enhancing overall vehicle agility. Common Issues and Reliability Concerns While the Mitsubishi 4G67 is praised for its durability, like any engine, it has its share of common problems that owners should be aware of. Typical Problems Cooling System Failures: Overheating due to radiator or water pump issues can lead to head gasket failures. Head Gasket Leaks: Common in high-mileage engines, resulting in coolant loss and compression issues. Timing Belt Wear: Regular replacement is essential; failure can cause severe engine damage. Ignition and Fuel Delivery Problems: Worn spark plugs, fuel injectors, or sensors can affect performance. Oil Consumption: Excessive oil burn may indicate worn piston rings or valve seals. Known Durability Strengths The engine's robust construction generally ensures longevity if properly maintained. Many units surpass 200,000 miles with routine service. Turbocharged versions are often more prone to wear but can be reliable if properly cared

for. Recalls and Safety Notices There have been few recalls associated with the 4G67, but owners should consult manufacturer notices and stay current with maintenance to prevent issues.

Maintenance and Tuning Tips Proper maintenance is vital to prolonging the life and performance of the Mitsubishi 4G67 engine.

Regular Service Intervals

Oil Changes: Every 3,000 to 5,000 miles with high-quality oil.

Timing Belt Replacement: Typically every 60,000 to 100,000 miles.

Coolant Flush: Every 30,000 to 50,000 miles.

Spark Plugs and Filters: Replace according to manufacturer's schedule.

Performance Upgrades and Tuning

Turbo Upgrades: For turbo models, upgrading the intercooler, exhaust, and tuning ECU can yield significant power gains.

Intake and Exhaust Mods: Improve airflow and throttle response.

Fuel System Tuning: Ensuring proper fuel mixture enhances performance and efficiency.

Preventive Measures Regularly inspect hoses, belts, and seals. Keep the cooling system in optimal condition. Use high-quality fuel and oil. Address warning signs promptly to prevent major failures.

Conclusion: The Legacy of the Mitsubishi 4G67 The Mitsubishi 4G67 engine exemplifies a well-engineered, reliable powerplant that has served a broad range of vehicles with distinction. Its design balances simplicity with performance, making it a favorite among mechanics and car enthusiasts alike. Whether in stock form or tuned for higher output, the 4G67 continues to demonstrate longevity and adaptability, cementing its place in Mitsubishi's engine lineup history. For owners and restorers, understanding its technical aspects, common issues, and maintenance needs is key to maximizing its lifespan and performance. As automotive technology advances, the 4G67 remains a testament to Mitsubishi's engineering prowess during its era, offering a dependable choice for daily driving, modification projects, and classic car restoration.

Question Answer

What are the main specifications of the Mitsubishi 4G67 engine?

The Mitsubishi 4G67 engine is a 1.6-liter inline-four engine, part of the Sirius family, known for its reliable performance, 4-valve SOHC configuration, and an output of approximately 115 horsepower and 110 lb-ft of torque.

Which Mitsubishi models commonly used the 4G67 engine?

The 4G67 engine was used in various Mitsubishi models such as the Mitsubishi Lancer, Colt, and Mirage, primarily during the late 1990s and early 2000s.

What are common issues associated with the Mitsubishi 4G67 engine?

Common issues include potential cooling system problems, head gasket failures, and occasional oil leaks. Regular maintenance and timely repairs can help mitigate these problems.

Is the Mitsubishi 4G67 engine suitable for tuning or performance upgrades?

Yes, the 4G67 can be tuned for increased performance with modifications like ECU remapping, intake, exhaust upgrades, and turbocharging, but it's essential to ensure compatibility and durability.

How reliable is the Mitsubishi 4G67 engine over long-term use?

The 4G67 is generally considered a durable and reliable engine when properly maintained, with proper oil changes, cooling system upkeep, and timely part replacements.

What are the fuel economy ratings for the Mitsubishi 4G67 engine?

Fuel economy varies depending on the vehicle and driving conditions but typically ranges around 25-30 mpg combined, making it relatively efficient for its class.

Can the Mitsubishi 4G67 engine be replaced or swapped into other vehicles?

