

EndWrench

November 2008 | Number 44 | \$6

A Publication for Professional Repair Technicians from Subaru N.E.W. Horizons Dealers



Brake System **The** **Right** **[Brake]** **Stuff**

Also Inside:

Electrical System
P0400 Codes Revealed

Drive Train
Subaru Rack & Pinion Service

N.E.W. Horizons Dealer Listing

Insider Info

Some people just don't know when to stop.



Just our kind of people.

Flip through our latest performance parts catalog and discover all the new ways to make your Subaru, well, *your* Subaru. From STI Struts and Springs that improve handling to SPT Performance Cat-Back Exhaust Systems that let the world know you've arrived. Be sure to visit www.spt.subaru.com for a free catalog and to see all of the new performance parts as they become available during the year.



Visit us at booth #21703 in Central Hall

The End Wrench® and **www.endwrench.com** are quarterly publications of Subaru of America, Inc. No Part of this newsletter may be reproduced without the express written permission of Subaru of America, Inc.

Subaru Consultants:

Terri Claybrook
 Ross Sellers
 Gary Skalkowski

Editorial and Circulation Offices:

598 Pine Point Drive
 Akron, Ohio 44333
 Phone: 330.666.9886

Issue Design:

Christopher M. Ayers III

Caution: Vehicle servicing performed by untrained persons could result in serious injury to those persons or others.

Information contained in this publication is intended for use by trained, professional auto repair technicians ONLY. This information is provided to inform these technicians of conditions which may occur in some vehicles or to provide information which could assist them in proper servicing of these vehicles.

Properly trained technicians have the equipment, tools, safety instructions, and know-how to perform repairs correctly and safely. If a condition is described, DO NOT assume that a topic covered in these pages automatically applies to your vehicle or that your vehicle has that condition.

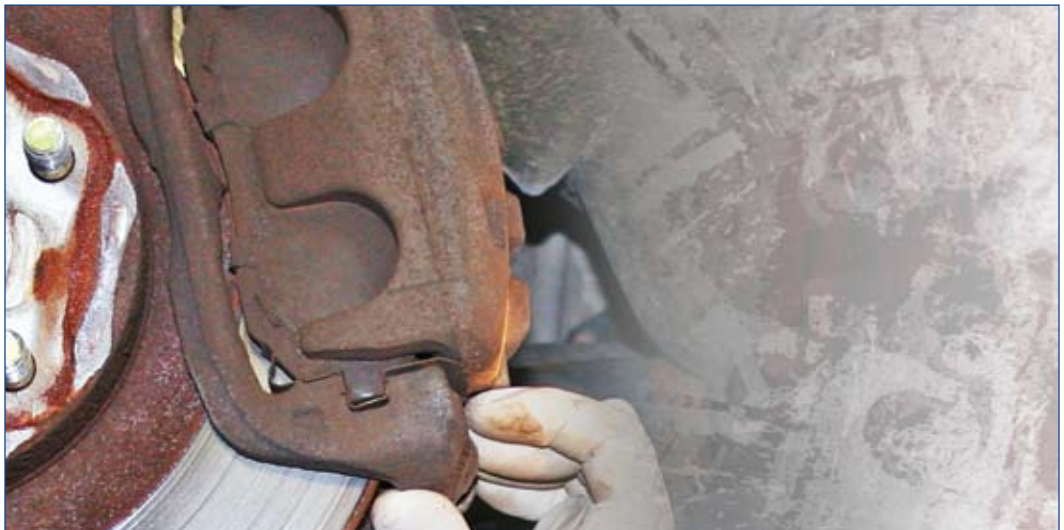
Subaru, Legacy, Forester, Outback, Impreza, WRX, Baja, STi and STI are Subaru Registered Trademarks. B9 Tribeca is a Trademark.

Subaru Internet Resources

Additional Subaru Parts and service information is available online. The End Wrench can also be found at www.endwrench.com. Log onto <http://techinfo.subaru.com> for access to Subaru service manuals, service bulletins, Tech Tips, newsletters and owner's manuals You can also select from a range of SPT Performance Parts at www.spt.subaru.com

4 | Brake System
The Right Brake Stuff

Aftermarket replacement brake parts may not be the best choice for use on your customer's Subaru vehicle. Here's the right information on selecting the right brake components.



18 | Electrical System
P0400 Codes Revealed

Emissions-related diagnostic trouble codes can be very confusing. Here's a look at how Subaru of America, Inc. has added and streamlined P0400-series DTCs from the onset of OBD II in 1996.



12 | Drive Train
Subaru Rack & Pinion Service

They're extremely durable, but even top-notch Subaru rack and pinion steering systems require routine inspection, maintenance and service to continue operating at an optimum level.



29 | Resource
Insider Info

This department presents an assortment of Subaru service information and time-saving tips useful to aftermarket technicians. Tips in this issue include: Tribeca Air Conditioning Refrigerant Specifications, Coolant Overflow Problems, Coolant Exchange Machine Approved, New TPMS Transmitter for 2008, and 2008 Impreza Data Link Connector Color Change.



26 | N.E.W. Horizons Dealer Listings

Subaru N.E.W. Horizons Dealers have been recognized for their outstanding performance in serving the wholesale market. They provide you with a direct wholesale parts hotline and also maintain a large inventory of competitively priced Genuine Subaru Parts.



The Right [Brake] Stuff

Using aftermarket “OE-quality” replacement brake parts may not be the wisest choice. Here’s the right information on selecting the right brake components for your customers’ Subaru vehicles.

The question of whether or not to use OE brake parts lingers in the automotive aftermarket industry. Some would say that aftermarket brake parts are just as good as the OE parts and are cheaper. In fact, neither of these points is accurate.

OE brake parts are selected for use by the vehicle manufacturer after lengthy research and testing and supplied by the top companies in their respective fields. These components are made from the best materials, manufactured under the highest quality standards and monitored for any defects, which are quickly eliminated. They are backed by warranties from reputable companies. The same statements cannot be said about many aftermarket parts.

Lastly, the cost of brake parts should not be judged by the initial price of the component, but by its proper fit and function; safe and efficient braking performance; durability and therefore – its overall cost in the long run.

Safety and Performance

A brake system component is not just another car part, like a horn or a headlight. The very essence of safety is the vehicle’s ability to efficiently stop – every time – when the brakes are applied.

The brakes must perform flawlessly over the usable lifetime of the components, so we call this factor “performance.” The level of performance determines the safeness of the braking system.

Once the performance level of the components falls, the safety becomes



jeopardized. The brake system is then serviced to bring the level of performance – and therefore safety – back up to acceptable standards. Most often, servicing the brake system requires replacing the pads or shoes; usually the rotors or drums must be resurfaced and may often be replaced; and sometimes the calipers require service or replacement.

When you are servicing the braking components on a Subaru vehicle, you may be faced with making a decision about whether to use Genuine Subaru replacement parts or aftermarket parts. The question is: “Am I using the

right parts?” Here are the factors you need to seriously consider:

The Right Friction Material

Many suppliers of lesser-quality brake components offer not only inferior quality parts, but try to use fewer styles of parts to cover many different applications. The “one size fits all” doctrine just doesn’t make sense when we’re talking about the system that brings the vehicle to a safe, dependable stop at any and all speeds, under diverse road and weather conditions.

^ Subaru brake pads are specifically formulated for optimum performance when combined with the other braking components on each vehicle.

Thirty years ago, there was only one basic type of friction material used in all brake compound applications – asbestos. With the phasing out of asbestos, many other types of organic, non-organic, ceramic and semi-metallic compounds entered the

picture. Today, there are nearly thirty compound formulas, all designed to meet the specific needs of the various types of vehicles on the road, under diverse braking conditions.

Different compounds deliver different braking characteristics. Each vehicle has a specific profile of the friction compound that is best for use

with the driving performance level of the vehicle and the other braking components on the vehicle. Choosing the correct compound for the specific vehicle can only be achieved by skilled engineers, thoroughly testing and selecting the best formula. This is what Subaru engineers do when they design a vehicle.

The Right Pads

Different vehicles have different friction compound requirements, based on vehicle weight; drivetrain type; vehicle performance type; rotor type, size and metallurgy. The design of OE pads is based on proper stopping power, fade resistance, heat

✓ Matching the braking components is critical to optimum performance.





^ Genuine Subaru brake rotors meet the highest standards of manufacturing and inspection.

dissipation and pedal effort under all driving conditions.

The type of friction compound, as well as the method and quality of the manufacturing process determines the overall durability - and therefore the cost effectiveness - of the brake pad.

Your local Subaru N.E.W. Horizons Dealer can supply dozens of part numbers, each with specific applications for specific vehicles, covering models from the last several years.

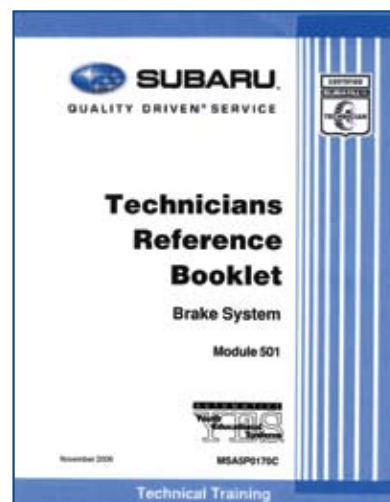
The Right Rotors

The selection of replacement rotors requires some logical thinking. Rotors

must meet the safety and performance level of the vehicle under its intended usage. For example: using a racing application intended for an Impreza WRX STI on a Tribeca would not be wise.

Rotors designs can range from safety-oriented styles for family-hauling vehicles to high speed braking applications, which require high heat dissipation. Each style is different. High performance racing-style rotors are usually slotted or drilled for heat dissipation and normally matched with high-density friction material pads. However, the smaller surface area reduces the contact coefficient desired in normal day-to-day driving, where maximum braking surface is desired.

v Brake System Technicians Reference Booklet, Module 501.



High quality rotors must be manufactured from the best materials, properly cast to eliminate warping, casting pockets and fissures which can result in premature replacement.

