

The End Wrench™

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

SUBARU 

Fall 2001 Number 16 \$6

Subaru Supplemental Restraint Systems

SEMA Show Issue



Information Inside

For your Subaru Impreza WRX
and Impreza 2.5 RS customers...

Flat Out Fun!



AN EXPANDED LINE OF PERFORMANCE PARTS FOR SUBARU IMPREZA WRX OR 2.5 RS!

Looking for even more performance, endurance and flat out fun? Check out our expanded line of performance parts, engineered specifically for the Subaru Impreza WRX or 2.5 RS. From front end covers to performance mufflers, these high quality components allow you to customize, not compromise! Watch for new additions coming soon! For more information, visit www.subaru.com/perfparts.

Just a few examples:

- Strut Tower Braces — Steel or Carbon Fiber
- Short-Throw Shifter
- Performance Mufflers and Intermediate Pipes
- Titanium Shift Knob
- Performance Suspension Kit
- Performance Gauges
- Carbon Fiber Patterned Trim Kits
- Carbon Fiber Shift Knob and Brake Handle
- Rear Differential Protector
- BBS 17" Aluminum Alloy Wheel
- Under Spoilers
- Front End Cover
- SPT Decals
- Rear Decklid Spoiler



* Not all parts applicable to all models/model years. See your local Subaru dealer for details.

SUBARU 
Genuine Parts

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

Information contained in this newsletter 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.

Forester, Impreza, Justy, Legacy, Loyale, Outback and Subaru SVX are Registered Trademarks.

The End Wrench™

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

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Since 1995, all Subaru vehicles have been equipped with driver and front passenger airbags. Diagnosis of this system will be necessary if the vehicle has been involved in an accident, or if other damage has occurred. This article provides the information needed to safely work on and around Subaru supplemental restraint systems (SRS).



Original Equipment Parts/
Professional Service

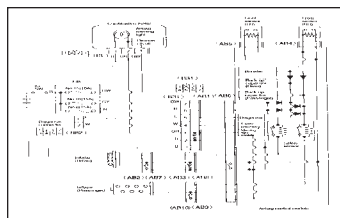
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Our commitment to help you keep your customers satisfied and coming back to you for their Subaru service and repairs has not changed. In fact, there are more parts being offered under the Subaru OEPRO banner than ever.



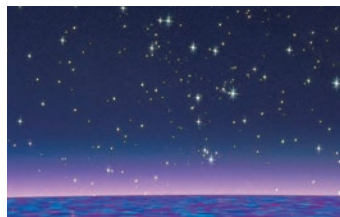
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Subaru N.E.W. Horizons Dealers have been recognized for their outstanding performance in serving the wholesale market. They provide you with a direct wholesale parts hotline and also maintain a large inventory of competitively priced Genuine Subaru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

Subaru Supplemental Restraint Systems

The supplemental restraint system (SRS) consists of an airbag control module, left and right front sensors, a safety sensor built into the control module and airbag modules for the driver and passenger containing an airbag and inflator. Some recent Subaru models are also equipped with side airbag modules.

The left and right front sensors are connected in parallel. The front sensors and safety sensor are connected in series. The airbag will inflate if at least one front sensor and the safety sensor sense an impact at the same time.

System Precautions

When servicing the airbag system, always follow the service procedures, precautions, and warnings indicated in the appropriate Subaru service manuals and related service bulletins. Failure to do so may result in personal injury and/or damage to the system.

Before servicing the airbag system, turn the ignition switch OFF, disconnect the battery and wait at least 10 minutes before proceeding. This gives the back-up capacitors in the airbag control unit time to discharge. This prevents accidental airbag deployment.

Always store the airbag module on a clean flat surface with the cover pad and horn buttons facing up. In addition, it should be stored with nothing else placed on top of it.

The airbag module must not be exposed to temperatures above 200 degrees F.

Note: Exposure to temperatures of 300 degrees Fahrenheit or greater will cause airbag module deployment.

Never discard an undeployed airbag module. When replacing an undeployed airbag module, save the packaging material (inner packaging and carton) from the new module. After installing the new module on the vehicle, repackage the old module in the same manner as the new module was packaged.

Note: Do not ship modules unless they are packaged in an approved container. A deployed module may be enclosed in a plastic bag and scrapped in a normal manner.

