

Section 1

TOYOTA CULTURE

Toyota

Toyota, from its beginning to the present, has followed its original goal of continuous improvements.



- Learning Objectives:
1. Upon completing Toyota Culture, you will be able to:
 - Recognize how Toyota's history contributes to its current success.
 - Identify the function of each of Toyotas U.S. operations.
 2. Given a Toyota vehicle line (passenger vehicle truck, etc.) you will be able to identify that line's features and characteristics.

Sakichi Toyoda

In 1891, Sakichi Toyoda starts designing and making looms.

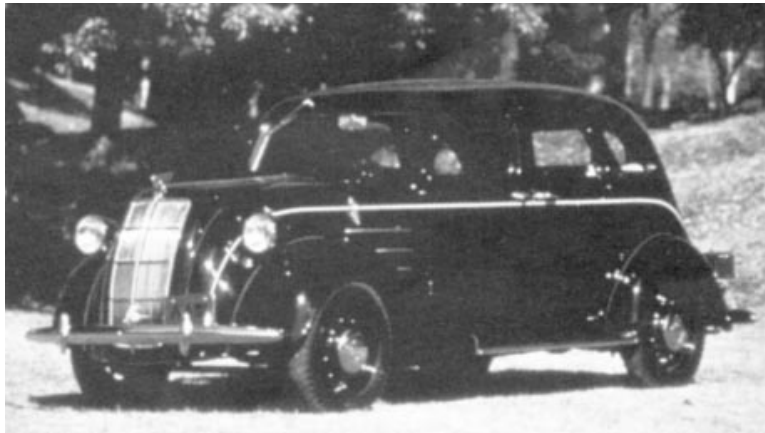


Pre-Automotive Toyoda 1890-1920 Toyota's history began in 1891 when Sakichi Toyoda started designing and making looms in Japan. In 1894, Toyoda designed and built his first automatic loom and after several rough starts, he formed the Toyoda Automatic Loom Works to manufacture looms for the Japanese and eventually worldwide textile markets.

Early Automotive Toyoda In 1920, Sakichi's son, Kiichiro, joined the company. Kiichiro, like his father before him, had seen automobile manufacturing in the United States and wanted to produce cars in Japan. His goal was to mass-produce an inexpensive passenger car.

Toyota AA

The AA was Toyota's first domestically produced automobile.



1934, the first Toyota engine was developed– a 6-cylinder that produced 65 horsepower. The first prototype automobile, the A1, followed in 1935. The vehicle was tested and improved daily, an example of “Kaizen”, which means continuous improvement. This is the heart of Toyota’s philosophy. The result of all this hard work was the AA, Toyota’s first domestically produced automobile.

Toyota now had to market and sell the vehicles it was about to produce. It was decided that a new name was needed and after a company-wide contest was held, the name Toyota was chosen, because it took fewer brush strokes to write than Toyoda.

Throughout the late 30’s and early 40’s, Toyota improved it’s manufacturing process by adopting a “just in time” concept and standardizing the work. This improved efficiency and quality.

In Japan, Toyota sales continued to improve through the 1950’s. Sales went from 22,000 units in 1955 to 71,000 units in 1957, with 70% of the sales coming from trucks. The Toyota Crown was introduced in 1955. Its large engine made it very popular with Japan’s taxi drivers.

Throughout this timeframe, Toyota continued to improve it’s design and manufacturing processes, getting away from some of the “borrowed” technology from the past.

In the late 50’s and early 60’s, Toyota expanded rapidly overseas exporting to Latin America, Southeast Asia, Africa, Europe and the United States. In 1966, Toyota exported just over 100,000 units. By 1971, that figure grew to almost 800,000.

Toyota Motor Sales, USA

The first office of Toyota Motor Sales was located in Hollywood, CA.



Toyota Motor Sales, USA On October 31, 1957, Toyota Motor Sales of America was established in a defunct Rambler dealership in Hollywood, California.

Toyopet Crown

The Toyopet Crown was introduced to the U.S. in 1957.



Toyopet Crown The Toyopet Crown was introduced to the U.S. during this time. Designed for the Japanese market, only 287 vehicles were sold in 1958. Even though Toyopet sales were disappointing, the Land Cruiser, a strong seller throughout the world, sold well in the U.S.

Toyota Corona

In 1965, the Corona was introduced to the United States.



Corona Toyota decided to develop a vehicle specifically for the American market, the Corona. Introduced in 1965, it marked a new beginning for Toyota in America. In 1966, more Toyotas were sold in the U.S. than in all previous years combined. By mid-1967, the Corona was the third best selling import in the U.S. and established Toyota's reputation for dependability and quality.

New U.S. Headquarters In February of 1967, Toyota moved to new headquarters in Torrance, California, greatly expanding its ability to meet the growing demand for Toyota vehicles in the U.S.

Toyota Corolla

The Corolla delivers quality and economy in 1968.



Corolla Introduced in 1968 and equipped with front disc brakes, an available automatic transmission and A/C, the Corolla delivered the combination of quality and economy that was Toyota's hallmark.

Toyota's Growing Reputation From 1974 through 1977, the Corolla was the best selling car in the world. In 1976, Toyota surpassed Datsun in the combined car and truck market, in part, due to the introduction of the Corolla Liftback and Celica GT Liftback.

In 1977, Toyota celebrated its 20th year in the U.S. and sold its millionth vehicle in America.

Toyota was firmly established as a leader in quality, dependability and value, a reputation that it continues to strengthen today.

Toyota Assembly line

Not just a worker, but a team member responsible for the continuous improvement philosophy.



Toyota Production System
1980-1990

Throughout its history, Toyota has always worked to improve its production quality and economy, through the “just-in-time” philosophy and “Kaizen” meaning continuous improvement. In 1986, Toyota sold more than 1,000,000 vehicles in the U.S.

At the heart of the Toyota Production System is responsibility. Workers are organized into teams with each team member responsible for quality inspections, problem solving and ideas for continuous improvement. Any worker can stop the assembly line if a problem is detected.

The Toyota Production System is used at the New United Motor Manufacturing, Inc. (NUMMI) plant in Fremont, CA, a joint venture with General Motors. Vehicles produced at NUMMI include Corolla and Tacoma for Toyota and Chevrolet Prizm for General Motors.

U.S. Manufacturing

In addition to the NUMMI plant opened in 1984, Toyota opened Toyota Motor Manufacturing Kentucky (TMMK) in Georgetown, Kentucky which builds Camry, Avalon, Camry Wagon and Sienna. The Princeton, Indiana plant opened in 1998 and produces the full-size Toyota Tundra pick-up and Sequoia.

Camry The Toyota Camry has become the Corolla of the 90's. This mid-sized vehicle, available with a range of options, became the best selling car in the United States in 1997.

Tundra A successor to the T100, Toyota launched its first V8-powered full-size pick-up, the Tundra.

Lexus Model

The Lexus brand is a result of the continuous improvement philosophy.



Introduction of Lexus In 1990, Toyota introduced its Lexus brand proving to the world that a Japanese automaker is capable of making a world-class luxury car. The Lexus brand is continuously ranked at the top of the J.D. Power Customer Satisfaction and Vehicle Quality surveys.

Toyota in the U.S.A.

The 12 regions assist the dealership network in the United States.



Toyota in America Toyota Motor Sales, Inc. is an American company in charge of overseeing the sales and service efforts of Toyota in the United States.

There are 12 regions, each responsible for the dealer network in their area; Boston, New York, Central Atlantic, Southeast, Cincinnati, Chicago, Kansas City, Gulf States, Denver, Portland, San Francisco and Los Angeles. It's these regions that assist the most important part of the Toyota family, our dealers and ultimately you.

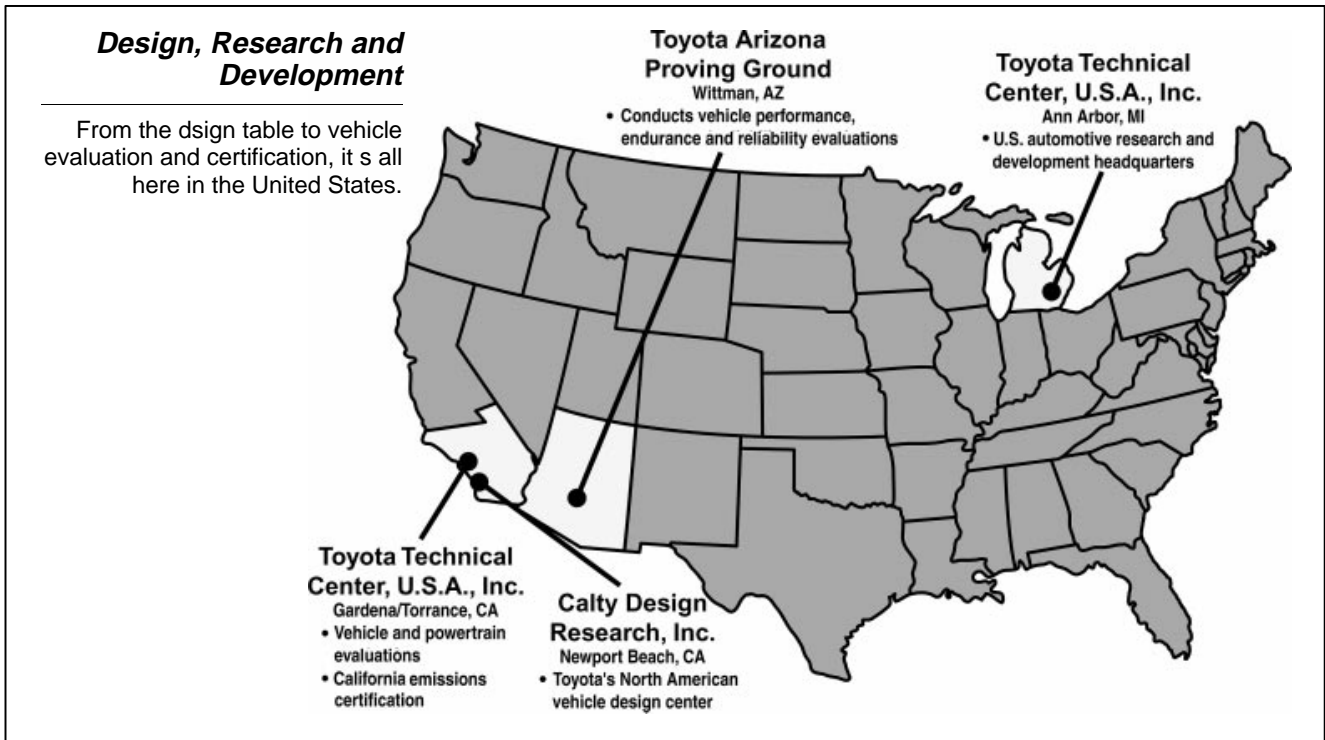
The North American representative for Toyota Motor Corporation, our Japanese parent company, is located in New York City.

Regional Training Centers

There are 12 regional training centers, along with vocational schools and community colleges, to better serve dealerships.

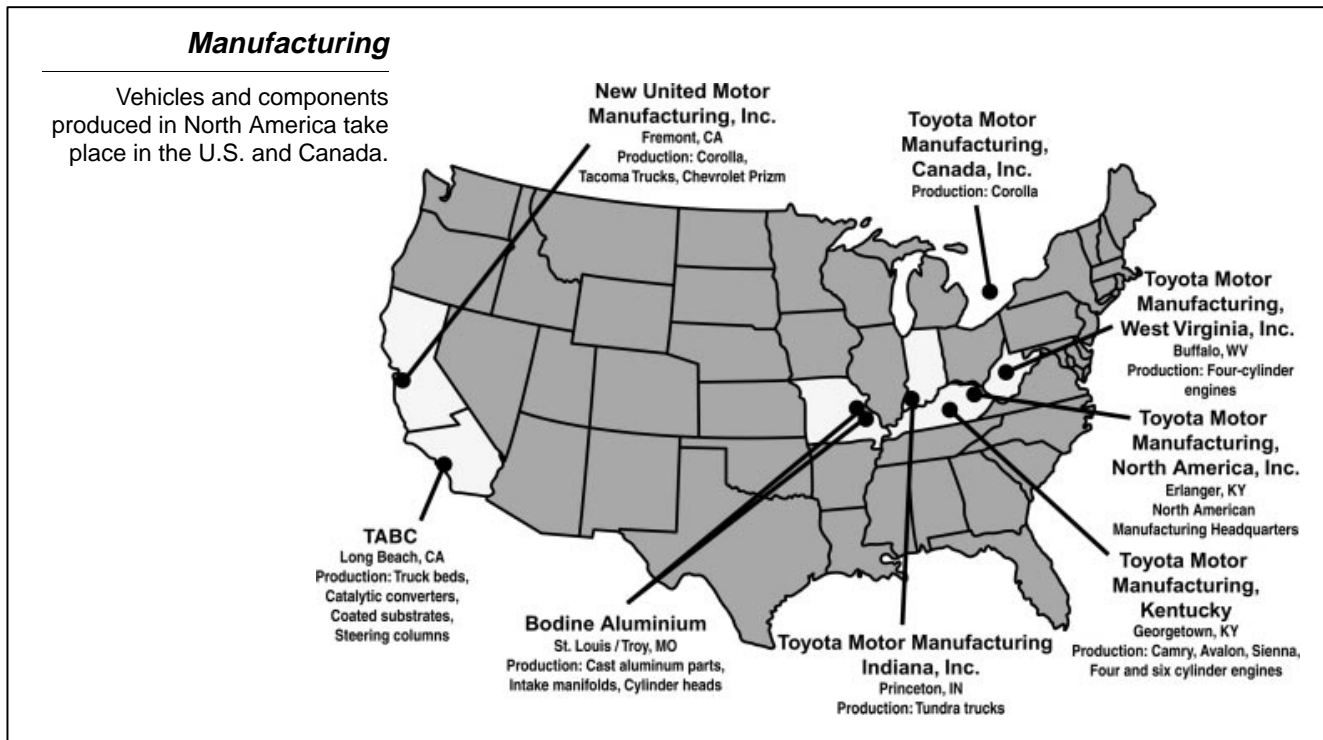


Regional Training Centers Toyota maintains 12 Regional Training Centers across the country. In addition, technical training courses are also held in remote facilities such as vocational schools and community colleges.



Design, Research and Development Designing vehicles in the United States is an important part of Toyota's North American operations.

- Toyota Technical Center, U.S.A. in Ann Arbor, Michigan, conducts research and development on new vehicles.
- Toyota Technical Center, U.S.A. in Southern California, performs vehicle and powertrain evaluations and California emissions certification.
- Toyota Arizona Proving Ground provides the opportunity to test and evaluate new vehicles.
- Caltex Design Research Center in Newport Beach, California is responsible for new vehicle design in the United States.



Manufacturing Toyota Motor Manufacturing, North America, operates plants throughout the United States and Canada. Headquartered in Erlanger, Kentucky, Toyota Motor Manufacturing is responsible for all manufacturing operations in the United States and Canada.

Additional manufacturing facilities include:

- New United Motor Manufacturing in Fremont, California, which builds Tacoma and Corolla.
- Toyota Motor Manufacturing, Indiana, which builds Tundra trucks, Sequoia and Sienna.
- The West Virginia Facility manufactures 4-cylinder engines.
- TABC located in Long Beach, California, produces truck beds, catalytic converters, coated substrates and steering columns.
- Bodine Aluminum in St. Louis and Troy, Missouri, make cast aluminum parts including intake manifolds and cylinder heads.
- The Georgetown, Kentucky plant is Toyota's largest facility in North America. The plant is responsible for building Avalon and Camry.
- Toyota Motor Manufacturing, Canada, is responsible for the production of Corolla and Solara.

There is also a Toyota Industrial Equipment Manufacturing plant in Columbus, Ohio, which manufactures forklifts.

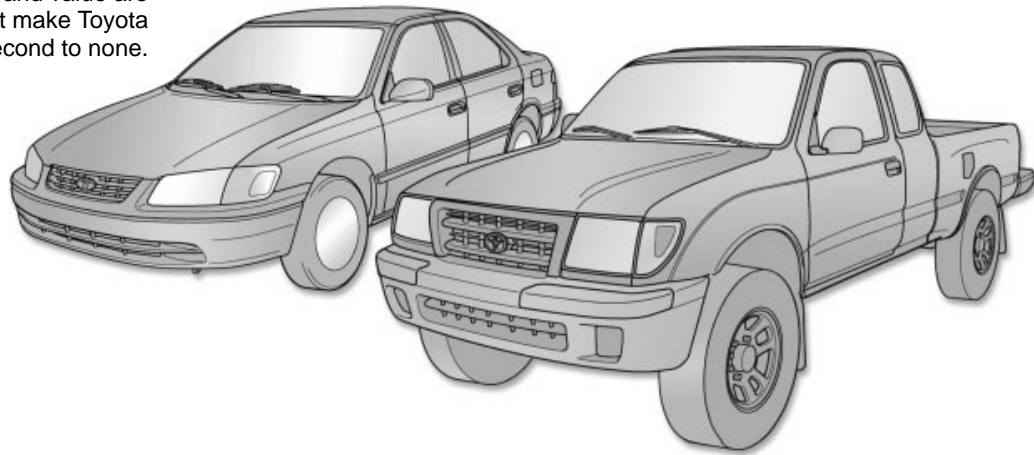
Corporate Investment All in all, as of 2000, Toyota has invested more than \$10.2 billion in United States facilities and employees and has purchased over \$10.3 billion in parts. In addition, Toyota dealerships have invested more than \$7 billion in local economies throughout the country.

Toyota employs almost 27,000 people in the United States and accounts for nearly 95,000 dealership related jobs.

All totaled, Toyota's commitment in the United States has generated more than \$21 billion in direct investments and parts purchases and accounted for more than 121,000 jobs.

Vehicle Design and Characteristics

Quality and value are characteristics that make Toyota vehicles second to none.

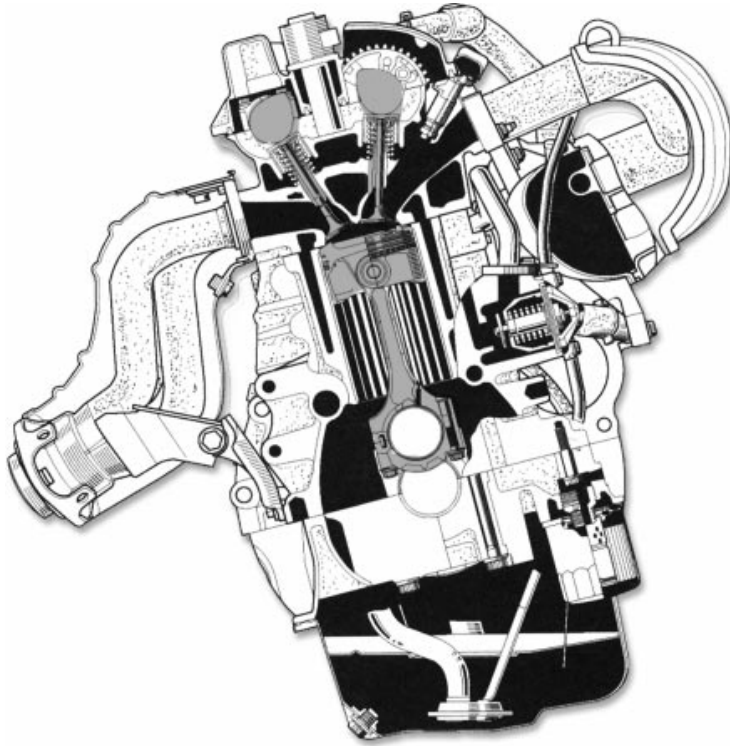


Vehicle Design and Characteristics Toyota vehicle designs range from 2WD passenger cars to 4WD trucks. Passenger car and truck segments include:

- Compact cars
- Sedans
 - Mid-Size
 - Full-Size
- Sports Cars
- Mini Vans
- Trucks
 - Small
 - Full-Size
- SUV
 - Compact
 - Mid-Size
 - Full-Size

Passenger Car Engines

Continuous improvements, like TCCS and VVT, have made passenger car engines the most efficient and powerful engines to date.

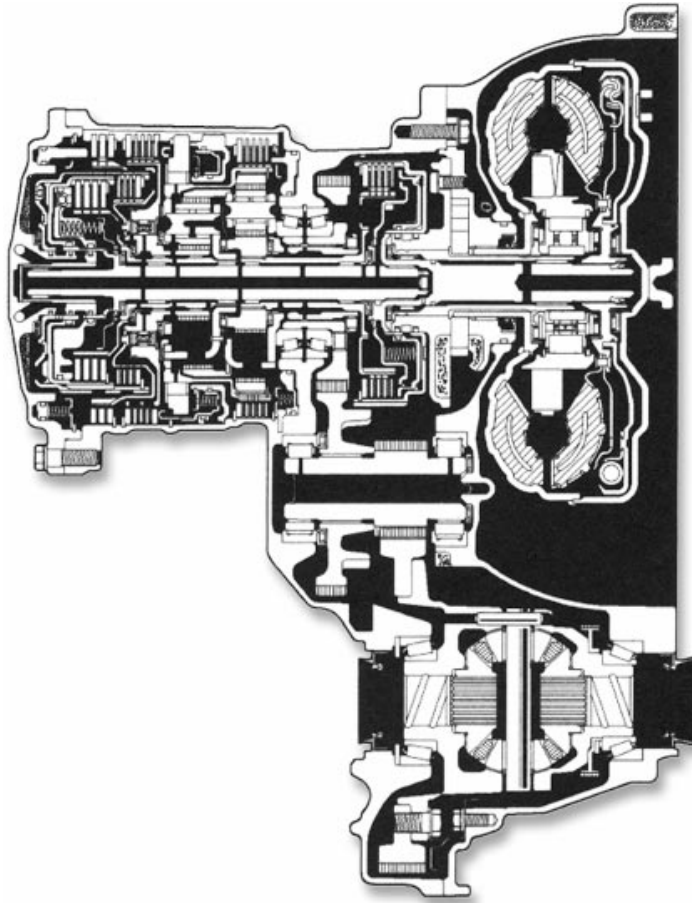


Passenger Car Engines Toyota passenger car engines are either 4-cylinder, 16-valve or V6, 24-valve and include the following features:

- On-Board Diagnostics II (OBD II) engine controls
- Variable Valve Timing for enhanced performance
- Distributorless Ignition for precise ignition control and reliability
- Optional Turbocharger or Supercharger

Transmission/Transaxles

Passenger car transmissions range from the 5-speed manual to the electronically controlled automatic transmission.



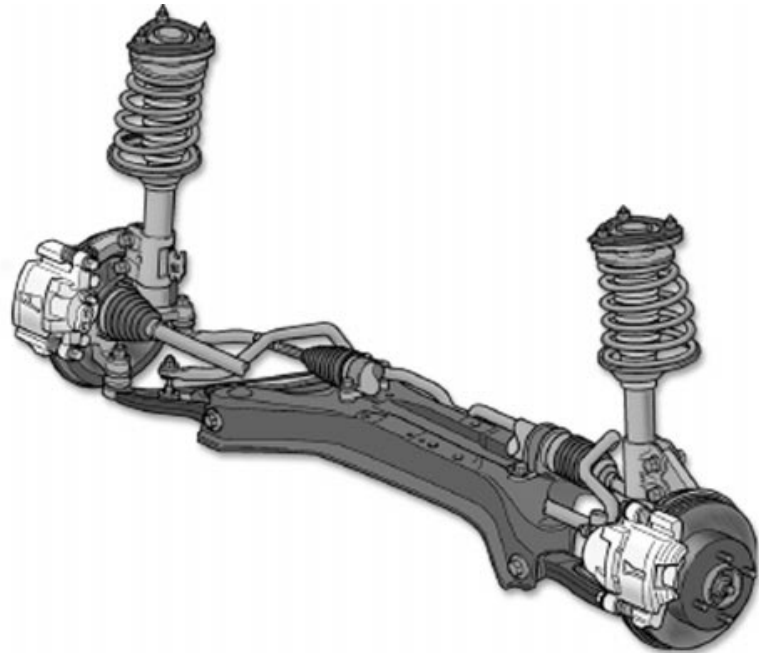
Passenger Car Transmissions/ Transaxles

All Toyota passenger cars use one of the following transmission types:

- 5-Speed Manual
- 6-Speed Manual
- 3-Speed Automatic
- 4-Speed Electronically Controlled Automatic (ECT)
- 4-Speed ECT-i (intelligence)
- 4-Speed Sportshift ECT for performance shifting from the steering wheel

Passenger Car Chassis

To improve handling, safety and performance, different systems like ABS, traction control and power rack and pinion steering are added to the chassis.



Passenger Car Chassis In addition to uni-body construction, Toyota passenger car chassis include:

- Power Rack and Pinion Steering (variable-assist)
- Fluid-Filled Engine Mounts
- 4-Wheel Disc Brakes
- Anti-Lock Braking System
- Traction Control
- Vehicle Skid Control

***Passenger Car
Safety Features***

Seat belts and airbags are all critical for passenger safety.



Passenger Car Safety Features All Toyota passenger cars are equipped with front airbags as standard equipment. Driver and front passenger side airbags are available for additional safety.

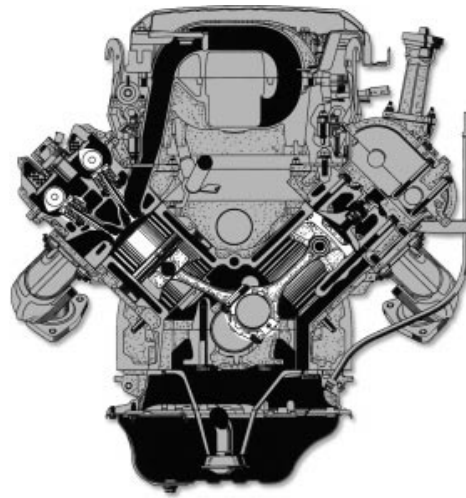
ELR/ALR Toyota seatbelts use 2 types of retracting mechanisms:

1. ALR = Automatic Locking Retractor
2. ELR = Emergency Locking Retractor

Note that seatbelts in some vehicles include pretensioner and force limiter.

Truck Engines

Continuous improvements in truck engines have resulted in greater power and efficiency.



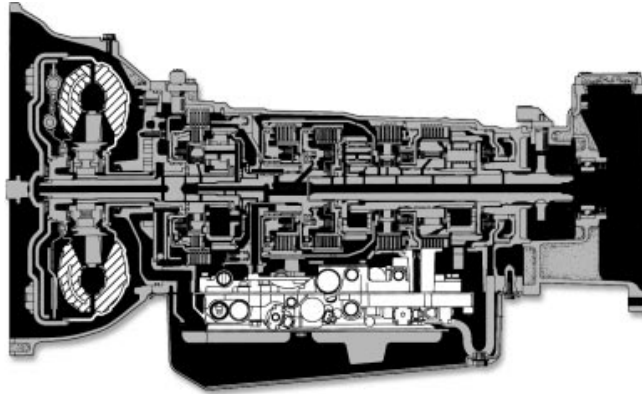
Truck Engines Available truck engines include:

- 4-Cylinder, 16-Valve
- V6, 24-Valve
- V8, 32-Valve

Each engine uses On-Board Diagnostics II (OBD II) and a distributorless ignition system.

Truck Transmissions

Manual and automatic transmissions are available on trucks.

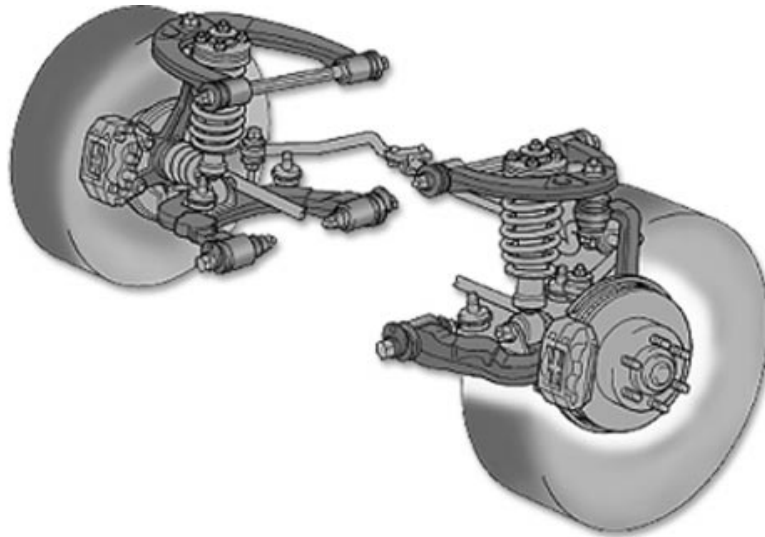


Truck Transmissions Transmissions available on Toyota trucks include:

- 5-Speed Manual
- 4-Speed ECT
- 4-Speed ECT-i

Truck Chassis

Trucks can have different front suspension design types.

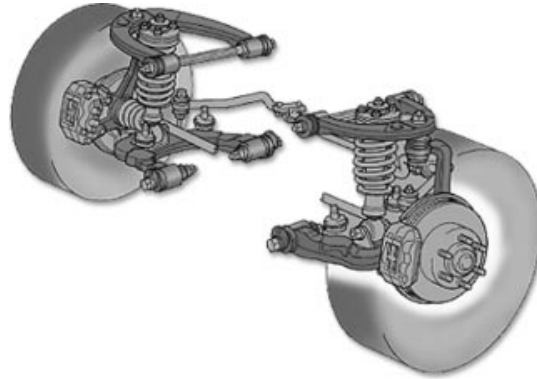


Truck Chassis Toyota trucks use the following Front Suspension types:

- MacPherson Strut
- Double Wishbone

Brake Systems

Truck brake systems are either disc/drum or 4-wheel disc type.

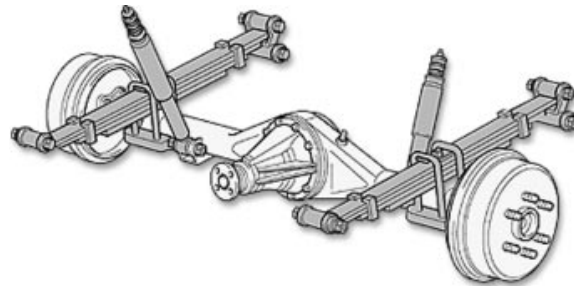


Brake Systems Brake systems used on trucks include:

- Disc/Drum
- 4-Wheel Disc
- ABS (Anti-Lock Braking System)
- EBD (Electronic Brake Distribution)
- VSC (Vehicle Skid Control)
- BA (Brake Assist)
- Active Traction Control

Rear Suspensions

Solid axle with leaf springs is a common rear suspension, but there are several other types. Examples of these are: 4-link with coil springs, independent strut, and solid axle with coil springs.

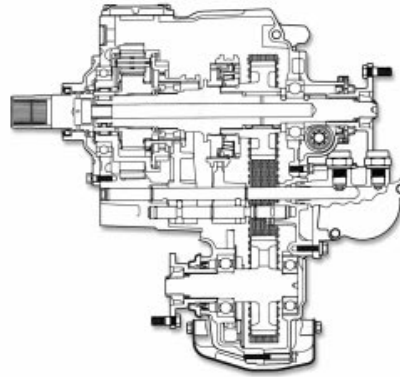


Rear Suspensions Rear suspension types include:

- 4-link Coil Spring
- Independent Strut Type
- Solid Axle with Coil Springs
- Solid Axle with Leaf Springs

Truck Powertrains

There are many powertrain types and features.



Truck Powertrains Toyota trucks are available with the following powertrain types and features:

- 2WD
- 4WD
- Torque Sensing Limited Slip Differential
- All-Trac (4WD)
- 4Wheel On-Demand
- Touch-Select 4WD
- Multi-mode 4WD with Active Traction Control

Truck Safety Features

Safety is always a priority with Toyota.

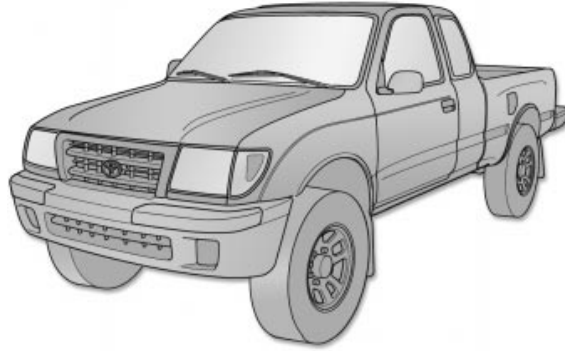


Truck Safety Features The following safety features can be found on Toyota trucks:

- ELR/ALR Seatbelts
- Seatbelt Pretensioners and Force Limiters
- Driver and Front Passenger Airbags
- Side Airbags
- Curtain Shield Airbags
- Passenger Side SRS Airbag Cut-Off Switch

Truck Features

Truck features include: access cab, TRD package and towing package, as well as many others.