The Right Calipers

The quality and function of the actuating pistons and seals largely determines the performance and safety level of the calipers, but the proper fit, tolerances and durability of the caliper and mounting accessories are also critical.

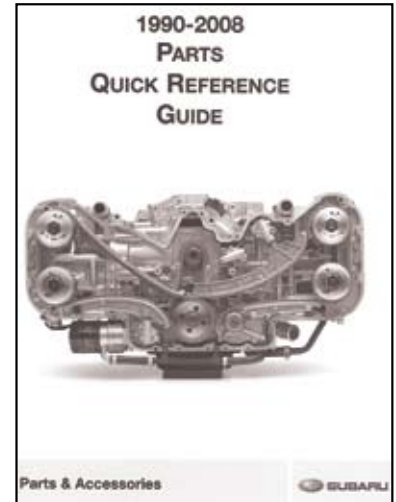
Subaru brake calipers utilize either a single or dual piston design, depending on the model. Each design

incorporates pistons with an optimum bore size for rapid and effective brake force application when the brake pedal is pushed and smooth consistent release when the foot is lifted off the pedal. Using a caliper without these exacting specifications jeopardizes braking performance and safety.

The position of the caliper mounting holes and components must be in the exact positions as on the OE calipers or the braking operation may not align or perform as specifications require. The smooth action of the slide pins must also be precise.

Lastly, the quality of the caliper casting is important. The absence of cracks and fissures, resistance to

✓ 1990-2008 Parts Quick Reference Guide.



Genuine Subaru Remanufactured Calipers

Not all remanufactured calipers are alike. Genuine Subaru calipers begin with the original equipment. They're disassembled, cleaned, machined and refitted with OE parts to strict standards. Then, they are tested and assembled in a dust-free environment to prevent contamination. And, they're backed by the Genuine Subaru Parts Limited Warranty. They fit and function like new Genuine Subaru parts, and save you money because they cost less to build. You and your customers can trust them to perform as good as the original factory parts. There's no compromise in safety or quality.

Contact your local N.E.W. Horizons Dealer for application details on Genuine Subaru Remanufactured brake calipers.



corrosion and the quality of machining can determine the overall fit, function and durability of the caliper.

When considering the importance of the brake caliper specifications for constant, flawless performance, it's easy to understand that "one size fits many" calipers are not a wise choice.

The Right Match

Matching the right pad to the right rotor and the right caliper is crucial. If the formula compounding of the

pad is harder than the OE part, the result may be harsh "grabbing" of the brakes and/or excessive wear of the rotor, resulting in premature replacement. If the pads are softer than the OE part, the result may be underperforming braking, resulting in an unsafe operating condition. Matching the right caliper to control the right pad and rotor is necessary to provide the best control of braking power.

The value of properly applying and releasing the brake - time after time - cannot be understated.

The Right Components

Different types of powertrains require slightly different types of braking system components. Rear-wheel-drive vehicles have different braking characteristics than front-wheel-drive or all-wheel-drive vehicles. The design of Subaru components takes into consideration the type of All-Wheel-Drive system used on each specific vehicle and matches them for optimum performance.



THE GENUINE WAY TO STOP A SUBARU!

REMANUFACTURED CALIPERS OF THIS QUALITY CAN ONLY COME FROM SUBARU AND AKEBONO.

Not all remanufactured brake calipers are the same. Akebono remanufactured calipers for Subaru begin with original equipment. Then, Akebono assembles and tests calipers using materials and processes that meet or exceed Subaru specifications.

- ▶ **ASSEMBLED IN A DUST-FREE ENVIRONMENT TO PREVENT CONTAMINATION.**
- ▶ **AKEBONO IS THE EXCLUSIVE PROVIDER OF GENUINE SUBARU REMANUFACTURED BRAKE CALIPERS.**
- ▶ **NO COMPROMISE IN SAFETY OR QUALITY FOR YOUR CUSTOMERS.**



AKEBONO CORPORATION | NORTH AMERICA
34385 WEST TWELVE MILE ROAD
FARMINGTON HILLS, MI 48331 USA

The Right Service Information

Just as important as the right braking components is the right service information. With Subaru of America Inc., that information is always at your fingertips. Complete service information is available 7/24 on the Subaru Technical Information Systems website at

<http://techinfo.subaru.com>.

On the website, you will find all the shop manuals and information needed to service your customer's Subaru vehicle. To further help you can view or download the Brake System Technicians Reference Booklet, Module 501; P/N MSA5P0170C.

The Right Parts

To help you identify the right Subaru brake parts, the 1990-2008 Parts Quick Reference Guide, P/N MSA6P0802, is available through your local Subaru N.E.W. Horizons Dealer.

It lists Genuine Subaru replacement parts and accessories including brake pads and shoes, brake system reseal kits, master cylinder reseal kits and remanufactured calipers – all covered by the Genuine Subaru Limited Parts Warranty.

Because part numbers change from time to time, always have the VIN handy when ordering. VIN charts are deciphered in the front of the guide.

The Right Choice

In a nutshell: the very best way to maintain the specific engineered-in safety, performance and overall operation of your customer's Subaru vehicle is to match the original Subaru brake components as closely as possible. Considering the facts, the right choice is to install Genuine Subaru brake parts. The braking system is just too important to take a chance on parts with unknown quality. <

Tell your customers to cool it.



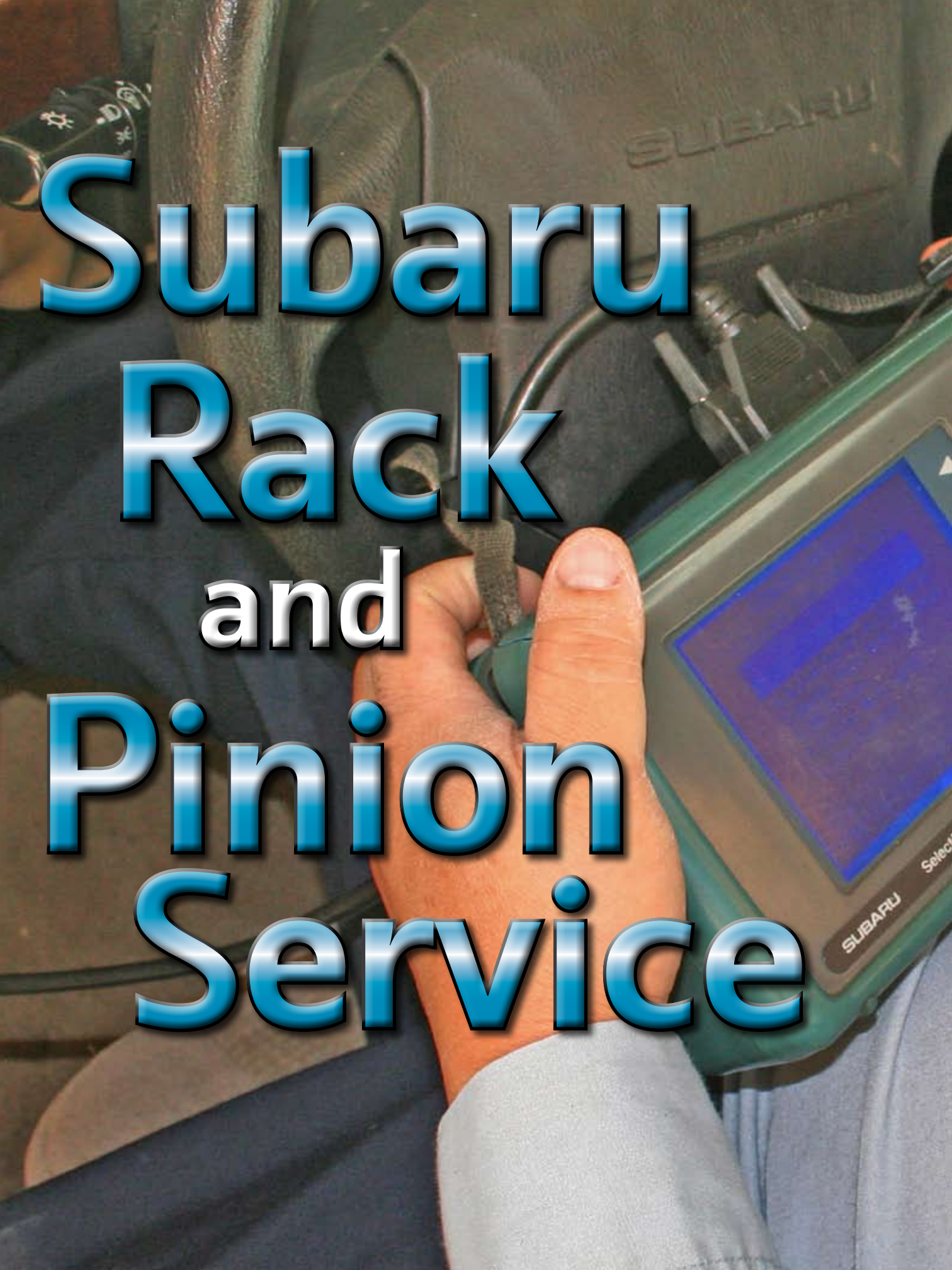
With Subaru's Super Coolant!

For the protection and performance that Subaru vehicles and their owners demand, only Genuine Subaru Automotive Chemicals will do. The full line of quality-tested products features Genuine Subaru Long Life Super Coolant – a new formulation that provides up to 10 years of corrosion and rust protection for all cooling system components, without additional corrosion inhibitors.


The Genuine Subaru Automotive Chemicals line includes everything from Brake Fluid to a new Engine Maintenance Kit – all engineered to assure maximum performance and trouble-free driving. For more information or to find your nearest Subaru dealer, go to www.endwrench.com.



SUBARU.



Subaru Rack and Pinion Service



Subaru rack and pinion steering systems are among the best in the industry, but even the best need routine maintenance and service to function at an optimum level.

Rack and pinion steering systems are extremely durable, but in order to function flawlessly for 100,000 miles or more, they require routine inspection, maintenance and occasional service.