Wear protective clothing when handling a deployed airbag module. Always use gloves and eye protection. Even though the residue is NOT toxic, it may cause minor eye and skin irritation.

All of the SRS components are sealed. Do not disassemble or repair. If an SRS



Battery Disconnect



Proper Module Handling

**O.E.
PRO
CORNER**

O.E.PRO: Full Support at Full Throttle



Rally Cheers Surge for the Hot WRX

**Subaru Struts Its Stuff:
High Performance Struts and Springs
Make Their Debut ***

**O.E.PRO Offers Parts Lines Priced
to Perfection**

**Keep Your Head on Straight When it
Comes to Labor Costs**

* Struts and springs sold "as is" without any warranty coverage. Intended for off-highway application only.
May bring vehicle out of compliance with safety and/or emissions standards. Can only be lawfully installed by end user.
See dealer for complete details.



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THE BEST PROGRAM TO HELP YOU GROW IS O.E.PRO

O.E.PRO: Full Support at Full Throttle



Few joys in life top the thrill of winning. From the joy of coming across the finish line at full speed to the satisfaction of being the best at what you do, the surge of pride that comes with reaching your goal is what keeps people striving to excel. Lately, every Subaru enthusiast is sharing that feeling of excellence. With all the road rally wins racked up by racers driving the sleek and durable Subaru Impreza 2.5 RS and the powerful new Subaru WRX, the air is super-charged with positive vibrations. The Subaru owners in your area who follow the results of performance car rallies know how the Subaru is smoking the competition — time after time. And that can mean extra business for you: in performance parts, performance accessories and more.

Naturally, we're supporting you with all we've got by continually developing, testing and introducing new Subaru

Performance Tuning (SPT) components and accessories. In fact, you'll find Genuine Subaru performance struts and springs are now available. These components will give Impreza 2.5 RS models the same kind of surefooted road response that has helped win rallies all across the country. As an independent, you can make a nice profit on these items since they are strictly after sale items that will not be installed by authorized Subaru dealers. So you've got an open market of every Subaru performance enthusiast who lives in your area.

Of course, struts and springs are only a part of the long list of SPT parts you can sell to avid Subaru owners. You've got everything from short throw shifters to differential protectors to performance mufflers and a sharp-looking variety of performance accessories to boot. What's more, O.E.PRO covers an entire line of O.E.-quality replacement parts including engine components, remanufactured parts, maintenance items, automotive chemicals and more — all at competitive prices.

So, whenever you're working on a Subaru, be it an installation of performance parts or simply a routine brake job, you're covered with the best parts possible. That's the kind of support that helps keep your own business on a winning track.



Rally Cheers Surge for the Hot WRX

Throngs of cheering racing fans lining the routes and the finish lines at the Sports Car Club of America ProRally Series of events across the United States these past six months have been treated to a thrilling dose of excitement and spectacle. And the car that has been leading the pack in so many cases has been the powerful new Subaru WRX. Teams of Subaru drivers piloting the racy sedan with the responsive turbo-charged boxer engine have crossed the finish line in such impressive numbers that Subaru currently stands tantalizingly close to walking away with this year's SCCA ProRally Manufacturer's Championship.

Different teams have fared fantastically throughout the series of eight events held so far in this year's SCCA ProRally Series. With finishes in first place at some rallies and several



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teams finishing one right after another in the high standings of other rallies, Subaru drivers and their cars have proven their metal over tough, twisting forest and mountain roads at speeds exceeding 100 miles an hour. In fact, the performance of the Class N WRX vehicles beating out cars with more powerful Open Class configurations is even more impressive.

Attendees at the SEMA show this year will even be able to see the high-performance WRX model. Some may even get a first hand, close-up look at one or two of the machines that have been taking racing honors.

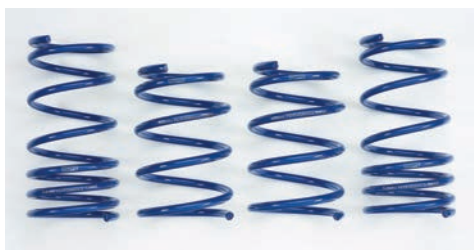
Subaru is proud of the results we have achieved with the 2.5 RS and WRX models and by its racing teams. We think you'll find the excitement at the finish lines of these rallies is going to translate into real excitement by Subaru owners in your area. We hope you enjoy sharing the news with them. Certainly all the performance-enhancing refinements learned through our racing program will be shared among a variety of Subaru vehicles for many years to come.