Truck Features Toyota trucks are available with the following features:

- Standard cab
- Xtracab (extended cab)
- Access Cab (extended cab with rear access doors)
- Double Cab (4-door)
- Toyota Racing Development (TRD) Package
- Towing Package

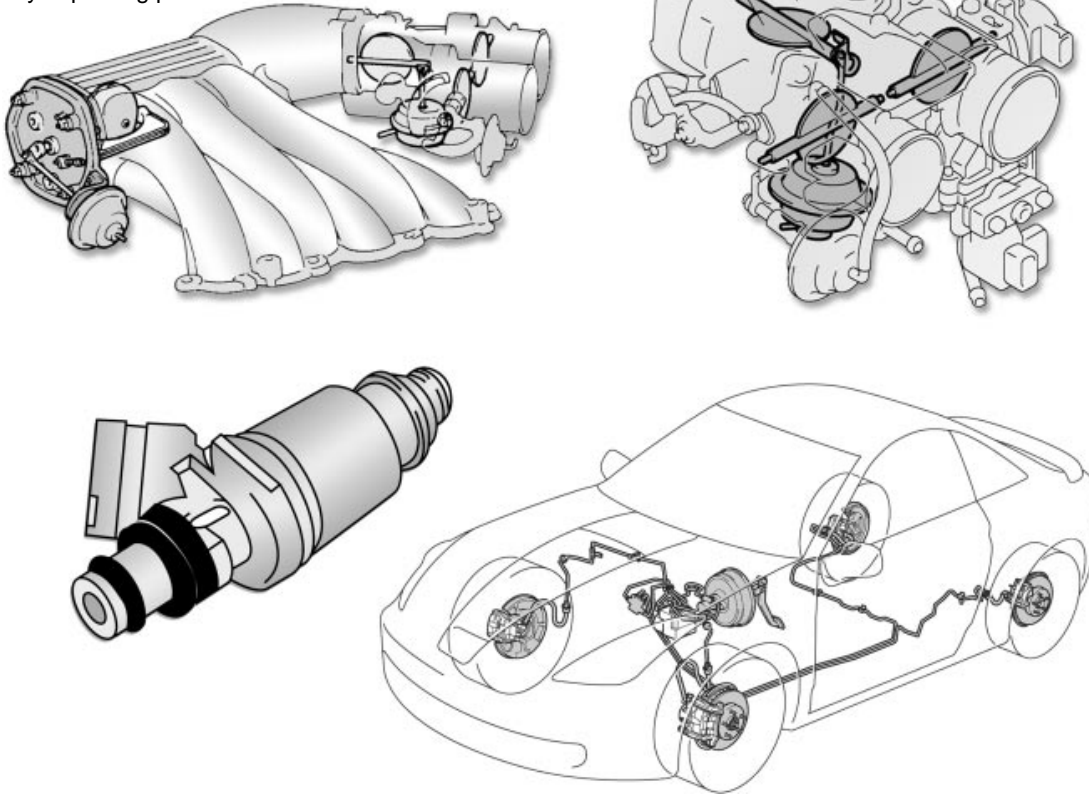
End of Section 1

Section 2

Toyota Technology

Toyota Technology

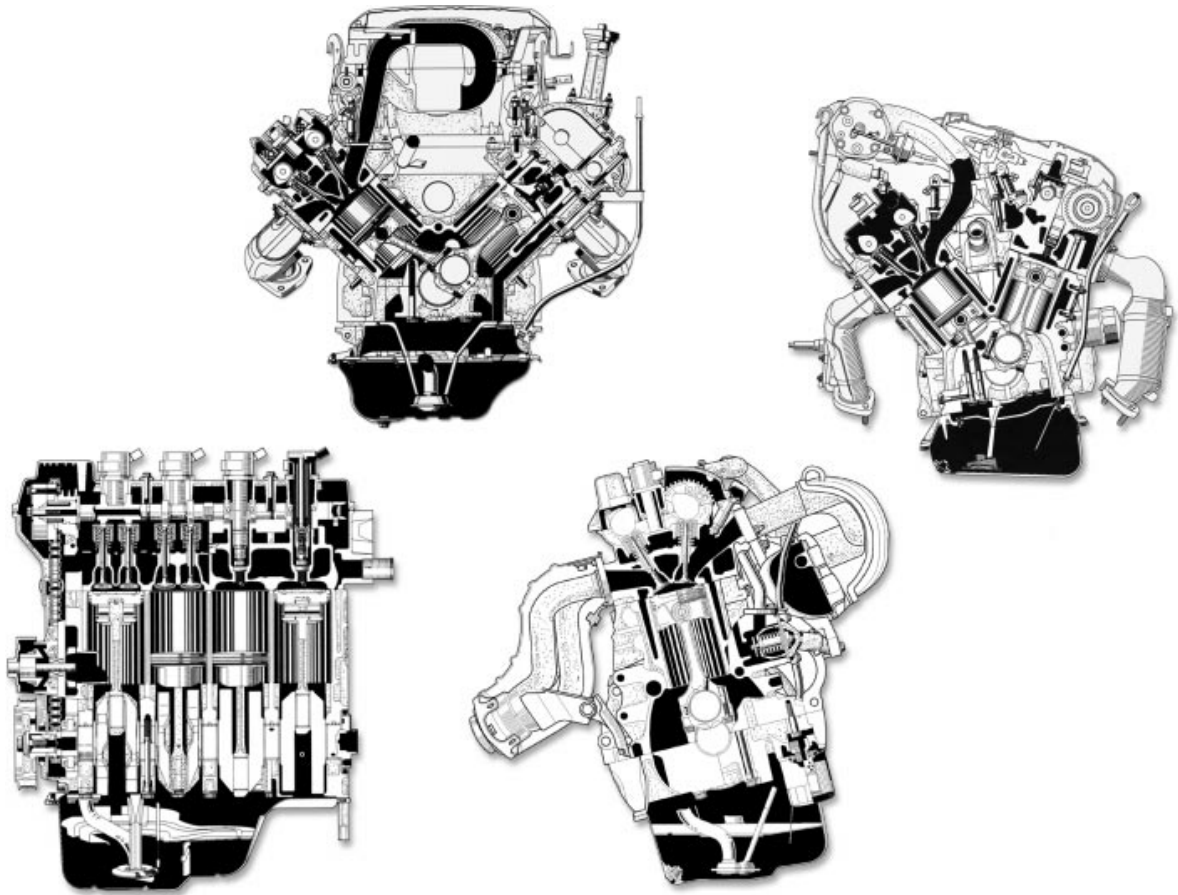
Toyota technology is on a continually improving path.



- Learning Objectives:
1. Given a vehicle component or system, you will be able to identify the primary variations of the component or system that Toyota uses.
 2. Given a service scenario, you will be able to identify the best technical resource available and locate the information required to repair the vehicle.
 3. Identify the steps of the Six-Step Diagnostic Process and when to apply them.
 4. Access Diagnostic Trouble Codes using the Toyota Diagnostic Tester.
 5. Erase Diagnostic Trouble Codes using the Toyota Diagnostic Tester.
 6. Identify the major steps of the Pre-Delivery Service procedure.

Toyota's Engine Technology

Automotive engines efficiently generate higher power output while meeting today's emission standards.

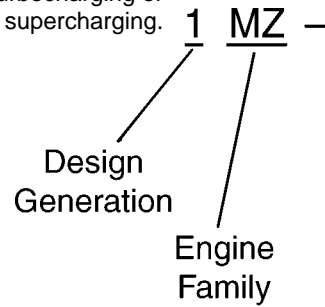


Introduction This section provides an overview of major elements of Toyota's automotive technology. These elements include:

- Engines
- Engine Control and Emissions Systems
- Transmissions
- Drivelines
- Chassis

Identifying Engines

Engine codes are used to identify engine family, fuel system or type, valvetrain angle, turbocharging or supercharging.



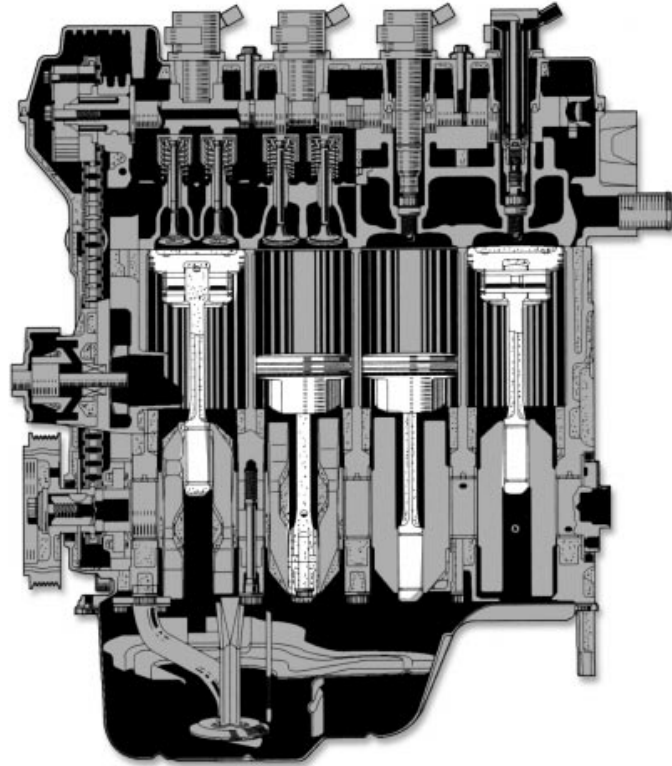
- FE = Electronic Fuel Injection
- FE = Narrow Included Valvetrain Angle
- GE = Wide Included Valvetrain Angle
- FNE = Compressed Natural Gas
- FZE = Supercharged
- GTE = Turbocharged
- FXE = Hybrid System

Engine Codes Toyota uses engine codes to identify engines by design generation, engine family and other characteristics.

Engines

4-Cylinder Engines

The small DOHC 4-cylinder generates high power output with excellent fuel economy.



In-Line 4-Cylinder The in-line 4-cylinder, the smallest engine design offered by Toyota, balances power with fuel economy. As with all Toyota engines, the 4-cylinder engine design features dual overhead camshafts (DOHC), four valves per cylinder, and electronic fuel injection (EFI).

Features include:

- Rapid burn/Taper squish combustion chambers
- Low tension piston rings
- Short skirt pistons
- Shim and/or bucket valve adjustment
- Variable Valve Timing (VVT-i/VVTL-i)
- Select fit main and rod bearings
- Balance shafts

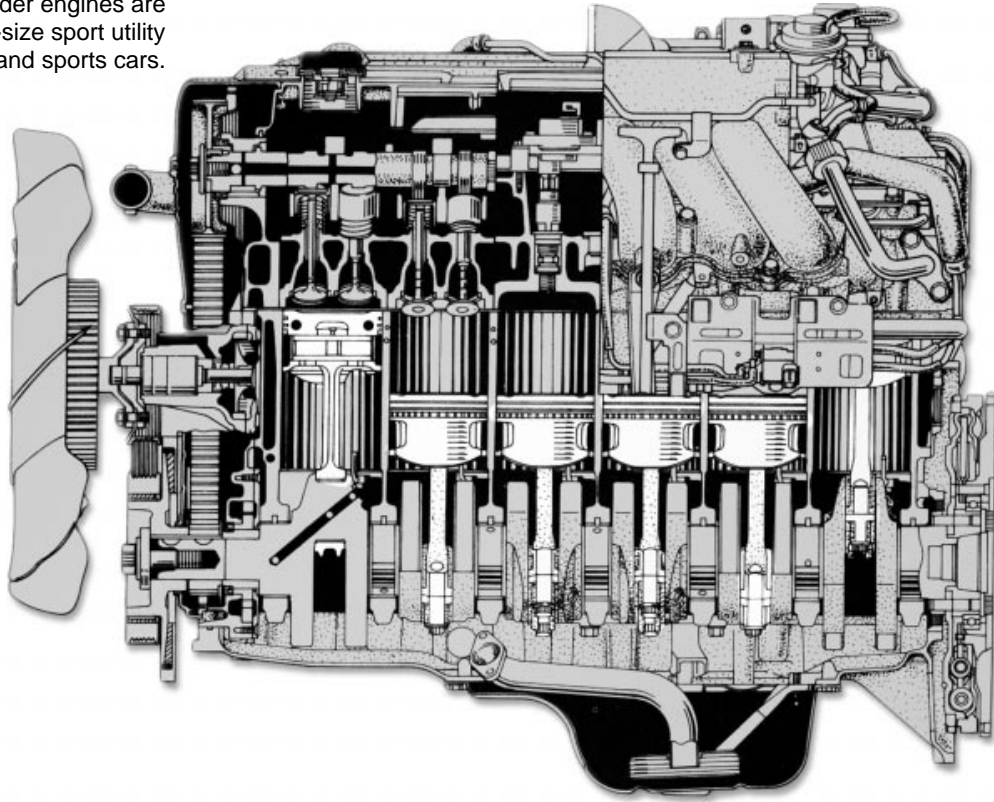
Primary 4-Cylinder
Engine Codes

Code	Displacement
1NZ-FE	1.5L
1ZZ-FE	1.8L
2ZZ-GE	1.8L
2RZ-FE	2.4L
3RZ-FE	2.7L
3S-FE	2.0L
3S-GE	2.0L
5S-FE	2.2L
5S-FNE	2.2L*
1AZ-FE	2.0L
2AZ-FE	2.4L
22-RE	2.4L

*Runs on compressed natural gas

In-Line 6-Cylinder Engines

In-line 6-cylinder engines are mainly used on full-size sport utility vehicles and sports cars.



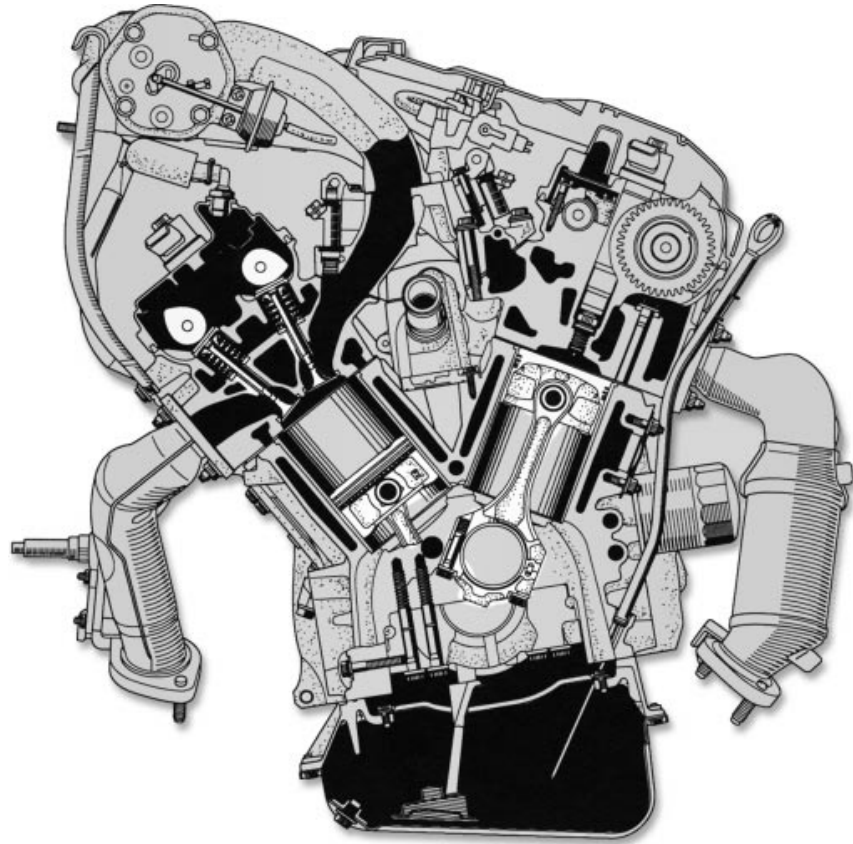
In-Line 6-Cylinder In-line 6-cylinder engines have been used in sports cars and full-size sport utility vehicles. Most modern 4-cylinder engine features and characteristics apply to the in-line 6-cylinder.

Primary In-Line
6-Cylinder
Engine Codes

Code	Displacement
7M-GE	3.0L
7M-GTE	3.0L
2JZ-GE	3.0L
2JZ-GTE	3.0L
1FZ-FE	4.5L

24-Valve V6 Engines

24-valve V6 engines produce high power output.



V6 Engine The 24-valve V6 engine is the high-end option for power and performance in some Toyota trucks. Again, most of the 4-cylinder engine characteristics covered earlier apply to the V6 engine.

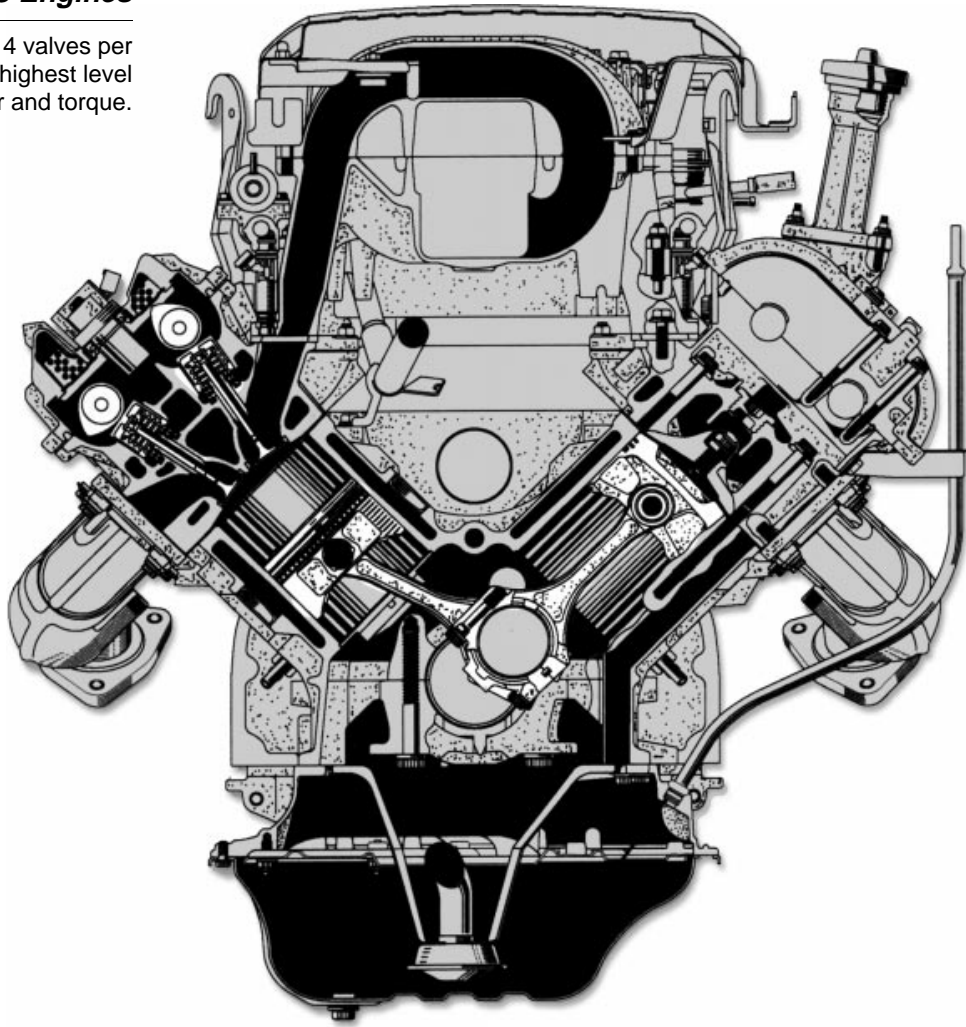
Truck engines come with either single or double overhead camshafts, while passenger cars use the double overhead camshaft design only.

Primary V6
Engine Codes

Code	Displacement
3VZ-E	3.0L
3VZ-FE	3.0L
2VZ-FE	2.5L
1MZ-FE	3.0L
5VZ-FE	3.4L

32-Valve V8 Engines

V8 engines with 4 valves per cylinder generate the highest level of horsepower and torque.



V8 Engine The 32-valve V8 is the largest engine Toyota markets in North America. The 4.7L engine is Toyota's top-of-the line option for power and performance, and includes such features such as DOHC, sequential multi-port fuel injection and an electronic throttle control system.

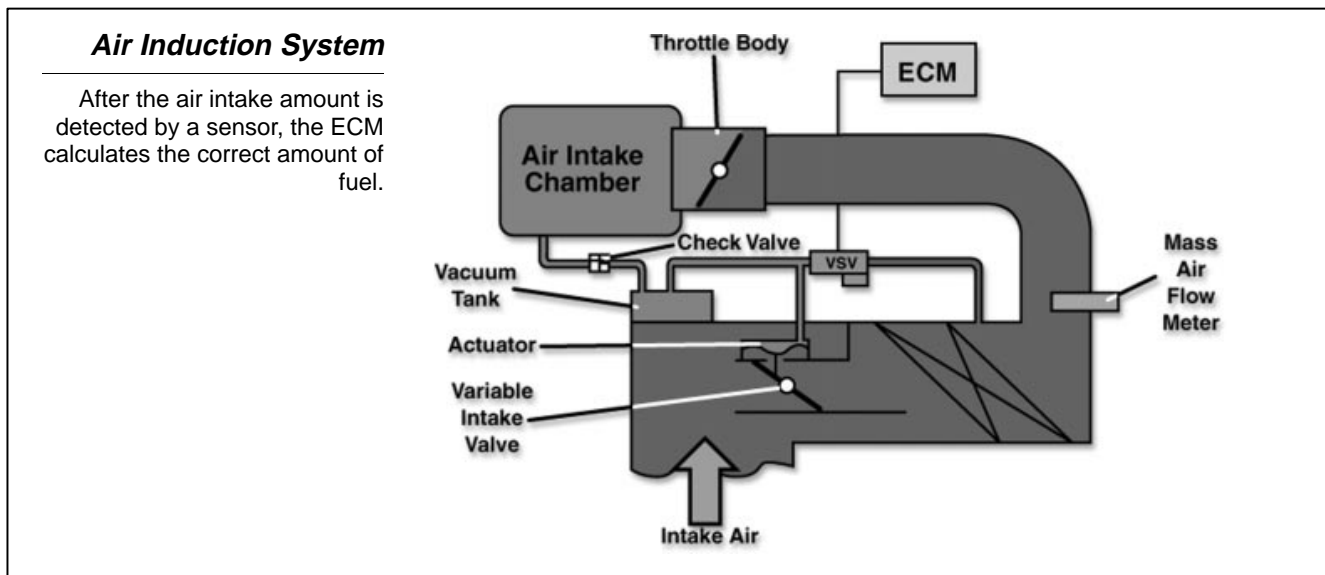
Primary V8
Engine Codes

Code
2UZ-FE

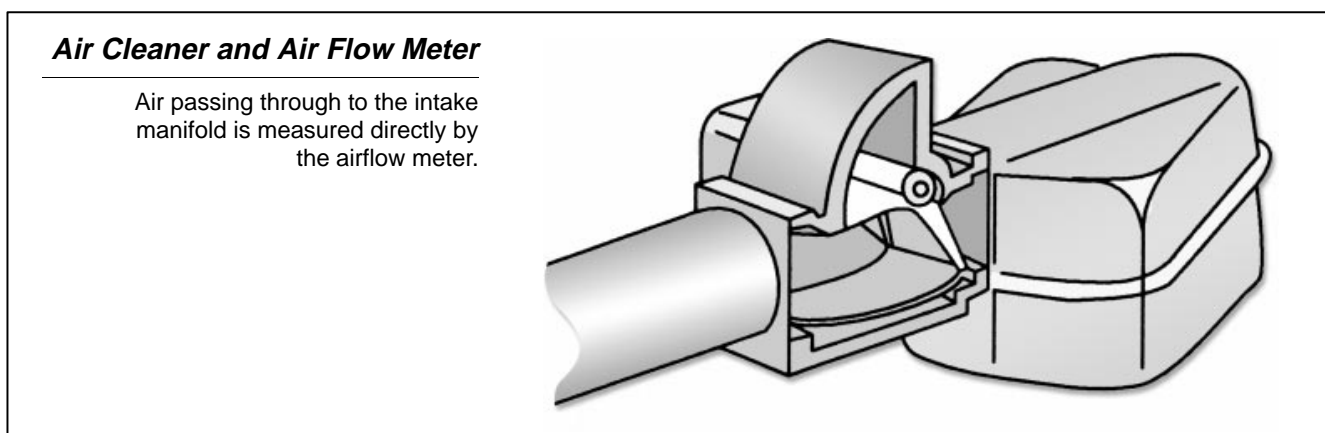
Displacement
4.7L

Engine Control and Emissions Toyota vehicles are designed so that the engine constantly receives the precise air/fuel mixture to operate efficiently and to meet all government standards. Systems that assist in these functions include the following:

- Air induction
- Fuel delivery
- Ignition
- Feedback
- Emissions



Air Induction System The air induction system filters, measures, and delivers air to the engine.

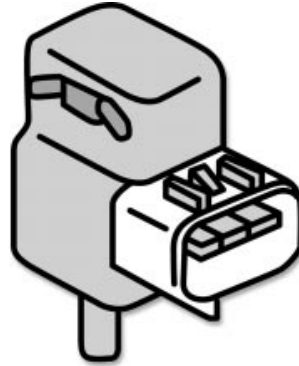


Air Cleaner The air cleaner filters the air to remove debris. Filtering elements are designed for specific applications to provide optimum performance.

Air Flow Meter An air flow meter measures the volume of air flowing through it. Toyota engines that have the L-Type EFI system use either a vane type or Karman vortex design.

Manifold Absolute Pressure Sensor

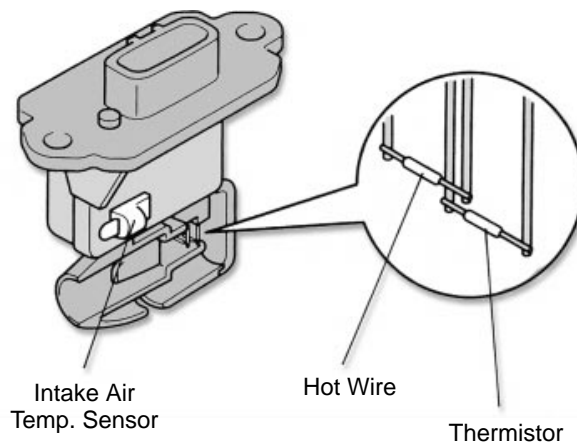
A Manifold Absolute Pressure (MAP) sensor uses a silicone chip mounted inside a reference chamber to measure intake manifold pressure. As the silicone chip changes its resistance with changes in pressure, the ECM calculates the correct amount of fuel injection.



Manifold Pressure Sensor A Manifold Absolute Pressure (MAP) sensor uses a silicon chip mounted inside a reference chamber to measure intake manifold pressure. The silicon chip changes its resistance with changes in pressure, thereby altering the voltage signal. Based on the change in resistance, the ECM can calculate the correct amount of fuel to inject and when to ignite the cylinder. Toyota engines that have the D-type EFI system use this type of sensor.

Mass Air Flow Sensor

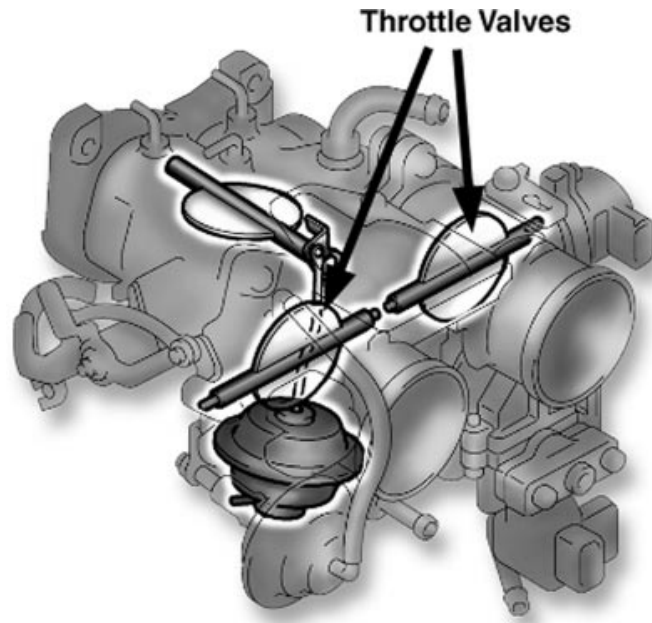
The Mass Air Flow (MAF) sensor uses a platinum hot wire that converts the amount of air drawn into the engine into a voltage signal. Based on the intake air volume, the ECM can determine the required amount of fuel injection.



Mass Air Flow Sensor The newer, and more common air flow measuring device is the Mass Air Flow (MAF) sensor. The MAF sensor uses a platinum hot wire that converts the amount of air drawn into the engine into a voltage signal. Based on the intake air volume, the ECM can calculate engine load and determine how much fuel injection is required and when to ignite the cylinder.

Throttle Body

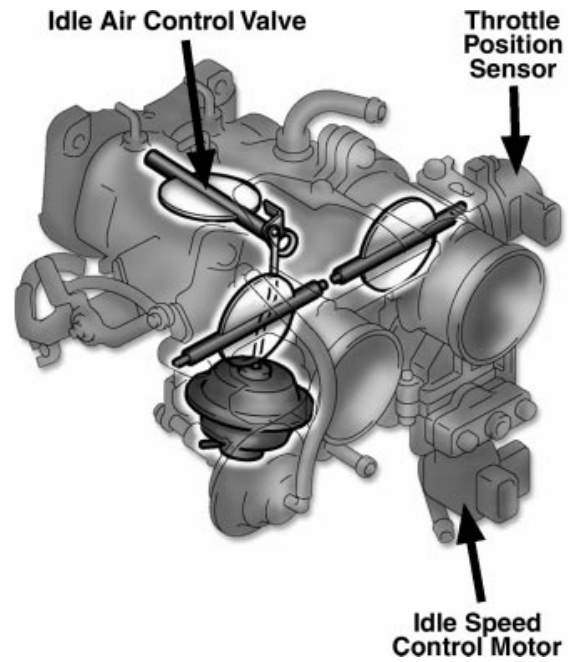
The throttle body houses the throttle valve, which controls the amount of air flowing into the engine.



Throttle Body The throttle body houses the throttle valve, which controls the air intake volume during normal engine operation.

Idle Speed Control

The throttle body contains the throttle plates, throttle position sensor and idle speed control motor to control idle speed.

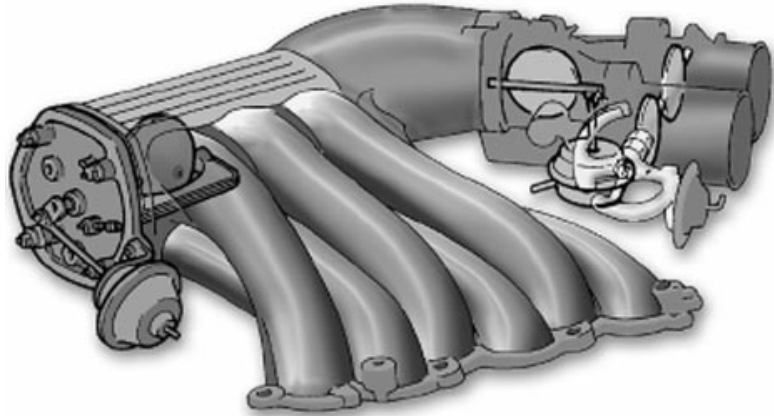


Idle Speed Control To control idle speed, the throttle body incorporates the following:

- Idle Air Control Valve
- Throttle Position Sensor
- Idle Speed Control Motor

Air Intake

The air intake chamber contains an air intake control valve. This valve is activated by ACIS which is used to alter the intake pipe length to improve engine performance in all speed ranges.



Induction System The air intake chamber delivers air from the throttle body to the intake manifold. On Toyota engines, the air intake chamber and intake manifold may be separate components or integrated.

Toyota induction system features include:

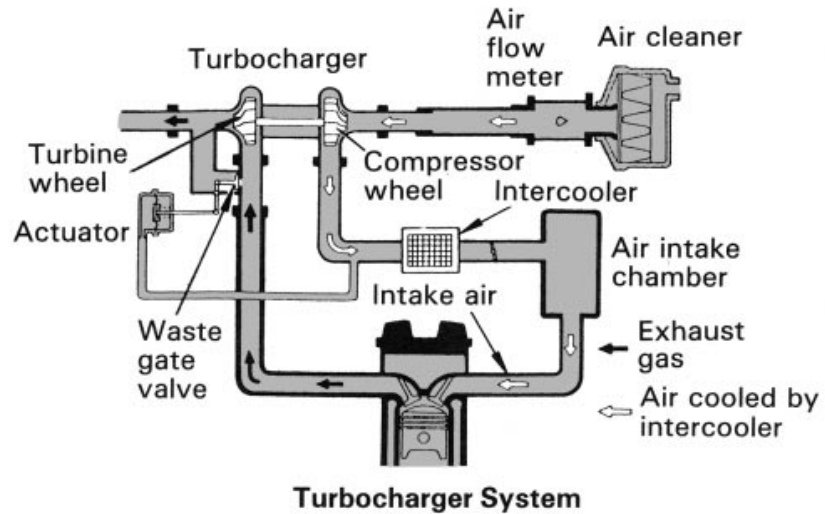
- Throttle Body
- Acoustic Control Induction System (ACIS)

Intake Manifold Air velocity increases as it passes through long, narrow runners in the intake manifold before entering the combustion chamber.

Some engines use a variable length intake runner system for improved performance in all speed ranges.

Boosting Horsepower

Engine horsepower can be increased by either turbocharging or supercharging.



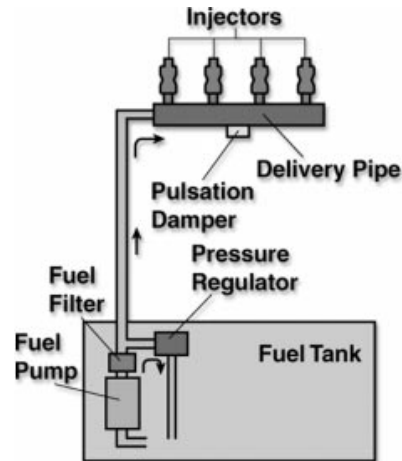
Turbochargers/ Superchargers

Some Toyota engines use a single or twin turbocharger to boost engine horsepower. A turbocharger is an air pump driven by exhaust gases that forces more air into the cylinders. Toyota turbochargers use engine oil for lubrication.

A supercharger also pumps more air into the cylinders but is mechanically driven by a V-belt. Toyota superchargers require special oil for lubrication and must be checked periodically.

Fuel System

The fuel system needs to deliver the correct volume of fuel to the cylinders under all operating conditions.



Fuel System The fuel system stores, filters, regulates pressure, and delivers fuel to the fuel injectors. Excessive fuel that is not delivered to the injectors is returned to the fuel tank. Toyota uses two types of fuel return systems.

1. Return Fuel Delivery System

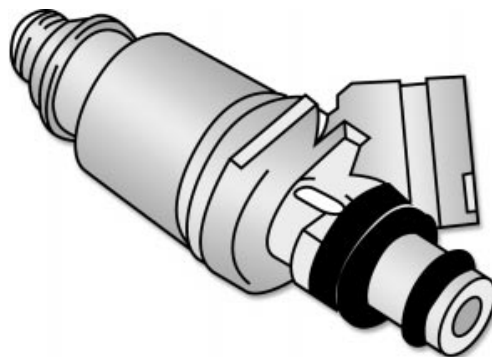
This system delivers fuel to the fuel rail and returns excessive fuel volume back to the tank by a fuel return line.

2. Returnless Fuel Delivery System

This system uses a single fuel delivery line to the injectors and pumps the excessive pressure directly back into the tank.

Fuel Injector

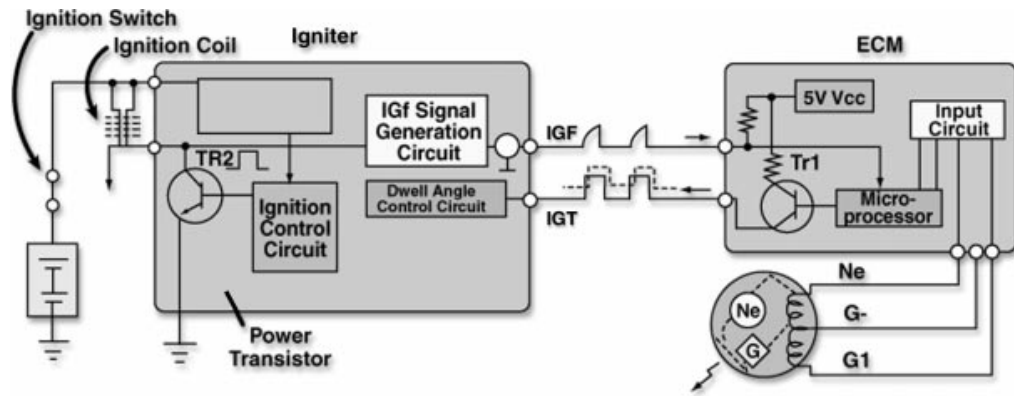
The ECM determines when and length of time that the fuel injectors operate.



Fuel Injector A fuel injector is an electromechanical device that meters, atomizes, and directs fuel into the intake manifold, based on electrical signals from the ECM. Depending on the vehicle the injectors can be fired in groups, simultaneously or individually in sequence. When servicing or diagnosing injector circuits always use the proper technical resources for diagnostic information.

Ignition System

The ignition system on a gasoline engine sends voltage to the spark plugs just prior to or at peak compression.



Ignition System In EFI controlled systems such as the Toyota Computer Control System (TCCS), the ignition system uses sensors to time the spark correctly. These sensors include the camshaft position sensor and the crankshaft position sensor.

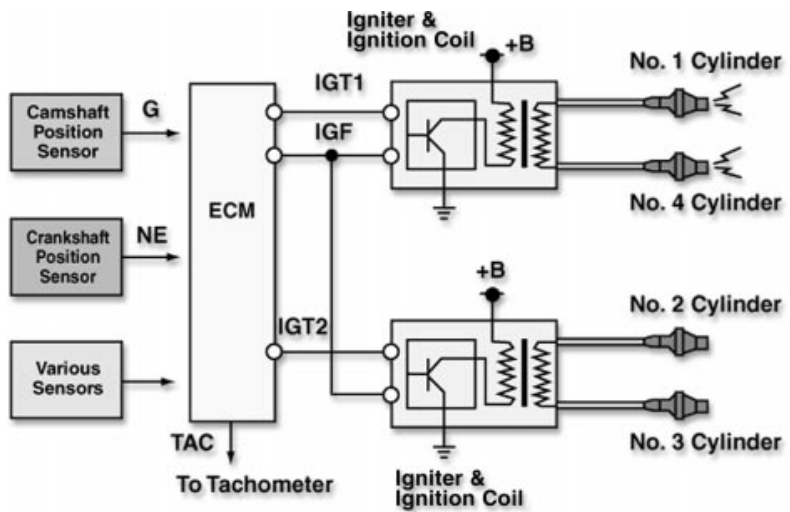
Camshaft Position Sensor The camshaft position sensor (CMP) detects rotation of the camshaft, which is used to determine cylinder position and engine speed. This is also referred to as the G signal.