The most common problems encountered with rack and pinion steering systems are leaks, fluid contamination and wear. Hoses and seals can leak, causing a loss of operating pressure and depriving moving parts of necessary lubrication. Hoses and seals can also break down and contaminate the fluid with bits of rubber, neoprene or other particles. Corroded or rusted parts can add bits of metallic particles to foul the system. Fluid contamination can also occur if moisture enters the system.

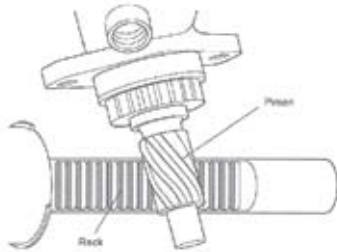
As the system grows older, the components may wear and deteriorate, affecting the operation. The contact area where the pinion meets the rack, for example, can become worn over years of operation and develop “center wear,” causing a loose play and a “wandering feel” in the steering, when driving straight forward.

Subaru Rack and Pinion Systems

All Subaru steering systems use a rack and pinion steering mechanism. As the steering wheel is turned, the pinion gear on the bottom end of the steering column rotates, proportionately moving the rack (and the wheels) left or right.

Rack and pinion steering is the choice of modern automakers

✓ As the pinion rotates, the rack moves left or right.

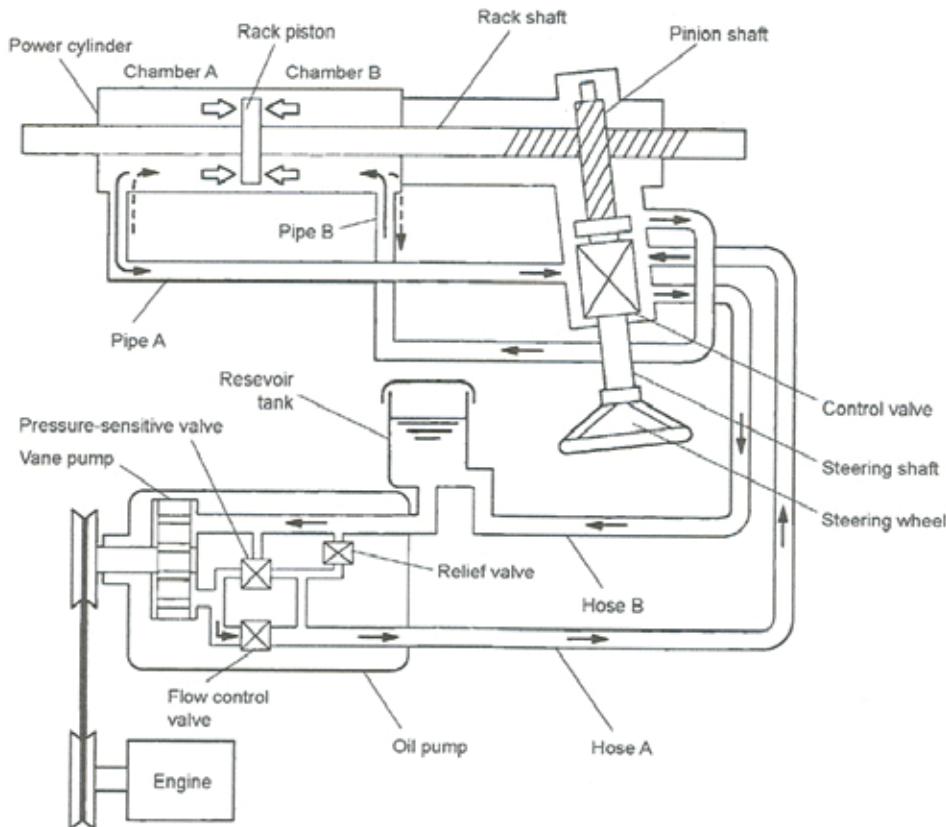


because it gives the driver precise control of the wheels. This simple, compact design is also easy to service. Let's take a look at the design and components of the system:

The Power Steering System

The power steering system consists of the oil pump, control valve, power cylinder and fluid reservoir. The oil pump is belt-driven by the engine and generates the oil pressure that operates the power cylinder, while the flow valve, built into the pump, controls the oil flow rate. The control valve directs the flow of the oil to the left or right side of the power cylinder. The power cylinder contains a piston on the rack shaft and cylinder and is operated by the pressurized oil from the pump. The pressurized oil is fed through the flow control valve to the steering gearbox and then returns to the reservoir tank.

✓ Rack and pinion power steering hydraulic system.



The Control Valve

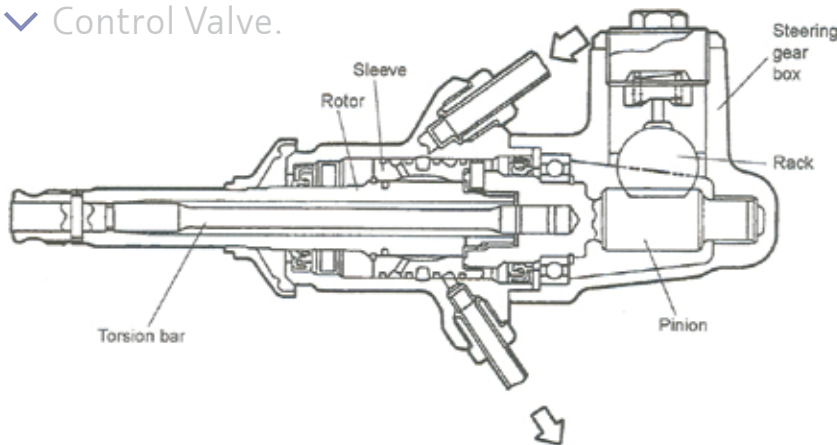
The control valve consists of a rotor, which rotates together with the steering shaft, and a pinion that rotates together with the sleeve and torsion bar. The pinion and rotor are loosely engaged with a spline and the torsion bar, which is twisted by the turning force applied to the steering wheel, connects them. This generates a relative displacement of the rotor and sleeve and thereby increases or decreases the oil channel cross-sectional area and controls both the changeover of the working fluid channel and the working pressure. When oil pressure is not produced – due to oil pump failure, drive belt failure or other causes – torque is directly transmitted from the valve rotor through the spline to the pinion.

System Inspection

The best way to diagnose rack and pinion problems is to first carefully listen to any customer concerns, note any comments and ask questions to help isolate the problem. Next, you'll want to take a test drive to verify any concerns. During the test drive, the following observations should be noted:

- **Steering and control problems.** Test for heavy steering effort, steering wheel surges during turning, wandering, failure of steering wheel to return to center, or leading to one side or the other.

Control Valve.



• **Noises.** Listen for any hissing, rattling, knocking, grinding, squealing, squeaking, whistling or creaking noises and attempt to pinpoint the source of the noise.

• **Vibrations.** Note any vibration emanating from the rack and pinion valve or connecting linkage.

Because there are variations by model and year, always refer to the proper service information for the vehicle you are servicing. Correct power steering system diagnostic tables for each model are available on the Subaru Technical Information System website at <http://technifo.subaru.com>. These tables list the trouble, possible cause and corrective action for all symptoms.

The drive belt should be inspected during routine maintenance and adjusted as needed. The belt should be replaced if found to be worn.

You can tell a lot about the condition of the system by inspecting the power steering fluid. During

SUBARU ATF-HP



- Specially manufactured to meet Subaru's exact standards of quality.
- For use in all Subaru transmissions, including 5EAT.
- Superior oxidation and shear stability prolongs fluid life.
- Chemically balanced to protect seals and "o" rings.
- Maximum service life for Subaru transmissions and their internal components.



Proudly manufactured to meet Subaru's highest quality standards by:

Idemitsu Lubricants America Corporation,
a wholly owned subsidiary of Idemitsu Kosan, Ltd.

GENUINE PARTS



- ✓ Genuine Subaru ATF-HP and ATF/PSF automatic transmission and power steering fluids.



steering system inspection, look for discoloration or darkening of the fluid, an indication of oxidation or contamination from debris. This debris may be caused by metallic or rubber component degeneration.

Subaru of America, Inc. recommends inspection of the power steering system every 15,000 miles. The power steering fluid should be

- ✓ The Subaru Steering Systems Technicians Reference Booklet.



Genuine Subaru replacement rack and pinion assembly. >

replaced if found to be discolored or contaminated.

Always use only Genuine Subaru fluids for the power steering system. Genuine Subaru ATF/PSF (P/N SOA868V9240) is recommended for use in all Subaru power steering systems and transmissions, except those equipped with 5-EAT automatic transmissions. The XT-6 with Electronic Power Steering has its own fluid.

Genuine Subaru ATF-HP (P/N SOA868V9241) is recommended for use in all Subaru power steering systems and transmissions, including those equipped with 5-EAT automatic transmissions.

These fluids are specially formulated to protect seals, hoses and O-rings, and for maximum oxidation stability.

Rack and Pinion Service

If you find that the rack and pinion assembly is damaged or leaking, you have two choices: rebuild or replace.

- Rebuilding the Rack and Pinion Assembly

While rebuilding may hold the overall cost down, it will require you to obtain some special tools. If you prefer to rebuild, tools for rebuilding and resealing Subaru rack

and pinion assemblies are readily available through the Subaru Special Tools website at <http://subaru.spx.com>.

Rack and pinion rebuilding and resealing information and procedures are available on the Subaru Technical Information System (STIS) website at <http://technifo.subaru.com>. On the STIS website, the Subaru Steering Systems Technicians Reference Booklet; Module 502, P/N MSA5P0271C, can be viewed or downloaded. It illustrates step-by-step procedures for rebuilding and resealing rack and pinion assemblies. And, of course, always refer to the specific service manual for the vehicle you are servicing.

- Genuine Subaru Replacement Rack and Pinion Assembly

You may not want to rebuilds rack and pinion assemblies, because of low volume. In this case, it's better to purchase Genuine Subaru replacements from your local Subaru N.E.W. Horizons Dealer. The replacement assembly will arrive quickly and is covered by the Genuine Subaru Parts Limited Warranty for your peace of mind.<



Variable Gear Ratio (VGR) Power Steering

Some Subaru models use a VGR rack and pinion system, in which the gear ratio is varied, depending on steering wheel turning angle. When the wheels are pointed straight ahead, the gear ratio is larger to alleviate steering wheel kickback and other adverse conditions that occur while the vehicle is in motion. Road handling characteristics are also improved because the driver's body movements are not readily imparted to the steering. When the vehicle is turning, steering response is improved because the gear ratio becomes smaller as the turning

angle increases.