Engine swaps are possible but require significant modifications. The 4G67 is primarily compatible with Mitsubishi models designed for that engine, so custom adaptations are necessary for different vehicles.

What maintenance practices are recommended for the Mitsubishi 4G67 engine?

Regular oil changes, coolant flushes, timing belt replacements, and monitoring for leaks or unusual noises are essential to keep the 4G67 running smoothly.

Are there aftermarket parts available for the Mitsubishi 4G67 engine?

Yes, there are aftermarket parts such as performance camshafts, exhaust systems, and ECU tunes available to enhance the performance of the 4G67 engine, though availability may vary by region.

Related keywords: Mitsubishi 4G67, 4G67 engine specifications, Mitsubishi engine parts, 4G67 tuning, Mitsubishi 4G67 performance, 4G67 turbo, Mitsubishi engine repair, 4G67 engine rebuild, Mitsubishi motor comparison, 4G67 fuel efficiency

Mitsubishi ecu pinouts

mitsubishi ecu pinouts: The Complete Guide for Car Enthusiasts and Technicians

Understanding the intricacies of Mitsubishi ECU pinouts is essential for automotive enthusiasts, mechanics, and tuners aiming to optimize vehicle performance, diagnose issues, or perform custom modifications. The Engine Control Unit (ECU) acts as the brain of your Mitsubishi vehicle, managing everything from fuel injection to ignition timing. Knowing the precise pin configuration enables accurate wiring, troubleshooting, and tuning, ensuring your vehicle runs smoothly and efficiently. In this comprehensive guide, we will explore Mitsubishi ECU pinouts in detail, covering common models, pin functions, wiring tips, and resources for sourcing ECU diagrams.

What Is a Mitsubishi ECU and Why Is Pinout Information Important?

The ECU (Electronic Control Unit) in Mitsubishi vehicles is responsible for managing engine functions based on sensor inputs. Each ECU has a specific pinout configuration—a diagram or list of pins and their functions—that maps out how various signals enter and exit the unit. Proper knowledge of ECU pinouts is crucial for:

- Performing accurate diagnostics
- Wiring aftermarket tuning components
- Replacing or upgrading ECUs
- Ensuring safe and reliable vehicle operation

Without precise pinout data, you risk incorrect wiring, potential damage to the ECU or vehicle, or incomplete diagnostics.

Common Mitsubishi ECU Models and Their Pinouts

Mitsubishi has produced a variety of ECU models over the years, each with unique pin configurations tailored to specific engines and vehicle platforms. Here are some of the most commonly encountered ECU models:

- Mitsubishi Eclipse (DSM) ECUs**
 - Models: MD-1, MD-2, MD-3
 - Features: 80-pin or 96-pin configurations
 - Applications: 4G63T, 4G64, 4G69 engines
- Mitsubishi Lancer Evolution ECUs**
 - ECU models: 4G63, 4B11, 4B12
 - Pin counts vary from 80 to 120 pins
- Mitsubishi Outlander and Other SUV ECUs**
 - Typically 64- to 96-pin configurations
 - Complex wiring due to added vehicle modules
- Mitsubishi Triton and Pickup ECUs**
 - Commonly 80-pin models
 - Engine-specific wiring details

For each of these models, detailed pinout diagrams are available through service manuals, online forums, or specialized ECU pinout databases.

Understanding Mitsubishi ECU Pinout Diagrams

A Mitsubishi ECU pinout diagram provides a visual or tabular overview of all the pins and their functions. These diagrams typically include:

- Pin number or position
- Wire color or code
- Signal description (e.g., sensor input, actuator control)
- Voltage levels or reference signals

Deciphering these diagrams is essential for accurate wiring and troubleshooting. Here are some tips for understanding and using ECU pinout diagrams effectively:

- Identify Power and Ground Pins**
 - Usually labeled as BATT, +V, or GND
 - Crucial for powering the ECU properly
 - Ensure power supply is stable before making modifications
- Locate Sensor Inputs**
 - Includes signals from sensors such as MAF, MAP, crankshaft, camshaft, TPS, and oxygen sensors
 - Important for diagnostics and tuning
- Find Actuator Control Pins**
 - Control fuel injectors, ignition coils, and other actuators
 - Usually output pins from the ECU