Crankshaft Position Sensor Similar to the CMP, the crankshaft position sensor (CKP) sends out a signal based on the rotation of the crankshaft. This signal is also referred to as the NE signal.

Distributor System In a distributor ignition system, the ECM controls spark timing electronically, using signals from sensors and engine speed. Some earlier vehicles used an igniter located in the distributor while others used an external mounted igniter.

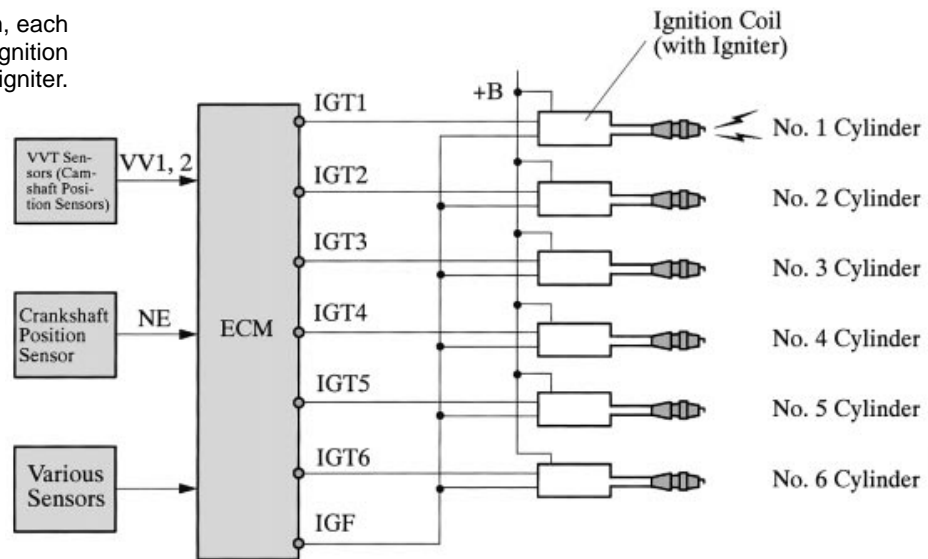
Simultaneous Ignition

A simultaneous ignition system fires two spark plugs at the same time, but one does not affect combustion.



Direct Ignition System

In a direct ignition system, each spark plug has its own ignition coil with igniter.

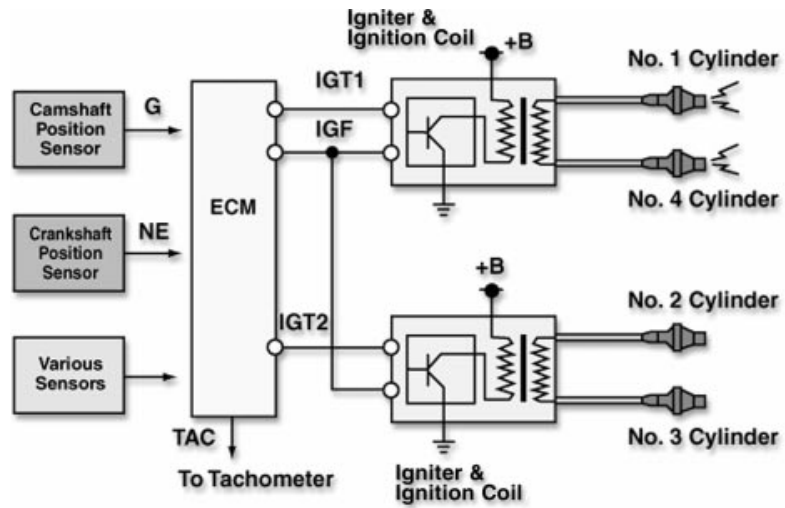


Direct Ignition Systems Direct Ignition Systems (DIS), come in two configurations.

1. Independent - one ignition coil per cylinder
2. Simultaneous - one ignition coil for two cylinders. In this system the ignition coil is mounted directly to one spark plug and a high-tension cord is connected to the other spark plug.

Electronic Spark Advance

With constant engine changes such as speed, load and temperature, spark timing is electronically adjusted constantly.

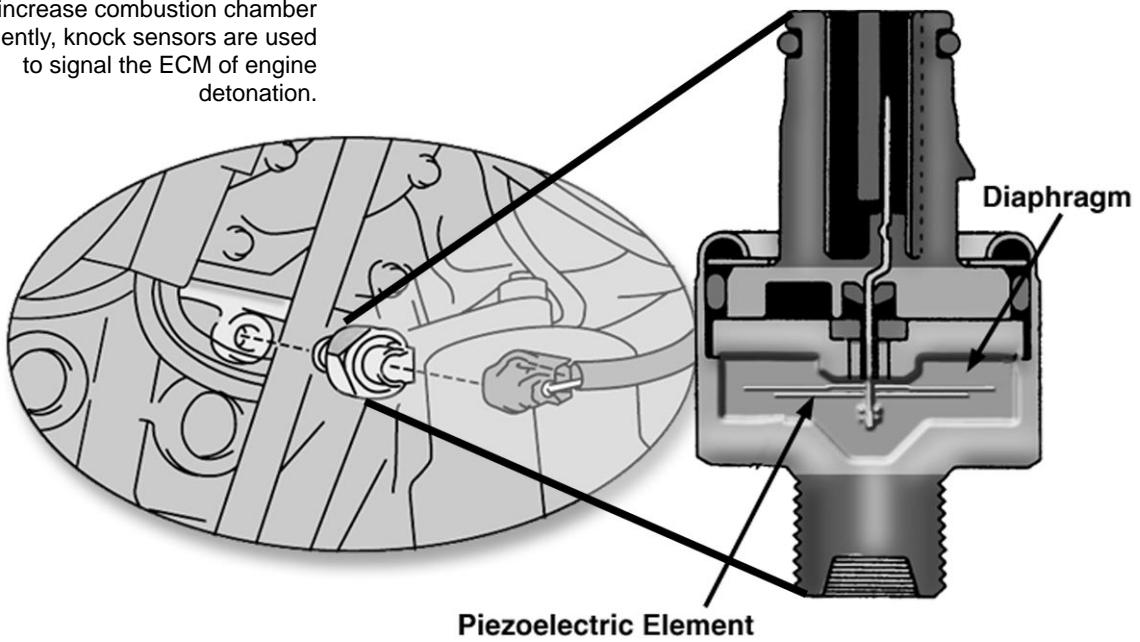


Electronic Spark Advance (ESA)

The electronic spark advance system provides the engine with ideal ignition timing characteristics. The ECM determines optimum ignition timing based on sensor inputs for all engine running conditions.

Knock Sensor

To increase combustion chamber efficiency, knock sensors are used to signal the ECM of engine detonation.

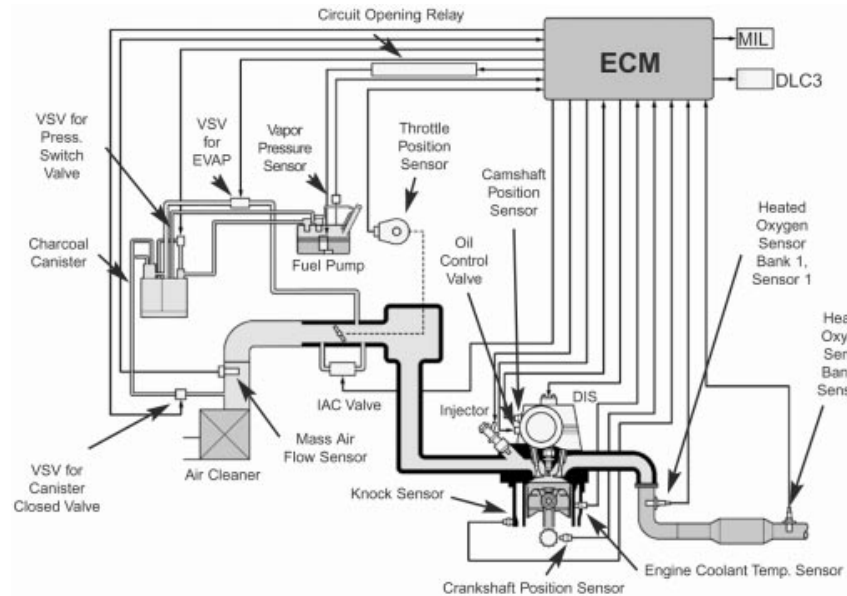


Knock Sensor Knock sensors signal the ECM when engine detonation (knock) occurs, and the ECM adjusts spark timing until the knocking stops.

Feedback System

Oxygen Sensors

To maintain proper air/fuel mixture, oxygen sensors detect the amount of air in the exhaust and then signal the ECM with a corresponding millivolt signal.

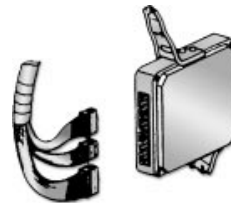


Oxygen Sensors Oxygen sensors measure the amount of oxygen in the exhaust and indicate combustion efficiency and catalytic converter operation. Toyota engines use two types of oxygen sensors, zirconium dioxide and titanium oxide.

Oxygen sensors are used to monitor exhaust gases before the catalytic converter for proper air/fuel mixture and after the catalytic converter to monitor converter efficiency.

Engine Control Module

The ECM is an information processing center because it sends and receives signals.



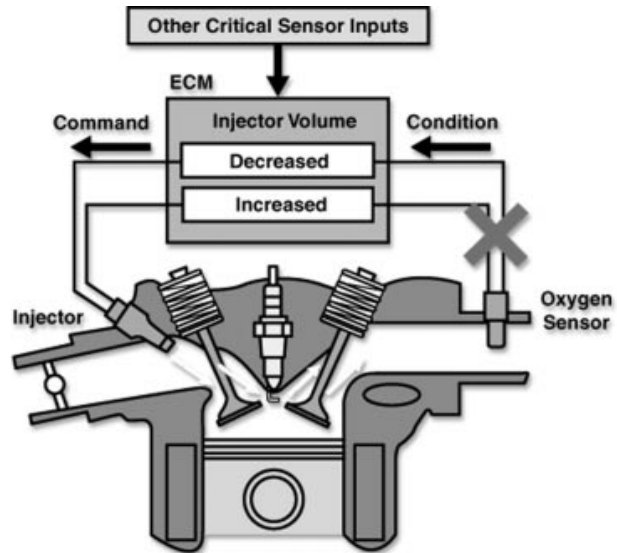
Engine Control Module The Engine Control Module (ECM), or Engine Control Unit (ECU), is the “brain” of the modern engine and continuously monitors and adjusts engine control systems to achieve optimal engine performance and fuel economy while minimizing harmful emissions

The ECM continuously checks sensor signals and some output signals to verify and memorize proper operation. If a malfunction is detected, the ECM may illuminate the Malfunction Indicator Lamp and store a diagnostic trouble code in its memory. Disconnecting the battery will erase this memory.

If the ECM loses a sensor signal or determines that a sensor is unreliable, it substitutes a preset value, called a fail-safe value, to control engine operation.

Open Loop

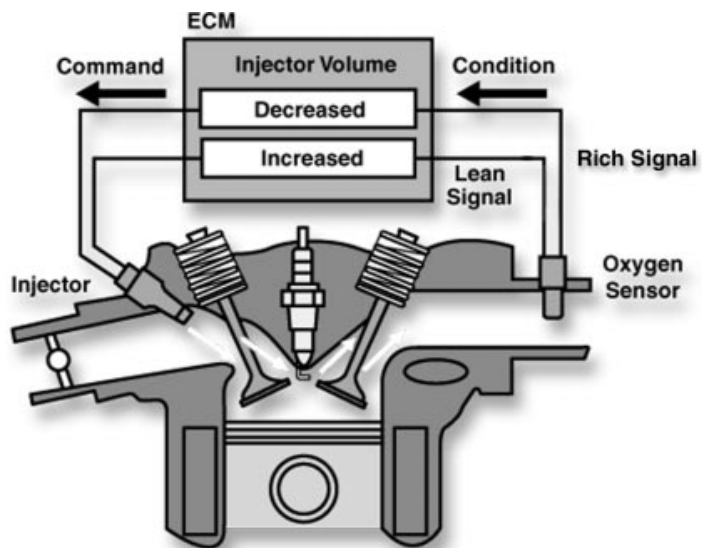
During open loop operation, the ECM does not acknowledge any signals from the oxygen sensor.



Open Loop During open loop operation, the ECM adjusts the air/fuel ratio according to a preset program. Signals from the oxygen sensor are ignored. This is necessary for good driveability when the engine is cold or under heavy load.

Closed Loop

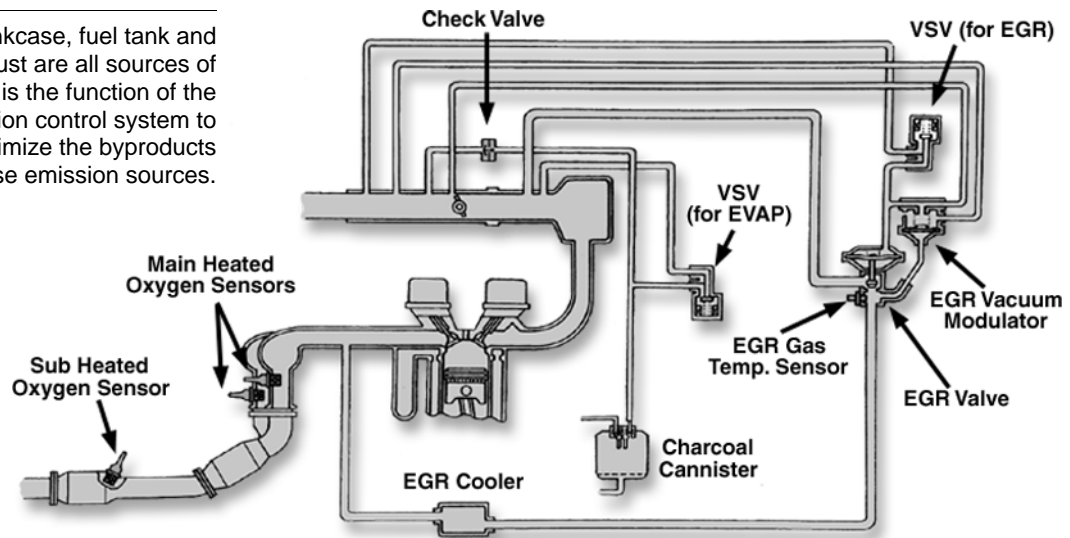
During closed loop operation, the oxygen sensor is always signaling the ECM along with the other sensors, so the ECM can continuously adjust the air/fuel mixture.



Closed Loop During closed loop operation, the ECM adjusts the air/fuel ratio based on signals from the oxygen sensor. Closed loop operation is used when the engine is running at a warm idle or under normal cruising conditions.

Emission System

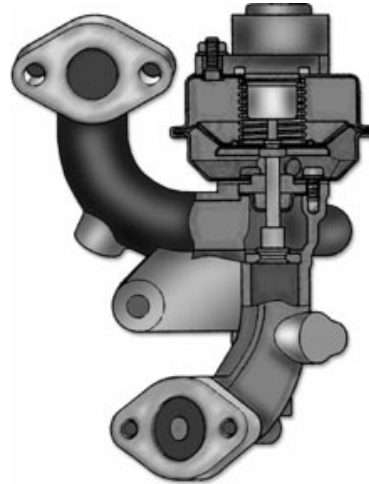
The crankcase, fuel tank and exhaust are all sources of emissions. It is the function of the emission control system to eliminate or minimize the byproducts of these emission sources.



Emission System The purpose of the Emission Control System is to control the emissions and exhaust emitted from the vehicle. It is designed to convert the harmful gases into harmless ones and to reduce damage to the environment.

Exhaust Gas Recirculation

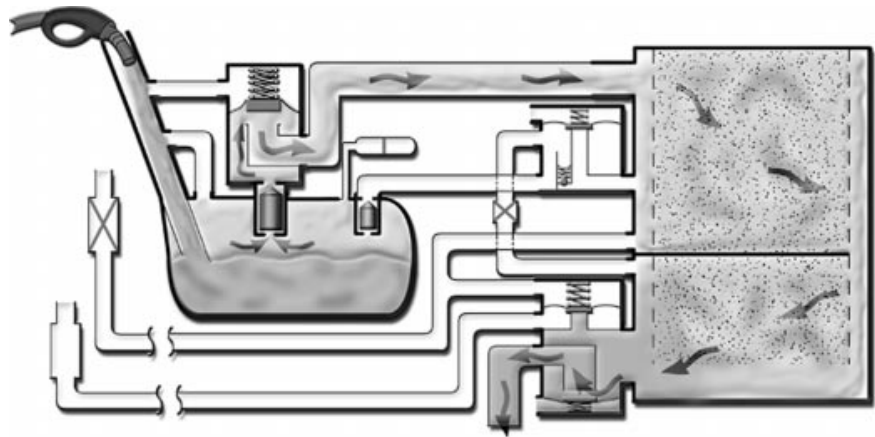
The EGR valve routes a small amount of exhaust gases to the intake manifold where it lowers combustion temperature and pressure and reduces NOx.



Exhaust Gas Recirculation The EGR system diverts small amounts of exhaust gases into the intake manifold to lower combustion temperature and pressure and reduce harmful NOx emissions.

Evaporative Emission Controls

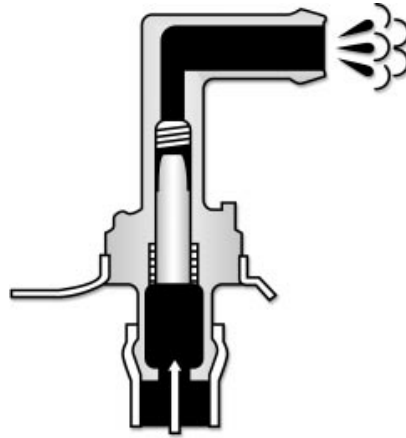
A well sealed evaporative system will function extremely efficiently because all vapors are recirculated back into the intake manifold.



Evaporative Emission Controls Evaporative controls capture vapors from the fuel system and send them to the intake manifold, where they are burned in the engine and prevented from escaping into the atmosphere.

Positive Crankcase Ventilation (PCV)

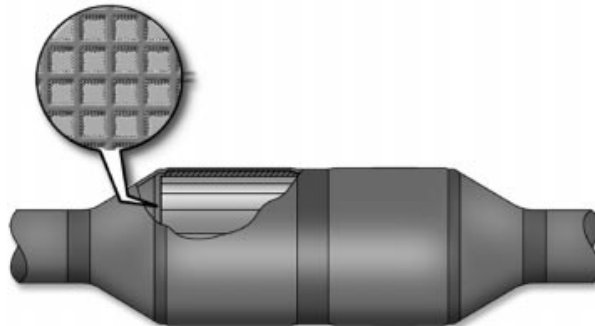
The PCV system uses manifold vacuum to draw harmful vapors from the crankcase into the intake manifold.



Positive Crankcase Ventilation The positive crankcase ventilation (PCV) system removes harmful vapors that slip past (or “blow-by”) the piston and collect in the crankcase. The PCV system uses manifold vacuum to draw these harmful vapors into the intake manifold.

Catalytic Converter

The catalytic converter not only converts harmful gases into harmless gases, it also operates quickly, and produces low exhaust backpressure.

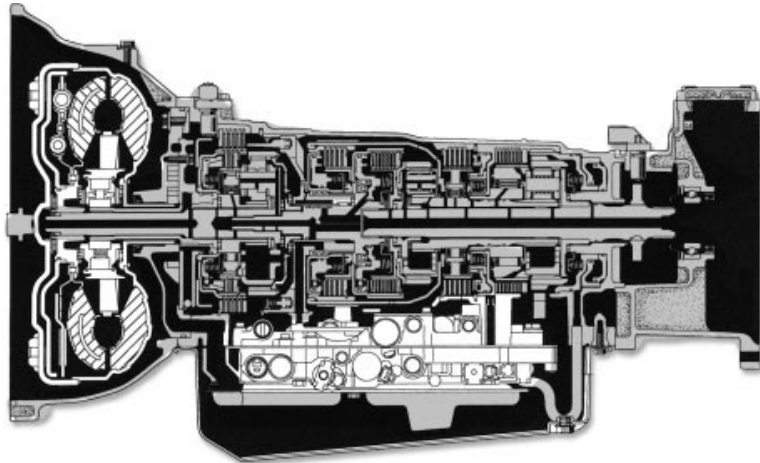


Catalytic Converter The catalytic converter is an emission control device that is part of the exhaust system that helps reduce tailpipe emissions.

Transmissions A transmission is a device that transmits power from the engine to the drive wheels. This power, or torque, is varied by the transmission either manually or automatically. Transmissions are designed to drive either the front or rear wheels.

Electronically-Controlled Automatic Transmission

The electronically-controlled automatic transmission is shifted by the ECM.



Electronically Controlled Transmission (ECT) Features In an electronically-controlled transmission an ECM, or ECU, adjusts the shift intervals based on the vehicle speed, gear position and throttle opening. An ECT is virtually identical to a hydraulically controlled transmission with the addition of electrical components.

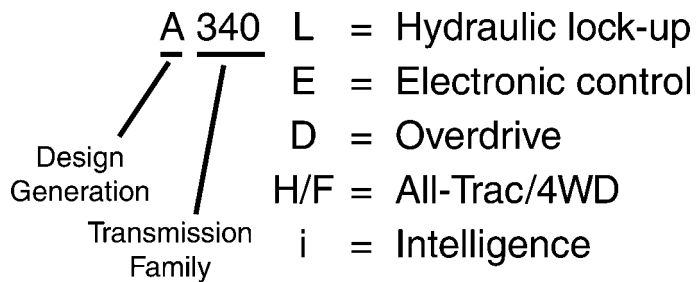
Toyota vehicles use several types of automatic transmissions and must use the correct fluid to operate properly.

Features of the ECT include:

- Engine Control Module
- Power/Economy modes
- Sport Shift

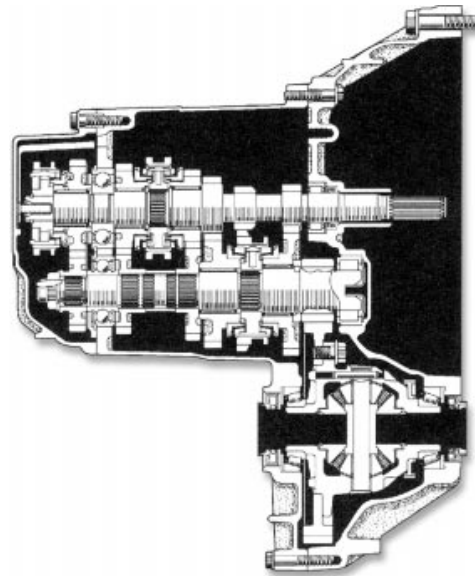
Automatic Transmission Codes

Automatic transmission codes provide specific information of a transmission.



Manual Transmission

The manual transmission transmits engine torque that can be varied by manual selection of a gear ratio.

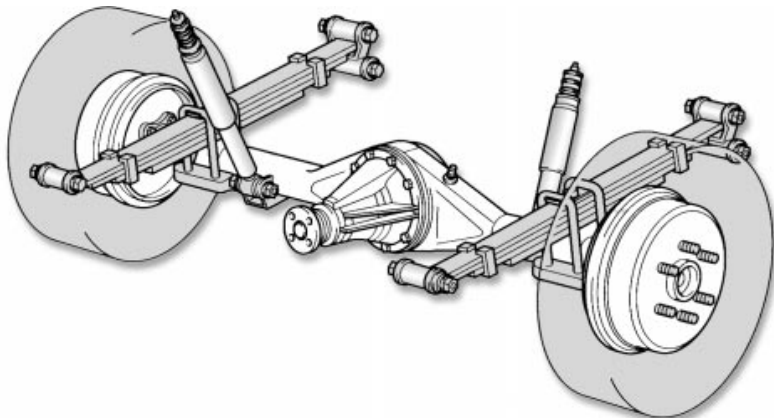


Manual Transmission Features Toyota manual transmissions feature:

- Sport-like shifting
- Fully-synchronized forward gears for smooth shifting
- A hydraulic clutch system

Rear Wheel Drive

Rear wheel drive vehicles have a differential gear unit in the rear axle housing that redirects power from the drive shaft to the rear wheels.

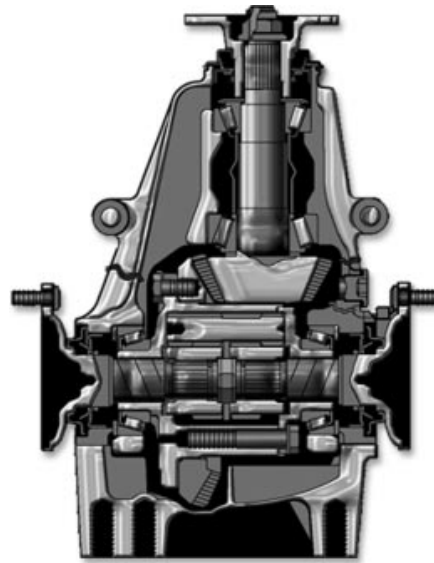


Drivelines The driveline is the set of components that transfers power from the engine to the drive wheels and come in three different configurations:

- Front wheel drive (FF)
- Rear wheel drive (FR)
- 4-wheel drive (4WD)

Differentials

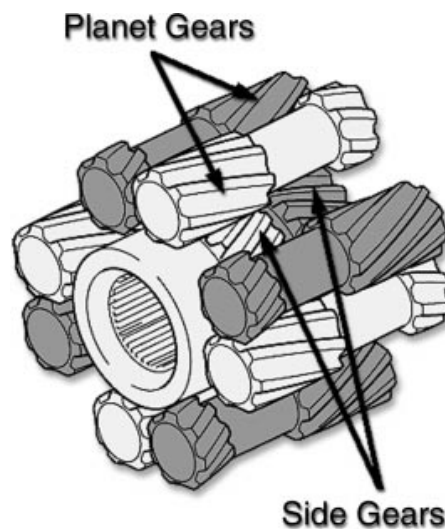
The differential will send engine torque to the drivewheels and increase the torque by providing a final drive gear reduction.



Standard Differential A differential is a gear assembly that transfers power from the drive shaft to the drive wheels. A standard differential transfers more power to the drive wheel that has less traction.

Limited Slip Differential

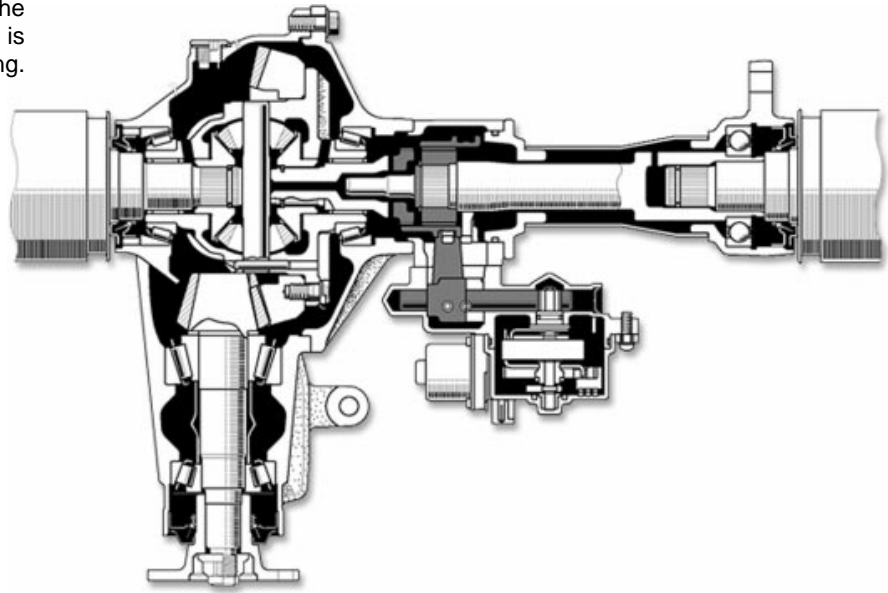
A Limited Slip Differential has all of the same components as a conventional differential but is designed to transfer power to the drive wheel with the best traction.



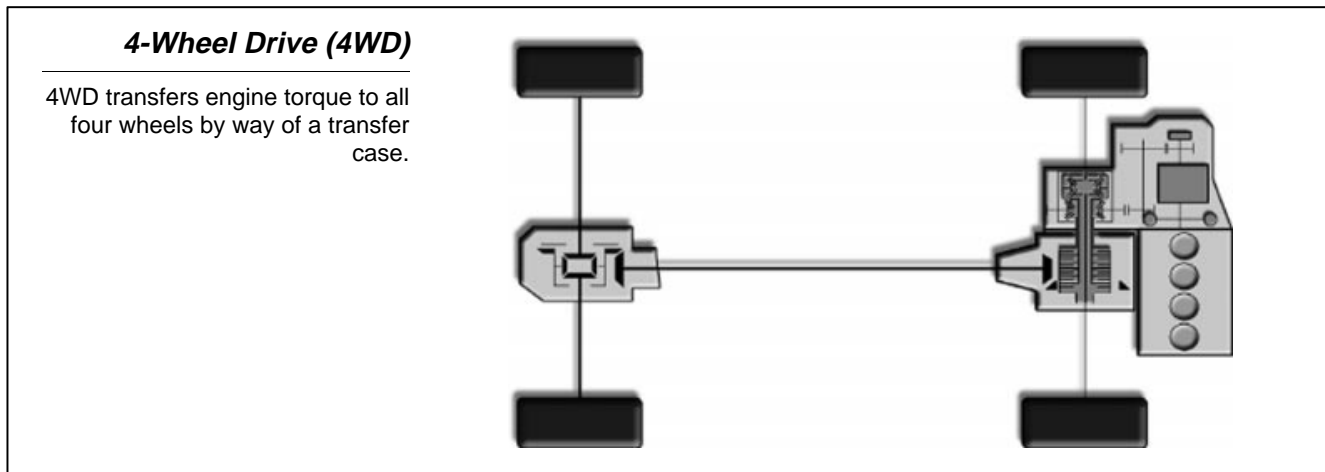
Limited Slip Differential To improve traction, a limited slip differential transfers power to the drive wheel with the best traction. When one drive wheel loses traction, the differential will transfer more power to the opposite drive wheel.

Automatic Disconnecting Differential (A.D.D.)

A.D.D. allows the front differential to engage into H4 position from the H2 position while the vehicle is moving.



Automatic Disconnecting Differential As the transfer lever is shifted from H2 to H4, the A.D.D. system uses a vacuum operated shift fork which moves a sleeve to engage the front axle shaft to the front differential.



4-Wheel Drive In 4WD, the driveline uses a transfer case (or similar device) to transfer power to all four wheels. 4WD offers superior traction and power for off-road driving, and comes in part or full-time versions.

Part-Time 4WD Part-time 4WD operates in 2WD most of the time and allows the driver to switch to 4WD as needed. Some part-time 4WD systems require the driver to stop the vehicle and lock the front wheel hubs manually to operate in 4WD.

Full-Time 4WD Full-time 4WD systems operate in 4WD drive at all times and use an extra (center) differential device to absorb differences in driveshaft rotation rates.

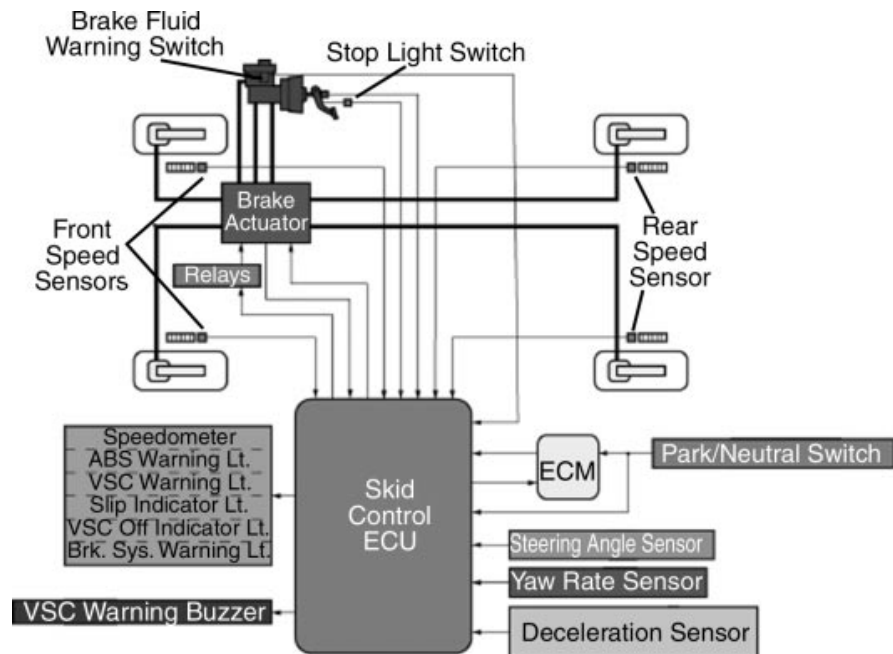
On-Demand 4WD On-demand 4WD is a part-time 4-wheel driveline that can switch between 2WD and 4WD without stopping the vehicle. This is often referred to as “shift on the fly” 4WD.

One-Touch Hi-4 Selector Some Toyota vehicle’s have a “Touch Select” 4WD switch. The switch operates an on-demand transfer system that allows the driver to select between 2WD and 4HI and between 4HI and 4LO at the touch of a button.

Automatic Disconnecting Differential (A.D.D.) A.D.D. allows the front differential to engage into H4 position from the H2 position while the vehicle is moving. This system uses a vacuum operated shift fork which moves a sleeve to engage the front axle to the front differential.

Traction Control

The traction control system is designed to prevent the drive wheels from slipping on acceleration and improve vehicle stability.



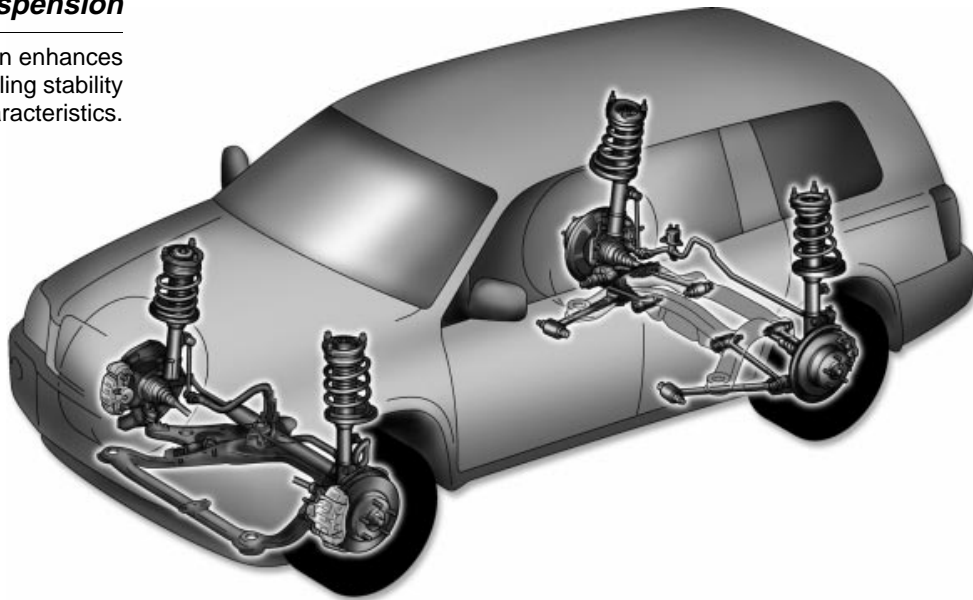
Traction Control The traction control system prevents the drive wheels from slipping on acceleration by means of controlling brake application and reducing engine power.

Chassis The chassis consists of the frame, suspension, steering, tires and wheels. Toyota has several suspension systems, including:

- 4-Wheel Independent
- Independent Double Wishbone
- Torsion Beam
- Solid Rear Axle with Leaf Springs
- 4-Link with Coil Springs

Independent Suspension

Independent suspension enhances riding comfort, handling stability and control characteristics.