In the VGR system, the angle of the gear on the rack is varied, causing the contact point to vary. The gear is set back on the rack so that the gear thickness increases as the gear moves away from the center of the rack. As the steering wheel is turned to the left or right, the gear ratio becomes correspondingly lower. As a result, the rack moving speed at either end is larger than the speed at the center. Accordingly, the gear ratio at both ends becomes smaller than at the center.

GENUINE SUBARU REMANUFACTURED STARTERS

WHY BUY GENUINE?

- R**EPLACE — We replace more parts than aftermarket brands.
- E**NGINEERED — Designed to meet original OEM drawings.
- M**ANUFACTURED — Made with same OE components as factory parts.
- A**SSEMBLED — Completely assembled from components and not just repaired.
- N**EW — Fully performs as new unit.



IT'S ALL IN THE PROCESS

Remanufacturing Process (Genuine Subaru)

1. Dismantle core and clean all components.
2. Replace key components 100% with new OE part.
3. Test all other critical components.
4. Replace components that do not meet specs.
5. Assemble, test and box.

Rebuilt Process (Typical Aftermarket)

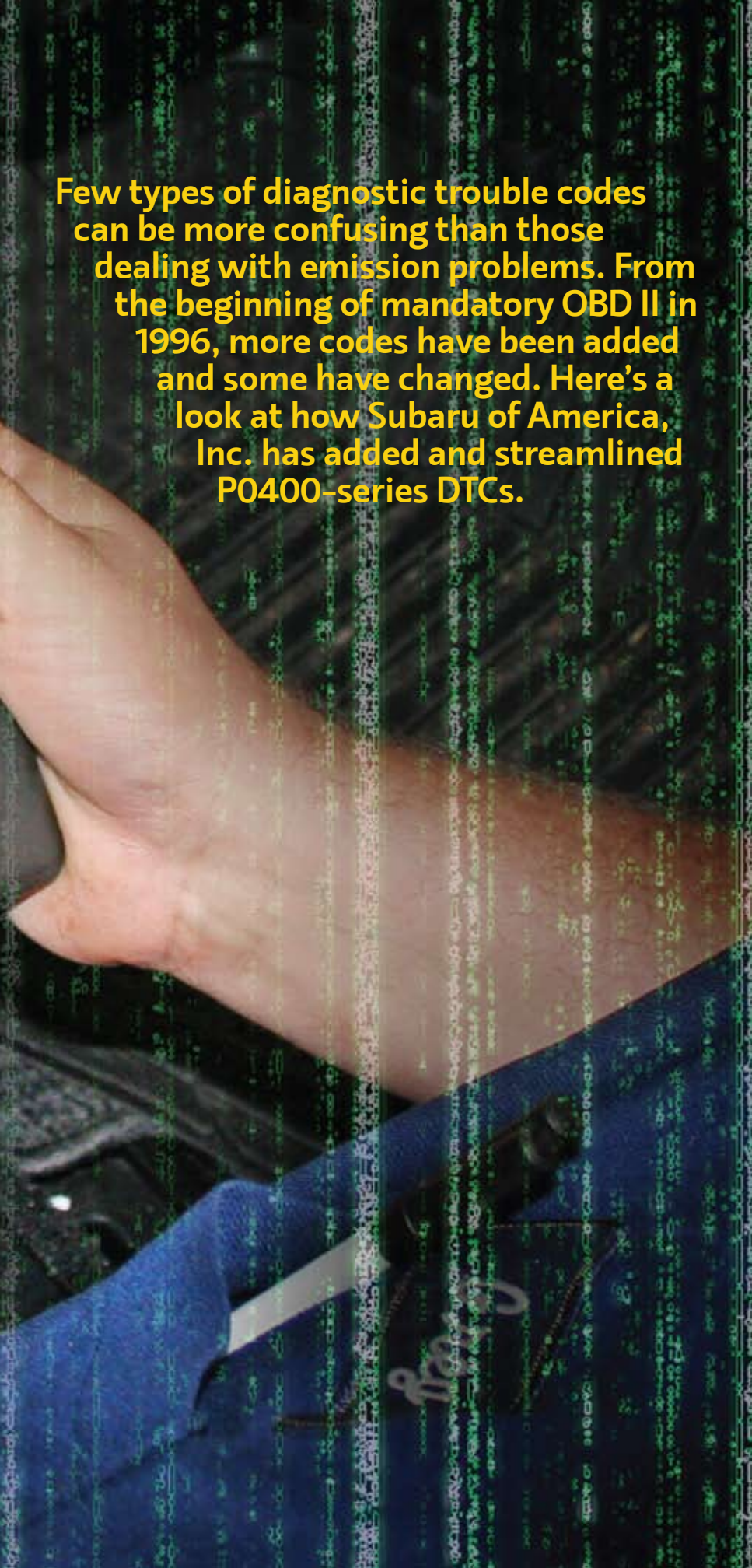
1. Identify damaged part or parts.
2. Replace damaged part with non-OE part and clean.
3. Re-assemble, test and box.



Remanufactured for Subaru by
DENSO
Available only through your local Subaru Dealer

P0400 Codes Revealed





Few types of diagnostic trouble codes can be more confusing than those dealing with emission problems. From the beginning of mandatory OBD II in 1996, more codes have been added and some have changed. Here's a look at how Subaru of America, Inc. has added and streamlined P0400-series DTCs.

Emissions-related OBD II diagnostic trouble codes (DTCs) have evolved over the last dozen years to more precisely pinpoint the problems in automotive systems. The handful of emissions codes used for On-Board Diagnostic (OBD) systems on the late 1980s and early 1990s has grown to nearly a hundred today. Over that time, many DTCs have been modified to more accurately reflect the cause, while others have been added to the list to address issues with advancing technology.

In order to understand how these factors affect Subaru vehicles, it's necessary to first look at the history of emissions control, on-board diagnostics and the DTC coding system.

How We Got Here

The history of automotive emissions monitoring and control began over forty years ago. The skies over major urban areas were becoming polluted with an unhealthy combination of industrial and automotive exhaust gases, which formed a smoky fog, dubbed "smog." The State of California took steps to reduce these pollutants by forming commissions and administrations to regulate the sources of these pollutants. In 1966, California required basic emission control devices on all passenger cars and light trucks sold within the state. The Federal government followed a couple of years later, but enforcement was difficult to maintain.

The U. S. Congress passed the Clean Air Act in 1970 and created the

Environmental Protection Agency to regulate and police the problem of air pollution (among other things), but the huge bureaucracy needed to research, form standards, regulate and inspect was still not in place.

In the early 1980s, a few on-board computer modules began to appear on passenger vehicles as a way to control fuel injection and emission controls. These systems were implemented mainly for inspection and testing at the end of assembly lines to make sure vehicles left the factory in compliance with California and EPA regulations.

The California Air Resources Board (CARB) mandated that all

new vehicles sold in the state in 1988 be equipped with basic on-board diagnostic (OBD) emissions controls. Automakers complied, but each used its own proprietary designs of control modules, data link connectors, sensors, software and actuation devices. Vehicles could only be serviced with that company's tools and service information, causing much confusion and restricting service by the independent aftermarket.

To begin the road toward uniformity, the Society of Automotive Engineers (SAE) called for standardization, beginning with the data link connector (DLC) and

diagnostic test signals. For the next few years, progress was slowly but steadily made toward standardizing the emissions-related portions of OBD, while leaving the rest of the diagnostics to proprietary discretion of the manufacturer.

In 1994, CARB issued a complete set of required diagnostic parameters for vehicles sold in California for the 1996 model year. These new "OBD II" standards, including the standardized DLC and Diagnostic Trouble Codes (DTCs), were adopted by the U.S. government for vehicles sold in all states for 1996.

Automobile manufacturers were allowed to establish or keep their

It's What's Inside That Counts *Genuine Subaru Remanufactured Parts*

Re-power Legacy, Impreza or Forester with Genuine Subaru Remanufactured Short Blocks!

Available NOW! through your local Subaru dealer:

1997 – 1999 2.5L DOHC Short Blocks

1999 – 2004 2.5L SOHC Short Blocks

Each Genuine Subaru Remanufactured Short Block:

- Is remanufactured to meet or exceed O.E. specifications
- Offers the same reliability and fit of O.E. replacement parts
- Is backed by a 3 year / 36,000 mile warranty*

*See your local dealer for details.



GENUINE PARTS



Remanufactured for Subaru by:



own proprietary codes, but were mandated to also align those dealing with emissions as OBD II DTCs.

It is at that point that we begin our look at how Subaru vehicles use OBD II codes and how the systems have developed up to 2008.

NOTE: This article will deal only with OBD II diagnostics which were mandated in all vehicles starting with 1996 models. For On-Board Diagnostics (OBD) trouble codes and diagnostic procedures on most 1995 and prior Subaru vehicles, refer to the Subaru Technical Information Systems website at <http://techinfo.subaru.com> and search under the appropriate vehicle and model year.

Decoding the Codes

One of the main reasons that emissions codes have been confusing is because, as emission systems evolved over the last dozen years, more codes have been added to cover newer and more complex devices.

OBD II diagnostic trouble codes (DTCs) are identified by a standardized system. Each letter or digit in the 5-place system represents a factor that tells a portion of the total story.

Let's look at an example.

The DTC P0442 can be decoded using the following system:

- The first place "P" in the P0442 code tells in which subsystem the fault is occurring:
 - P = Powertrain
 - B = Body
 - C = Chassis
 - U = Network Communication

Now, we know that the problem is in the powertrain.

- The second place "0" in the P0442 code tells whether the DTC is a generic OBD II fault as standardized by the Society of Automotive Engineers (SAE) or one developed by the vehicle manufacturer:

0 = SAE

1 = Manufacturer

OK, it's a standard OBD II DTC.