Common Pin Functions in Mitsubishi ECUs

While pin functions vary among models, some common signals are consistently present:

- Power Supply (+B):** Provides main voltage to the ECU
- Ground (GND):** Common ground reference
- Sensor Inputs:** MAF, MAP, TPS, crank, cam, coolant temperature, etc.
- Actuator Outputs:** Fuel injectors, ignition coils, idle control valve
- Communication Lines:** CAN bus, K-line, L-line for diagnostics and data transfer

Understanding these functions helps in diagnosing wiring issues or adding aftermarket components.

Wiring Tips for Mitsubishi ECU Pinouts

When working with Mitsubishi ECU pinouts, following best wiring practices ensures safety and reliability:

- Use Correct**

Wiring and Connectors Match wire gauge to current requirements Use OEM or high-quality replacement connectors Ensure proper insulation to prevent shorts Follow the Pinout Diagram Precisely Double-check pin numbers and functions before connecting Label wires for easy identification during troubleshooting Test Continuity and Voltage Use multimeters to verify connections Check voltage levels at power and sensor pins Be Mindful of Grounding Ensure all grounds are solid and shared properly Avoid ground loops that can cause signal noise

Sources for Mitsubishi ECU Pinout Diagrams Obtaining accurate and detailed ECU pinout diagrams is vital. Here are some reliable sources:

- Official Service Manuals:** Mitsubishi factory manuals provide comprehensive wiring diagrams and pinouts.
- Online Forums and Communities:** Websites like DSMtuners, EvolutionM.net, and MitsubishiForums.org host user-shared pinouts and wiring guides.
- ECU Pinout Databases:** Websites such as ECU Connections and Pinouts.ru offer detailed diagrams for various ECU models.
- Aftermarket Tuning and Diagnostic Tools:** Tools like EcuFlash, Tactrix OpenPort, and RomRaider often include pinout references.

Always verify diagrams with multiple sources to ensure accuracy before proceeding with wiring or modifications.

Conclusion Mastering mitsubishi ecu pinouts is essential for anyone involved in Mitsubishi vehicle diagnostics, tuning, or repair. Whether you're replacing an ECU, performing custom tuning, or troubleshooting wiring issues, having accurate pinout diagrams and understanding their functions is critical. Remember to source diagrams from reputable sources, follow wiring best practices, and double-check connections to ensure your vehicle operates safely and efficiently. With the right knowledge and tools, working with Mitsubishi ECU pinouts becomes a straightforward process that can significantly enhance your vehicle's performance and reliability.

Mitsubishi ECU Pinouts: An In-Depth Guide for Enthusiasts and Technicians Understanding the Mitsubishi ECU pinouts is fundamental for anyone involved in vehicle tuning, diagnostics, or repairs involving Mitsubishi engines. The ECU (Engine Control Unit) serves as the brain of your vehicle's engine management system, and knowing its pin configuration is essential for proper wiring, modifications, and troubleshooting. This comprehensive guide aims to provide detailed insights into Mitsubishi ECU pinouts, covering various models, their wiring diagrams, pin functions, and practical tips for working with these crucial components.

Introduction to Mitsubishi ECU Systems Mitsubishi has been a prominent manufacturer of automotive electronics, especially in the realm of turbocharged and performance-oriented vehicles like the Mitsubishi Lancer Evolution series, Eclipse, and Gallant. The ECU in these vehicles manages fuel injection, ignition timing, boost control, transmission control, and more. The ECU communicates with various sensors and actuators through a series of pins, each with specific functions. These pinouts vary across different Mitsubishi models and years, so it's vital to refer to the appropriate diagrams for your specific application.