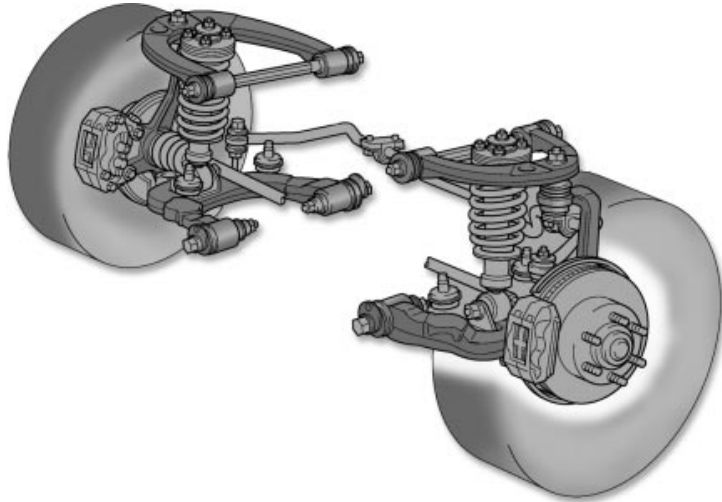


4-Wheel Independent Suspension 4-wheel independent suspension allows each wheel to react independently to bumps and potholes, enhancing handling and control. Many Toyota independent suspensions use struts.

Alignment Angles On most Toyota vehicles with strut suspensions, the only adjustable alignment angles are camber and toe. Refer to your Technician Reference Cards for vehicle adjustments and specifications.

Independent Double Wishbone Suspension

The Independent Double Wishbone Suspension is designed to reduce unsprung weight and provide better vehicle handling.



**Independent
Double Wishbone
Suspension**

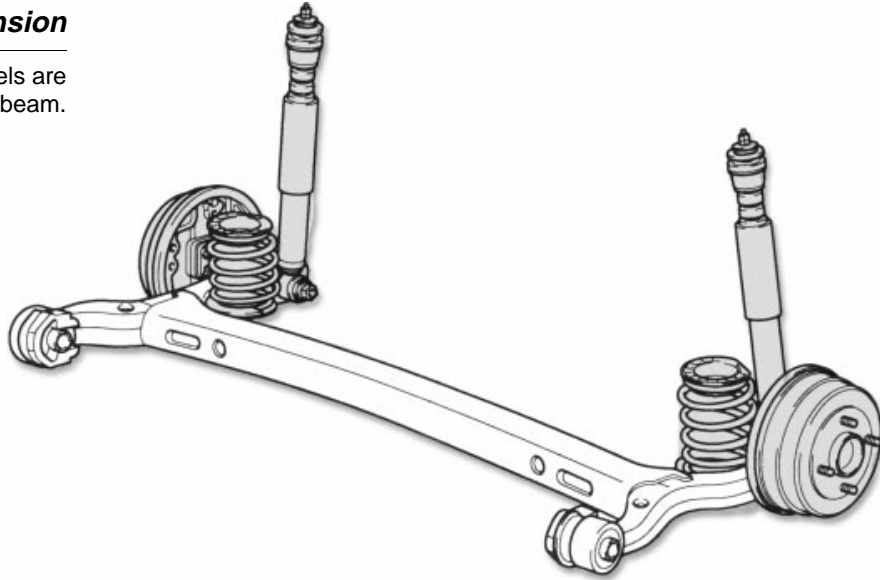
This type of suspension uses ball joints, unequal length control arms, steering knuckle and spindle.

Alignment Angles

On most double wishbone front suspensions, caster, camber and toe are adjustable.

Torsion Beam Suspension

The left and right wheels are connected by a flexible beam.



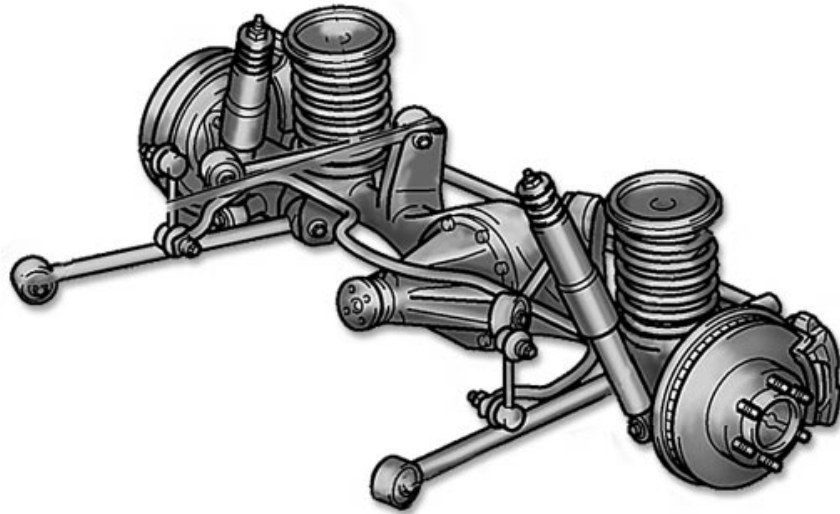
Torsion Beam Suspension Some Toyota vehicles use a non-independent torsion beam rear suspension, which allows precise up and down rear wheel movement. Equipped with coil springs, torsion beam suspension provides excellent vehicle control.

Rigid Axle with Parallel Leaf Springs This suspension type uses leaf springs to mount a rigid axle to the vehicle. Leaf springs are simple, rugged, and capable of supporting large payloads. The Tacoma and Tundra use this type of rear suspension design.

Alignment Angles There are no adjustable angles on rigid axle suspension designs.

4-Link Suspension

Axle positioning and load suspension are handled separately in this type

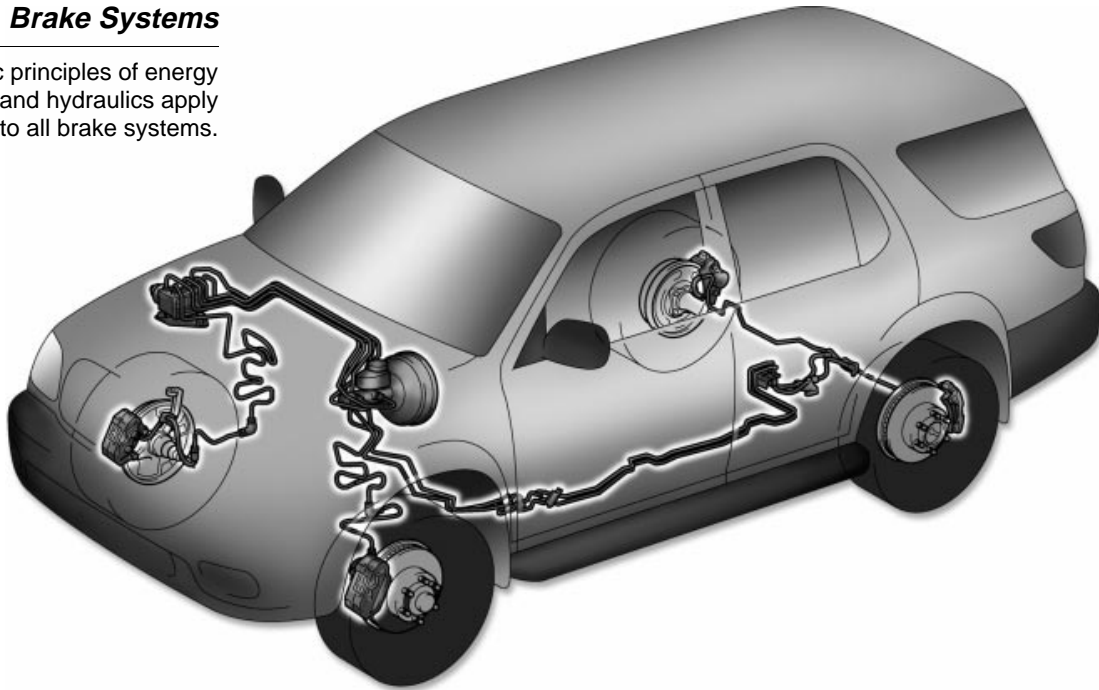


4-Link Suspension This rear suspension design delivers a comfortable ride and provides good load-carrying capacity. Toyota vehicles such as the 4Runner use this design to enhance off-road performance.

Alignment Angles There are no adjustable angles on 4-link rear suspension systems.

Brake Systems

The basic principles of energy conversion and hydraulics apply to all brake systems.



Brake Systems Braking systems use the friction of the tires against the road to slow and stop a moving vehicle. There are two types of braking systems:

- Conventional
- Anti-Lock Braking System (ABS)

Conventional Toyota vehicles offer 2 conventional brake configurations:

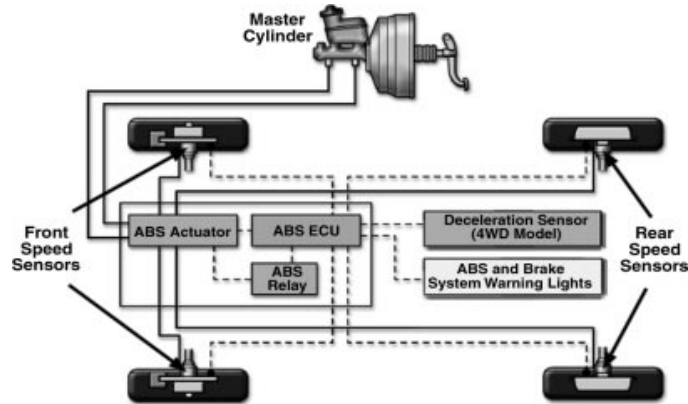
1. 4-wheel disc brakes
2. Front disc/rear drum brakes.

Other features include:

- Ventilated disc brake
- Diagonal split system on FWD models
- Self-adjusting brake mechanism
- Load-Sensing Proportioning Valve (LSPV)

Anti-Lock Braking System (ABS)

ABS modifies hydraulic pressure by using electric solenoids. During hard braking conditions, ABS prevents wheel lock-up and provides better directional control.



Anti-Lock Braking System

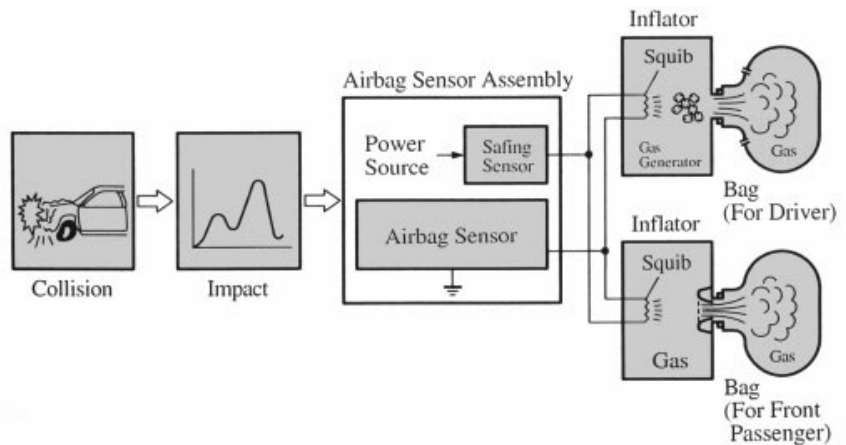
The Anti-Lock Braking System (ABS) is a computer-controlled system that regulates braking pressure to help avoid wheel lockup during hard braking and provide better steering control. ABS is available on most Toyota vehicles.

Anti-Lock Braking System features:

- 1, 3 and 4 sensor systems
- 1, 3 and 4 channel systems
- “G” sensors on 4WD/AWD vehicles
- Self-Diagnosis system

Supplemental Restraint System (SRS)

From the point of collision to airbag deployment, the SRS in conjunction with the usage of seat belts provide the passenger(s) maximum protection.



Supplemental Restraint System

Supplemental Restraint Systems (SRS) are called “supplemental” they supplement seat belts, which are the primary restraint for passenger safety. Toyota has two types of supplemental restraint systems:

- Dual Front Airbags
- Side-Impact Airbags

Dual Front Airbags The supplemental restraint system (SRS) activates driver and front passenger airbags to help protect the occupants during a severe frontal impact. Occupants must also wear seatbelts for maximum protection.

Side-Impact Airbags

Side-impact airbags used with seatbelts protect the driver and front passenger during side-impact collisions.



Side-Impact Airbags Some Toyota models offer side-impact airbags, which inflate to help the driver and front passenger during side-impact collisions.

Seatbelts

The seatbelt system uses pretensioner and force limiter to control seatbelt tension.

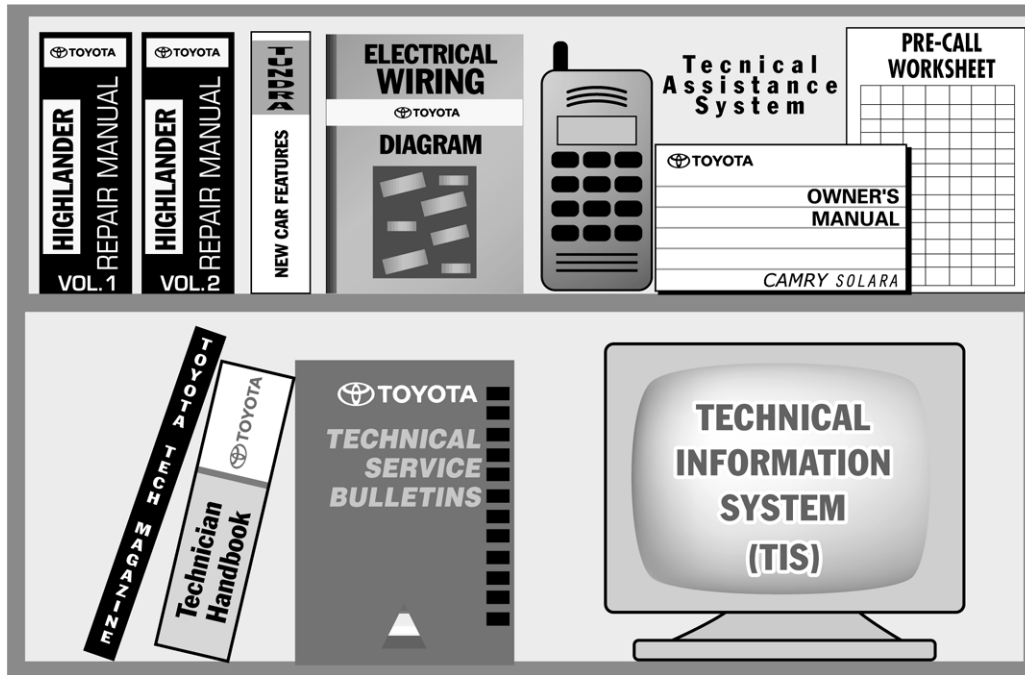


Seatbelt Pretensioner If the airbag sensor sends a signal to the center sensor during a collision, an electric current ignites the gas generator located in the pretensioner and retracts the seatbelt.

Seatbelt Force Limiter As the applied force on the retractor reaches a predetermined level, the force limiter activates to control the applied stress on the occupant.

Toyota Technical Resources

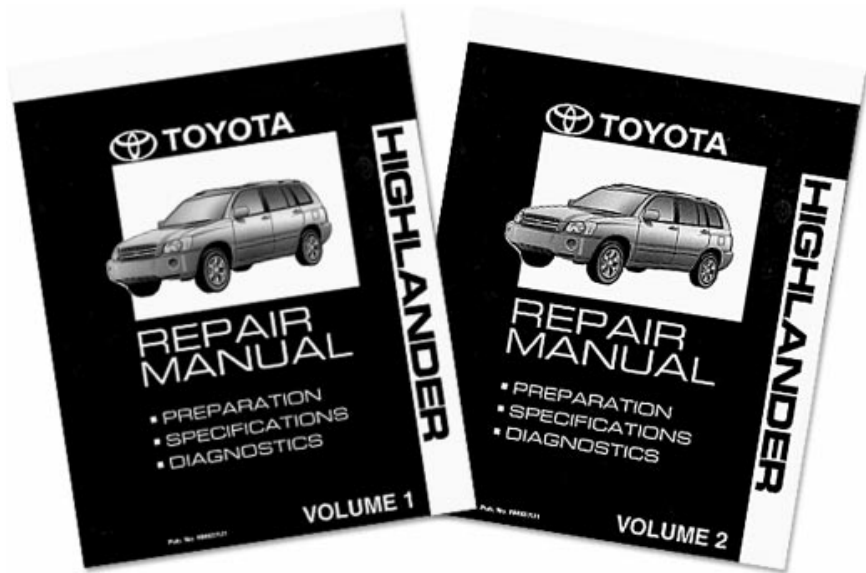
These are the resources that technicians can use when confronted with technical questions about Toyota vehicles.



Toyota Technical Resources Toyota provides a wide array of technical resources for dealership technicians. The following pages in this section provide an overview of these important resources in detail.

Repair Manuals

To get information quickly, repair manuals are organized into volumes divided by model type and year.



Repair Manuals Toyota publishes a repair manual set for each vehicle model and model year. The repair manuals are divided into volumes based on the content of the model line. In addition, there are sometimes supplemental manuals published for specific vehicle systems.

Repair Manual Section Headings

All headings printed in black indicate the topics covered in that volume. The headings printed in gray are items covered in the matching volume.

INTRODUCTION	1
PREPARATION	2
SERVICE SPECIFICATIONS	3
DIAGNOSTICS	5
ENGINE CONTROL SYSTEM	10
FUEL	11
EMISSION CONTROL	12
INTAKE	13
ENGINE MECHANICAL	14
EXHAUST	15
COOLING	16
LUBRICATION	17
IGNITION	18
STARTING & CHARGING	19
FRONT SUSPENSION	26
REAR SUSPENSION	27
TIRE & WHEEL	28
DIFFERENTIAL	29
DRIVE SHAFT / PROPELLER SHAFT	30
TRANSFER	31
BRAKE	32
PARKING BRAKE	33
AUTOMATIC TRANSMISSION / TRANS	40
STEERING COLUMN	50
POWER STEERING	51
HEATER & AIR CONDITIONER	55
SUPPLEMENTAL RESTRAINT SYSTEM	60

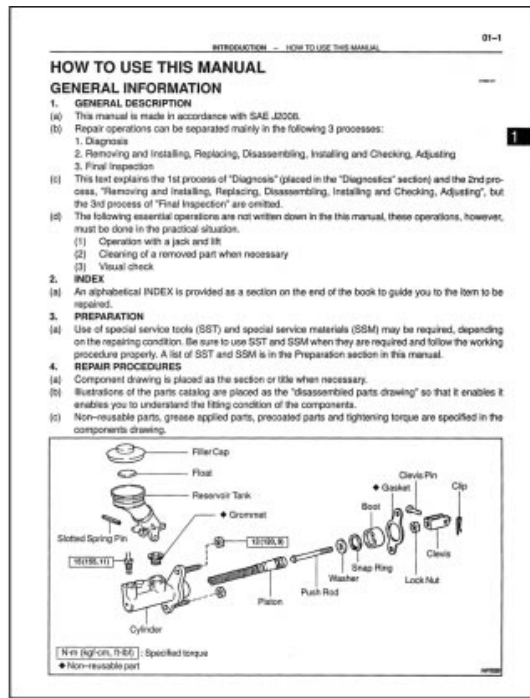
Table of Contents The FOREWARD, which is the first page in each volume, lists the codes for the specific models covered by the repair manual.

The Table of Contents in Volume 1 shows the contents of the combined service manual set (all volumes). Sections found in Volume 1 are printed in black ink whereas sections found in the matching volume are printed in gray.

Each section has a “thumb index” tab next to it. This tab appears on every page of the section, so that you can locate a section by finding the corresponding tab on the edge of the pages.

How to Use This Manual

The How To section can be found at the front of the repair manual.



How to Use This Manual This section is found at the front of the manual and guides you through using the manual.

Index Each section begins with an index, which lists each topic in the section and its page number.

General Description A general description describes and lists precautions for the repairs in the section that follows it.

Troubleshooting	Troubleshooting tables are included for each system to help you diagnose a problem and find its root cause.
Preparation	Preparation lists the tools, supplies, and additional information which should be gathered beforehand and explains their purpose.
Repair Procedures	Repair procedures show you what to do and how to do it. Most repair procedures contain an overview illustration, a task heading, and detailed text of the repair operation.
References	When necessary, the repair manual lists references by topic and page number.
Service Specifications	Specifications are presented in bold type throughout the text where needed.
Cautions, Notices, Hints	Cautions indicate the possibility of injury to people. Notices point the possibility of damage to components, and Hints help you complete the repair efficiently.
Vehicle Identification Information	This section shows you where to find the Vehicle Identification Number (VIN) on the vehicle that you are working on. You will find the VIN stamped on both the vehicle identification number plate and the certification label. The engine serial number is stamped on the engine block.

**Repair Manual/
Repair Instructions**

Repair information will be in the Repair Instruction section.

INTRODUCTION — REPAIR INSTRUCTION 01-5

REPAIR INSTRUCTION

PRECAUTION

1. BASIC REPAIR HINT

(H) HINTS ON OPERATIONS

1	Looks	<ul style="list-style-type: none"> Always wear a clean uniform for a customer. Must wear a hat and safety shoes.
2	Vehicle protection	<ul style="list-style-type: none"> Install a grill cover, fender covers, seat cover and floor mat before starting operation. In case of working with more than 2 persons, be sure to check safety each other. When operating with the engine running, pay attention to the ventilation.
3	Safe operation	<ul style="list-style-type: none"> In case of operating on a high-temperature portion, rotating, moving and vibrating portions, pay attention to a burn or injury. In case of jacking up, be sure to support the specified location with a right rack. In case of lifting up, verify a stable operation.
4	Preparation of tools and measuring gauge	<ul style="list-style-type: none"> Before starting operation, prepare a tool stand, SST, gauge, oil, shop rag and parts for replacement.
5	Removal & Installation, Disassembly and Assembly operations	<ul style="list-style-type: none"> Engage with a thorough understanding of a trouble phenomenon and perform effective operations. Before removing the parts, check the assembly condition, deformation and damage condition. When the work is completed, take a note or job maintenance so as not to make functional effects. Clean and wash the removed parts if necessary, and assemble after checking.
6	Removed parts	<ul style="list-style-type: none"> Put the removed parts in order for not causing mixing up or making them dirty. As for non-reusable parts such as gasket, O-ring, and self lock nut, change them to new ones following the instruction of this text. Sort out the parts for replacement in a bin or the like and show them to a customer.

(H) JACKING UP AND SUPPORTING VEHICLE
Care must be taken when jacking up and supporting the vehicle. Be sure to lift and support the vehicle at the proper locations (See page 01-19).

Repair Instructions This section lists information applicable to any inspection or repair work.

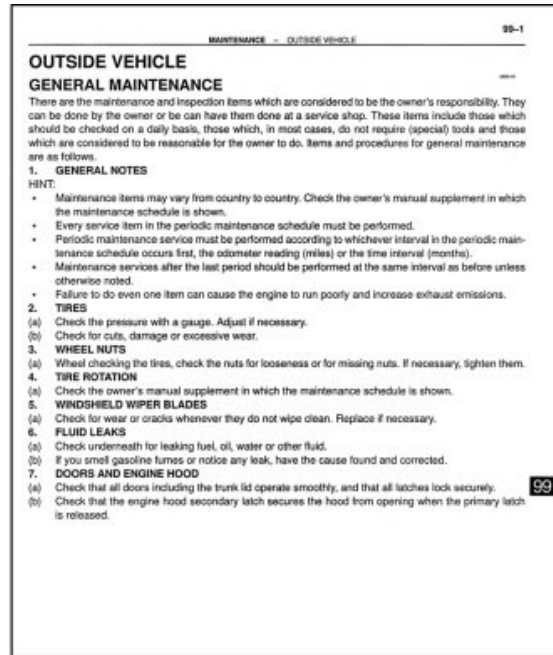
General Information This section lists hints that apply to all basic repairs.

Vehicle Lift and Support Locations This section shows where to position jacks, pantograph jacks, and supports.

Precautions This section gives precautions that apply to the entire Toyota fleet of vehicles.

Repair Manual/ Maintenance

If you need information regarding maintenance on a vehicle, then the Repair Maintenance section should be used.



Maintenance Categorized by vehicle area, this section covers maintenance procedures that can be performed by the owner as well as procedures that require a technician. The Maintenance section of the manual often refers you to the system specific sections for detailed inspection and maintenance procedures.

Outside Vehicle These are maintenance and inspection items considered the owner's responsibility (e.g., checking tire pressure periodically).

Inside Vehicle These maintenance and inspection items are also considered the owner's responsibility (e.g., checking that the horn works).

Underhood These are primarily fluid level checks and inspections performed by service technicians (e.g., checking the power steering fluid level).

Engine These are service items normally performed by a technician (e.g., replacing the air filter).

Brake These are service items performed by a technician (e.g., inspecting front pads and discs).

Chassis These are service items performed by a technician (e.g., inspecting ball joints and dust covers).

Body These are service items normally performed by a technician (e.g., tightening bolts to specification).

Repair Manual/ Troubleshooting

If troubleshooting is a problem, then turn to the Troubleshooting section for guidance.

INTRODUCTION — HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS — 01-22

HOW TO TROUBLESHOOT ECU CONTROLLED SYSTEMS
GENERAL INFORMATION

HINT:
A large number of ECU controlled systems are used in the HIGHLANDER. In general, the ECU controlled system is considered to be a very intricate system requiring a high level of technical knowledge and expert skill to troubleshoot. The fact is, however, that if you proceed to inspect the circuits one by one, troubleshooting of these systems is not complex. If you have adequate understanding of the system and a basic knowledge of electricity, accurate diagnosis and necessary repair can be performed to locate and fix the problem. This manual is designed through emphasis of the above standpoint to help service technicians perform an accurate and effective troubleshooting, and is compiled for the following major ECU controlled systems: The troubleshooting procedure and how to make use of it are described on the following pages.

System	Page
1. SFI System (2AZ-FE)	05-1
2. SFI System (1MZ-FE)	05-152
3. ABS with BA & EBC System	05-214
4. ABS with DSD & BA & TRAC & VSC System	05-211
5. Electronic Control Suspension Thruster (ESC)	05-453
6. Air Conditioning System	05-427
7. Supplemental Restraint System	05-387
8. Audio System	05-711
9. Continuation Meter	05-772
10. Power Window Control System	05-607
11. Power Door Lock Control System	05-633
12. Wireless Door Lock Control System	05-653
13. Sliding Door System	05-617
14. Engine Immobilizer System	05-887
15. Theft Deterrent System	05-913
16. Block Modem Communication System	05-829
17. Cruise Control System	05-867

FOR USING SCAN TOOL OR TOYOTA HAND-HELD TESTER

HINT:

- Before using the tester, the tester's operator manual should be read thoroughly.
- If the tester cannot communicate with ECU controlled systems when you have connected the cable of the tester to the DLC3, turned the ignition switch ON and operated the tester, there is a problem on the vehicle side or tester side.
 - If the communication is normal when the tester is connected to another vehicle, inspect the diagnostic data link line (Busline) or ECU power circuit of the vehicle.
 - If the communication is still impossible when the tester is connected to another vehicle, the problem is probably in the tester itself, so perform the Self Test procedures outline in the Tester Operator's Manual.

How to Troubleshoot ECU Controlled Systems

This section describes how to troubleshoot systems that are controlled by Electronic Control Units (ECU).

Customer Problem Analysis

Ask the customer about the conditions and the environment when the problem occurred.

Symptom Confirmation and Diagnostic Trouble Code Check

Confirm the symptoms and problem conditions and check the on-board diagnostics system for stored DTCs.

Symptom Simulation

Recreate the conditions and environment the customer described that cause the symptom to occur.

Problem Symptoms Table

Use this table to troubleshoot a malfunction when a DTC is not stored in the vehicle's on-board diagnostic system.

Circuit Inspection	This section explains how to use each page in the Circuit Inspection section, which includes DTC Number and Detection Item, Circuit Description and Wiring Diagram.
Terms	This section consists of two charts - a list of all abbreviations used in the manual and a glossary of SAE-J1930 terms and their Toyota equivalents.
Preparation	This section provides important repair preparation information.
Special Service Tools	This table is a quick reference of Special Service Tools (SSTs) you need to gather before you begin a repair operation.
Recommended Tools	This table is a quick reference for recommended tools you need to gather before you begin a repair operation.
Equipment	This table is a quick reference for equipment you need to gather before you begin a repair operation.
Special Service Materials	This table is a quick reference for Special Service Materials (SSMs) you need to gather before you begin a repair operation.
Service Specifications	This section has tables of specifications for each vehicle system component, including torque specifications. The section is grouped by vehicle system (engine mechanical, emission control, etc.) and arranged in the same order as the vehicle systems are listed in the table of contents.
Diagnostics	This section contains key troubleshooting information (DTC table, problem symptoms table, etc.) grouped by vehicle system. You can use this section to isolate the problem and identify the repair procedure in Volume 2 that will fix it.

Diagnostic Trouble Code (DTC) Chart

The diagnostic trouble code chart provides a comprehensive list of all DTCs.

99-14 DIAGNOSTICS - 97-02 (2001-02-01)

DIAGNOSTIC TROUBLE CODE CHART

HINT: Parameters listed in the chart may not be exactly the same as your readings due to the type of instrument or other factors. If a malfunction code is displayed during the DTC check in the check mode, check the circuit for the codes listed in the table below. For details of each code, refer to the "See page" under the respective "DTC No." in the DTC chart.

SAE DEFINED:

DTC No. (See Page)	Detection Item	Trouble Area	ML	Memory
P0100 (25-25)	Mass Air Flow Circuit Malfunction	•Open or short in mass air flow meter circuit •Mass air flow meter •ECM	○	○
P0101 (25-26)	Mass Air Flow Circuit Range/Performance Problem	•Mass air flow meter	○	○
P0102 (25-27)	Intake Air Temp. Circuit Malfunction	•Open or short in intake air temp. sensor circuit •Intake air temp. sensor (built in mass air flow meter) •ECM	○	○
P0105 (25-34)	Engine Coolant Temp. Circuit Malfunction	•Open or short in engine coolant temp. sensor circuit •Engine coolant temp. sensor •ECM	○	○
P0106 (25-27)	Engine Coolant Temp. Circuit Range/Performance Problem	•Cooling system •Engine coolant temp. sensor	○	○
P0107 (25-36)	Throttle/Pedal Position Sensor/Switch "A" Circuit Malfunction	•Open or short in throttle position sensor circuit •Throttle position sensor •ECM	○	○
P0121 (25-40)	Throttle/Pedal Position Sensor/Switch "A" Circuit Range/Performance Problem	•Throttle position sensor	○	○
P0125 (25-46)	Insufficient Coolant Temp. for Closed Loop Fuel Control	•Open or short in A/F sensor (Bank 1, 2 sensor 1) circuit •A/F sensor (Bank 1, 2 sensor 1) •Air induction system •Fuel pressure •Injector •Gas leak on exhaust system •ECM	○	○
P0128 (25-50)	Thermostat Malfunction	•Thermostat •Cooling system •Engine coolant temp. sensor •ECM	○	○
P0130 (25-51)	Oxygen Sensor Circuit Malfunction (Bank 1 Sensor 1)	•Open or short in heated oxygen sensor circuit •Heated oxygen sensor	○	○
P0131 (25-52)	Oxygen Sensor Heater Circuit Malfunction (Bank 1 Sensor 1)	•Open or short in heated oxygen sensor heater circuit •Heated oxygen sensor •ECM	○	○
P0132 (25-53)	Oxygen Sensor Circuit Malfunction (Bank 2 Sensor 1)	•Open or short in heated oxygen sensor circuit •Heated oxygen sensor	○	○
P0133 (25-54)	Oxygen Sensor Heater Circuit Malfunction (Bank 2 Sensor 1)	•Same as DTC No. P0131	○	○

Diagnostic Trouble Code Chart This chart provides a comprehensive list of all DTCs associated with the vehicle system involved and explains the detection item and trouble area of the DTCs listed.

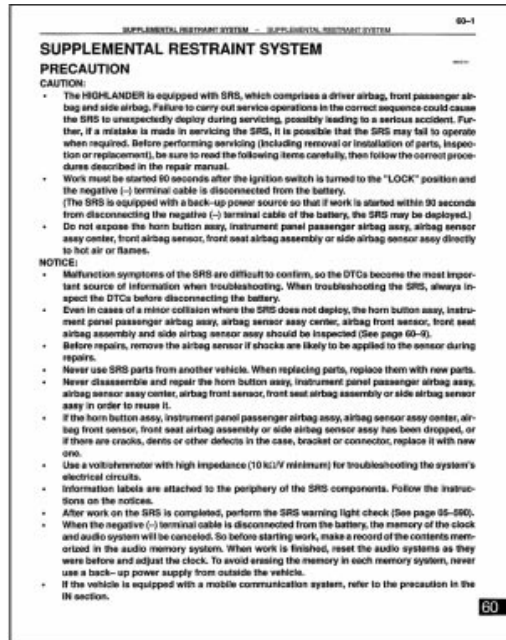
Parts Location This drawing shows the location of the major components associated with the vehicle system you are troubleshooting.

Terminals of ECM This section uses a chart and table to identify the symbols, wiring color, condition, and the voltage normally present for each terminal on the electronic control module (ECM).

Inspection Procedures This section describes the circuit associated with a DTC and explains how to inspect components in that circuit and determines whether a component requires replacement or repair.

SRS Airbag

Supplemental Restraint System precautions must be observed very carefully before attempting any repairs.



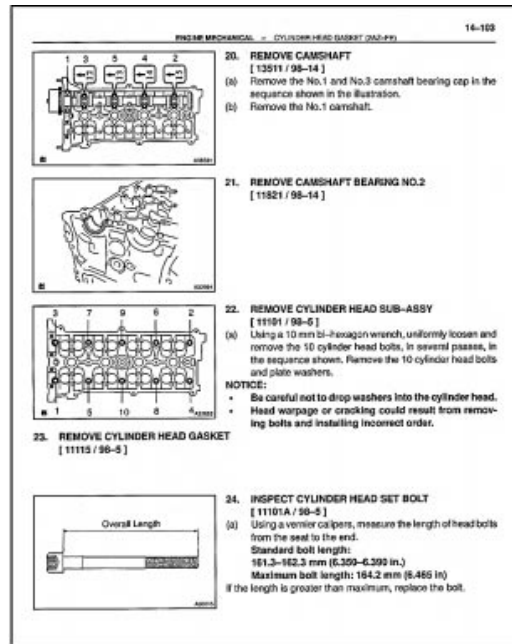
Precautions This topic lists precautions the technician should take when working on a specific system to prevent personal injuries or damage to components.

System Inspection This section provides component inspection procedures and specifications for specific vehicle systems.

System Component Diagram This section shows a component layout overview of a specific system.

Repair Section

The Repair section includes illustrations, part names and step-by-step repair procedures.



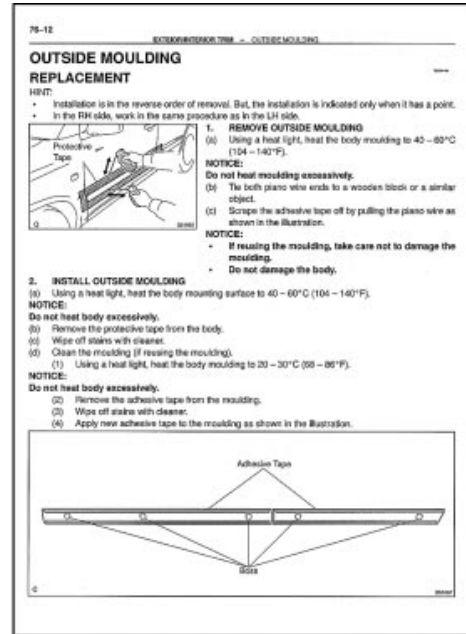
Repair Section Each section contains step-by-step procedures for repairing a system. These procedures often include illustrations with part names. The step-by-step procedures for each system usually include the following procedures:

- Removal
- Disassembly
- Reassembly
- Installation

NOTE: While the repair manual covers the inspection, removal, and installation of many electrical components, the Electrical Wiring Diagram provides more detailed inspection information needed to diagnose the vehicle electrical circuits.