- The third place "4" in the P0442 code indicates the affected subsystem:

1 = Air/Fuel Control

2 = Fuel System (Injectors)

3 = Ignition System/Misfire

4 = Auxiliary Emission Controls (EGR/AIR/CAT/EVAP)

5 = Vehicle Speed/Idle Control and Auxiliary Inputs

6 = Computer System (PCM or Communications)

7 = Transaxle/Transmission

8 = Transaxle/Transmission

The problem lies in the emission control systems, but further information will be required to pinpoint the problem.

- The fourth and fifth places "42" in the P0442 code will give the specific location of the faulty circuit or component. These digits vary by subsystem, but referring to DTC charts or reading with a quality scan tool will identify the exact problem.

In this case, the "42" indicates: Evaporative Emission Control System Malfunction (Small Leak - 1 mm/0.04 in).

In many 2001 and prior models, a P0442 DTC may be caused by a loose gas cap. In 2002, the DTC P0457 was added to differentiate between an EVAP system leak and a loose gas cap.

Subaru OBD II Diagnostic Trouble Codes.

Here is a chronological list of OBD II DTCs used in Subaru vehicles:

1995 Impreza, Legacy, Outback, Outback Sport

P0400

Exhaust Gas Recirculation Flow Malfunction

P0403

Exhaust Gas Recirculation Malfunction

P0420

Catalyst System Efficiency Below Threshold

P0441

Evaporative Emission Control System Incorrect Purge Flow

P0443

Evaporative Emission Control System Incorrect Purge Control Valve Circuit Malfunction

1996 (Full OBD II)

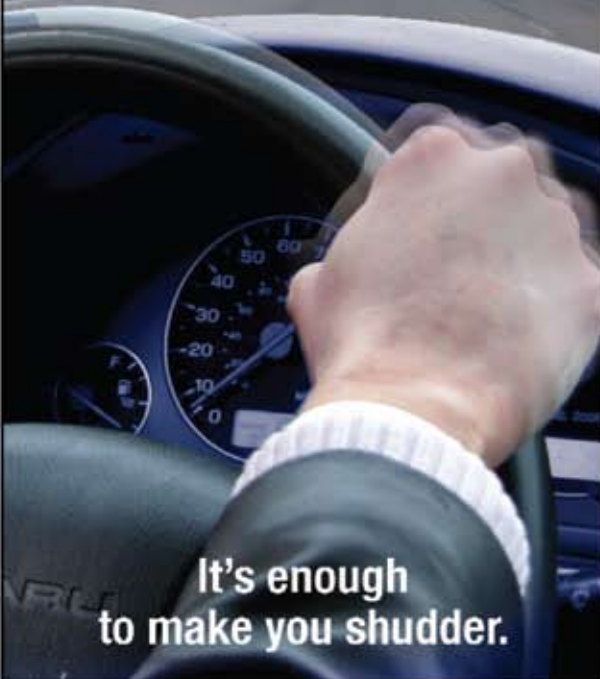
P0410

Secondary Air Injection System Malfunction

P0412

Secondary Air Injection System Switching Valve "A" Circuit Malfunction

The truth about aftermarket brake parts:



It's enough
to make you shudder.

It's no secret that some aftermarket brake parts cost less than genuine OE replacements. But is it worth the risk? Our engineers compared the quality and performance of Genuine Subaru Brake parts with aftermarket imitations.



The results are conclusive: Genuine Subaru parts outperform the other brands tested in every category. More rust resistant, stronger, and less vibration that can result in annoying wheel shudder.

For the full story on how aftermarket parts just don't measure up, ask your dealer for a free copy of this pamphlet. Find your nearest Subaru dealer at www.endwrench.com.



SUBARU.

P0440

Evaporative Emission Control System Malfunction

P0446

Evaporative Emission Control System Vent Control Malfunction

P0450

Evaporative Emission Control System Pressure Sensor Malfunction

P0451

Evaporative Emission Control System Pressure Sensor Range/Performance Problem

P0461

Fuel Level Sensor Circuit Range/Performance Problem

1997

P0452

Evaporative Emission Control System Pressure Sensor Low Input

P0453

Evaporative Emission Control System Pressure Sensor High Input

P0462

Fuel Level Sensor Circuit Low Input

P0463

Fuel Level Sensor Circuit High Input

1998

P0480

Cooling Fan Relay 1 Circuit Low Input

P0483

Cooling Fan Function Problem

2001

The 2001 model year saw the addition of more DTCs and clarification of some existing DTCs to further focus on the problems of leaks and incomplete purging.

P0442

Evaporative Emission Control System Malfunction (Small Leak - 1 mm/0.04 in.)

P0444

Evaporative Emission Control System Purge Control Valve Circuit Low Input

P0445

Evaporative Emission Control System Purge Control Valve Circuit High Input

P0447

Evaporative Emission Control System Vent Control Low Input

P0448

Evaporative Emission Control System Vent Control High Input

P0456

Evaporative Emission Control System Malfunction (Very Small Leak - .05 mm/.02 in.)

P0464

Fuel Level Sensor Intermittent Input

2002

P0457

Evaporative Emission Control System Malfunction (Fuel Cap Loose/Off)

P0458

Evaporative Emission Control System Purge Control Valve Circuit Low Input

P0459

Evaporative Emission Control System Purge Control Valve Circuit High Input

2005

P0400

Exhaust Gas Recirculation Flow

P0420

Catalyst System Efficiency Below Threshold (Bank 1)

P0442

Evaporative Emission Control System Leak Detected (Small Leak)

P0447

Evaporative Emission Control System Vent Control Circuit Open

P0448

Evaporative Emission Control System Vent Control Circuit Shorted

P0451

Evaporative Emission Control System Pressure Sensor Range/Performance

P0452

Evaporative Emission Control System Pressure Sensor Low Input

P0453

Evaporative Emission Control System Pressure Sensor High Input

P0456

Evaporative Emission Control System Leak Detected (Very Small Leak)

P0457

Evaporative Emission Control System Leak Detected (Fuel Cap Loose/Off)

P0458

Evaporative Emission Control System Purge Control Valve Circuit Low

P0459

Evaporative Emission Control System Purge Control Valve Circuit High

P0461

Fuel Level Sensor Circuit Range/Performance

P0462

Fuel Level Sensor Circuit Low Input

P0463

Fuel Level Sensor Circuit High Input

✓ On Board Diagnostics - II (OBD II) Technicians Reference Booklet.



✓ Evaporative Systems Diagnosis Technicians Reference Booklet.



P0464

Fuel Level Sensor Circuit Intermittent

P0483

Cooling Fan Rationality Check

2006

P0410

Secondary Air Injection System

P0411

Secondary Air Injection System Incorrect Flow Detected

P0413

Secondary Air Injection System Switching Valve "A" Circuit Open

P0414

Secondary Air Injection System Switching Valve "A" Circuit Shorted

P0416

Secondary Air Injection System Switching Valve "B" Circuit Open

P0417

Secondary Air Injection System Switching Valve "B" Circuit Shorted

P0418

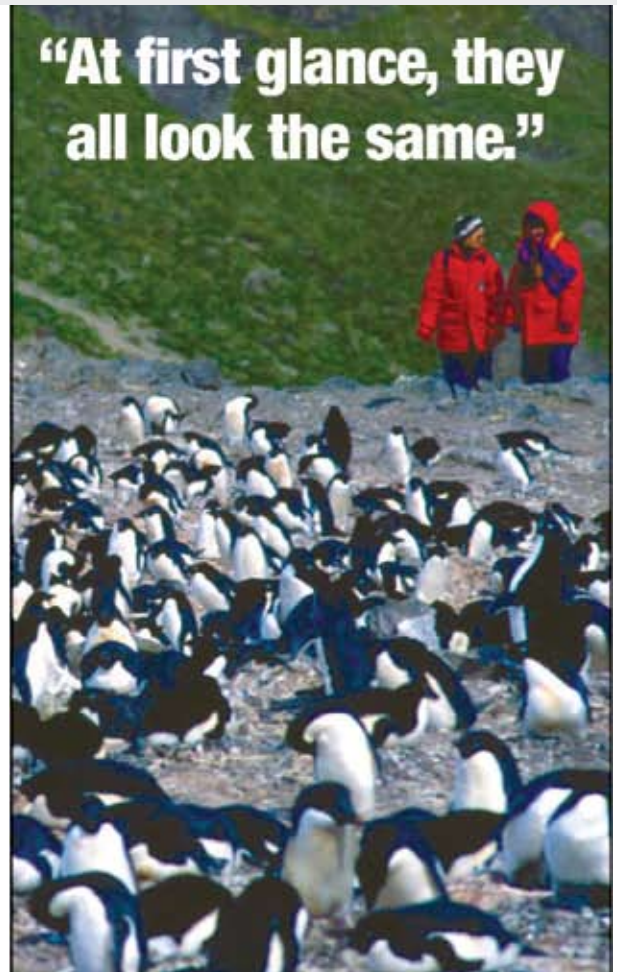
Secondary Air Injection System Control "A" Circuit Open

You can learn more about Subaru emissions-related diagnostic trouble codes and how to service them by logging onto the Subaru Technical Information Systems website at <http://techinfo.subaru.com> and purchasing or downloading the following Technicians Reference Booklets:

On Board Diagnostics - II (OBD II) Technicians Reference Booklet, Module 407; P/N MSA5P0162C

Evaporative Systems Diagnosis Technicians Reference Booklet; P/N MSA5P0922C.

Always refer to the Subaru Technical Information Systems website at <http://techinfo.subaru.com> for the correct information for the Subaru vehicle you are servicing .<



Same with replacement parts.

Though replacement parts might look the same, the similarity ends when your work begins. Why take chances with aftermarket imitations that may not fit, and may not last? Get the real thing—competitively priced, and delivered fast. To find the Subaru dealer nearest you, call **1-800-SUBARU3** or visit **www.subaru.com**. Or for helpful technical tips and Subaru-specific techniques, check out **www.endwrench.com**.