Understanding ECU Pinout Basics Before diving into specific model pinouts, it's important to understand the general layout and common pin functions:

- Power and Ground Pins:** Provide the necessary electrical supply for the ECU operation.
- Sensor Inputs:** Connect to inputs like throttle position sensors, MAP/MAF sensors, coolant temperature sensors, etc.
- Actuator Outputs:**

switch input		Power supply trigger		10		Crankshaft position sensor	
TDC sensor input		20		Coolant temperature sensor		Sensor input	
for engine temp		30		Throttle position sensor (TPS)		Input for throttle angle	
40		MAF sensor input		Mass airflow sensor input		50	
Fuel injector control		Outputs for individual injectors		60		Ignition coil	
control		Controls ignition sparks		70		Ground	
Common ground for ECU circuitry		80		Power supply		12V ignition	
power		[Note: The actual pin numbers and functions may differ based on the ECU revision; always consult the specific service manual.]					

Mitsubishi DSM ECU Pinout (Turbo Models)

DSM (Diamond Star Motors) platforms, including Eclipse and Talon, utilize similar ECU pinouts. Highlights: 80-pin connectors are common. Main functions include sensor inputs (O2, MAP, MAF, TPS), outputs (injectors, coils), and communication lines. Example Pin Functions: Pin 1: Ignition switch input Pin 2-5: Injector outputs Pin 6-7: Coil control Pin 8: O2 sensor output Pin 9: Communication port (Serial or CAN) Special Notes: Many aftermarket tuning solutions connect directly to the ECU pins for remapping. Pinouts are available publicly, but verify with the specific ECU revision. Mitsubishi 16G & 20G ECU Pinouts (Evo VIII and IX) These models feature more advanced ECUs with increased pins for additional sensors and controls. Features: 144-pin or 160-pin connectors. Additional pins for features like active aero, advanced boost control, and launch control. Key Pins: Injector and coil outputs are grouped in dedicated banks. Sensor inputs include wideband O2, exhaust temp, and boost pressure. Communication via CAN bus is standard in newer models. Deciphering the Pin Functions Understanding each pin's role is critical when wiring, troubleshooting, or modifying the ECU. Common Pin Types: Power and Ground: Usually marked as +12V, +5V, GND, or B+. Sensor Inputs: TPS (Throttle Position Sensor): Typically a 5V reference with a signal and ground. MAP/MAF Sensors: Provide airflow data; require proper wiring to avoid false readings. Coolant Temp Sensor: Usually a thermistor providing resistance-based signals. Actuator Outputs: Fuel Injectors: Multiple wires, each controlling a specific injector. Ignition Coils: Usually controlled via transistor drivers. Boost Control Solenoids: Manage turbo boost pressure. Communication Lines: K-Line: Used for diagnostics on older models. CAN Bus: For modern vehicles, used for inter-module communication. Serial Data (UART): For tuning and data logging. Important Tips: Always verify pin functions before wiring, referencing official manuals. Use multimeters and oscilloscopes for signal verification. Maintain proper grounding and shielding to