Body Section

The Body Section includes removal, adjustment and installation procedures of body related components.



Removal and Installation of Body Clips

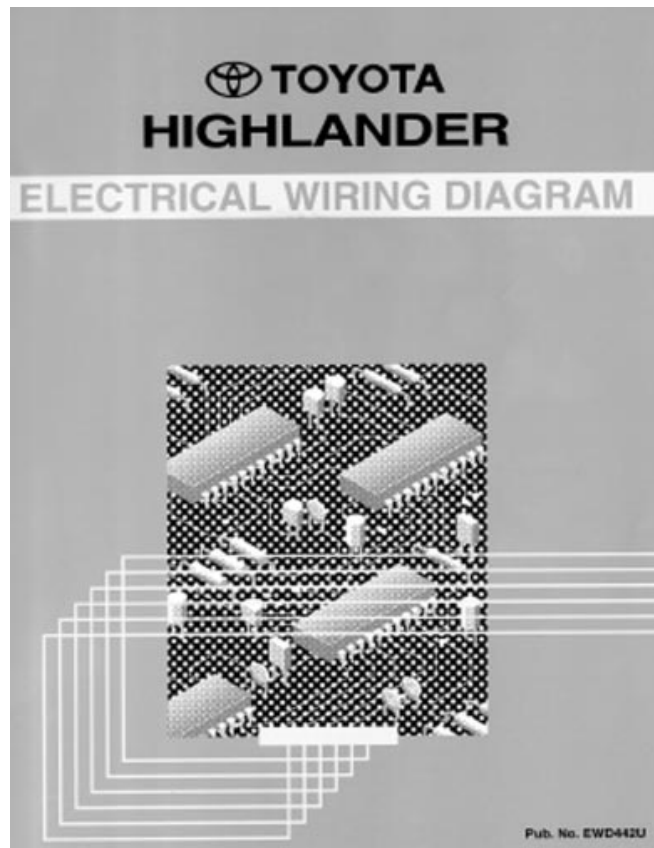
The Body Section of the repair manual includes the following information on body clips and fasteners:

- Types
- Removal and installation
- Locations

Reviewing this information before attempting to remove components from the vehicle will save you time and the aggravation of lost and broken fasteners.

***Electrical Wiring
Diagram (EWD)***

The EWD provides detailed system information needed to diagnose electrical problems.



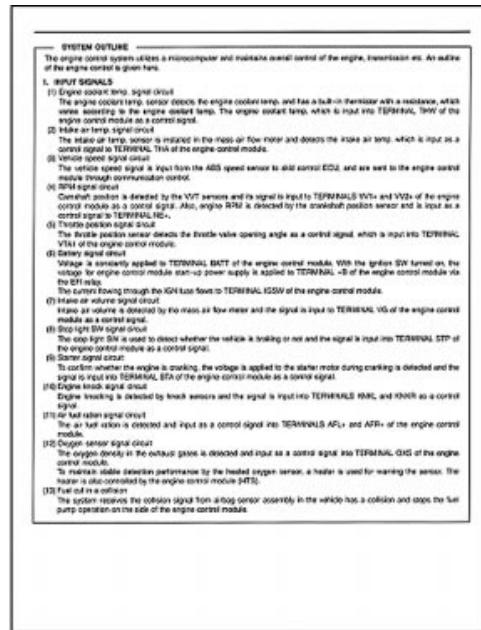
Electrical Wiring Diagram The Electrical Wiring Diagram (EWD) provides detailed component, wiring and diagnostic and repair information for vehicle electrical systems.

Table of Contents The Table of Contents lists section titles, codes, and page numbers. The section code is simply a letter that identifies the section (e.g., “A” for the Introduction, “B” for How to Use this Manual, “C” for Troubleshooting).

Introduction The Introduction page briefly describes each section of the manual.

System Outline

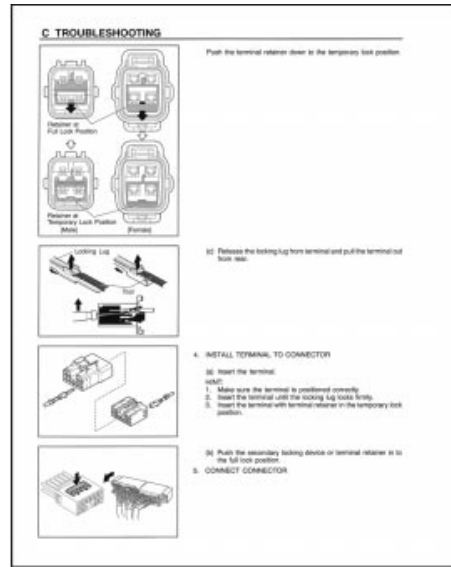
The system outline provides information such as input signals, control system operation, diagnosis and fail safe systems.



System Outline This section provides a system outline explaining system operation. Wiring diagrams, circuit information tables, ground points, and power source information charts are used in this book.

**Basic Electrical
Circuit Inspection**

Checking circuits, connecting or disconnecting connectors and terminal replacement, can all be located in the Troubleshooting section.



Basic Electrical Circuit Inspection This Troubleshooting section describes the basic inspection procedures for electrical circuits.

Circuit Checks This section describes how to measure voltage, continuity, and resistance, as well as how to find a short circuit. It includes diagrams to help you check these conditions.

Connectors Information This section explains how to connect and disconnect various types of male and female connectors.

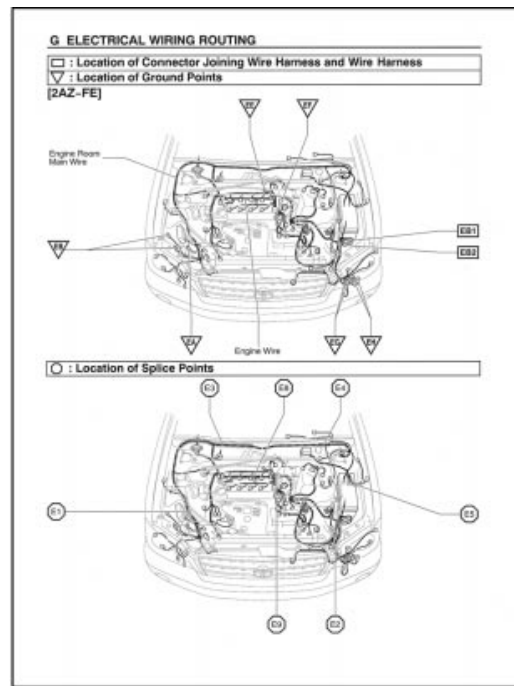
Abbreviations This section lists the abbreviations used in the manual, along with an explanation of each.

Glossary of Terms and Symbols This section explains the technical terms and symbols used throughout the manual.

Relay Locations This section shows you where to find various relays, such as those in the engine compartment and instrument panel.

Electrical Wiring Routing

Symbols locate and define harness component information.



Electrical Wiring Routing This section shows the vehicles wiring harness routings. Symbols are used to locate and define the following harness component information:



Position of Parts

The location of each vehicle component on the wiring harness can be found by a picture of the part or its connector and connector number.



Location of Connectors

A connector number identifies connector location.



Ground Points

Ground points are identified by the symbol and number.



Splice Points

Splice points are located within the wiring harness and are circuit connections that do not use a connector. Splices are identified by the symbol and number.



Wiring Harness Connectors

The configuration of the connectors used in the wiring harness are identified by number at the bottom of the page.

Using the Index to Locate a System Circuit

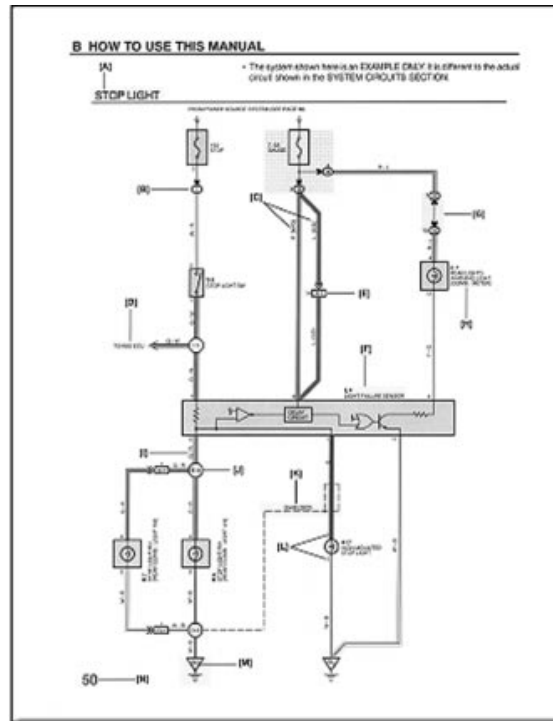
The System Circuit index lists all of its components by page number.

SYSTEM CIRCUITS H	
2001 HIGHLANDER ELECTRICAL WIRING DIAGRAM SYSTEM CIRCUITS	
	Page
ABS	152
AIR CONDITIONING (AUTOMATIC A/C)	202
AIR CONDITIONING (MANUAL A/C)	198
AUTOMATIC LIGHT CONTROL	138
BACK-UP LIGHT	120
CHARGING	15
CIGARETTE LIGHTER	200
COMBINATION METER	206
CRUISE CONTROL	190
DOOR LOCK CONTROL	170
ELECTRONICALLY CONTROLLED TRANSMISSION AND AT INDICATOR (E-TC) (FE)	88
ELECTRONICALLY CONTROLLED TRANSMISSION AND AT INDICATOR (E-TC) (FE)	134
ENGINE CONTROL AND ENGINE IMMOBILIZER SYSTEM (E-FC)	17
ENGINE CONTROL AND ENGINE IMMOBILIZER SYSTEM (E-FC) (FE)	66
FRONT FOG LIGHT	118
FRONT WIPER AND WASHER	208
GARAGE DOOR OPENER	224
HEADLIGHT (w/ DAYTIME RUNNING LIGHT)	112
HEADLIGHT (w/ DAYTIME RUNNING LIGHT) (FE)	114
HORN	212
ILLUMINATION	128
INTERIOR LIGHT	128
KEY REMINDER AND SEAT BELT WARNING	208
LIGHT AUTO TURN OFF	128
MIRROR HEATER AND FRONT DECKER	228
MOON ROOF	200
POWER OUTLET	200
POWER SEAT	212
POWER SOURCE	62
POWER WINDOW	208
RADIATOR FAN AND CONDENSER FAN (E-FC)	202
RADIATOR FAN AND CONDENSER FAN (E-FC) (FE)	204
RADIO AND PLAYER (SPEAKER)	238
RADIO AND PLAYER (SPEAKERS)	230
REAR WINDOW DEFOGGER	208
REAR WIPER AND WASHER	202
REMOTE CONTROL WIPER	238
SEAT HEATER	220
SHIFT LOCK	230
SRS	142
STARTING AND IGNITION	86
STOP LIGHT	128
TAIL LIGHT	120
THEFT DETERRANT SYSTEM	180
TRAILER TOWING	142
TURN SIGNAL AND HAZARD WARNING LIGHT	122
USE	120
WIRELESS DOOR LOCK CONTROL	180

System Circuit Index The System Circuits section starts with an index that lists all the systems covered and the page numbers.

System Circuits

The sample circuit explains how to read a wiring diagram.



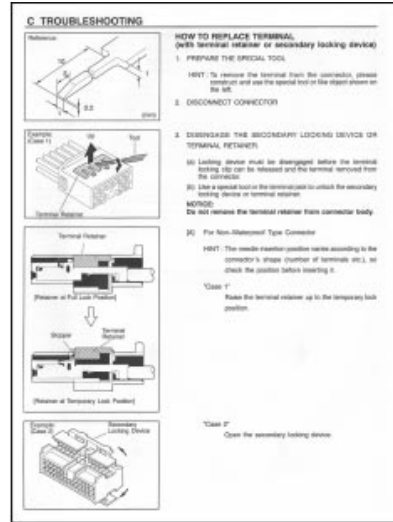
System Circuits This section explains how to read a wiring diagram. Included are:

- Junction block and wire harness connector
- Connector joining wire harness and wire harness
- Ground Points
- Splice Points
- Connector descriptions

System Outline	The System Outline describes how the system is controlled and operates.
Service Hints	The service hints provide information that will help you to diagnose and repair the system.
Parts Location	These charts show you where to find parts in the Electrical Wiring Routing section.
Relay Blocks	The Relay Locations section shows you where to find diagrams for the various relay blocks in each system.
Junction Block and Wire Harness Connector	The Relay Locations section shows you where to find diagrams for the various junction block to wire harness connectors in each system.
Connector Joining Wiring Harness to Wiring Harness	The Electrical Wiring Routing section shows you where to find diagrams for various wire harness to wire harness connectors in each system.
Ground Points	The Ground Points section shows you where to find diagrams for various ground points in each system.
Splice Points	The Electrical Wiring Routing section shows you where to find diagrams for various splice points in each system.
Connector Descriptions	The last part of the System Circuits section shows illustrations of various connectors, and indicates their colors.

Terminal Replacement

This section of the manual provides you with instruction for replacing electrical terminals.



Terminal Replacement In this section of the manual, you'll find step-by-step information for replacing electrical terminals.

Connector Chart

This connector chart lists the connector part number, code and part name.

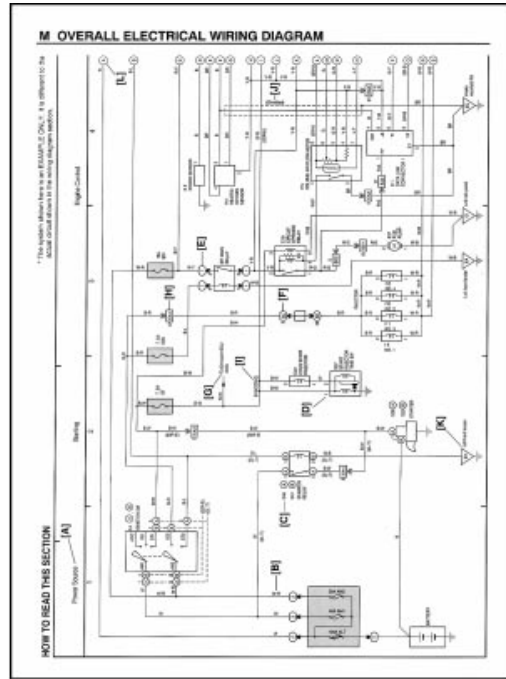
Code	Part Name	Part Number	Code	Part Name	Part Number
P11	Power Window SW	8888-1110	100	Door Locking Switch SW	8888-1000
P12	Power Window SW	8888-1110	101	Door Locking Switch SW	8888-1000
P13	Power Window SW (Driver's Side Locking)	8888-1110	102	Door Locking Switch SW	8888-1000
P14	Power Window SW (Passenger's Side Locking)	8888-1110	103	Door Locking Switch SW	8888-1000
P15	Power Window SW (Both Side Locking Control)	8888-1110	104	Door Locking Switch SW	8888-1000
P16	Power Side Mirror (Electric) Control	8888-1110	105	Door Locking Switch SW	8888-1000
P17	Power Side Mirror (Electric) Control	8888-1110	106	Door Locking Switch SW	8888-1000
P18	Power Side Mirror (Electric) Control	8888-1110	107	Door Locking Switch SW	8888-1000
P19	Power Side Mirror (Electric) Control	8888-1110	108	Door Locking Switch SW	8888-1000
P20	Power Side Mirror (Electric) Control	8888-1110	109	Door Locking Switch SW	8888-1000
P21	Power Side Mirror (Electric) Control	8888-1110	110	Door Locking Switch SW	8888-1000
P22	Power Side Mirror (Electric) Control	8888-1110	111	Door Locking Switch SW	8888-1000
P23	Power Side Mirror (Electric) Control	8888-1110	112	Door Locking Switch SW	8888-1000
P24	Power Side Mirror (Electric) Control	8888-1110	113	Door Locking Switch SW	8888-1000
P25	Power Side Mirror (Electric) Control	8888-1110	114	Door Locking Switch SW	8888-1000
P26	Power Side Mirror (Electric) Control	8888-1110	115	Door Locking Switch SW	8888-1000
P27	Power Side Mirror (Electric) Control	8888-1110	116	Door Locking Switch SW	8888-1000
P28	Power Side Mirror (Electric) Control	8888-1110	117	Door Locking Switch SW	8888-1000
P29	Power Side Mirror (Electric) Control	8888-1110	118	Door Locking Switch SW	8888-1000
P30	Power Side Mirror (Electric) Control	8888-1110	119	Door Locking Switch SW	8888-1000
P31	Power Side Mirror (Electric) Control	8888-1110	120	Door Locking Switch SW	8888-1000
P32	Power Side Mirror (Electric) Control	8888-1110	121	Door Locking Switch SW	8888-1000
P33	Power Side Mirror (Electric) Control	8888-1110	122	Door Locking Switch SW	8888-1000
P34	Power Side Mirror (Electric) Control	8888-1110	123	Door Locking Switch SW	8888-1000
P35	Power Side Mirror (Electric) Control	8888-1110	124	Door Locking Switch SW	8888-1000
P36	Power Side Mirror (Electric) Control	8888-1110	125	Door Locking Switch SW	8888-1000
P37	Power Side Mirror (Electric) Control	8888-1110	126	Door Locking Switch SW	8888-1000
P38	Power Side Mirror (Electric) Control	8888-1110	127	Door Locking Switch SW	8888-1000
P39	Power Side Mirror (Electric) Control	8888-1110	128	Door Locking Switch SW	8888-1000
P40	Power Side Mirror (Electric) Control	8888-1110	129	Door Locking Switch SW	8888-1000
P41	Power Side Mirror (Electric) Control	8888-1110	130	Door Locking Switch SW	8888-1000
P42	Power Side Mirror (Electric) Control	8888-1110	131	Door Locking Switch SW	8888-1000
P43	Power Side Mirror (Electric) Control	8888-1110	132	Door Locking Switch SW	8888-1000
P44	Power Side Mirror (Electric) Control	8888-1110	133	Door Locking Switch SW	8888-1000
P45	Power Side Mirror (Electric) Control	8888-1110	134	Door Locking Switch SW	8888-1000
P46	Power Side Mirror (Electric) Control	8888-1110	135	Door Locking Switch SW	8888-1000
P47	Power Side Mirror (Electric) Control	8888-1110	136	Door Locking Switch SW	8888-1000
P48	Power Side Mirror (Electric) Control	8888-1110	137	Door Locking Switch SW	8888-1000
P49	Power Side Mirror (Electric) Control	8888-1110	138	Door Locking Switch SW	8888-1000
P50	Power Side Mirror (Electric) Control	8888-1110	139	Door Locking Switch SW	8888-1000
P51	Power Side Mirror (Electric) Control	8888-1110	140	Door Locking Switch SW	8888-1000
P52	Power Side Mirror (Electric) Control	8888-1110	141	Door Locking Switch SW	8888-1000
P53	Power Side Mirror (Electric) Control	8888-1110	142	Door Locking Switch SW	8888-1000
P54	Power Side Mirror (Electric) Control	8888-1110	143	Door Locking Switch SW	8888-1000
P55	Power Side Mirror (Electric) Control	8888-1110	144	Door Locking Switch SW	8888-1000
P56	Power Side Mirror (Electric) Control	8888-1110	145	Door Locking Switch SW	8888-1000
P57	Power Side Mirror (Electric) Control	8888-1110	146	Door Locking Switch SW	8888-1000
P58	Power Side Mirror (Electric) Control	8888-1110	147	Door Locking Switch SW	8888-1000
P59	Power Side Mirror (Electric) Control	8888-1110	148	Door Locking Switch SW	8888-1000
P60	Power Side Mirror (Electric) Control	8888-1110	149	Door Locking Switch SW	8888-1000
P61	Power Side Mirror (Electric) Control	8888-1110	150	Door Locking Switch SW	8888-1000
P62	Power Side Mirror (Electric) Control	8888-1110	151	Door Locking Switch SW	8888-1000
P63	Power Side Mirror (Electric) Control	8888-1110	152	Door Locking Switch SW	8888-1000
P64	Power Side Mirror (Electric) Control	8888-1110	153	Door Locking Switch SW	8888-1000
P65	Power Side Mirror (Electric) Control	8888-1110	154	Door Locking Switch SW	8888-1000
P66	Power Side Mirror (Electric) Control	8888-1110	155	Door Locking Switch SW	8888-1000
P67	Power Side Mirror (Electric) Control	8888-1110	156	Door Locking Switch SW	8888-1000
P68	Power Side Mirror (Electric) Control	8888-1110	157	Door Locking Switch SW	8888-1000
P69	Power Side Mirror (Electric) Control	8888-1110	158	Door Locking Switch SW	8888-1000
P70	Power Side Mirror (Electric) Control	8888-1110	159	Door Locking Switch SW	8888-1000
P71	Power Side Mirror (Electric) Control	8888-1110	160	Door Locking Switch SW	8888-1000
P72	Power Side Mirror (Electric) Control	8888-1110	161	Door Locking Switch SW	8888-1000
P73	Power Side Mirror (Electric) Control	8888-1110	162	Door Locking Switch SW	8888-1000
P74	Power Side Mirror (Electric) Control	8888-1110	163	Door Locking Switch SW	8888-1000
P75	Power Side Mirror (Electric) Control	8888-1110	164	Door Locking Switch SW	8888-1000
P76	Power Side Mirror (Electric) Control	8888-1110	165	Door Locking Switch SW	8888-1000
P77	Power Side Mirror (Electric) Control	8888-1110	166	Door Locking Switch SW	8888-1000
P78	Power Side Mirror (Electric) Control	8888-1110	167	Door Locking Switch SW	8888-1000
P79	Power Side Mirror (Electric) Control	8888-1110	168	Door Locking Switch SW	8888-1000
P80	Power Side Mirror (Electric) Control	8888-1110	169	Door Locking Switch SW	8888-1000
P81	Power Side Mirror (Electric) Control	8888-1110	170	Door Locking Switch SW	8888-1000
P82	Power Side Mirror (Electric) Control	8888-1110	171	Door Locking Switch SW	8888-1000
P83	Power Side Mirror (Electric) Control	8888-1110	172	Door Locking Switch SW	8888-1000
P84	Power Side Mirror (Electric) Control	8888-1110	173	Door Locking Switch SW	8888-1000
P85	Power Side Mirror (Electric) Control	8888-1110	174	Door Locking Switch SW	8888-1000
P86	Power Side Mirror (Electric) Control	8888-1110	175	Door Locking Switch SW	8888-1000
P87	Power Side Mirror (Electric) Control	8888-1110	176	Door Locking Switch SW	8888-1000
P88	Power Side Mirror (Electric) Control	8888-1110	177	Door Locking Switch SW	8888-1000
P89	Power Side Mirror (Electric) Control	8888-1110	178	Door Locking Switch SW	8888-1000
P90	Power Side Mirror (Electric) Control	8888-1110	179	Door Locking Switch SW	8888-1000
P91	Power Side Mirror (Electric) Control	8888-1110	180	Door Locking Switch SW	8888-1000
P92	Power Side Mirror (Electric) Control	8888-1110	181	Door Locking Switch SW	8888-1000
P93	Power Side Mirror (Electric) Control	8888-1110	182	Door Locking Switch SW	8888-1000
P94	Power Side Mirror (Electric) Control	8888-1110	183	Door Locking Switch SW	8888-1000
P95	Power Side Mirror (Electric) Control	8888-1110	184	Door Locking Switch SW	8888-1000
P96	Power Side Mirror (Electric) Control	8888-1110	185	Door Locking Switch SW	8888-1000
P97	Power Side Mirror (Electric) Control	8888-1110	186	Door Locking Switch SW	8888-1000
P98	Power Side Mirror (Electric) Control	8888-1110	187	Door Locking Switch SW	8888-1000
P99	Power Side Mirror (Electric) Control	8888-1110	188	Door Locking Switch SW	8888-1000
P100	Power Side Mirror (Electric) Control	8888-1110	189	Door Locking Switch SW	8888-1000
P101	Power Side Mirror (Electric) Control	8888-1110	190	Door Locking Switch SW	8888-1000
P102	Power Side Mirror (Electric) Control	8888-1110	191	Door Locking Switch SW	8888-1000
P103	Power Side Mirror (Electric) Control	8888-1110	192	Door Locking Switch SW	8888-1000
P104	Power Side Mirror (Electric) Control	8888-1110	193	Door Locking Switch SW	8888-1000
P105	Power Side Mirror (Electric) Control	8888-1110	194	Door Locking Switch SW	8888-1000
P106	Power Side Mirror (Electric) Control	8888-1110	195	Door Locking Switch SW	8888-1000
P107	Power Side Mirror (Electric) Control	8888-1110	196	Door Locking Switch SW	8888-1000
P108	Power Side Mirror (Electric) Control	8888-1110	197	Door Locking Switch SW	8888-1000
P109	Power Side Mirror (Electric) Control	8888-1110	198	Door Locking Switch SW	8888-1000
P110	Power Side Mirror (Electric) Control	8888-1110	199	Door Locking Switch SW	8888-1000
P111	Power Side Mirror (Electric) Control	8888-1110	200	Door Locking Switch SW	8888-1000

Note: Not all of the above part numbers of the connector are established for the supply.

Part Number of Connectors The Part Number of Connectors chart lists the code, part name, and part number for each connector for replacement purposes.

Overall EWD

This diagram shows you how different circuits are connected to each other.





Overall Electrical Wiring Diagram The Overall Electrical Wiring Diagram shows how each circuit in the vehicle connects to the other circuits in the vehicle.

Diagrams This section contains detailed illustrations of how the different electrical systems connect to each other.

Power Source (Current Flow Chart) The Power Source (Current Flow Chart) diagram shows the route by which current flows from the battery through the circuit protection devices and provides a source of electricity to each circuit.

Technical Service Bulletins (TSB)

TSBs contain up-to-date technical information and factory fixes to help technicians diagnose and repair problems.

TOYOTA Technical Service BULLETIN		REPLACEMENT CERTIFICATION LABELS Model: All Models		PRODUCT GENERAL INFORMATION PROJID-97
Introduction Replacement Certification Labels (vinyl label affixed to driver's door or door post) may be available from Toyota providing the request meets one of the criteria listed below.				
				
Affected Vehicles • All Toyota vehicles.				
Certification Label Criteria				
1. The vehicle is in an accident and the label is damaged or is attached to a part that will be replaced during the repair.				
<p>NOTE:</p> <ul style="list-style-type: none"> - Processing a new label will be delayed if the old certification label is not available. + A new label MAY NOT be available if the vehicle is more than five years old and the old label does not accompany this request. 				
2. The label is stolen.				
Procurement Procedure				
To request a replacement label, complete a copy of the form on the back of this bulletin. Your dealer parts account will be billed \$10.00 for each replacement of a damaged or stolen label.				
<p>NOTE:</p> <p>All replacement labels for damaged and/or stolen vehicles are subject to approval by the Technical Compliance Department. If you have any specific questions, contact (310) 781-3290.</p>				
Warranty Information • No applicable Warranty Information.				
 Toyota Supports ASE Certification				Page 1 of 2

Technical Service Bulletins TSBs contain vehicle repair information, corrections to technical publications and PDS information.

Replacement bulletins are available through the Toyota Non-Parts System and can be viewed on the Toyota Information System (TIS).

Dealerships receive Technical Service Bulletins (TSBs) throughout the year. During the first quarter of the year, bound editions of the previous years TSBs are sent to dealerships.

Special Service Tools (SST)

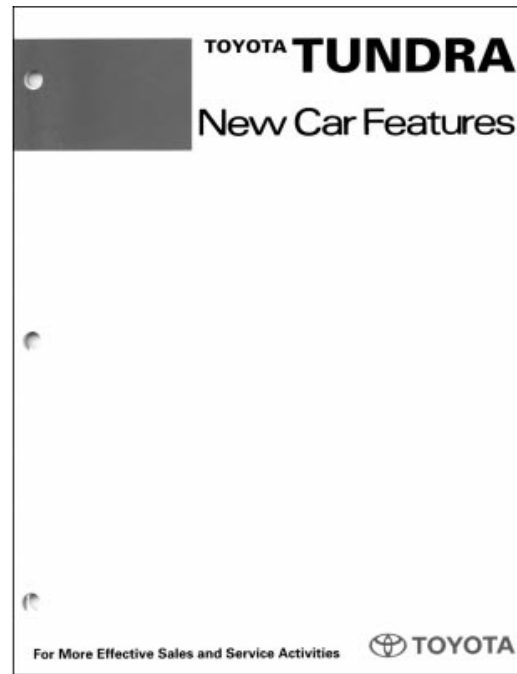
Special Service Tools are designed for a specific task, and to help you perform the job safely and efficiently.



Special Service Tools (SST) Toyota sends Special Service Tools (SSTs) to your dealership to help you make certain repairs safely, efficiently, and properly. An SST is designed for a specific task, such as replacing a crankshaft front oil seal. Refer to Volume 1 of the Service Manual for SST information.

New Car Features

All new model information regarding automotive systems and technology are located in the NCF.



New Car Features Book The New Car Features Book is often the best source for information about new Toyota automotive systems and technology.

Each book is divided into four sections:

- Introduction
- New Model Outline
- Technical Description
- Appendix

Overview The Overview provides a general description of the new model changes.

Index The Table of Contents includes a “thumb index” tab for each section. This tab appears on every page of the section, so you can locate a section by finding the corresponding tab on the edge of the pages.

A multi-vehicle thumb index identifies sections by number. Each section contains information on one model (Corolla, Camry, etc.). The general section lists changes that apply to all models from that year.

A single vehicle thumb index identifies sections by abbreviating the section title. Single vehicle books contain the same information as multi-vehicle books but in greater detail.

Model Code and Line-Up This section explains the model code, model line-up, provides details of engine, body type, and transmission for each model.

New Model Outline The New Model Outline provides the following information:

Development Objectives - This section describes the overall concept behind the new vehicle and its major selling points, such as fuel economy or passenger comfort.

Design - This section uses illustrations to show the major exterior and interior design elements of the vehicle, such as dashboard instrument layout or seat styling.

Main Equipment The New Model Outline describes information such as the location of storage spaces inside the passenger compartment from the driver’s and/or passenger’s viewpoint.

Main Mechanisms The New Model Outline also describes the main equipment that is hidden from the driver’s or passenger’s view, such as the engine, suspension, safety features, and other elements not mentioned in previous sections.

List of Equipment

This page of the manual lists the main equipment that is needed for a particular section.

22

Main Equipment List ●: Standard ○: Option —: No setting

Item	Standard cab		Access cab	
	STD	SR5	SR5	Limited
Tilt steering column	○	○	○	●
Off road package	—	—	○*1	○*1
ABS	○	○	○	○
Slide type back glass	○	○	○	●
Privacy Glass Standard cab: back glass, Access cab: quarter & back glass	—	○	○	●
Wheel arch molding	—	○	○	—
Over fender	—	—	○*2	●
Power window & power door lock	—	○	○	●
Front fog lights (clear)	○	○	○	●
Power outside rear view mirror	—	○	○	●
Rear console box	—	○*4	●*3 ○	○
Air conditioner	○	○	○	●
Front seat	Bench	●	●*5	—
	40: 60 Split	—	○*6 ●*7	●*4 ●
	Captain	—	○*4	●*3 ○
	Captain (Driver seat: PWR)	—	—	○
Rear seat	—	—	●	●

List of Equipment Each section of the new model outline lists the major equipment involved in that system or category (such as safety features).

Technical Description The technical description lists each vehicle system and describes it component-by-component, including the engine, chassis, body, and electrical systems.

Appendix The appendix lists the major technical specifications for each model, model style (2-door, 4-door, etc.) and trim level (base, CE, LE, etc.).

**Technical Training
Course Handbook**

The Technician Handbook provides information such as system description, diagnostic and repair procedures, and Special Service Tools.

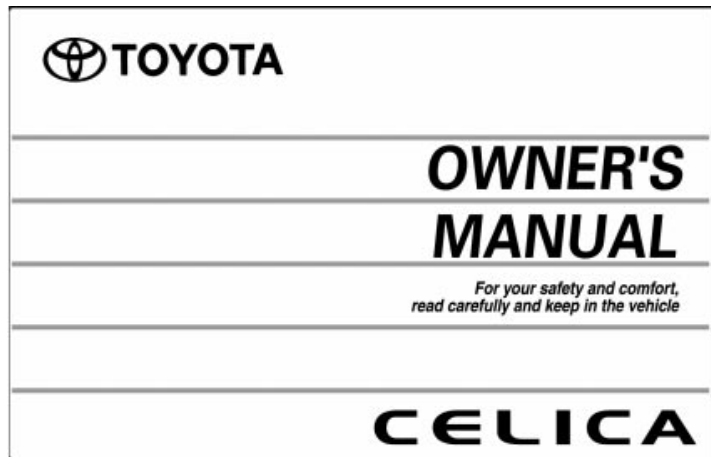


Technician Handbook All technicians receive handbooks when attending technical training courses. The handbooks provide system descriptions, diagnostic and repair procedures, and information on the use of Special Service Tools (SSTs).

At the dealership, technicians can use their handbooks as reference material to review new or seldom-used procedures as needed.

Owner's Manual

For quick general model information, use the Owner's Manual.



Owner's Manuals Owner's manuals are a good source of information on vehicle systems, that may not be found in the repair manual. Items such as new vehicle break-in, approved fuel, operating instructions and vehicle interior care can be referenced in the Owner's Manual.

Owner's manuals can also serve as quick references for model information, technical specifications, and engine capacities.

Technician Reference Cards

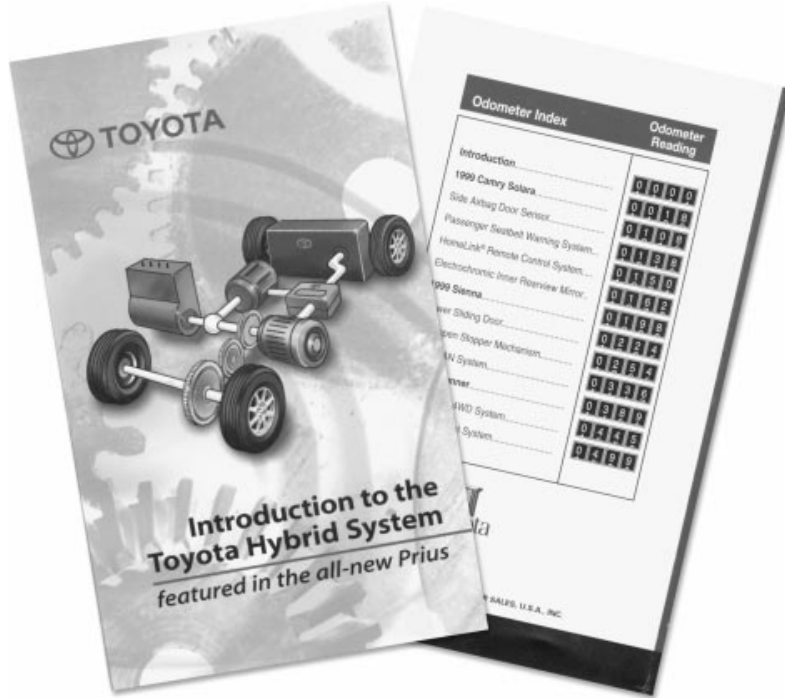
The Technician Reference Cards are job aids with information on transmissions, VINs, model codes, control systems and wheel alignment.



Technician Reference Cards Toyota develops and distributes reference cards as job aids for technicians. These cards include important technical content on transmissions, vehicle identification numbers, model codes, various control systems, and wheel alignment.

Technical Training Videos

Live action videos that show diagnostic and repair information.



Technical Training Videos

Toyota Technical Training Videos provide live action diagnostic and repair information. Videos are sent directly to the dealership and incorporate an “odometer” feature for easy access to the information you wish to view.