SUBARU

What is a Subaru **N.E.W. Horizons Dealer?**



Subaru N.E.W. Horizons Dealers have been recognized for their outstanding performance in serving the wholesale market. N.E.W. Horizons dealers provide you with a direct wholesale parts hotline and also maintain a large inventory of competitively priced Genuine Subaru Parts, which means you can get most parts immediately. If not, the N.E.W. Horizons dealers' direct access to the Subaru Parts Distribution Network means it can get you almost any part you need quickly. If you have a question about a specific part or repair job, just ask. No one knows a Subaru, or the parts needed to repair them, like a Subaru N.E.W. Horizons Dealer.

Please note: Left Column telephone numbers provide direct access to Subaru N.E.W. Horizons Parts Departments. Right Column numbers provide general access to Subaru N.E.W. Horizons Dealers.

Alabama

Birmingham

Jim Burke Subaru
866.320.7320 205.252.8154

Gardendale

Serra Subaru
800.426.4351 205.608.1978

Alaska

Anchorage

Continental Subaru
800.478.7278 907.562.2722

Fairbanks

Auto Service Subaru
907.455.9816 907.456.6217

Arkansas

Little Rock

Riverside Subaru
501.448.0042 501.448.8000

Arizona

Avondale

Michael Crawford Subaru
623.298.1212 623.298.1212

Phoenix

Camelback Subaru
800.876.5199 800.876.5199

Phoenix

Steven Jory Subaru
602.413.0444 602.493.6600

Scottsdale

Power Subaru Scottsdale
480.425.2950 480.425.2800

Tucson

Emich Subaru
520.298.3011 800.264.7733

California

Albany

Albany Subaru
510.526.8791 510.528.1244

Auburn

Gold Rush Subaru
530.885.4019 530.885.4019

Carlsbad

Bob Baker Subaru
760.438.3113 760.438.2200

Chino

Chino Valley Subaru
909.393.8498 909.393.0103

Costa Mesa

South Coast Subaru
714.475.6454 714.689.2103

El Cajon

Bob Baker Subaru - El Cajon
619.440.1213 619.440.0404

Fresno

Herwaldt Subaru
559.438.6934 559.438.6944

Fullerton

Renick Subaru
714.680.0222 714.871.9300

Lake Forest

Irvine Subaru
949.452.0100 949.837.3500

Livermore

Livermore Subaru
925.447.1100 925.447.1102

Long Beach

Timmons Subaru
888.489.5001 562.595.4601

Monrovia

Sierra Subaru
626.932.5614 626.359.8291

Oakland

Downtown Subaru
510.653.0350 510.547.4424

Redding

Shasta Subaru
530.223.0737 530.223.2177

Redwood City

Carlsen Subaru
650.365.2600 650.365.6390

Riverside

Subaru of Riverside
951.785.6975 951.785.6070

Roseville

AutoWest Subaru
888.220.4269 916.786.6611

Sacramento

Maita Subaru
916.484.4876 877.484.4870

San Bernardino

Subaru of San Bernardino
877.378.2278 909.888.8686

San Diego

Kearny Mesa Subaru
858.495.9090 858.278.7100

San Jose

Stevens Creek Subaru
408.984.1006 408.984.2001

San Rafael

Marin Subaru
415.257.4690 415.454.9240

Santa Cruz

Subaru of Santa Cruz
831.420.1402 831.420.1500

Santa Rosa

Prestige Subaru
707.575.1051 800.773.1855

Shingle Springs

Shingle Springs Subaru
530.676.0444 530.677.8771

Ventura

Barber Subaru
805.641.2787 805.643.9259

Van Nuys

Subaru Sherman Oaks
818.670.7463 818.670.7450

Walnut Creek

Diablo Subaru
925.937.6990 925.937.6900

Colorado

Aurora

Shortline Subaru
303.364.3368 303.364.2200

Boulder

Flatirons Subaru
303.443.2919 303.443.0114

Colorado Springs

Heuberger Subaru
800.675.2227 719.475.1920

Durango

Morehart Subaru
970.385.0202 970.247.2121

Englewood

Burt Subaru
800.525.8402 303.761.7453

Englewood

GO Subaruu Araphoe
720.895.0813 303.792.0330

Fort Collins

Dellenbach Subaru
970.530.0945 970.226.3100

Grand Junction

Grand Junction Subaru
970.241.2414 800.244.2902

Thornton

Mike Shaw Subaru
800.579.0815 303.438.7500

Connecticut

Branford

Premier Subaru
203.643.1220 203.481.0687

Canton

Mitchell Subaru
800.693.7731 860.693.6391

Danbury

Colonial Subaru
203.748.2891 203.744.8383

Middletown

Schaller Subaru
860.826.2050 860.632.1112

Milford

Dan Perkins Subaru
888.206.6206 203.882.5680

Torrington

Center Subaru
877.652.2229 860.489.1301

Vernon

Suburban Subaru
800.229.6550 860.649.6550

Watertown

Chase Parkway Subaru
800.327.9002 860.274.8866

Delaware

Newark

Matt Slap Subaru
302.861.3030 302.453.9900

Florida

Clearwater

Fitzgerald's Countryside
Subaru
727.725.2843 727.799.1800

Delray Beach

Delray Subaru
888.830.7337 561.454.1800

Fort Myers

O'Brien Subaru
239.938.1398 239.277.1222

Jacksonville

Subaru of Jacksonville
800.393.3455 904.641.6455

Miami

William Lehman Subaru
305.651.0295 305.653.7123

Sanford
Mastro Subaru
866.283.7034 321.206.1792

Tampa
Mastro Subaru
813.880.5974 813.880.5954

Tampa
Reeves Subaru
800.835.9256 813.933.2811

West Palm Beach
Palm Beach Subaru
561.686.1560 561.683.7100

Georgia

Cumming
Troncalli Subaru
770.889.8951 770.889.8951

Duluth
Subaru of Gwinnett
678.584.7245 678.475.3500

Idaho

Boise
Larry Miller Subaru
888.941.2218 208.323.6300

Moscow
Ambassador Subaru
800.422.0297 208.882.2722

Illinois

Arlington Heights
Roto Subaru
847.952.3252 847.255.5700

Countryside
Autobarn's Subaru of Countryside
708.354.6200 708.497.3999

Evanston
Evanston Subaru
847.869.9769 847.869.5700

Highland Park
North Shore Subaru
847.433.6656 847.432.4800

Joliet
Bill Jacobs Subaru
815.725.8700 630.963.9700

Libertyville
Liberty Subaru
866.226.4444 847.362.2683

Naperville
Gerald Subaru
630.355.8111 630.355.3900

North Aurora
Gerald Subaru North Aurora
630.907.0867 630.907.0800

O'Fallon
John Hanna Subaru of O'Fallon
618.206.3333 618.206.3333

Schaumburg
Subaru of Schaumburg
800.828.9899 847.884.6000

Indiana

Indianapolis
Speedway Subaru
317.263.3742 317.263.0002

Indianapolis
Tom Wood Subaru
317.705.7016 317.848.8888

Lafayette
Bob Rohrman Subaru
800.775.7713 765.449.8100

Merrillville
Subaru of Merrillville
888.758.0120 219.756.7900

Mishawaka
Gurley Leap Subaru
574.258.7706 574.256.5427

Iowa

Cedar Rapids
Jim Miller Subaru
800.332.0290 319.393.0640

Davenport
Lujack Subaru
563.386.1511 563.386.1511

Urbandale
Ramsey Subaru
515.278.6460 515.278.6400

Kansas

Olathe
Olathe Subaru
913.324.3333 913.780.0400

Topeka
Figgs Subaru
800.757.7717 785.267.2390

Kentucky

Louisville
Bachman Subaru
866.897.8227 502.493.2920

Louisville
Neil Huffman Subaru
800.777.6509 502.448.6666

Nicholasville
World Class Subaru
859.241.2034 877.881.0500

Louisiana

Covington
Baldwin Subaru
985.892.2902 985.892.2203

New Orleans
Performance Subaru
504.822.1230 504.822.2222

Maine

Bangor
Quirk Subaru
800.564.7900 207.942.7364

South Portland
Pape Subaru
800.640.6685 207.774.1429

Maryland

Annapolis
Annapolis Subaru
866.509.3018 443.837.1400

Baltimore
Russel Subaru
410.788.1700 410.744.2300

Bel Air
Bel Air Subaru
410.893.0611 410.879.1133

Cumberland
Thomas Subaru
888.724.6310 301.724.6310

Gaithersburg
Fitzgerald Subaru of Gaithersburg
800.670.4801 301.670.4800

Glen Burnie
Wilkins Subaru
410.689.8066 410.689.8000

Hagerstown
Sharrett Subaru
301.739.9999 301.739.7700

Kensington
Fitzgerald Subaru
800.876.3748 301.881.4000

Owings Mills
Heritage Subaru
410.581.6696 410.363.8300

Silver Spring
Herb Gordon Subaru
301.890.3065 301.890.3040

Massachusetts

Belmont
Cityside Subaru
781.641.1999 781.641.1900

Danvers
Ira Subaru
978.739.8858 978.739.8850

Natick
MetroWest Subaru
888.456.2200 508.651.2000

Norwood
Clay Subaru
781.768.8285 781.762.2400

Shrewsbury
Patrick Subaru
508.421.8650 508.756.8364

Springfield
Bertera Subaru
413.734.4964 413.734.4964

Webster
Long Subaru
800.982.2298 508.943.7070

Michigan

Ann Arbor
Dunning Subaru
800.662.0073 734.662.3444

Commerce Twp
Dwyer & Sons Subaru
800.548.0993 248.624.8535

Ferndale
Hodges Subaru
248.547.6167 248.547.8800

Grand Rapids
Delta Subaru
888.44DELTA 616.988.9797

Kalamazoo
Maple Hill Subaru
269.978.0190 269.342.6600

Lansing
Williams Subaru
800.258.2853 517.484.1341

Marquette
Fox Marquette Subaru
906.226.1600 906.226.1600

Traverse City
Cherry Capital Subaru
800.852.6475 800.868.8994

Troy
Suburban Subaru
248.643.0735 248.643.7660

Minnesota

Bloomington
Bloomington Subaru
952.887.0600 952.881.6200

Brooklyn Park
Brooklyn Park Subaru
763.582.7462 763.424.3331

Burnsville
Walser Subaru
952.435.9696 952.898.1717

Hermantown