prevent electrical noise. Working with Mitsubishi ECU Pinouts: Practical Aspects Engaging with ECU pinouts involves more than just identification; it requires careful handling and adherence to best practices. Tools Needed Multimeter Oscilloscope Wiring diagrams specific to your vehicle Pin extraction tools Soldering equipment (for custom wiring) ECU pinout diagrams (from service manuals or online repositories) Wiring and Modifications Always disconnect the battery before working on ECU wiring. Use shielded cables for sensitive sensor signals. When installing aftermarket devices, ensure proper pin identification to avoid damage. For ECU tuning, many use piggyback controllers or direct chip tuning, which often connect to specific pins. Diagnostics and Troubleshooting Verify power and ground pins first. Check sensor signals for correct voltage ranges. Use diagnostic tools to communicate with the ECU via OBD-II or manufacturer-specific protocols. Refer to pinout diagrams for pinpointing issues like open circuits or faulty sensors. Sources for Mitsubishi ECU Pinout Data Reliable information is vital for safe and effective work. Here are some recommended sources: Official Service Manuals: The most accurate and detailed diagrams. Online Forums and Communities: Such as EvolutionM, DSMtuners, and Mitsubishi-specific groups. Wiring Diagram Databases: Websites like Alldata, Mitchell1, or Haynes manuals. ECU Pinout PDFs: Many enthusiasts have compiled comprehensive diagrams available for free or purchase. Common Challenges and Precautions Working with ECU pinouts can present challenges: Incorrect Pin Identification: Can lead to damage; always cross-verify. Pin Damage: During extraction or wiring, pins can bend or break. ECU Compatibility: Ensure the ECU matches your vehicle's model and year. Electrical Noise: Can cause false sensor readings; proper shielding and grounding are necessary. Firmware Variations: Different revisions may have varying pinouts. Precautions: Always work in a static-free environment. Use insulated tools. Keep detailed records of modifications. When in doubt, consult a professional or experienced tuner. Conclusion: Mastering Mitsubishi ECU Pinouts A thorough understanding of Mitsubishi ECU pinouts is essential for effective vehicle tuning, diagnostics, and repairs. Whether you're an enthusiast looking to modify your turbocharged DSM or Evolution, or a technician performing repairs, knowledge of the specific pin configurations ensures safe and successful work. Remember that Mitsubishi's ECU pinouts can vary significantly between models and years, so always refer to official documentation or trusted community resources. Proper identification, careful wiring, and adherence to best practices will help you avoid costly mistakes and unlock the full potential of your vehicle's engine management system. By mastering these pinouts, you gain the ability to troubleshoot complex electrical issues, install performance upgrades, and optimize engine performance with confidence. Happy tuning!

Question Answer

What is the purpose of Mitsubishi ECU pinouts?

Mitsubishi ECU pinouts provide the wiring connections and pin configurations needed for diagnosing, tuning, or replacing the ECU in Mitsubishi vehicles.

Where can I find the official Mitsubishi ECU pinout diagrams?

Official Mitsubishi ECU pinout diagrams are typically available in service manuals or repair guides, which can be obtained from authorized dealers or automotive repair databases.

Are Mitsubishi ECU pinouts the same across different models?

No, ECU pinouts vary between Mitsubishi models and years. It's essential to refer to the specific pinout diagram for your vehicle's make, model, and year.

How can I identify the main power and ground pins on a Mitsubishi ECU?

The main power and ground pins are usually marked on the ECU pinout diagrams, often labeled as 'BATT', 'IGN', 'GND', or similar. Refer to the vehicle's service manual for precise identification.

What tools are needed to connect to Mitsubishi ECU pinouts for tuning?

Tools such as a diagnostic connector, OBD-II interface, wiring harness, and a compatible ECU tuning software are necessary to connect to Mitsubishi ECU pinouts for tuning purposes.

Can I modify or repair Mitsubishi ECU wiring using the pinout information?

Yes, understanding the ECU pinouts enables you to troubleshoot wiring issues, perform repairs, or modify connections safely. However, caution is advised, and professional assistance is recommended.

Are Mitsubishi ECU pinouts compatible with aftermarket tuning devices?

Many aftermarket tuning devices are designed to interface with Mitsubishi ECU pinouts, but compatibility depends on the specific model and device. Always verify compatibility before connecting.

How do I prevent damage when working with Mitsubishi ECU pinouts?

To prevent damage, disconnect the vehicle's battery before working on the ECU wiring, use proper tools, follow wiring diagrams carefully, and avoid static discharge or short circuits.

Are there online resources or forums to find Mitsubishi ECU pinout information?

Yes, automotive forums, DIY tuning communities, and specialized repair websites often share

Mitsubishi ECU pinout diagrams and related troubleshooting tips.

What precautions should I take when connecting to Mitsubishi ECU pinouts for data logging?

Ensure the vehicle is turned off before connecting, use proper interfaces and connectors, avoid short circuits, and follow manufacturer instructions to prevent damage or data corruption.

Related keywords: Mitsubishi ECU wiring, Mitsubishi ECU connector, Mitsubishi ECU pin configuration, Mitsubishi ECU diagram, Mitsubishi engine control unit, Mitsubishi ECU troubleshooting, Mitsubishi ECU pinout diagram, Mitsubishi ECU wiring harness, Mitsubishi ECU pin locations, Mitsubishi ECU repair