Toyota Tech Magazine

Toyota Tech magazine is a quarterly publication written for technicians.



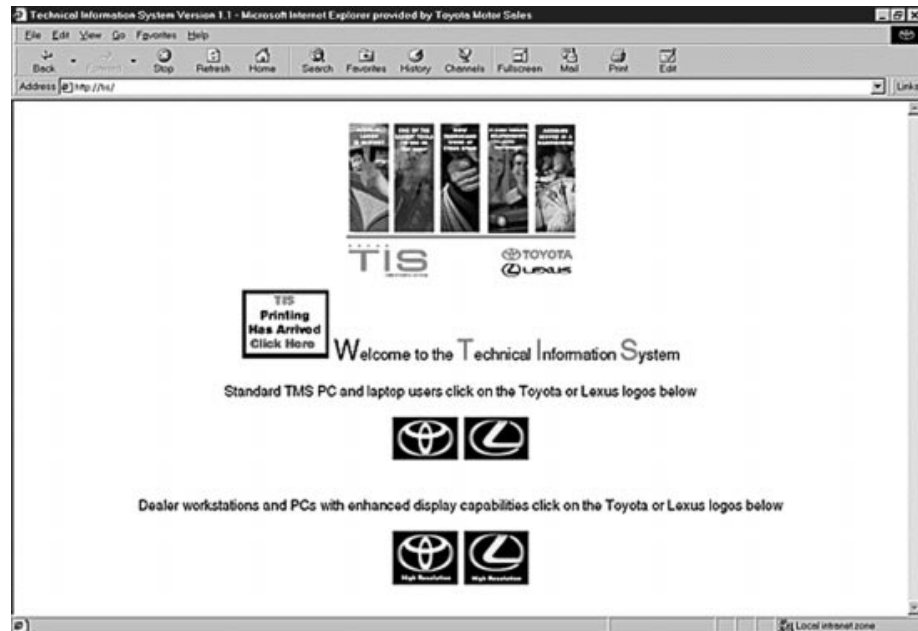
Toyota Tech Magazine

Toyota Tech Magazine is a magazine for Toyota in-dealership technicians. It provides Toyota service technicians with timely, pertinent technical features and articles that directly impact their ability to provide quality vehicle repair and maintenance. This improved service proficiency results in customer satisfaction, increased profitability for the dealership and, ultimately, greater ownership loyalty.

The magazine also provides Toyota Technicians an avenue to receive information on Toyota recognition and certification programs, new technical service procedures, new model highlights and advances in automotive technology.

Toyota Information System(TIS)

TIS provides valuable just-in-time technical information.



Toyota Information System (TIS) The Toyota Information System (TIS) is a just-in-time technical information resource, that uses Toyota's intranet.

The contents include:

- Service Publications
- Warranty Information
- Accessory information
- Training References
- Collision Repair Information
- Tools and Equipment
- Diagnostic Tester Interface
- Campaign Information
- Factory Information

TIS Contents

TIS covers everything from Accessory Information to Warranty Information. The TIS main menu gets you to the information quickly.

1. Repair Information
2. Warranty
3. Accessories
4. References
5. Collision Repair
6. Tools and Equipment
7. Diagnostics
8. SSC Inquiry
9. Factory Communications

TIS Contents TIS content available for selection from the main menu include:

1. Repair Information
2. Warranty Information
3. Accessory Information
4. Training References
5. Collision Repair Information
6. Tools and Equipment
7. Diagnostic Tester Interface
8. Campaign Information
9. Factory Communications

Repair Information

All repair information in printed form can be found in the Repair Information section of the TIS.

Repair Information

- All Repair Information
- TSB
- Repair Manual
- Auto Trans Unit Repair
- EWD
- New Car Features
- Owner's Manual
- Pre Delivery Service
- SSC Publications

Repair Information Repair Information includes the following service publications:

- Technical Service Bulletins (TSB)
- Repair Manuals
- Automatic Transmission Unit Repair Manuals
- Electrical Wiring Diagrams (EWD)
- New Car Features
- Owner's Manual
- Pre-Delivery Service information
- SSC Publications

These publications contain the same content as the printed copies but have content search and information linking capabilities that make them easy to use. In addition they cannot get lost or ruined and always contain the latest changes.

Warranty in TIS

The Warranty section contains
Warranty Bulletins,
Policy/Procedures and Flat Rate
Manual information.

Warranty

- All Warranty**
- Bulletins**
- Policy/Procedure Manual**
- Flat Rate Manual**

Warranty Warranty information includes:

- Warranty Bulletins
- Policy and Procedures Manual
- Flat Rate Manual

Accessories in TIS

TIS contains Accessory information for all models.



Model

Year

Repair Information

Warranty

Accessories

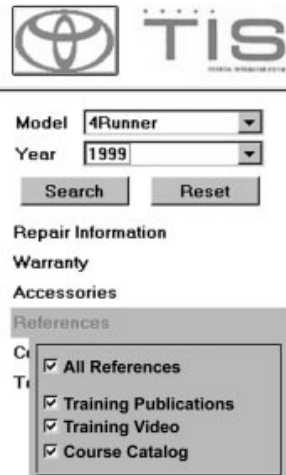
- All Accessories
- PIO
- DIO
- PANT Bulletins

Accessories Accessories includes information on:

- Port Installed Options (PIO)
- Dealer Installed Options (DIO)
- Parts and Accessories News Today (PANT) Bulletins

References in TIS

The References section contains a list of videos, catalogs and publications.



Model

Year

Repair Information

Warranty

Accessories

References

- All References
- Training Publications
- Training Video
- Course Catalog

References The Reference section contains the following technical training references:

- Training Publications
- Training Videos
- Course Catalog

Collision Repair in TIS

All information related to Collision Repair can be found in this section of TIS.

Collision Repair Collision repair information includes:

- Collision Repair Information Bulletins (CRIB)
- Dimension Guides
- Collision Training
- Collision Repair Manual

Tools and Equipment in TIS

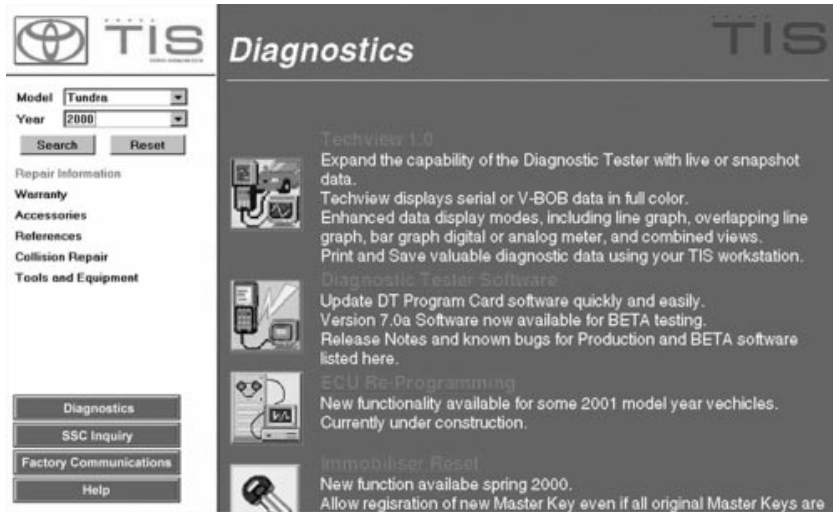
The Tools and Equipment section contains a list of Special Service Tools, Testers and Dealer Equipment.

Tools and Equipment Tools and Equipment content includes:

- Special Service Tools (SST)
- Tester Operations Manual
- Wire Harness Repair Kit
- Dealer Equipment

Diagnostics in TIS

All information regarding diagnosing vehicle systems can be found in the Diagnostics section of the TIS.



Diagnostics The Diagnostics section of TIS contains valuable information on diagnostic tester operation and usage.

Special Service Campaigns

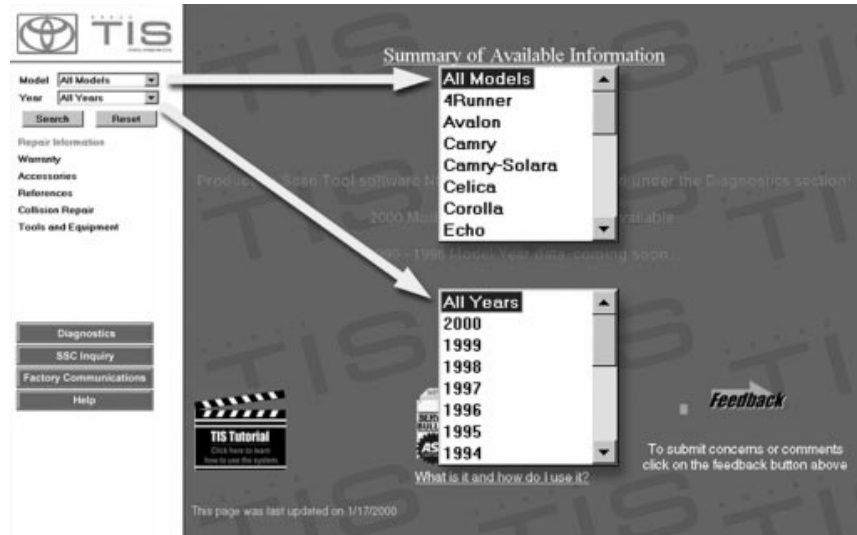
Given a VIN, service campaign information can be found in the Special Service Campaign section of the TIS.



Special Service Campaigns The Special Service Campaign (SSC) screen allows you to search for campaigns on a vehicle by VIN.

Drop-Down Menus

Drop-down menus allow you to search for specific model information.



Drop-Down Menus The TIS system uses drop-down menus to assist you in searching for information. For example, a search in Repair Information lets you look at all the information available or select the specific model and year of vehicle you need.

Information Search

Once you have selected a topic, it can be broken down into subcategories.



Information Search After selecting the vehicle you need repair information for, a repair information drop-down menu lets you choose the information you want to search.

Screen Sections

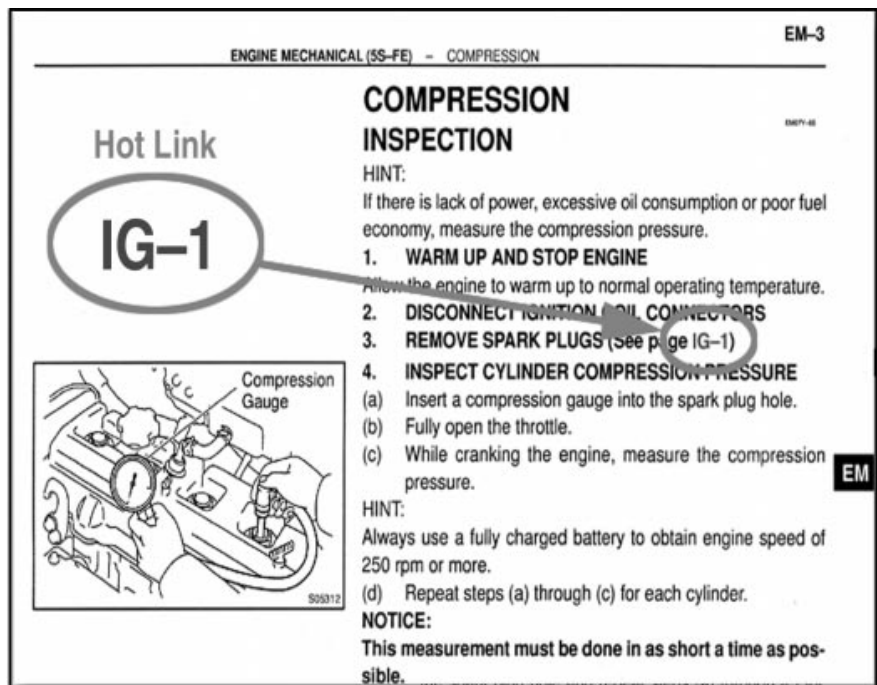
The Drop-Down Menus have sections and sub-sections.



Screen Sections This screen has drop down menus for the section and sub-section of the repair manual you want to search.

Repair Section

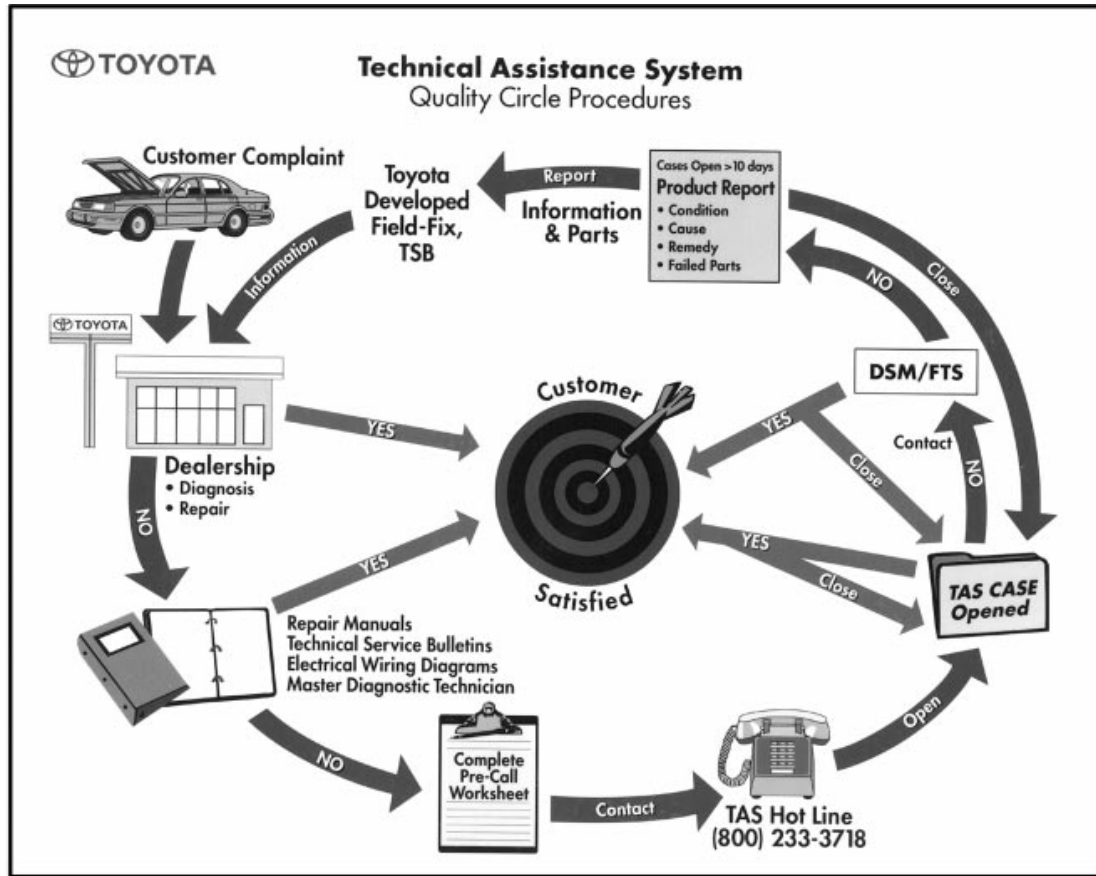
The Drop-Down Menus will enable you to pinpoint your desired repair information.



Repair Section When you select the desired inspection or repair procedure, the publication contents will appear.

Technical Assistance System

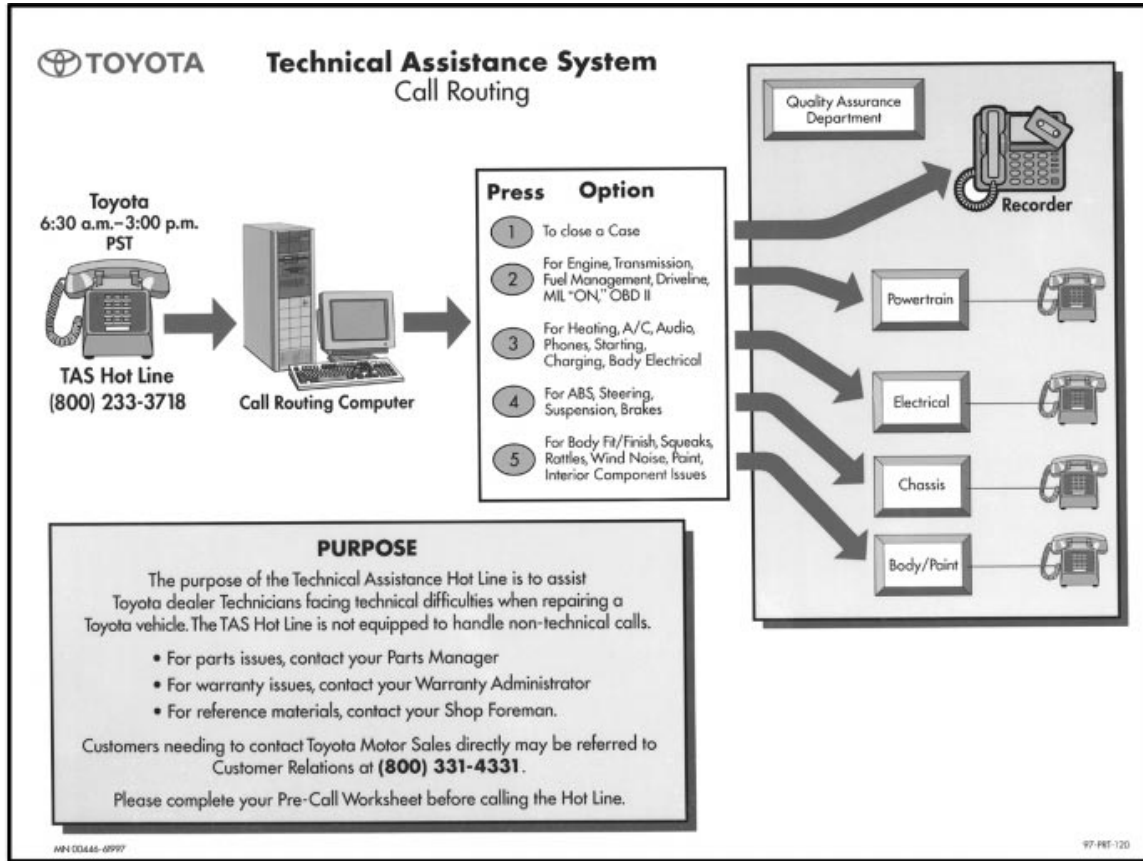
The Technical Assistance System can help you solve that vehicle problem.



Technical Assistance System The purpose of the Technical Assistance System (TAS) Hotline is to provide dealership technicians with diagnostic assistance and repair information. This is done by carefully discussing the vehicle's condition with a TAS engineer, determining the root cause and finding an effective resolution.

TAS Call Routing

The TAS hotline will direct you to the proper component group.



TAS Call Routing The TAS Hotline is designed to give you the option of selecting a component group to obtain the most effective repair information.

Pre-Call Worksheet

It is important to complete this worksheet prior to calling the "Hotline".

 **TOYOTA**
TECHNICAL ASSISTANCE SYSTEM
Pre-Call Worksheet

Important Note: Read instructions on the reverse side **BEFORE** completing this form or calling the "Hotline."

Dealer Code: _____ Technician Name: _____

Dealer Name: _____

Dealer Phone Number: _____ Dealer FAX Number: _____

VIN: _____ Customer's Last Name: _____

Mileage: _____ P/D: _____ Model: _____

Customer Complaint: Yes No _____

Diagnostic Code(s): _____

Checks/Repairs Performed: _____

Your TAS phone number is:

When to Call the Hotline The Technical Assistance System is a limited resource and should not be called unnecessarily. Make sure you've fulfilled your responsibilities before picking up the phone.

Call the hotline only after you have:

- Verified, or tried to verify, the problem.
- Performed the diagnostic steps needed.
- Referred to your technical resources (TSB, repair manual, EWD, etc.).
- Completed the Pre-Call Worksheet.

When NOT to Call the Hotline

Do NOT call the hotline for the following:

- Before you've completed the Pre-Call Worksheet
- Before you've tried your best to repair the vehicle
- Reference materials
- Warranty issues
- Parts issues

Results The following will result from your hotline call:

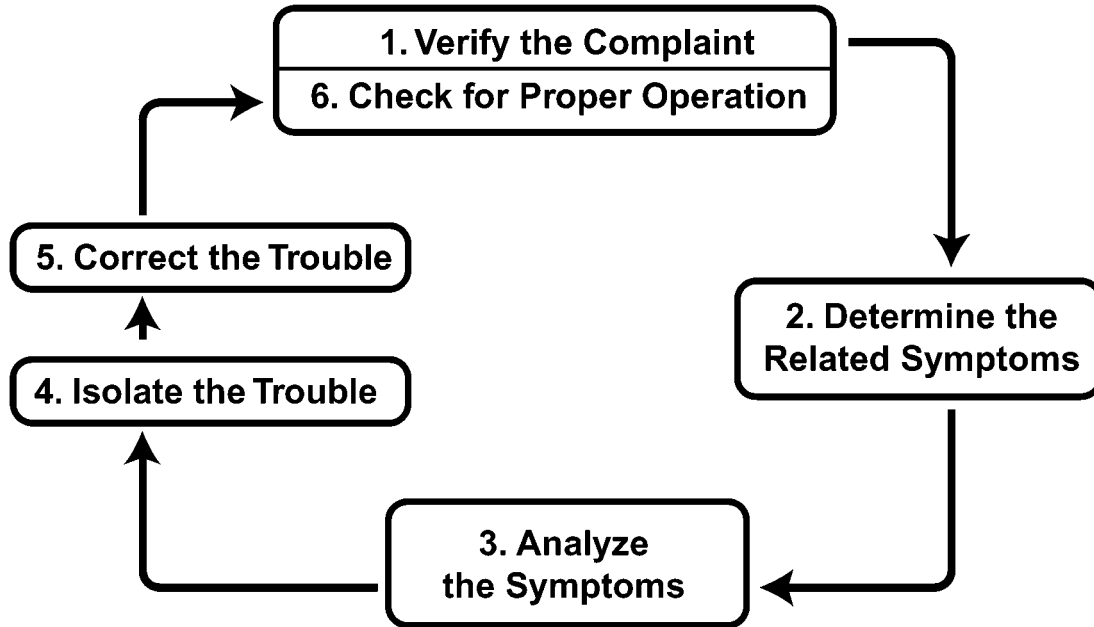
- The vehicle will be repaired.
- DSM/FTS support will be required.
- Cases open for more than 10 days will result in a product report.

It is the dealer's responsibility to close the case after the vehicle has been repaired. By closing a case with the proper information, the dealer will help to constantly update the Repair Database which helps other technicians and dealers when they call for assistance.

If you do your part, the TAS personnel will be better able to help you out.

Six-Step Diagnostic Process

The Six-Step Diagnostic Process can help you logically approach the problem vehicle.



Six-Step Diagnostic Process

When diagnosing a vehicle you'll often count on your experience to know where and what to look for. In many cases that will be all you need to fix the vehicle. But what about those situations where you think you've done everything and you still can't fix the vehicle?

One important tool that you may use without even thinking about it is a diagnostic process or procedure. A good diagnostic procedure allows you to approach the problem logically and keeps you from replacing unnecessary parts.

Make sure your diagnostic procedure contains the following six steps:

1. **Verify the Complaint** It almost goes without saying that you can't fix a problem that you can't duplicate. When verifying the customer's complaint:
 1. Get all the information you need from the customer.
 2. Verify the complaint under the conditions that the customer states the problem occurs.
 3. Road test the vehicle with the customer, if necessary.
 4. Don't forget TAS if a problem cannot be verified.

2. **Determine the Related Symptoms** When gathering information, it is important to look at what's working and what's not working. This is especially true of any electrical problem. To determine the related symptom:
 1. What items operate properly?
 2. What items are inoperative or operating improperly?
 3. Determine the relationship between the symptoms using your technical resources.

3. **Analyze the Symptoms** After gathering the information you need, take a few minutes to analyze the information you have before making any tests or repairs.
 1. Do you understand how the system or component should operate?
 2. Use all available resources to understand the operation of the affected and related systems or components.
 3. Based on this knowledge determine what you want to check and what results you expect.

4. Isolate the Trouble Now that you know what you're looking for and what you should find, start testing systems and components. Use the tools that will give you the most accurate information available. You'll find more information, more quickly using the diagnostic tester than you will with a test light. To isolate the trouble:

1. Perform all necessary checks, tests and measurements to determine the exact cause of the problem.

5. Correct the Trouble It makes it sound so simple, doesn't it? Obviously it's more complicated than just one statement, but if you've taken the time to do the research up front it becomes much easier. In addition, the repair manual, electrical wiring diagram and the Technical Assistance System all offer diagnostic information to help you through this step.

There are really only a couple of things that you need to do to repair a vehicle. This can include:

1. Making an adjustment.
2. Repairing a circuit or component.
3. Repairing/Replacing the part.
4. Explaining proper system operation to the customer.

6. Check for Proper Operation But you're not done yet. After making the repair, make sure it's the right repair.

1. Check for proper operation under the same conditions you used for verification.
2. Make sure that additional problems do not exist.

Again, you probably use a procedure like this every day and don't even think about it. That's the point. When you get one of those hard to diagnose problems, think through the process before attempting any repairs.

Toyota Diagnostic Tester

The Toyota Diagnostic Tester is a hand-held instrument designed to diagnose electrical and engine control systems.



Toyota Diagnostic Tester The Toyota Diagnostic Tester has the following features to help you diagnose and repair Toyota vehicles:

- Displays Diagnostic Trouble Codes (DTC).
- Erases OBD II and airbag codes.
- Displays system operation data.
- Has laboratory oscilloscope analysis.
- Performs Active tests.
- Records and recalls data.
- Prints data, graphs, scope displays and test results.
- Reprograms ECM on some models.

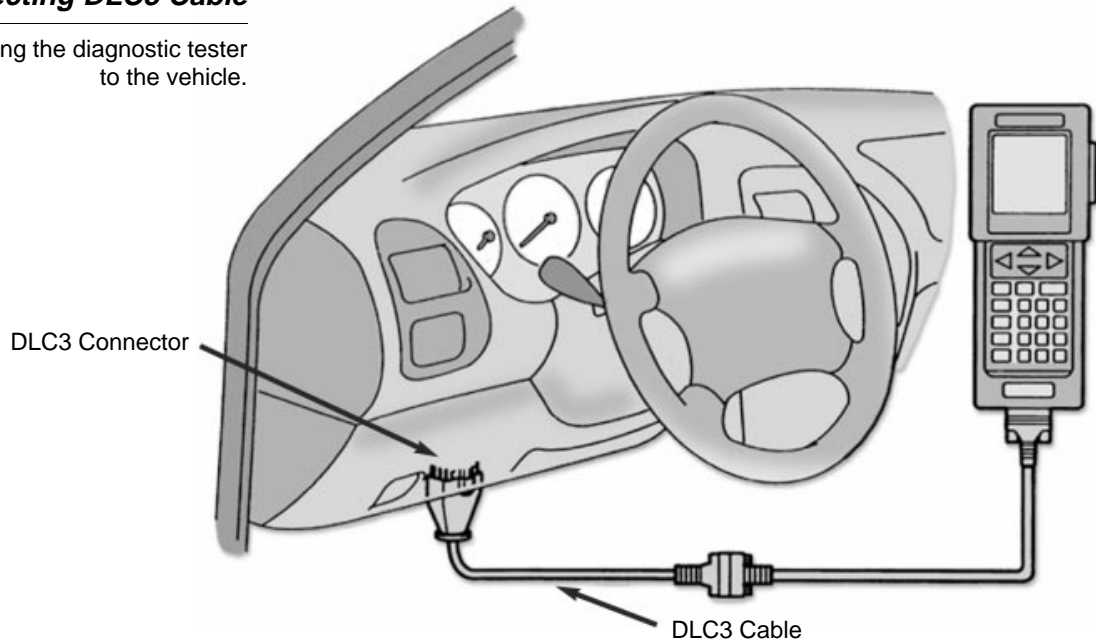
Additional training is available on all Diagnostic Tester functions.

The “Using the Toyota Diagnostic Tester” worksheet will assist you in using the Toyota Diagnostic Tester to:

- Check for Diagnostic Trouble Codes on OBD II vehicles.
- Erase Diagnostic Trouble Codes on OBD II vehicles.

Connecting DLC3 Cable

Connecting the diagnostic tester to the vehicle.



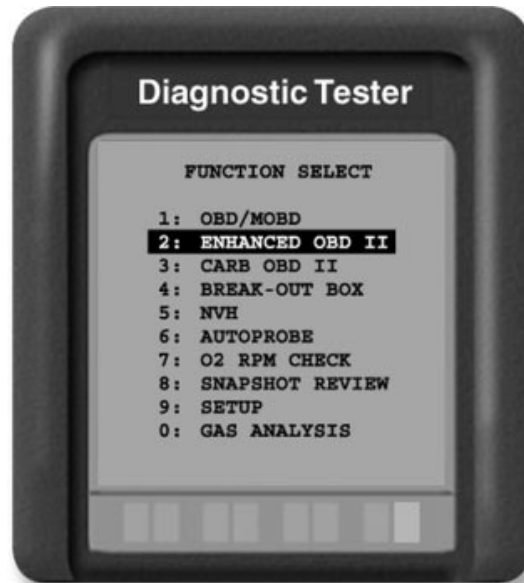
Connecting the Diagnostic Tester

Connect the Diagnostic Tester to the vehicle by connecting the DLC3 cable (OBD II connector) of the tester to the DLC3 connector on the vehicle.


Checking for DTCs on OBD II Vehicles




Operating the Diagnostic Tester

By pressing the ON/# key, you are ready to begin your testing.



Operating the Diagnostic Tester

1. Turn the vehicle ignition ON.
2. Use the OBD II Operator's Manual (Diagnostic Tester) to verify that the correct program card and/or cartridges are installed for OBD II testing.
3. Power up the Diagnostic Tester by pressing the  key.
4. When the Sign-on screen comes up, press ENTER.
5. From the FUNCTION SELECT menu, select ENHANCED OBD II.

NOTE: Make your selections by scrolling using the  and  keys or by entering the number of your selection and pressing .

OBD II

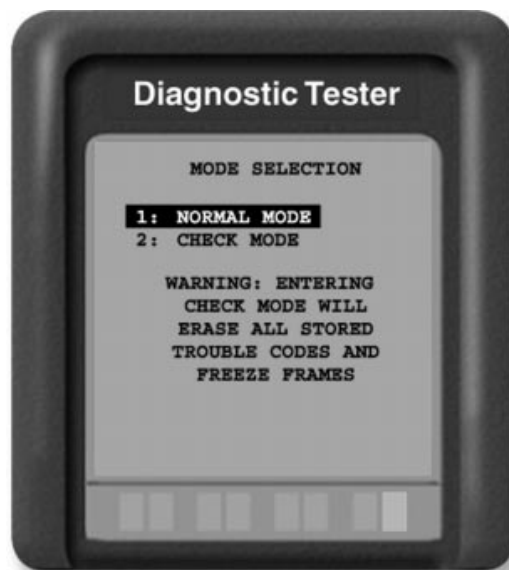
Pressing ENTER confirms that you are checking an OBD II vehicle.



Confirm that you are checking an ENHANCED OBD II vehicle by pressing .

MODE SELECTION

Select NORMAL MODE.



7. From the MODE SECTION menu, select NORMAL MODE.

NOTE: CHECK MODE is used when duplicating intermittent faults.

ENHANCED OBD II MENU

After you select TROUBLE DATA, don't forget to press ENTER.



8. From the ENHANCED OBD II menu, select TROUBLE DATA.

TROUBLE DATA MENU

Once in the TROUBLE DATA MENU, select CODES/FREEZE and press ENTER to continue.



9. From the TROUBLE DATA menu, select CODES/FREEZE.

TROUBLE CODES

Once you select
CURRENT CODES,
press ENTER.



10. From the TROUBLE CODES menu, select CURRENT CODES.

***DIAGNOSTIC TROUBLE
CODES (DTC)***

You will now see DTCs or
NO DTC CODES on the screen.



11. Either NO DTC CODES or the DTCs currently stored in the ECM will now be displayed.

NOTES: An * by the DTC number indicates that Freeze Frame Data is stored for that DTC.

A ↓ indicates that additional DTCs are stored.

If you press **ENTER** while in CODES/FREEZE you will go directly to the Freeze Frame Data if you are highlighting the code that has attached Freeze Frame Data. Select **ENTER** to return to the DTC screen.

Erasing DTCs

Erasing Codes

To erase DTCs, return to TROUBLE DATA MENU. Select CLEAR CODES and press ENTER.



12. Return to the TROUBLE DATA menu by pressing as necessary.
13. At the TROUBLE DATA menu, select CLEAR CODES.

CLEAR DTCs

When you clear DTCs, you also clear FREEZE FRAME and READINESS TEST Data.



14. The Diagnostic Tester will ask you if you are sure that you want to clear the Trouble Codes and Freeze Frame Data. Select .

DTCs CLEARED

From this screen, selecting ENTER will return you to the main menu.



15. The Diagnostic Tester will verify that you have cleared the codes. Select to return to the main menu.

WARNING! Trouble Codes and Freeze Frame Data are critical to diagnosing and repairing OBD II incidents. Clearing the Trouble Code will erase the Freeze Frame Data. Never clear a code unless you are trying to duplicate an intermittent problem or confirm a repair. It's always a good idea to print the Freeze Frame Data before clearing any codes.

Turning OFF the Tester

Pressing EXIT and ON at the same time will turn the Diagnostic Tester OFF.



16. Turn OFF the Diagnostic Tester by pressing and at the same time.

Pre-Delivery Service (PDS)

Pre-Delivery Service

There are seven categories on the Pre-Delivery Service Check Sheet that must be completed prior to customer delivery.