Miller Hill Subaru
218.722.3085 218.722.5337

Minnetonka
Morrie's Subaru
952.797.1362 952.544.0376

Moorhead
Ward Muscatell Subaru
218.236.0191 218.236.0191

Rochester
Clements Subaru
507.285.4730 507.289.0491

Vadnais Heights
White Bear Subaru
651.481.3180 651.481.0230

Missouri

Ballwin
Dean Team Subaru
636.227.6527 636.227.0100

North Kansas City
Jack Miller Subaru
816.474.8222 816.474.3100

Saint Louis
Lou Fusz Subaru - St Louis
800.341.5935 314.994.1500

Webster Groves
Webster Groves Subaru
800.966.5184 314.968.5167

Montana

Billings
Rimrock Subaru
406.655.8662 406.651.5200

Bozeman
Subaru of Bozeman
406.586.4094 406.586.1771

Missoula
Four Seasons Subaru
406.728.2516 406.728.2510

Nebraska
Bellevue

 Beardmore Subaru
 402.738.7606 402.734.2525

Lincoln

 DuTeau Subaru
 800.228.4183 402.420.3300

Omaha

 Stan Olsen Subaru
 402.393.1989 402.397.8300

Nevada
Las Vegas

 Subaru of Las Vegas
 702.495.2141 702.495.2140

Reno

 Lithia Reno Subaru
 800.495.6000 775.825.8474

New Hampshire
Concord

 Ed Reilly Subaru
 800.381.5177 603.225.0200

Keene

 Subaru of Keene
 866.832.0013 603.355.5000

Milford

 Subaru of Milford
 603.672.5699 603.673.0512

Stratham

 Exeter Subaru
 800.540.1503 603.778.0300

New Jersey
Bloomfield

 Lynnes Subaru
 800.782.7597 973.743.2111

Cherry Hill

 Subaru of Cherry Hill
 856.330.1505 856.330.1500

Englewood

 Town Motor Subaru
 201.568.5200 201.568.5200

Flemington

 Flemington Subaru
 800.218.1432 908.782.2025

Lumberton

 Miller Subaru
 609.261.7844 609.267.4000

Morristown

 Subaru of Morristown
 800.541.1127 973.326.9131

Oradell

 Liberty Subaru
 201.261.7495 201.261.0900

Ramsey

 Ramsey Subaru
 201.327.0070 201.327.0070

Sicklerville

 Martin Subaru
 800.288.8756 856.629.6833

Trenton

 Coleman Subaru
 609.883.6447 609.883.2800

New Mexico
Albuquerque

 Galles Davis Subaru
 505.837.5238 505.837.5200

Albuquerque

 Garcia Subaru
 505.260.5164 505.260.5155

New York
Amherst

 Northtown Subaru
 716.835.4611 716.835.8500

Brooklyn

 Bay Ridge Subaru
 718.232.1919 718.234.7960

Colonie

 Goldstein Subaru
 800.955.1727 518.869.1250

Glen Cove

 North Coast Subaru
 516.770.7333 516.676.3676

Hicksville

 Grand Prix Subaru
 516.822.2200 516.822.6800

Huntington

 Metric Subaru
 631.858.0316 631.499.6777

Ithaca

 Maguire Subaru
 607.277.4444 607.257.1515

Jamestown

 Ed Shults Subaru
 716.664.0188 716.484.7151

Oneonta

 Five Star of Oneonta
 800.244.0005 607.432.0201

Orangeburg

 Bill Kolb, Jr. Subaru
 845.398.6323 845.359.7777

Orchard Park

 West Herr Subaru
 716.667.3570 716.662.3565

Pleasantville

 Prestige Subaru
 800.769.4611 914.769.5100

Port Jefferson Station

 Thomas Subaru
 631.473.4800 631.473.4800

Rhinebeck

 Ruge's Subaru
 800.343.7843 845.876.7074

Roslyn

 Port Subaru
 516.484.6633 516.484.6633

Rye

 Rye Subaru
 914.967.6300 914.967.6300

Sayville

 Donaldsons Subaru
 631.590.2226 631.567.6400

Staten Island

 Staten Island Subaru
 718.980.5758 718.979.0033

Syracuse

 Bill Rapp Subaru
 800.887.7277 315.437.2501

Syracuse

 Romano Subaru
 315.475.3365 315.475.7933

Utica

 Don's Subaru
 315.797.5140 315.797.1520

Vestal

 Matthews Subaru
 607.754.0397 607.754.2050

Victor

 Van Bortel Subaru
 585.924.4383 585.924.5230

Wantagh

 Hassett Subaru
 516.785.7200 516.785.7800

Yonkers

 Smith Cairns Subaru - Yonkers
 800.473.2496 914.377.8100

Yorktown Heights

 Curry Subaru
 800.288.6777 914.736.1300

North Carolina
Asheville

 Prestige Subaru
 888.854.4293 828.298.9600

Boone

 Southern States Subaru of
 Boone
 800.844.2665 828.264.0675

Chapel Hill

 Performance Subaru
 866.321.0692 919.942.3191

Charlotte

 Folger Subaru
 704.569.3313 704.536.9635

Greensboro

 Bob Dunn Subaru
 336.544.0776 336.855.7222

Raleigh

 Southern States Subaru
 919.863.4057 919.863.4057

Wilmington

 Parkway Subaru
 800.424.9434 910.392.4888

Winston Salem

 Flow Subaru
 336.761.3682 336.723.3524

Ohio
Bedford

 Ganley Subaru of Bedford
 800.475.8555 440.439.3444

Brunswick

 Brunswick Subaru
 330.460.7080 330.273.3300

Cincinnati

 Subaru of Beechmont
 513.474.5720 513.474.4313

Columbus

 Byers Subaru
 614.792.2462 614.792.2455

Columbus

 Byers Subaru - Whitehall
 866.574.9256 614.864.5180

Cuyahoga Falls

 Cascade Subaru
 330.929.4815 330.929.1861

Fairborn

 Wagner Subaru
 937.878.2171 937.878.2171

Fairfield

 Busam Subaru
 513.771.8118 888.771.8118

North Olmsted

 Ganley Westside Subaru
 440.734.9375 440.734.2000

Toledo

 Yark Subaru
 800.367.9275 419.841.7771

Oklahoma
Broken Arrow

 Ferguson Subaru
 800.880.8815 918.258.1800

Oregon
Beaverton

 Carr Subaru
 503.520.4117 503.644.2161

Eugene

 Kendall Subaru
 541.465.3555 541.465.4600

Gresham

 Gresham Subaru
 503.661.5812 503.661.1200

Medford

 Southern Oregon Subaru
 800.866.9756 541.772.3377

Oregon City

 Lithia Subaru - Oregon City
 866.717.2512 503.656.0612

Portland

 Wentworth Subaru
 800.232.8097 503.232.2000

Pennsylvania
Allentown

 Becker Subaru
 610.365.6530 610.395.3745

Butler

 Kerven Subaru
 800.537.8369 724.287.0734

Doylestown

 Fred Beans Subaru
 215.348.0202 215.348.7500

East Petersburg

 Lancaster County Subaru
 800.215.5644 717.569.4514

Erie

 New Subaru
 800.352.1052 814.868.4805

Feasterville
Colonial Subaru
215.355.8856 215.355.8800

Harrisburg
Faulkner Subaru - Harrisburg
800.522.2131 717.564.4545

Jenkintown
Glanzmann Subaru
800.440.0130 215.885.8282

Leesport
Steve Moyer Subaru
610.916.7000 610.916.7000

Limerick
Welsh Subaru of Limerick
610.489.4198 610.489.3122

Mechanicsburg
Cumberland Valley Subaru
800.382.1436 717.697.9448

Moon Township
Day Apollo Subaru
412.264.0253 412.253.2213

Moosic
Minooka Subaru
800.982.4054 570.346.4641

Newtown Square
Rafferty Subaru
800.784.0004 610.353.6900

Northumberland
W & L Subaru
877.995.7822 570.473.3432

Pittsburgh
Day Subaru
412.253.2212 412.343.1600

Pittsburgh
Bowser Subaru
800.231.4452 412.469.2100

Stroudsburg
Ertle Subaru
570.213.4035 570.421.4140

York
Apple Subaru
800.228.7299 717.854.1800

Rhode Island

Warwick
Bald Hill Subaru
800.781.2393 401.822.8100

South Dakota

Rapid City
Courtesy Subaru
800.658.3054 605.342.7034

Tennessee

Harriman
Earl Duff Subaru
877.610.2005 865.882.0113

Knoxville
Grayson Subaru
800.816.4120 865.251.9100

Memphis
Jim Keras Subaru
901.373.2760 901.373.2700

Nashville
Jim Reed Subaru
800.522.2207 615.329.2929

Texas

Arlington
Teape Subaru of Arlington
866.676.4350 817.419.4300

Austin
Austin Subaru
800.385.4076 512.323.2837

Austin
Gillman Subaru - Austin
512.651.5956 800.953.3981

Dallas
Subaru of Dallas
214.420.4425 214.526.5555

Dickinson
McRee Subaru
866.205.0202 281.309.5126

Houston
Gillman Subaru
- Houston North
281.209.4328 800.288.9180

Houston
Gillman Subaru
- Houston Southwest
713.776.4834 800.999.8309

Houston
West Houston Subaru
281.676.2155 281.398.3300

Hurst
Teape Subaru
866.598.7278 817.255.6200

Lewisville
Huffines Subaru
800.650.6261 972.221.8686

Plano
Subaru of Plano
800.526.4131 972.801.9900

San Antonio
North Park Subaru
800.880.8846 210.308.0200

Schertz
Gilman Subaru
210.651.5533 210.651.5533

Utah

Salt Lake City
Mark Miller Subaru
800.348.8207 801.268.3734

Salt Lake City
Nate Wade Subaru
800.221.4287 801.355.7571

Sandy
Larry H. Miller Subaru
800.453.6456 x2 801.553.5200

Vermont

Burlington
Burlington Subaru
800.394.7974 802.660.8099

Virginia

Alexandria
Beyer Subaru
703.667.1234 703.768.5800

Charlottesville
Brown's Subaru
800.635.3170 434.973.1351

Fairfax
Farrish Subaru
703.934.1620 703.273.0200

Harrisonburg
Bob Wade Subaru
540.437.2481 540.434.3900

Leesburg
Dulles Subaru
800.394.5337 703.777.7077

Midlothian
Pence Subaru
800.447.3623 804.378.0244

Norfolk
Perry Subaru
757.965.8411 757.461.8855

Richmond
Subaru of Richmond
804.935.2604 804.346.4000

Roanoke
First Team Subaru
800.277.8757 540.362.4800

Springfield
Sheehy Subaru
703.922.2210 703.922.7900

Staunton
Staunton Subaru
800.296.3465 540.213.1877

Vienna
Stohlman Subaru
800.697.4979 703.893.2990

Washington

Auburn
Mike Scarff Subaru of Auburn
866.456.3025 253.737.1345