TOYOTA
TOYOTA PRE-DELIVERY SERVICE CHECK SHEET

<p>A. BEFORE INSPECTION</p> <p>01 INSTALL FUSE(S)</p> <p>See Application Chart on back</p> <p>02 Install outside rearview mirrors*</p> <p>B. FUNCTIONAL OPERATION</p> <p>Apply parking brake and turn ignition "ON", check gear selector in reverse, turn on lights and rear defogger. Unlock doors, release gas door, release trunk hatch.</p> <p>01 Check dome, courtesy, map and sun visor lights*</p> <p>02 Check warning/indicator lights, gauges and horn</p> <p>03 Check passenger air bag system cutoff switch and light*</p> <p>04 Check windshield wipers and washers</p> <p>05 Check headlights, instrument lights, turn signals, emergency flashers and brake lights</p> <p>06 Check inside/outside rearview mirror operation/adjustment</p> <p>07 Check cigarette lighter and power outlet*</p> <p>08 Check sunroof/convertible top*</p> <p>09 Check audio system and set clock*</p> <p>10 Install anti-look override button cover</p> <p>C. WALKAROUND INSPECTION</p> <p>Start at left front door. Check window and door lock operation from interior power switch, if equipped. Continue around vehicle in a counterclockwise direction checking each door and window operation, child door locks, seat belts, interior condition, all lights, trunk contents. Remove rubber body plugs from glove box for installation during UNDER VEHICLE INSPECTION. Finish by checking headlight aim and continue into UNDER HOOD checks.</p> <p>01 Check window operation</p> <p>02 Check door and door lock operation, including wireless remote control (if equipped)</p> <p>03 Check that engine starts with all keys</p> <p>04 Check power sliding door operation (if equipped)</p> <p>05 Check that child safety door locks are in normal (unlocked) position*</p> <p>06 Check seats and seat belt operation</p> <p>07 Check integrated child seat and seat belt operation*</p> <p>08 Check rear defogger*</p> <p>09 Check side marker, tail, backup and license plate lights</p> <p>10 Check trunk light* and trunk trim appearance</p> <p>11 Check spare tire pressure and jack and tool installation</p> <p>12 Check headlight aim</p> <p>D. UNDER HOOD</p> <p>01 Check engine oil and ATF* fluid levels</p> <p>02 Check brake, clutch* and power steering fluid levels</p> <p>03 Check engine coolant level</p> <p>04 Check battery state-of-charge by Open Circuit Voltage method. Recharge if below 12.4 volts (75% charge)</p> <p>* Inspect or install when Equipped/Required</p>	<p>E. UNDER VEHICLE (ON HOIST)</p> <p>01 Remove disc brake air-dust covers*</p> <p>02 Remove front spring spacers*</p> <p>(See Application Chart on back)</p> <p>03 Install rubber body plugs*</p> <p>04 Inspect tires for defects/damage and adjust tire* pressure</p> <p>05 Install wheel covers/caps</p> <p>06 Install mudguards (if fitted)</p> <p>07 Install antenna (if fitted)</p> <p>F. ROAD TEST</p> <p>A complete road test helps assure Customer Satisfaction. Drive vehicle over a variety of road surfaces and driving conditions. Check for unusual noise and driving performance.</p> <p>Enter Odometer Reading</p> <p>Reading before test: _____</p> <p>Reading after test: _____</p> <p>01 Check cold engine operation</p> <p>02 Check engine operation during warm-up</p> <p>03 Check engine at normal operating temperature</p> <p>04 Check clutch/transmission operation</p> <p>05 Check brake and parking brake operation</p> <p>06 Check steering operation and off-center</p> <p>07 Inspect for abnormal noises and vibration</p> <p>08 Inspect for squeaks and rattles</p> <p>09 Check front and rear "bender and A/D" operation</p> <p>10 Check cruise control operation*</p> <p>11 Check front seat heater* and seat memory function*</p> <p>12 Redundant messages (Asterisk *):</p> <p>G. FINAL INSPECTION AND CLEANING</p> <p>01 Remove interior protective covers, unnecessary labels, tags, etc.</p> <p>02 Remove protective covers just before delivery to customer.</p> <p>03 Visually inspect all interior parts for installation, damage, fit, dirt, etc.</p> <p>04 Remove Raggen® protective film</p> <p>05 Wash and clean vehicle</p> <p>06 Inspect paint finish for scratches, chips, rust, dents, damage, etc.</p> <p>07 Inspect exterior body parts for proper installation, damage, rust, etc.</p> <p>08 Sign "Committed to Excellence" sticker (P/N 00406-STICK_PD556) and affix to window</p> <p>COMMENTS:</p> <p>Completion and retention of this form is required to comply with Toyota's Warranty Policy.</p> <p>TECHNICIAN'S SIGNATURE: _____ SERVICE MANAGER'S SIGNATURE: _____</p> <p>NAME (PLEASE PRINT): _____ NAME (PLEASE PRINT): _____</p> <p>Date: _____ Dealer Name: _____ Dealer Code: _____ Vehicle Identification Number (Sticker): _____</p> <p style="font-size: small;">Order additional forms through the Dealer Support Materials System (DECS) MATS B008-PDS02 88 PDS 1-03</p>
---	---

Pre-Delivery Service Pre-Delivery Service The new vehicle delivery experience is possibly the single most important event in a customer's ownership cycle. This is the time when lasting impressions are formed regarding the vehicle they just purchased, your dealership, and Toyota in general. The saying, "you never get a second chance to make a positive first impression" rings especially true as it relates to the delivery experience.

Simply put, no matter how much "goodwill" is generated during the sale, if the customer takes delivery but feels their Toyota is not perfect, all that hard work - the hard work of everyone involved in the production, transportation, preparation and delivery of that vehicle - can be lost.

Your customer's true first impression of their new Toyota begins the moment they turn the ignition key for the very first time. Accordingly, it is your challenge to ensure that each new Toyota is perfect at that moment in time.

- On-Board Inspection** During this preliminary inspection, vehicles are checked while still on the carrier for superficial damage that may have occurred during transport. The normal amount of time for on-board inspection is approximately five minutes per vehicle.
- On-Ground Inspection** A more thorough inspection is conducted after the vehicles have been taken off the transporter.
- On-Hoist Inspection** The vehicle is raised off the ground for a thorough under vehicle inspection.
- Pre-Delivery Service (PDS)** The Pre-Delivery Service is conducted to prepare the vehicle for display and delivery.
- The goal is to deliver 100% problem-free Toyotas.
 - Each dealership should designate a stall for the PDS inspection.
- Storage Lot** If the vehicle does not go directly to the sales lot, or is not delivered to a customer, it may be parked in the storage lot.
- Long-term or off-site storage requires special care to keep vehicles free of scratches and dents.

- Dealer-Installed Options (DIO)** In many instances, optional equipment and accessories are installed on new vehicles at the buyers request or for display and demonstration. After these options are installed, the vehicles should be inspected and the options tested for proper operation.
- Sales Lot Display** Proper vehicle display allows customers to examine new Toyotas in a safe, clean, and organized environment. It projects a professional appearance to the customer and minimizes the possibility of damage to the vehicles.
- Sales Delivery** The new vehicle delivery is an integral element of the sales process. It helps to ensure that an informed and satisfied buyer drives away from your dealership in a clean vehicle and in perfect working order. Accordingly, following an established new vehicle delivery procedure helps the customer/dealership relationship begin on a positive note. More importantly, it strengthens customer satisfaction and ultimately, your dealership's image in the marketplace. A proper delivery procedure accomplishes the following goals:
- It provides a procedure for sales consultants to follow ensuring a thorough delivery of every new vehicle.
 - It ensures that all Toyota customers are familiar with the operation and features of their new vehicle and receive the vehicle in perfect condition.
 - It introduces customers to key personnel and operating procedures of the Service and Parts Department.

End of Section 2



Notes

Section 3

Administrative Aspects of Service

Warranty Tags

The correct Warranty Tag must always be attached to any part related to a warranty repair.

The image displays three forms used in the warranty process:

- TOYOTA QUALITY CONTROL LAB:** A form for recording vehicle and repair details. Fields include Delivery Date, Frame No., Vehicle Prod. Date, Engine No., Mileage, Part No., Claim No., Date of Repair, and Dealer Code. It also has checkboxes for 'HOLD THIS PART FOR:' and 'TECH REPORT NO.'.
- TOYOTA / LEXUS PRODUCT REPORT PARTS RECOVERY TAG:** A form for tracking parts recovery. It includes fields for VIN and Part No., and a list of instructions: 1. WRITE VIN AND PART NUMBER ON TAG AND ATTACH TO PARTS. 2. PACKAGE PARTS FOR SHIPMENT. 3. FILL IN "SHIPMENT FROM" PORTION OF UPS SHIPPING DOCUMENT. 4. ATTACH SHIPPING DOCUMENT TO PACKAGE. 5. CALL UPS FOR PICKUP.
- A.R.S. SHIPPING LABEL:** A shipping label for UPS Ground. It includes fields for From (Name, Street, City, State, ZIP Code) and To (2015 W 190 TH ST, TORRANCE CA 90504 6203). It features a barcode with the number CA 908 9-70 and a tracking number 1Z 4X4 15X 06 1976 8285.

- Learning Objectives:
1. Identify your warranty parts responsibilities.
 2. Identify the documentation requirements for a warranty repair order.
 3. Identify your dealership's and your responsibility for completing service campaigns.
 4. Locate the vehicle information needed to order the correct repair part.
 5. Identify the tools Toyota uses to measure service satisfaction.

Warranty System Understanding and properly administrating Toyota's warranty policies and programs allows your dealership to maximize customer satisfaction and dealership profitability.

Warranty Parts Recovery Evaluating parts removed for a warranty repair can provide valuable clues for improving Toyota products and service. Under the Warranty Parts Recovery Program, Toyota may request the return of selected parts for this purpose. Returned parts are usually used for quality assurance, technical research, technical compliance, vendor follow-up, or defect analysis. The information may be used to improve the part or for future training.

Parts Retention and Storage To ensure that parts removed for warranty are available when requested, your service department has specific retention and storage procedures.

- All parts replaced for a warranty repair **MUST** be retained until the dealer receives a Daily Warranty Parts Recovery Summary or Daily Warranty Parts Scrap Report to indicate if the part is to be returned to the Parts Recovery Center (PRC) or scrapped by the dealer.
- Requested parts **MUST** arrive at the PRC within 15 days from the requested date to avoid debit of the entire claim.
- If the requested part is not available, a notation **MUST** be made on the Daily Warranty Parts Recovery Summary explaining why the requested part cannot be shipped.
- Parts that have a "core" charge must be sent to the manufacturer.

Technician Responsibilities Before the parts department can accept removed parts, the technician must prepare them for storage. This includes:

- Cleaning the parts to remove excess oil and debris.
- Draining lubricants and fluids.
- Reassembling all disassembled parts.
- Packaging defective parts in new parts packaging when possible.
- Making sure all associated parts including gaskets, fasteners, springs, etc. are returned.

Warranty Tags

There are specific warranty tags that the Parts Department must assign to warranty related repairs.

The image shows three forms used for warranty parts. The first is a 'TOYOTA QUALITY CONTROL LAB' tag with fields for delivery date, frame no., vehicle prod. date, engine no., mileage, part no., claim no., date of repair, and checkboxes for 'HOLD THIS PART FOR:' and 'TECH REPORT NO.'. The second is a 'TOYOTA / LEXUS PRODUCT REPORT PARTS RECOVERY TAG' with fields for VIN and PART NO., and a list of instructions: 1. WRITE VIN AND PART NUMBER ON TAG AND ATTACH TO PARTS. 2. PACKAGE PARTS FOR SHIPMENT. 3. FILL IN "SHIPMENT FROM" PORTION OF UPS SHIPPING DOCUMENT. 4. ATTACH SHIPPING DOCUMENT TO PACKAGE. 5. CALL UPS FOR PICKUP. The third is an 'A.R.S.' shipping label for 'PARTS RECOVERY CENTER' in Torrance, CA, with a tracking number 'CA 908 9-70' and 'UPS GROUND' service.

Parts Department Responsibilities The Parts Department is responsible for tagging and storing removed warranty parts. Therefore, it is important that the repair order is properly filled out by the technician. The Parts Department acknowledges receipt of the parts next to the technicians defect and repair description.

Repair Order Documentation Careful documentation of the warranty repair is vital. The parts department relies on this information to properly tag and store the warranty parts in the event of a request for inspection by the District Service and Parts Manager (DSPM) or for recovery. Toyota relies on accurate information for analysis to determine potential product concerns. The R.O. is so important, Toyota will only process and pay a warranty claim, including "Z" Code claims, if the R.O. is complete and correct.

Service Campaigns Toyota conducts Service Campaigns to notify Toyota owners of certain conditions that may affect their vehicles. Vehicles included in a campaign are identified specifically by VIN. When an owner is notified of a Service Campaign and brings the vehicle into the dealership, the dealer must inspect and/or make corrections to the vehicle as described by the campaign.

The Federal Government tracks compliance with Special Service Campaigns. It is important to Toyota customers and the dealership that all required actions be taken as soon as possible after a Service Campaign is initiated.

There are three different types of Service Campaigns issued by Toyota:

1. Special Service Campaign (SSC)
2. Limited Service Campaign (LSC)
3. Special Policy Adjustment (SPA)

Campaign Procedures Toyota initiates a Service Campaign by first sending a cover letter to dealers explaining the campaign, which vehicles are affected, any part information necessary to perform the campaign and reimbursement procedures. The cover letter also indicates the date on which owners will be notified so that the dealer can be prepared.

With the cover letter, Toyota includes technical instructions on how to make the required inspection, adjustment or repair.

The dealer also receives a VIN List of applicable vehicles which Toyota records indicate were sold by the dealership or are in the dealer's stock.

Dealer Responsibilities As soon as the dealer receives the Service Campaign notification, the dealer should:

- Review all campaign materials.
- Order parts (if required by the campaign).
- Perform the campaign on affected vehicles in dealer stock.
- Perform the campaign on affected vehicles brought in by customers even if they don't have a campaign notification.
- Perform the campaign on affected vehicles returned from lease, traded in or used as demo vehicle before placing the vehicle in used inventory or transferring title to a retail or wholesale buyer.
- Dealers are required to place an SSC completion label on the location indicated in the technical instructions when completing a Special Service Campaign.

Getting the Right Part Getting the right part usually means clearly identifying the vehicle. Before you start looking up a part, you should know the following information about the vehicle:

- Vehicle Model
- Production Date
- Engine Number
- Accessories and Options
- Country where the vehicle was assembled

Identification Plate

The diagram shows a rectangular identification plate with the following text and callouts:

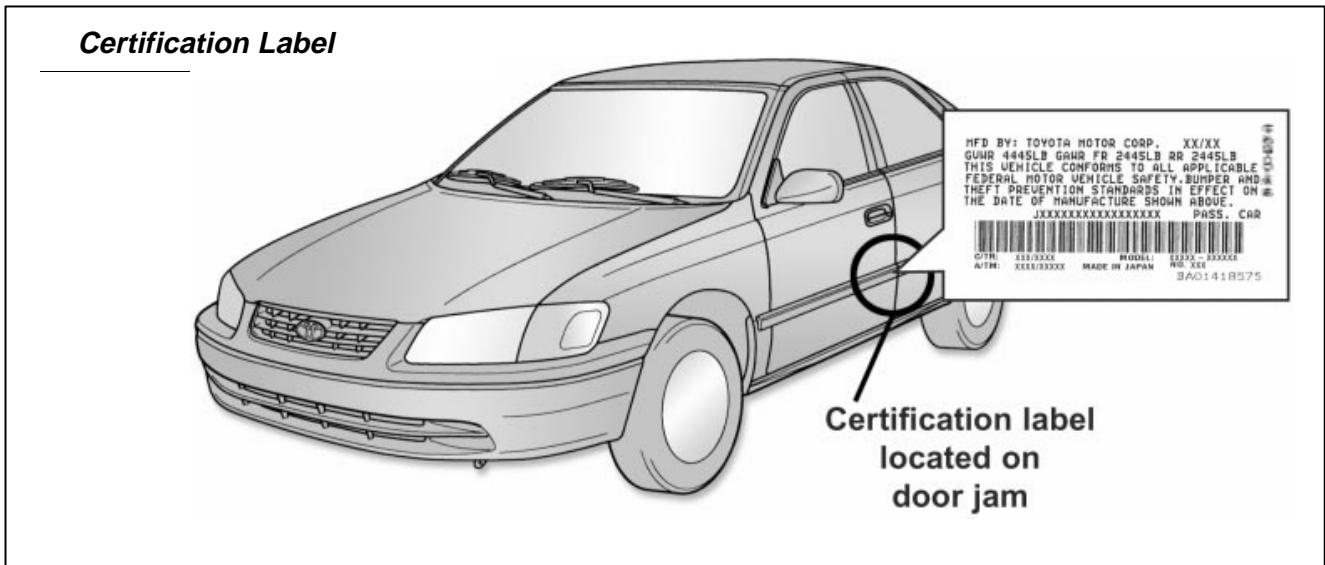
- ① ENGINE 5M-GE 2759cc
- TOYOTA MOTOR CORPORATION
MADE IN JAPAN
- ② JTXXXXXXXXXXXXXX
- 18440
- ③ MODEL MA51L-BLPQFA
- C TR A TM ④ 035 ⑤ TS84 ⑥ F293 - A43DE ⑦

1. ENGINE indicates engine type and displacement.
 2. VEHICLE IDENTIFICATION NUMBER
 3. MODEL indicates model code
 4. C (Color) indicates body color code
 5. T (Trim) indicates trim code
 6. A (Axle) indicates axle code
 7. TM (Transmission) indicates transmission code.

Identification Plate The Identification Plate is located adjacent to the firewall in the engine compartment on vehicles built prior to 1989. It includes the following information about the vehicle:

1. Engine type
2. VIN
3. Model Code
4. Body Color
5. Trim Code
6. Axle Code
7. Transmission Code

Certification Label (1989-On)



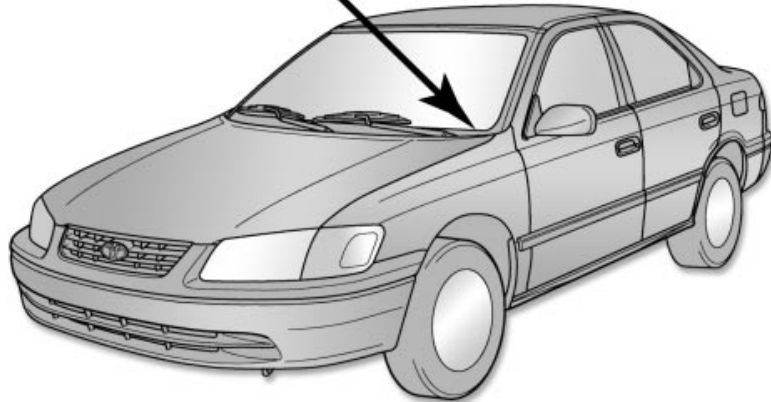
Certification Label The Certification Label is located on the inside of the driver's door or the lower part of the driver's door pillar. This label is used on vehicles from 1989 to the present.

The most important information on this label for finding parts is the Production Date. Parts can change during a model run. The Production Date identifies the year and month of manufacture so that you can identify these changes.

Vehicle Identification Number Plate

Vehicle Identification Number (VIN)

The VIN identifies a particular vehicle.



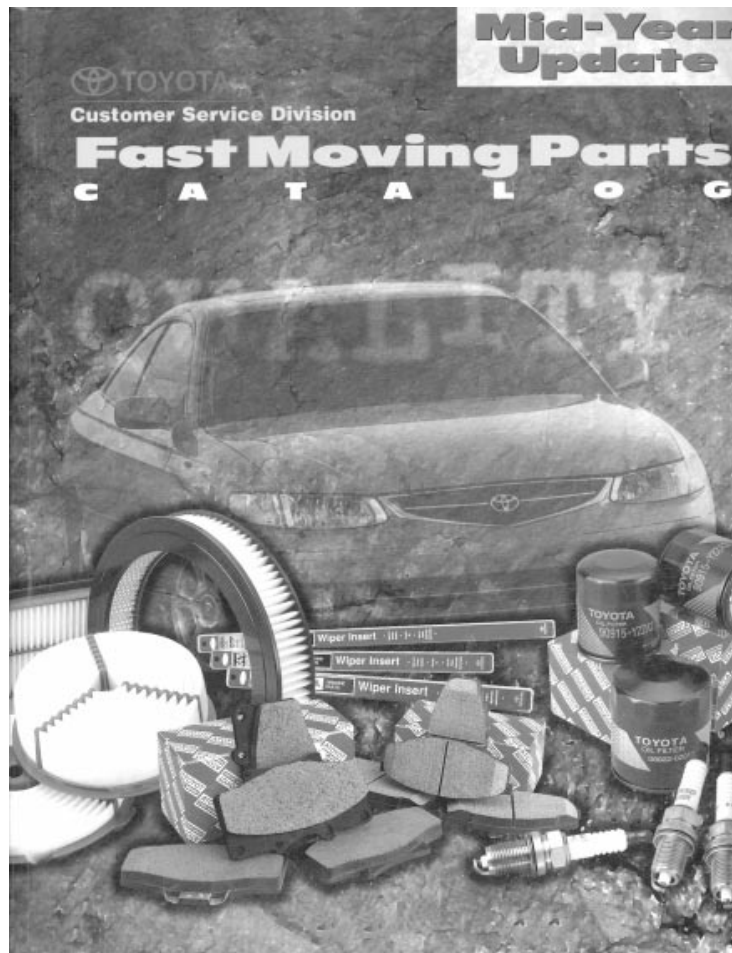
Vehicle Identification Number The VIN plate is riveted to the dashboard in the bottom corner of the windshield on the driver's side and uniquely identifies a particular vehicle. The VIN provides the following information:

- World Source
- Manufacturer
- Vehicle type
- Body type
- Engine family
- Series
- Restraint System
- Car Line
- Check Digit
- Model Year
- Plant Code
- Serial number unique to one vehicle.

Refer to TIS for the current year VIN decoding information.

Fast Moving Parts Catalog

They re quick.
Boy are they quick!



Fast Moving Parts Catalog

The Fast Moving Parts Catalog is one of the most useful references you have for looking up parts day-to-day. It includes the fastest moving parts in one easy reference.

The catalog is organized first by Vehicle Model, then by Part Family. Suppose you are looking for an alternator for a 1999 Camry. You would first look under Camry, then under Electrical. In the Electrical Parts Family you will find a table of alternators.

To identify the specific alternator, you must know the Vehicle Model Number, Production Date and Engine. The Production Date is located on the Certification Label. The other information may be decoded from the VIN.

The Fast Moving Parts Catalog is printed twice a year in April and November. Each dealer receives one copy of each printing. Additional copies can be ordered. In fact, many dealers purchase additional copies as giveaways to wholesale accounts.

Part Numbers

Part numbers pinpoint specific components to specific models.

Part numbers are organized by vehicle model and part family

For example: 16100-79185

The 16 designates a cooling system related component

Part Numbers Part Name Code will identify the type of part. For example, 16100 identifies it as a water pump.

The first two digits are called the Group Number. The Group Number describes a particular family of parts. For example, all Cooling System parts begin with “16”. The remaining three digits (16100) identify a section of parts within the group, in this case, the water pump.

In no time, you will begin to associate the Group Number with certain vehicle components.

The remaining digits in the 10-digit part number identify the type of engine or vehicle and design information about the part such as an engineering change.

Toyota also uses 12-digit part numbers. The last two digits are added to a 10-digit part number to indicate color, size or remanufactured component.

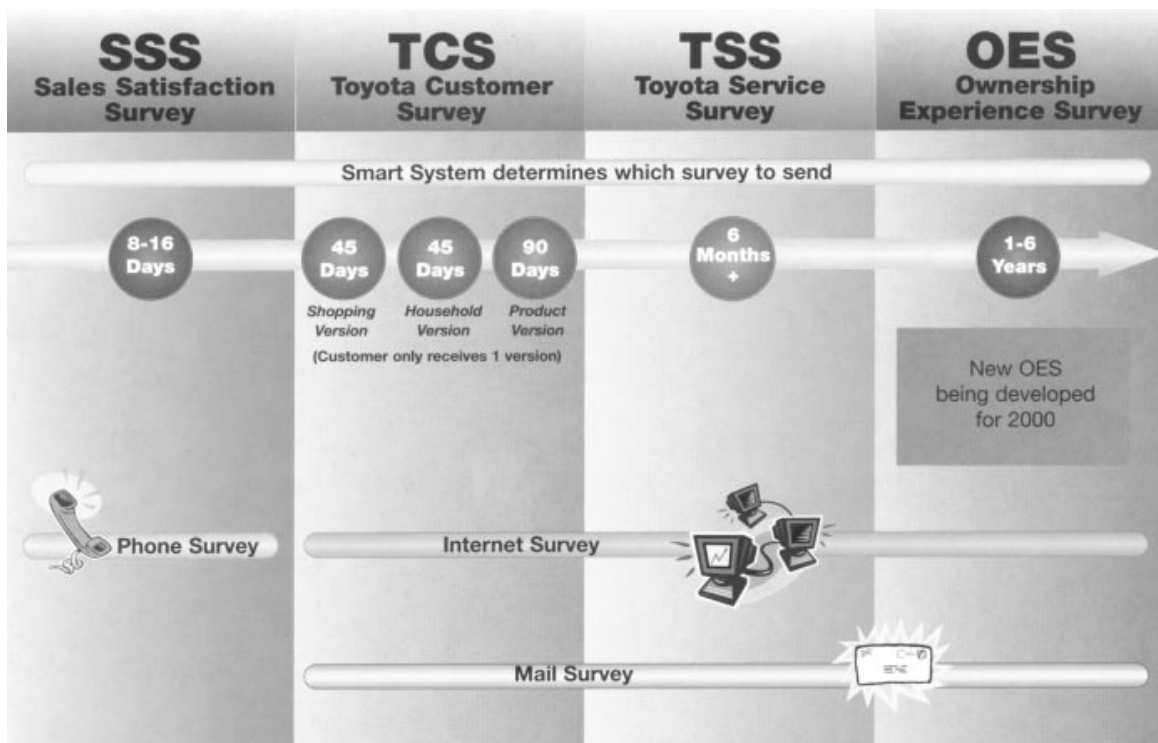
Commitment to Customer Loyalty

Customer satisfaction is vital to a dealership's sales and profitability. It's a well know fact that it is more expensive to sell a car to a new customer than to an existing customer.

Your performance in fixing your customer's vehicle right the first time is measured in Toyota's Service Survey (TSS). An outline of Toyota's survey system and a copy of the TSS survey have been included to help you understand the process and your role in it.


Survey System

Customer satisfaction may be measured in four ways.



Toyota Service Survey

The customer's recent service experience is recorded on the Service Survey.


TOYOTA SERVICE SURVEY

- Please check the type of service work performed at this visit: (Mark all that apply.)
 - Warranty
 - Oil change/Factory scheduled maintenance
 - Non-warranty
 - Other (please explain) _____
- Please rate your satisfaction with the dealer service department on each of the following...

	Completely Satisfied	Satisfied	Neither Satisfied Nor Dissatisfied	Dissatisfied	Completely Dissatisfied	Not Applicable
How satisfied are you with the...						
a) Ease of scheduling service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
b) Completion of the service in the time promised?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c) Explanation of the work performed on your vehicle?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
d) Effort of the dealership to obtain parts for your Toyota? (If parts not needed, check "Not Applicable")	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e) Overall performance of the person who prepared your service order?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
f) Effort of the dealership to see that the service was done right?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
- Was your vehicle fixed right the first time? Yes No
- After your service visit, did someone from the dealership contact you by phone or by mail to see if you were satisfied with your overall service experience? Yes No
- Would you recommend this dealership to a friend or relative as a place to have a Toyota serviced?
 - Definitely recommend
 - Might or might not recommend
 - Probably recommend
 - Probably not recommend
 - Definitely not recommend
- Should you need service again for your Toyota, would you return to this Toyota dealership as your first choice for service?
 - Definitely return
 - Might or might not return
 - Probably return
 - Probably not return
 - Definitely not return
- Please explain why you would or would not select this Toyota dealership as your first choice for service?

- Please use this section for any additional comments or suggestions.

Thank you.

Please return this survey in the business-reply envelope provided to:
Toyota Motor Sales, U.S.A., Inc. • P.O. Box 10079 • Toledo, OH 43682

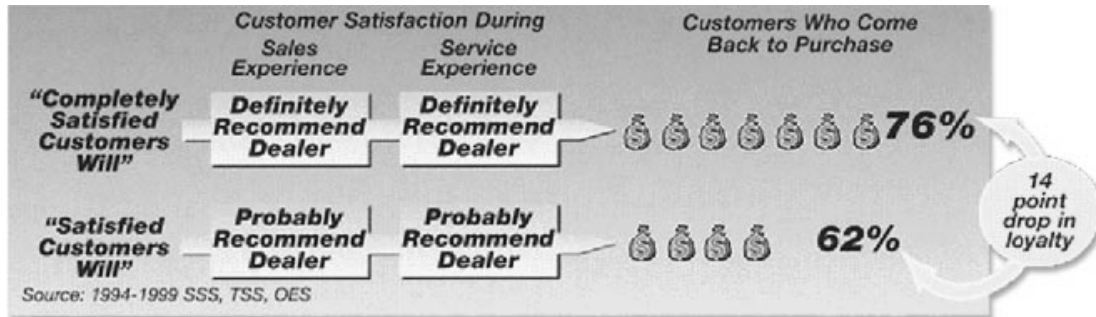
For assistance, please contact the Customer Relations Manager at XYZ Toyota at 123-456-7890 or the Toyota Customer Assistance Center at 800-331-4331.
You can also reach Toyota Motor Sales on the Internet at www.toyota.com.

JT2BF22K3W000000 20000428 022000000000

0601-0400

Evaluating the Survey

This graphic explains how the survey affects your dealership.



End of Section 3



Notes

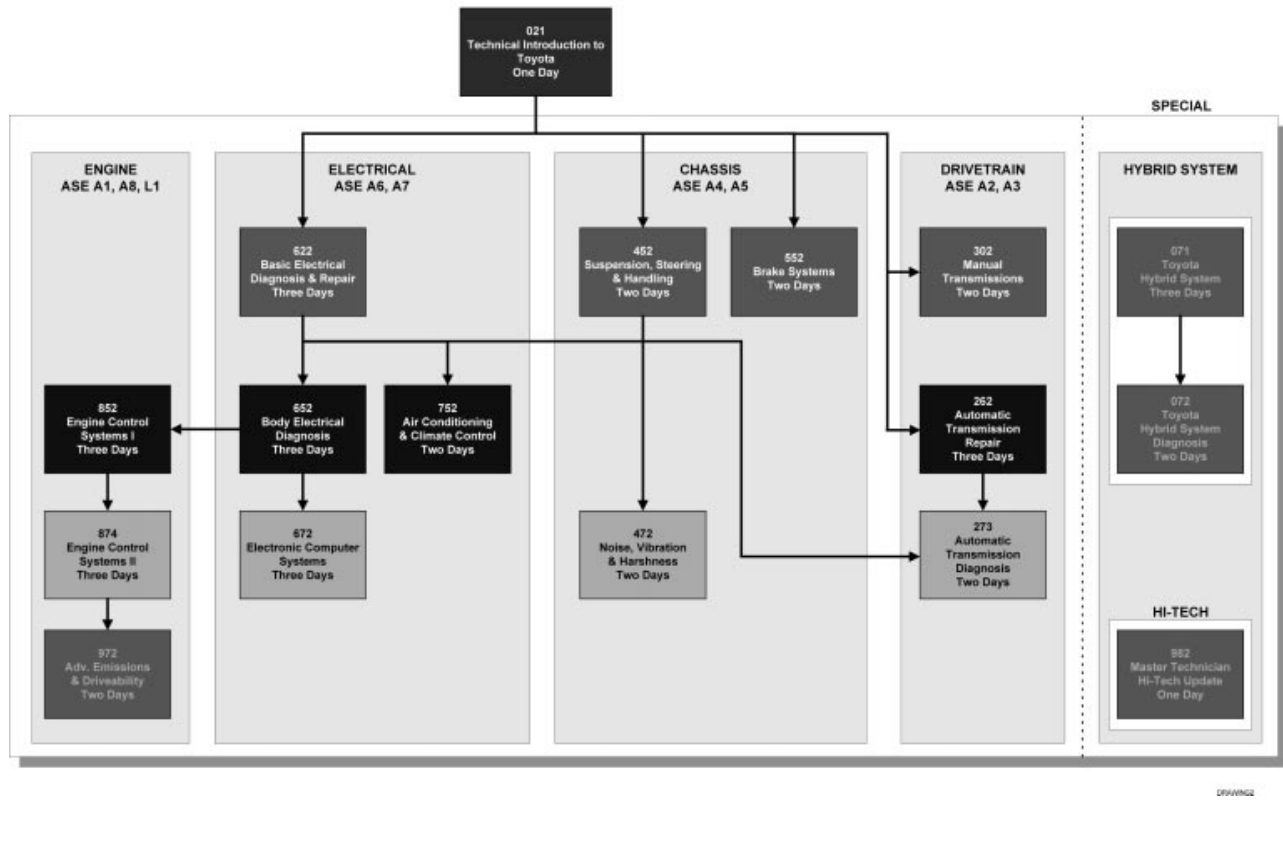
A large grid area for taking notes, consisting of a fine grid of small squares.

Toyota Technician Certification

Technician Course of Study

These courses will help you to achieve your highest level of performance.

Toyota Technician Course of Study



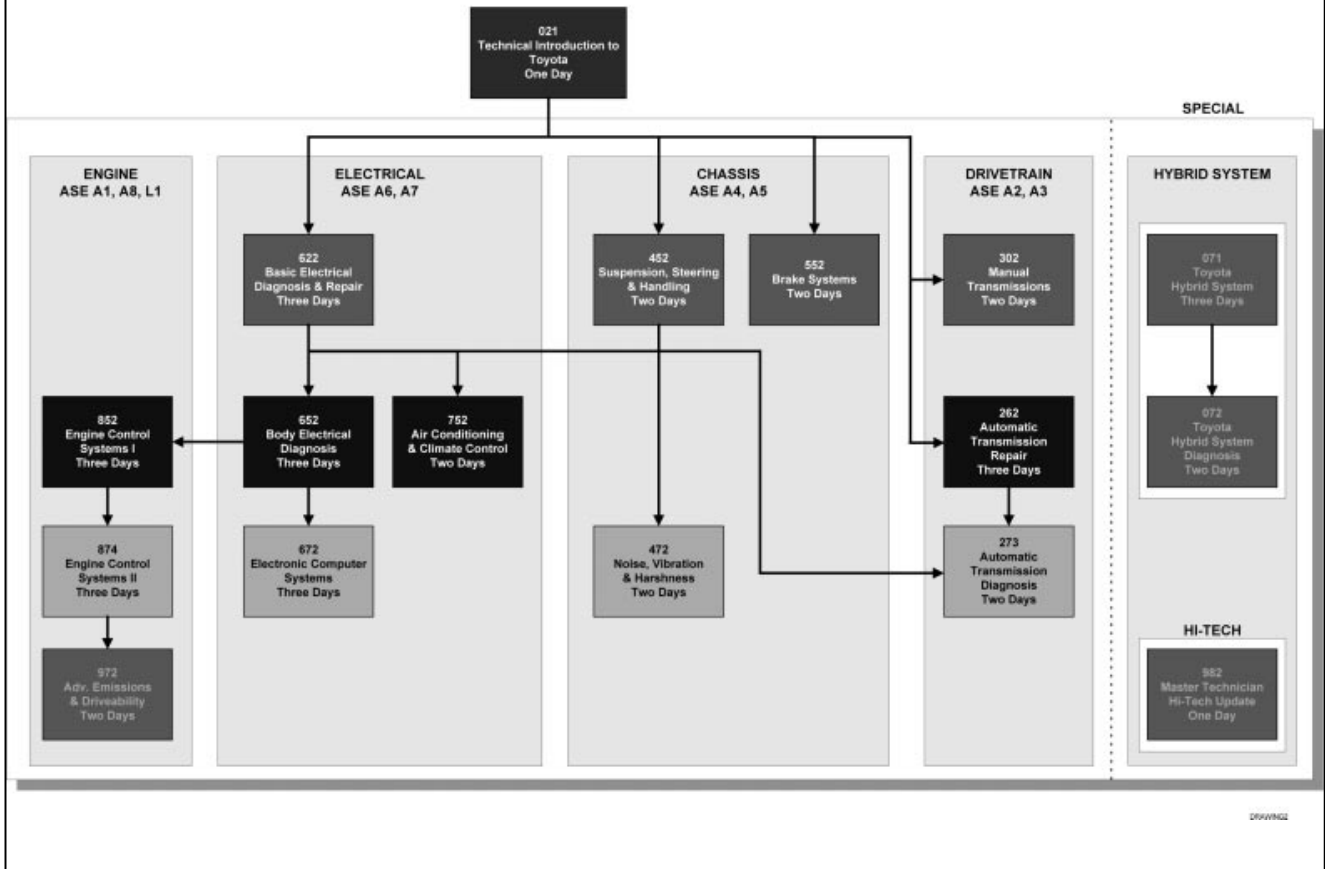
Learning Objectives: Upon completing this section of the course you will be able to:

1. Identify the elements of Toyota technical training and their applications.
2. Identify the elements of the T-TEN, ASE and AYES programs and their benefits to Toyota.
3. Identify the features of the Toyota Certified Technician Program (TCTP).

Technician Course of Study

These courses will help you to achieve your highest level of performance.

Toyota Technician Course of Study



Introduction This section provides an overview of major elements of Toyota’s Technician Certification Program. These elements include:

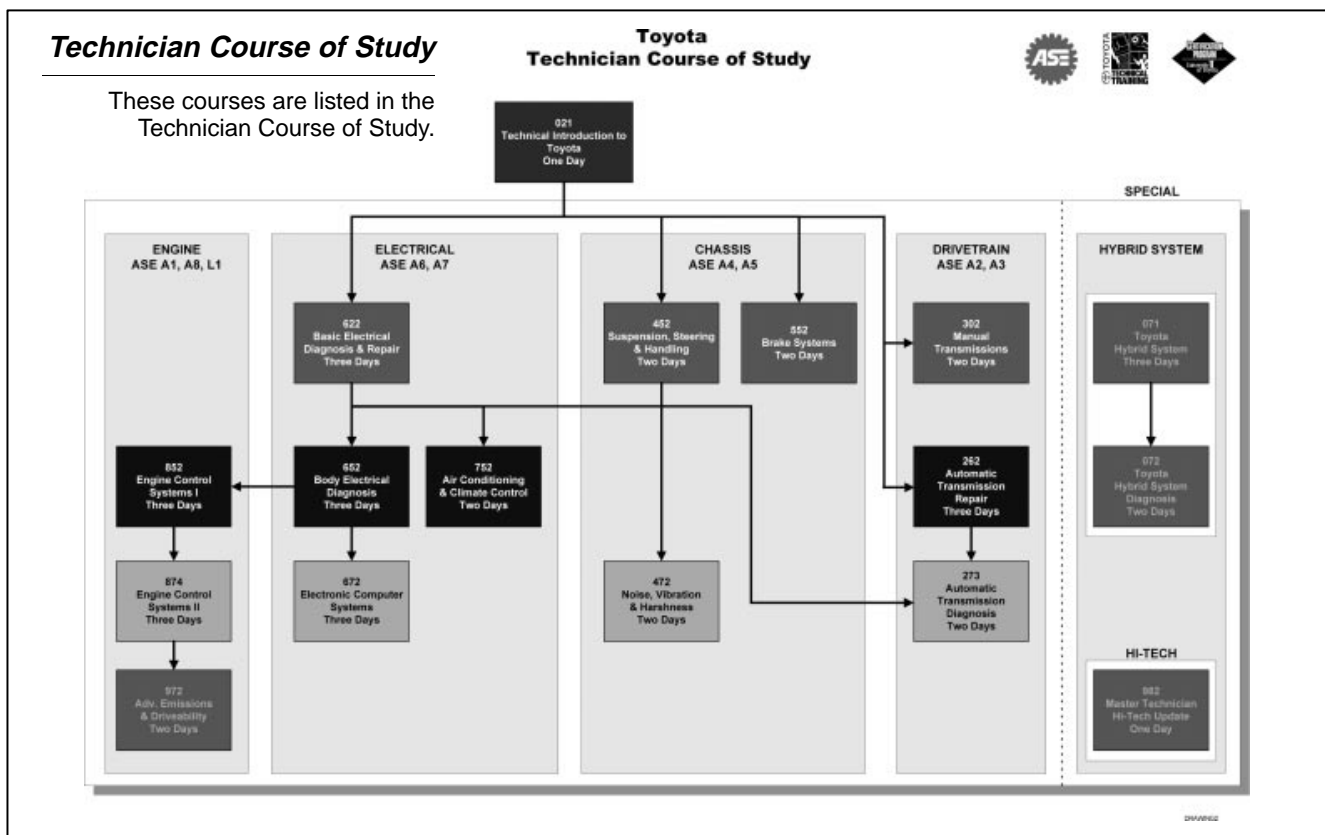
- The Training Process
- Technician Course of Study
- Skill Level Guidelines
- New Model Training
- Automotive Service Excellence (ASE)
- Toyota Technical Education Network (T-TEN)
- Automotive Youth Educational System (AYES)
- Toyota Certified Technician Program (TCTP)

The Training Process As a Toyota Technician you have the opportunity to benefit from some of the best training in the industry. However, it is the responsibility of you and your Service Manager to take advantage of the opportunity by getting you the classes you need to advance your career.

Start by reviewing the Annual Training Plan and University of Toyota Course Catalog to determine which training courses you need to take.

You as a technician must:

- Assess your training needs
- Consider ASE Certification
- Develop a career path



Technician Course of Study Once you've decided which courses you need to take, check the Technician Course of Study to determine if any prerequisite courses are required.

After you've enrolled in a course, use any content related, in-dealership training materials, to help prepare you for the course. These may include videos or printed materials.

Upon completing the course you will need to pass an end-of-course test to obtain course credit.

Skill Level Guidelines

Each dealership needs a minimum number of certified technicians in each category.

TECHNICIAN SKILL LEVEL GUIDELINES				
# of	# of Technician Certifications			
Techs	Engines	Drivetrain	Chassis	Electrical
1 - 2	1	1	1	1
3 - 4	2	1	1	2
5 - 6	3	2	2	3
7 - 8	4	3	3	4
9 - 10	5	3	3	5
11 - 12	6	3	3	6
13 - 14	7	4	4	7
15 - 16	8	4	4	8
17 - 18	9	5	5	9
19 - 20	10	5	5	10
21 - 26	12	6	6	12
26 - 30	15	7	7	15
31+	15	8	8	15

Skill Level Guidelines The Annual Training Plan is based on Toyota's dealer skill level guidelines which helps the dealership determine how many technicians they need trained in each skill area.

New Model Training

There are 12 Regional Training Centers that conduct required technical training courses for all technicians.



New Model Training New Model Training is available at the Regional Training Centers whenever a New Model is introduced or a current model is substantially updated.

In-dealership New Model Technical Introduction videos are sent to all dealers to provide further information and reference.

ASE Certified

ASE Certified technicians are professional, knowledgeable and experienced individuals.


**Automotive Service
Excellence (ASE)**

ASE is an independent, non-profit organization whose mission is to improve the quality of vehicle repair and service through the testing and certification of repair and service professionals.

Here's how ASE certification works: Prospective candidates register for and take one or more of ASE's 40-plus exams. The tests are grouped into specialties for automobile, medium/heavy truck, truck equipment, school bus, and collision repair technicians as well as engine machinists, alternate fuels technicians, and parts specialists, and collision damage estimators.

Upon passing at least one exam and after providing proof of two years of relevant work experience, the test taker becomes ASE certified. Certification, however, is not for life. To remain certified, those with ASE credentials must be retested every five years.

The tests, which are conducted twice a year at about 800 locations around the country, are administered by ACT, an organization known for its academic and occupational testing programs. The exams stress knowledge of job-related skills. They are no cinch to pass; approximately one out of three test takers fails.

ASE-certified technicians usually wear blue and white ASE shoulder insignia and carry credentials listing their exact areas of expertise (brakes, engine repair, etc.), while employers often display their technicians' credentials in the customer waiting area of the dealership.

**Registering for
ASE Testing**

You may register by mail, fax, or online at www.asecert.org, but choose only one method of registration. Your dealership most likely receives ASE registration booklets before the next testing session, but if not, you can obtain the registration form online or by calling ASE. You can contact ASE by calling: 877-ASE-TECH or by mail at: ASE/ACT, 13505 Dulles Technology Dr. Suite 2, Herndon, VA 20171-3421.

T-TEN

The T-TEN program provides the dealership body with a better trained and qualified entry-level technician.



T-TEN The Toyota Technical Education Network or T-TEN is a state of the art industry and education cooperative training program designed to provide Toyota dealerships with qualified, entry level technicians. The student selection criteria ensures that only motivated, qualified students participate in the program. T-TEN schools receive support materials from Toyota providing students with valuable systems and components experience.

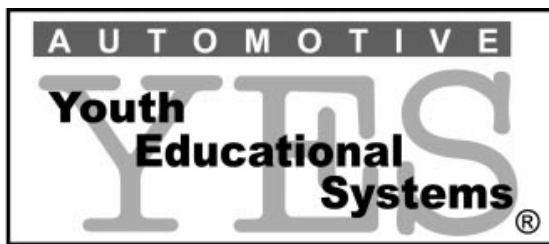
Participating students are required to work at a Toyota dealership as part of the T-TEN program. As a Toyota technician you may be asked to help or mentor a T-TEN student as part of your job.

In addition to providing dealerships with trained, qualified technicians, the T-TEN program also helps to enhance the dealership's and Toyota's image in the community.

You can contact T-TEN to learn about education opportunities in your area by calling: 800-441-5141 or by visiting their website at www.t-ten.com.

AYES

The AYES program is designed to encourage high school age students to pursue an automotive career.

**Automotive Youth
Educational
Systems**

Automotive Youth Educational Systems is a partnership of manufacturers, dealers, high schools and vocational schools. AYES is designed to help encourage high school and vocational school students pursue a career in the automotive industry as entry-level technicians.

To work effectively, AYES requires dealership mentors to help the students learn about career opportunities in the automotive industry. As a Toyota technician, you may be asked to work with an AYES student as a mentor.

You can contact AYES to learn about education opportunities in your area by calling 888-664-0044 or by visiting their website at www.ayes.org.

Toyota Certified Technician Program The Toyota Certified Technician Program (TCTP) provides valuable recognition and rewards to an important group of professionals - Toyota technicians. Individual technician certification contributes to the dealership's adherence to the recommended skill guidelines, advancing overall service excellence and customer satisfaction. Technicians earn certification through participation in Toyota Technical Training and successful completion of Automotive Service Excellence (ASE) testing.

ASE certification is an integral part of the TCTP program and is widely recognized in the industry for its technical excellence. ASE exams are given in the Spring and Fall of each year. Your participation in Toyota Technical Training courses will help you to prepare for these exams. Additional study guide information from companies like Check-Chart and Mitchell can be found at www.asecert.org.

The following charts list the requirements for each level of the TCTP program.

Foundations Level Technician

Foundations Level Technician requirements.

CRITERIA	FOUNDATIONS
ENROLLMENT	<ul style="list-style-type: none"> Actively employed at a Toyota dealership and listed on the National Staff Master with one of the following <u>primary</u> job titles: Line Technician, Shop Foreman, Diagnostic Specialist, Team Leader, Technician Apprentice.
TENURE	<ul style="list-style-type: none"> No Tenure Requirement.
COURSES	<ul style="list-style-type: none"> Successful completion of Foundations certification test with a minimum score of 80%. Self-paced modules include: <ol style="list-style-type: none"> Toyota Traditions Getting to Know Toyota Products Delivering V.A.L.U.E. to Every Customer
CERTIFICATION TESTING	<ul style="list-style-type: none"> Unlimited retakes of tests. Ongoing test administration.
PROGRAM DATES	<ul style="list-style-type: none"> Ongoing operation (monthly).
ONGOING CERTIFICATION MAINTENANCE	<ul style="list-style-type: none"> No additional requirements for Foundations level maintenance.

Certified Level Technician

Certified Level Technician requirements.

CRITERIA	CERTIFIED
ENROLLMENT	<ul style="list-style-type: none"> Actively employed at a Toyota dealership and listed on the National Staff Master with one of the following <u>primary</u> job titles: Line Technician, Shop Foreman, Diagnostic Specialist, Team Leader, Technician Apprentice.
TENURE	<ul style="list-style-type: none"> No Tenure Requirement. Prior achievement of Foundations level.
COURSES	<ul style="list-style-type: none"> Successful completion of the following: <ul style="list-style-type: none"> Engine <ul style="list-style-type: none"> 021, 622 AND 850 No ASE Certifications required. Drivetrain <ul style="list-style-type: none"> 021, 622 AND EITHER 262 OR 301 No ASE Certifications required. Chassis <ul style="list-style-type: none"> 021, 622 AND EITHER 452 OR 552 No ASE Certifications required. Electrical <ul style="list-style-type: none"> 021, 622 AND EITHER 652 OR 750 No ASE Certifications required.
CERTIFICATION TESTING	<ul style="list-style-type: none"> Testing limited to end of course test completion.
PROGRAM DATES	<ul style="list-style-type: none"> Ongoing operation (monthly).
ONGOING CERTIFICATION MAINTENANCE	<ul style="list-style-type: none"> Must fulfill current year's requirements to maintain certification.

Expert Level Technician

Expert Level Technician requirements.

CRITERIA	EXPERT
ENROLLMENT	<ul style="list-style-type: none"> • Actively employed at a Toyota dealership and listed on the National Staff Master with one of the following <u>primary</u> job titles: Line Technician, Shop Foreman, Diagnostic Specialist, Team Leader, Technician Apprentice.
TENURE	<ul style="list-style-type: none"> • 24 months total Toyota experience (in any job position). • Prior achievement of Certified level.
COURSES	<ul style="list-style-type: none"> • Successful completion of the following approved educational activities: <ul style="list-style-type: none"> Engine <ul style="list-style-type: none"> • Current ASE Certifications: A-1 AND A-8 • Current self-paced new model requirement • 850, 873 AND 972 Drivetrain <ul style="list-style-type: none"> • Current ASE Certifications: A-2 AND A-3 • Current self-paced new model requirement • 262, 272, AND 301 Chassis <ul style="list-style-type: none"> • Current ASE Certifications: A-4 AND A-5 • Current self-paced new model requirement • 452, 472 AND 552 Electrical <ul style="list-style-type: none"> • Current ASE Certifications: A-6 AND A-7 • Current self-paced new model requirement • 652, 672 AND 750
CERTIFICATION TESTING	<ul style="list-style-type: none"> • Testing limited to end of course test completion.
PROGRAM DATES	<ul style="list-style-type: none"> • Ongoing operation (monthly).
ONGOING CERTIFICATION MAINTENANCE	<ul style="list-style-type: none"> • Must fulfill current year's requirements to maintain certification.

Master Level Technician

Master Level Technician requirements.

CRITERIA	MASTER
ENROLLMENT	<ul style="list-style-type: none"> Actively employed at a Toyota dealership and listed on the National Staff Master with one of the following <u>primary</u> job titles: Line Technician, Shop Foreman, Diagnostic Specialist, Team Leader, Technician Apprentice.
TENURE	<ul style="list-style-type: none"> 60 months total Toyota experience (in any job position). Prior achievement of Expert level.
COURSES	<ul style="list-style-type: none"> Successful completion of the following approved educational activities: <ul style="list-style-type: none"> ASE Certifications: A-1 through A-8 Current self-paced new model requirement 262, 272, 301, 452, 472, 552, 622, 652, 672, 750, 850, 873, 972, 982 (Required 1/02)
CERTIFICATION TESTING	<ul style="list-style-type: none"> Testing limited to end of course test completion.
PROGRAM DATES	<ul style="list-style-type: none"> Ongoing operation (monthly).
ONGOING CERTIFICATION MAINTENANCE	<ul style="list-style-type: none"> Must fulfill current year's requirements to maintain certification.

Master Diagnostic Technician

You have entered the level of a Master Diagnostic Technician. Congratulations!

CRITERIA	MASTER DIAGNOSTIC TECHNICIAN
ENROLLMENT	<ul style="list-style-type: none"> Actively employed at a Toyota dealership and listed on the National Staff Master with one of the following <u>primary</u> job titles: Line Technician, Shop Foreman, Diagnostic Specialist, Team Leader, Technician Apprentice.
TENURE	<ul style="list-style-type: none"> 60 months total Toyota experience (in any job position). Prior achievement of Master level.
COURSES	<ul style="list-style-type: none"> Successful completion of the following approved educational activities: <ul style="list-style-type: none"> ASE Certifications: A-1 through A-8 AND L-1, Advanced Engine Performance Specialist Current self-paced new model requirement 01C (Required 1/02), 01D (Required 6/01), 02C (Required 1/02), 262, 272, 301, 452, 472, 552, 622, 652, 672, 750, 850, 873, 972, 982 (Required 1/02)
CERTIFICATION TESTING	<ul style="list-style-type: none"> Pass the MDT level certification test with a minimum score of 80%. Exam administered once annually.
PROGRAM DATES	<ul style="list-style-type: none"> Achievement based on training and testing completed by 01/31.
ONGOING CERTIFICATION MAINTENANCE	<ul style="list-style-type: none"> Must fulfill current year's requirements to maintain certification.

End of Section 4

Welcome to Toyota!

Congratulations! You've just completed your first
Technical Training Course with the University of Toyota.



Notes

Section 5

Worksheets

Worksheets

The following worksheets will help you become more familiar with Toyota vehicles and their technology.

Toyota Model Line Characteristics



WORKSHEET 1-1 Toyota Model Line Characteristics

Toyota offers one of the most diverse and attractive model line-ups in the industry. Your familiarity with the features and characteristics of each segment of the model line-up will help you to determine what systems or features may be causing a certain symptom on a customer's vehicle. In addition, it will make you more comfortable working on and promoting Toyota vehicles.

Objectives:

- Given a Toyota vehicle line you will be able to identify that line's features and characteristics. Model lines covered will include:
 - Compact
 - Mid-Size/Full-Size
 - Sports Car
 - Small Truck
 - Full-Size Truck
 - Mini Van
 - Compact Sport Utility
 - Mid-Size Sport Utility
 - Full-Size Sport Utility
 - Locate VIN Number
 - Locate Model Number

Before starting this worksheet, your instructor will tell you which vehicles are available for inspection in the shop. Check those vehicles above and make sure you inspect each one as necessary.

Compact Vehicle

Answer the following questions based on your existing knowledge and inspecting the vehicles. After the shop session you will review your answers as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

- List the current model year Toyota vehicles that fall into the Compact Vehicle category.

- List three engine characteristics (DOHC, timing belt, variable induction, etc.) found on Toyota Compact vehicles.



WORKSHEET 1-1
Toyota Model Line Characteristics

Toyota offers one of the most diverse and attractive model line-ups in the industry. Your familiarity with the features and characteristics of each segment of the model line-up will help you to determine what systems or features may be causing a certain symptom on a customer's vehicle. In addition, you will become more confident and comfortable working on and promoting Toyota vehicles.

Objectives:

- Given a Toyota vehicle line, you will be able to identify that line's features and characteristics. Model lines covered will include:
 - Compact
 - Mid-Size/Full-Size
 - Sports Car
 - Small Truck
 - Full-Size Truck
 - Mini Van
 - Compact Sport Utility
 - Mid-Size Sport Utility
 - Full-Size Sport Utility

Before starting this worksheet, your Instructor will tell you which vehicles are available for inspection in the shop. Check those vehicles above and make sure you inspect each one as necessary.

Compact Vehicle

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

1. List the current model year Toyota vehicles that fall into the Compact Vehicle category.

2. List three engine characteristics (DOHC, timing belt, variable induction, etc.) found on Compact vehicles.

3. Check the transmissions that are available in Compact vehicles.
- 4-Speed Manual
 - 5-Speed Manual
 - 3-Speed Automatic
 - 4-Speed Automatic
 - Other _____ (please list)
4. List two automatic transmission features found on Compact vehicles.

5. List one type of front and rear suspension system found on Compact vehicles.

Front _____

Rear _____

6. List two safety features found on Compact vehicles.

7. List any characteristics or features that YOU find to be unique to Compact vehicles.

Mid/Full-Size Vehicle

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

8. List the current model year vehicles that fall into the Mid or Full-Size Vehicle category.

Section 5 Worksheets

9. List the engines offered in Mid or Full-Size vehicles.

10. Check the transmissions available in Mid or Full-Size vehicles.

- 4-Speed Manual
- 5-Speed Manual
- 3-Speed Automatic
- 4-Speed Automatic
- Other _____ (please list)

11. List two automatic transmission features found on Mid or Full-Size vehicles.

12. List one type of front and rear suspension system found on Mid or Full-Size vehicles.

Front _____

Rear _____

13. List two safety features found on Mid or Full-Size vehicles.

14. List two options found on Mid or Full-Size vehicles.

15. List any characteristics or features that YOU find interesting on Mid or Full-Size vehicles.

Sports Car

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting the vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

16. List the current model year vehicles that fall into the Sports Car category.

17. List the engines offered in the Sport Cars category.

18. Check the transmissions available in the Sports Cars category.

- 4-Speed Manual
- 5-Speed Manual
- 4-Speed Automatic
- Other _____ (please list)

19. List two powertrain features that contribute to the image of Sports Cars.

20. List one type of front and rear suspension system found on Sports Cars.

Front _____

Rear _____

21. List any characteristics or features that YOU find interesting on Sports Cars.

Small Trucks

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting the vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

22. List the current model year vehicles that fall into the Small Truck category.

23. List the engines offered in Small Trucks.

24. Check the drivetrains available in Small Trucks.

- 2WD
- 4WD
- Full-Time 4WD
- All-Trac
- Other _____ (please list)

25. List two transfer case features found on Small Trucks.

26. List two types of differentials found on Small Trucks.

27. List two safety features found on Small Trucks.

28. List any characteristics or features that YOU find interesting on Small Trucks.

Full-Size Trucks

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting the vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

29. List the current model year vehicles that fall into the Full-Size Truck category.

30. List the engines offered in Full-Size Trucks.

31. List two engine features found on Full-Size Trucks.

32. Check the drivetrains available in Full-Size Trucks.

- 2WD
- 4WD
- Full-Time 4WD
- All-Trac
- Other _____ (please list)

33. List two transfer case features found on Full-Size Trucks.

34. List two safety features found on Full-Size Trucks.

35. List any characteristics or features that YOU find interesting on Full-Size Trucks.

Mini Van

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting the vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

36. List the current model year vehicles that fall into the Mini Van category.

37. List the engines offered in Mini Vans.

38. How many doors are there on Mini Vans?

39. List one type of front and rear suspension system found on Mini Vans.

Front _____

Rear _____

40. Describe the seat set-up found on Mini Vans.

41. List any characteristics or features that YOU find interesting on Mini Vans.

Compact Sport Utility Vehicles

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting the vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

42. List the current model year vehicles that fall into the Compact Sport Utility Vehicle category.

43. List the engines offered in Compact Sport Utility Vehicles.

44. Check the drivetrains available in Compact Sport Utility Vehicles.

- 2WD
- 4WD
- Full-Time 4WD
- All-Trac
- Other _____ (please list)

45. List two options available on Compact Sport Utility Vehicles.

46. List any characteristics or features that YOU find interesting on Compact Sport Utility Vehicles.

Mid-Size Sport Utility Vehicles

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting the vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

47. List the current model year vehicles that fall into the Mid-Size Sport Utility Vehicle category.

48. List the engines offered in Mid-Size Sport Utility Vehicles.

49. Check the drivetrains available in Mid-Size Sport Utility Vehicles.

- 2WD
- 4WD
- Full-Time 4WD
- All-Trac
- Other _____ (please list)

50. What types of rear differentials are available on Mid-Size Sport Utility Vehicles?

51. List any characteristics or features that YOU find interesting on Mid-Size Sport Utility Vehicles.

Full-Size Sport Utility Vehicles

Answer the following questions based on your existing knowledge and inspection of the vehicles. After inspecting the vehicles in the shop, you will review your findings as a group in the classroom.

VIN Number _____ Model Number _____ Production Date _____

52. List the current model year vehicles that fall into the Full-Size Sport Utility Vehicle category.

53. List the engines offered in Full-Size Sport Utility Vehicles.

54. Check the drivetrains available in Full-Size Sport Utility Vehicles.

- 2WD
- 4WD
- Full-Time 4WD
- All-Trac
- Other _____ (please list)

55. What types of rear differentials are available on Full-Size Sport Utility Vehicles?

56. List two options available on Full-Size Sport Utility Vehicles.

57. List any characteristics or features that YOU find interesting on Full-Size Sport Utility Vehicles.



WORKSHEET 2-1

Toyota Technical Resources

The technical resources available to you at the dealership are your key to efficiently and effectively repairing Toyota vehicles. If you have experience using other manufacturers technical resources you're likely to notice some similarities and some differences with Toyota's materials. Make sure to take the time to learn the content and format of Toyota's technical resources, it can save you time and make you money.

It's not important that you have all the answers when diagnosing a vehicle, it's important that you know where to look for the answers.

Objectives:

- Select the best resource available to answer a technical question.
- Identify other resources that may contain similar or supporting information.
- Locate the requested information using the following Toyota Technical Resources:
 - Service Manual (Volumes 1 & 2)
 - Electrical Wiring Diagram (EWD)
 - Technical Service Bulletins
 - New Car Feature Guides
 - Technician Handbook
 - Owner's Manual
 - Technician Reference Cards
 - Technical Training Videos
 - Toyota Tech Magazine

Answer the following questions using the best resource available. Identify the source of your answer and other resources that may contain similar or supporting information.

Air Conditioning System Diagnosis

A _____ comes into the dealership with a malfunctioning air conditioning system. Answer the following questions and identify the resource you used and other resources that may contain similar or supporting information.

1. The customer claims the system is not cooling properly. How should the controls be set to achieve the best cooling results?

Resource used to answer question.

Other resources that may contain similar or supporting information.

2. What are the test conditions for properly inspecting refrigerant pressure with a manifold gauge set?

Resource used to answer question.

Other resources that may contain similar or supporting information.

3. What is the proper refrigerant charge capacity for the system?

Resource used to answer question.

Other resources that may contain similar or supporting information.

4. What torque specification should you use when connecting the expansion valve to the evaporator?

Resource used to answer question.

Other resources that may contain similar or supporting information.

Section 5 Worksheets

5. An older technician tells you that the A/C system operation changed last year with the addition of a suction throttling valve. What resources could you use to verify this information?

6. The same technician tells you that a new blower motor resistor was introduced to improve system performance. What resources could you use to verify this information?

Idle Speed Control System

A _____ comes into the shop with a low idle speed. Answer the following questions and identify the resource you used and other resources that may contain similar or supporting information.

7. What is the proper idle speed for this vehicle?

Resource used to answer question.

Other resources that may contain similar or supporting information.

8. What resources could you use for background information on Engine Control System operation and diagnosis?

9. What does the term "VSV for EGR" refer to in the service manual?

Resource used to answer question.

Other resources that may contain similar or supporting information.

10. What preparation is required for properly checking the idle speed?

Resource used to answer question.

Other resources that may contain similar or supporting information.

11. The IAC valve has _____ wire(s) attached to it.

Resource used to answer question.

Other resources that may contain similar or supporting information.

12. Where is the IAC valve located on the vehicle?

Resource used to answer question.

Other resources that may contain similar or supporting information.

13. When replacing the IAC, is it necessary to remove the throttle body?

Resource used to answer question.

Other resources that may contain similar or supporting information.

Malfunction Indicator Lamp (MIL) Diagnosis

A _____ comes into the dealership with the MIL on. Answer the following questions and identify the resource you used and other resources that may contain similar or supporting information.

14. Which of the following connectors should the Toyota Diagnostic Tester be connected to when checking for DTCs?

DLC 1 **DLC 2** **DLC 3** (circle one)

Resource used to answer question.

Other resources that may contain similar or supporting information.

15. What detection item and malfunction area does DTC P0115 indicate?

Resource used to answer question.

Other resources that may contain similar or supporting information.

16. What is the first step for diagnosing DTC P0125?

Resource used to answer question.

Other resources that may contain similar or supporting information.

17. Should the coolant be drained when replacing the detection item for P0125?

Resource used to answer question.

Other resources that may contain similar or supporting information.

18. The Parts Counterperson says they need the build date and the model type for the vehicle you're working on in order to get you the part you need. Where can you find this information?

Alignment Diagnosis

A _____ comes into the dealership with front tire wear. Answer the following questions and identify the resource you used and other resources that may contain similar or supporting information.

19. What angles are adjustable on this vehicle?

Section 5 Worksheets

Resource used to answer question.

Other resources that may contain similar or supporting information.

20. According to a Toyota Technical Resource, which of the following could NOT be caused by improper front wheel alignment?

Hard Steering **Poor Return** **Excessive Play** (circle one)

Resource used to answer question.

Other resources that may contain similar or supporting information.

21. What measurement needs to be adjusted before aligning the front wheels?

Resource used to answer question.

Other resources that may contain similar or supporting information.

22. The vehicle you're aligning cannot be brought back into specifications by following the service manual procedures. What resources could you use to determine if any other procedures could be performed?

Electrical System Diagnosis

A _____ comes into your dealership. The customer states that the operation of the moonroof seems to be intermittent. Answer the following questions and identify the resource you used and other resources that may contain similar or supporting information.

23. The customer states that with the key in the OFF position, sometimes the moonroof will close and at other times it will not. What can cause this symptom?

Resource used to answer question.

Other resources that may contain similar or supporting information.

24. How many ground points are there in the moonroof circuit?

Resource used to answer question.

Other resources that may contain similar or supporting information.



WORKSHEET 2-2
Using the Toyota Diagnostic Tester

Model	Year/Prod. Date	Engine	Cal./Fed./Can.	Transmission	VIN Code

The Toyota Diagnostic Tester allows you to communicate with various vehicle computer controlled systems. The main purpose of the Diagnostic Tester is to diagnose and repair OBD II related incidents. When diagnosing OBD II related incidents the Diagnostic Tester can be used to check and erase DTCs, check freeze frame data, monitor system inputs and outputs and perform active tests for system actuators.

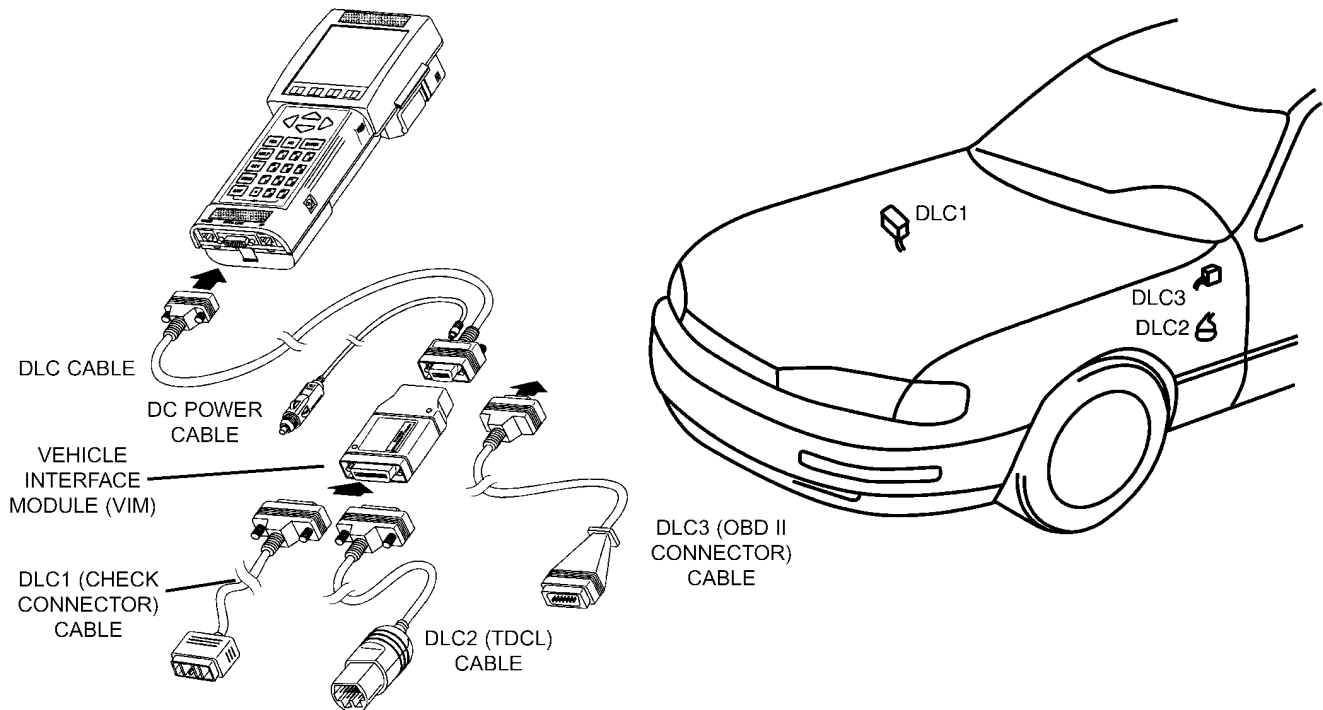
Objectives:


- Select the correct program card/cartridge and cables to interface the Diagnostic Tester with the vehicle.
- Program the Diagnostic Tester to establish communication with the OBD II ECM.
- Navigate through software menus to read Diagnostic Trouble Codes (DTCs) accessed through DLC3.
- Clear codes using the Diagnostic Tester.

WARNING! Diagnostic Trouble Codes and Freeze Frame data are critical to diagnosing and repairing OBD II incidents. Clearing the trouble code(s) will erase the freeze frame data. Never clear a code(s) unless you are trying to duplicate an intermittent problem or confirm a repair. It's always a good idea to print freeze frame data before clearing any code(s).

Connecting and Programming the Diagnostic Tester




1. On the diagram below, identify the proper Diagnostic Tester lead and the proper Data Link Connector (DLC) for checking DTCs. (Circle the correct cable and connector)



2. Use the OBD II Operator's Manual (Diagnostic Tester) to verify that the correct program card and/or cartridge is installed for OBD II testing.
3. Connect the Diagnostic Tester to the vehicle, turn the ignition ON and power-up the tester by pressing the  button.

When the FUNCTION screen comes up, press  .

4. From the FUNCTION SELECT menu, select ENHANCED OBD II.

NOTE: Use the  and  buttons to highlight an item and press  to select it.



5. From the MODE SELECTION menu, select NORMAL MODE.

NOTE: CHECK MODE is used when duplicating intermittent faults.



6. From the ENHANCED OBD II menu, select TROUBLE DATA.



7. From the TROUBLE DATA MENU, select CODES/FREEZE.



8. From the TROUBLE CODES menu, select CURRENT CODES.



9. In the space provided below, write down any DTCs that are present.

10. **NOTE:** If you press while in CODES/FREEZE, you will go directly to freeze frame data. Select to return to the DTC screen.

NOTE: 1. An * next to the DTC indicates that Freeze Frame Data is available.
2. A ▼ next to the number of DTCs indicates that additional codes are stored.

11. Return to the TROUBLE DATA MENU by pressing the .

12. At the TROUBLE DATA menu, select CLEAR CODES.



13. The Diagnostic Tester will ask you if you are sure you want to clear the trouble codes and freeze data. Select .

WARNING! Trouble Codes and Freeze Frame data is critical to diagnosing and repair OBD II incidents. Clearing the trouble code will erase the freeze frame data. Never clear a code unless you are trying to duplicate an intermittent problem or confirm a repair. It's always a good idea to print freeze frame data before clearing any codes.

14. The Diagnostic Tester will verify that you have cleared the codes. Select **ENTER** to return to the main menu.



15. Repeat steps 4 through 9 to ensure that the code has been erased.

16. When you are done, turn OFF the Diagnostic Tester by pressing **EXIT** and **ON #** at the same time.

17. Turn the vehicle's ignition switch "OFF".



Notes

A large grid area for taking notes, consisting of a 30x30 grid of small squares.



WORKSHEET 2-3
Pre-Delivery Service (PDS) Familiarization

Model	Year/Prod. Date	Engine	Cal./Fed./Can.	Transmission	VIN Code

Pre-Delivery Service is critical to the customer's perception of Toyota quality and satisfaction with the vehicle and your dealership. While it's easy to take short cuts while completing the PDS, it's important that ALL problems are taken care of BEFORE the customer takes possession of the vehicle.

Objectives:

- Familiarize yourself with the PDS form and procedure.

The vehicle you are working on has already had a PDS performed on it. Follow the instructions and the Pre-Delivery Service Check Sheet to complete the following activities. Make sure to answer the questions while completing the activities.

A. BEFORE INSPECTION

1. Have the fuses and outside rearview mirrors been installed?

YES/NO (circle one)

B. FUNCTIONAL OPERATION

2. Check the operation of all interior lights.
3. Check the audio system operation and clock.
4. List any problems found.

C. WALKAROUND INSPECTION

5. Complete the Walkaround Inspection checking only the driver's door. Do not check the headlight aim.
6. List any problems found.

D UNDER HOOD

7. Check the battery state of charge.

Is it within specifications? YES/NO (circle one)

E. UNDER VEHICLE (ON HOIST)

8. No activities required.

F. ROAD TEST

9. List two items to look for during cold engine operation.

1. _____

2. _____

10. List two items to look for when checking automatic transmission operation.

1. _____

2. _____

11. What steps can you take to properly check the vehicle for squeaks and rattles?

G. FINAL INSPECTION AND CLEANING

12. **NOTE:** You may not be responsible for the final cleaning of the vehicle, but in many cases you are the last responsible person to inspect the vehicle for paint, trim or body part problems.

List the procedure your dealership follows for the final inspection and cleaning procedure.