Bellevue
Chaplin's Bellevue Subaru
800.962.0822 425.641.2002

Bellingham
Dewey Griffin Subaru
360.676.0263 360.734.8700

Bremerton
Peninsula Subaru
877.894.7511 360.479.4320

Kirkland
Eastside Subaru
425.820.1676 425.820.8993

Puyallup
Subaru of Puyallup
253.475.3838 253.286.5900

Renton
Walker's Renton Subaru
800.261.7366 425.226.2775

Seattle
Carter Subaru
206.546.6030 206.542.1166

Spokane
Appleway Subaru
800.876.4412 509.924.6900

Spokane
Camp Subaru
509.458.3290 509.458.3288

Tacoma
Tacoma Subaru
253.473.6303 253.473.6200

Vancouver
Hannah Subaru
503.252.9947 360.314.0550

Wenatchee
Cascade Subaru
509.663.6498 509.663.0011

Wisconsin

Appleton
Gustman Subaru
800.283.6693 800.283.6693

Green Bay
Denil Wall Subaru
800.801.3366 920.468.8898

Madison
Don Miller Subaru
608.258.3561 608.258.3500

Mequon
Sommer's Subaru
262.242.0129 262.242.0100

Milwaukee
Don Jacobs Subaru
414.727.2903 414.727.2900

Waukesha
Don Jacobs Subaru
800.334.3934 262.521.3800

West Virginia

Morgantown
John Howard Subaru
800.999.9194 304.296.3205

Wyoming

Casper
White's Mountain Subaru
307.234.9949 307.237.2438



Please note: Left column telephone numbers provide direct access to Subaru N.E.W. Horizons Parts Departments.

Right column numbers provide general access to Subaru N.E.W. Horizons Dealers.

Insider Info

Coolant Exchange Machine Approved



Subaru of America, Inc. has named the Wynn's PowerFlush III as its approved coolant exchange machine. The machine was chosen for its three separate tanks that allow the ability to perform a clean water flush of the cooling system quickly and efficiently. A clean water flush is possible by filling one tank with fresh water, while the other two tanks hold new coolant and removed liquids.

The clean water flush process allows for a complete coolant exchange without the use of chemicals that could potentially harm the cooling system. Also, with three separate tanks, there is a complete isolation of any contaminants that could possibly be cycled back into the vehicle or any subsequent vehicles.

NOTE: Subaru of America, Inc. continues to discourage the use of flushing agents in its vehicles.

The high degree of coolant removal by using the PowerFlush III allows for the use of new Subaru Super Coolant in a vehicle that was not originally so equipped. This will permit the customer to take advantage of the 6 year, 75,000 mile coolant replacement interval of Subaru Super Coolant.

All standard cooling system service practices, including the use of Genuine Subaru coolants and Subaru Coolant Conditioner should be continued.

NOTE: Subaru of America, Inc. does not recommend the use of other coolant exchange or flushing machines.

Subaru of America, Inc. has tested the Wynn's PowerFlush III's performance and has found the machine acceptable for use with all Subaru vehicles. The PowerFlush III does not use a flushing chemical. It will also power-purge the entire system, including the heater core.

Details about the machine and purchasing information are available on the Subaru Special Service Tools website at <http://subaru.spx.com>.

Radiator Cap Cleaning and Testing

Many radiator caps can be successfully cleaned.

The most important factor is to thoroughly clean the negative pressure valve. If this is not done,



any remaining debris may result in continued coolant overflow loss. If there is an excessive amount of debris or the sealing rubber on the cap appears to be pitted or damaged, replace the cap.

1. Using clean water and a small brush – similar to a toothbrush – thoroughly clean the cap seal surface.
2. Manually open the negative pressure valve and thoroughly clean the inner and outer surfaces of the valve.
3. Check the radiator cap valve opening pressure using a radiator cap tester to ensure the cap is within specification. If the cap is out of specification, replace it.

Tribeca Air Conditioning Refrigerant Specifications

When servicing the air conditioning system on a 2006–2009 Tribeca, it is very important to identify whether you are working on a vehicle with front A/C only or a dual zone vehicle with both front and rear A/C systems. The amount of HFC-134a refrigerant specified will be different.

Front A/C Only Model

Minimum: 20 oz. (0.57 kg, 1.26 lb.)

Maximum: 22 oz. (0.63 kg, 1.39 lb.)

Front & Rear A/C Model

Minimum: 30 oz. (0.84 kg, 1.85 lb.)

Maximum: 32 oz. (0.90 kg, 1.98 lb.)

Make sure you install the correct amount of refrigerant for the vehicle you are servicing to avoid undercharging or overcharging the system.

New TPMS Transmitter for 2008

The design of the Tire Pressure Monitoring System (TPMS) tire valve/transmitter was changed, beginning with 2008 models. It is important to realize that the TPMS tire valve looks like the valve found on vehicles without TPMS. To avoid damaging the transmitter, care must be taken when deflating the tire or changing tires on the rims. To avoid confusion, please familiarize yourself with the new valve.

The 2007 and prior tire TPMS valve was silver in color, fitted with a retaining collar and topped with a silver cap (see photo).

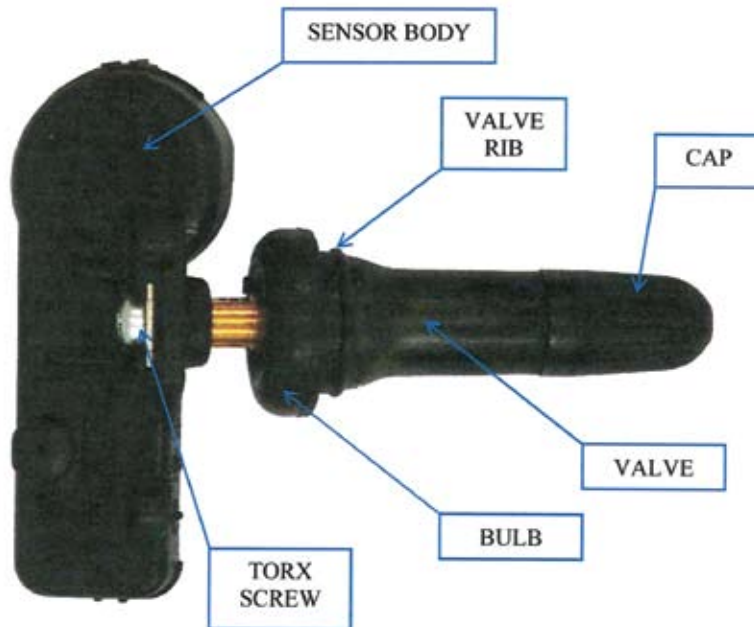
2007 and prior tire valve/TPMS transmitter.



This is the new black rubber tire valve/TPMS transmitter used beginning with 2008 models.



✓ Please note the components of the new style black rubber tire valve/TPMS transmitter.



The new “snap-in” valve is made from black rubber and fitted with a black cap. This new valve looks like the older-style valve used on vehicles without TPMS.

When deflating tires, never remove the valve stem with pliers as the delicate transmitter mounted on the valve stem base will be damaged. Instead, deflate the tire by depressing the valve stem or removing it with the proper tool. When reinstalling the valve, always tighten to the correct torque specifications using a valve stem torque tool.

Always refer to the proper service information for the vehicle you are serving for the correct data on how to best position the wheel on your tire changing machine to prevent damage to the transmitter when mounting or dismantling tires.

Further information on the new

style TPMS transmitter can be found in the 2008 New Model Update, Technician Reference Booklet; Module 917, P/N MSAP0803C. The booklet can be purchased or downloaded on the Subaru Technical Information Systems website at <http://techinfo.subaru.com>.

Recommended Materials

Subaru of America, Inc. has released a list of recommended materials of the repair and service of Subaru vehicles. Service Bulletin 01-167-08 covers fluids, coolant, refrigerant, greases, adhesives and seal materials that have been approved for use. The bulletin may be viewed or downloaded on the Subaru Technical Information System website at <http://techinfo.subaru.com>.

NGK the preferred OEM supplier of Subaru

Insist on Subaru genuine spark plugs at your next service visit.



SUBARU.

What *drives* You ...

power or
passion?

With NGK Spark Plugs, you're covered either way. The ideal performance plug for demanding environments.



THE WORLD LEADER

www.ngksparkplugs.com

The N.E.W. way

to serve your customers better...
and build your business faster.

If you're looking for faster response, deeper inventory and more competitive pricing, look for a Subaru N.E.W. Horizons dealer near you.



This national network of high-performing Subaru dealers is 100% committed to meeting the wholesale parts needs of independent repair shops like yours.

In addition to an unusually large inventory of competitively priced Genuine Subaru Parts, you'll also have quick access to remanufactured parts—high quality without the high price.

Plus you'll get expert technical and application assistance, including a Hotline providing direct access to the Subaru N.E.W. Horizons expanded parts inventory.

Explore this N.E.W. way to operate your business more efficiently and profitably. See the listing inside this issue to find your Subaru N.E.W. Horizons dealer.