Subaru Struts its Stuff: High Performance Struts and Springs Make Their Debut

Like the screech of tires and the roar of a highly tuned engine, the road-hugging action of the new Subaru Performance Tuning (SPT) struts and springs on the race-proven WRX has drawn a lot of attention on the world road rally circuit. Now, the same engineering experience, battle-tested cornering and remarkable stability that has led to the trophy-winning success of the WRX can be had on the 1998 to 2001 Impreza 2.5 RS models.



The new high-quality steel springs lower the stance of the 2.5 RS by approximately 1" for a better, road hugging center of gravity. By installing the kit, that includes two front and rear springs, you'll demonstratively improve the handling performance and vehicle responsiveness. These springs reduce vehicle squat during acceleration, body roll while cornering and excessive nose-diving when braking.



The performance struts feature fast adjustable damping to match anticipated driving conditions. These adjustments allow the tuning of rebound and compression settings from street to rally or track. There's even a patented check valve that minimizes hydraulic foaming to help keep shock performance fade free and in control. With 4 stages of adjustment on the front struts and 8 stages on the rear struts, you can provide 2.5 RS owners with a performance-enhanced suspension tuned to their preferences and ready to take on any challenge.

Available for immediate shipment, Genuine Subaru performance struts and springs offer you the opportunity to bring race-proven performance standards to your most enthusiastic Subaru Impreza 2.5 RS owners while earning a nice bit of extra profit for yourself. Go get 'em!

<u>Description</u>	<u>Part #</u>	<u>MSRP</u>
*SPT Struts (Set of 4)	SOA837Z1100	\$ 575.00
*SPT Springs (Set of 4)	SOA855Z1100	\$ 279.95

*Note: These Genuine Subaru performance struts and springs are sold "as is" without any warranty coverage. They are intended for off-highway application only. They may bring the vehicle out of compliance with safety and/or emission standards. Can only be lawfully installed by end user. See your local authorized Subaru dealer for complete details.

O.E.PRO WORKS HARD FOR YOU



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O.E.PRO Offers Parts Lines Priced to Perfection

Giving your customers high quality service at fair prices keeps them coming back to you whenever they have automotive maintenance or repairs. By offering you high quality Genuine Subaru Parts at fair wholesale prices we hope to keep you a loyal customer. In fact, that's why we go through all the effort we do when it comes to pricing. We check our prices against

OE-quality parts from automotive aftermarket manufacturers and distributors on a regular basis. We employ a team of pricing specialists that uses state-of-the-art software to ensure our pricing. We even compare our prices for captive and non-captive parts against other OEMs to ensure that the cost of owning a Subaru compares favorably with the cost of owning an import in the same class. By doing all this, we help you make a fair profit and we help you to keep your Subaru customers happy. That's perfection all around.

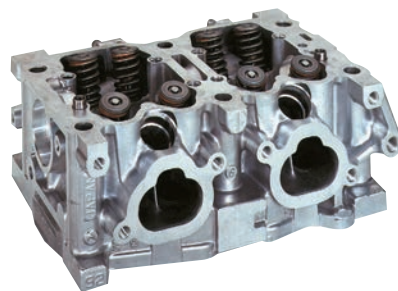


Call for
Pricing
Today!

To see how competitive Subaru pricing is, give your local authorized Subaru dealer a call. From maintenance items to remanufactured parts to engine components, the best quality Genuine Subaru part is always affordable.

Keep Your Head on Straight When it Comes to Labor Costs

Think you can save a lot of money assembling your own cylinder head rather than using a pre-assembled Genuine Subaru cylinder head assembly? Think again! Between the labor costs and the headache of having to remove, tear down, reassemble and reinstall a cylinder head, should a problem arise, those savings can completely disappear. And even if there's no problem with rebuilding, you'll still miss out on the benefits of leak testing, the full Subaru warranty and the peace of mind you get with a factory new pre-assembled cylinder head from Subaru. So get your head on straight and order what you know is right. And rest easy when it comes to major engine repairs.



Years	Part #	Notes	MSRP
LEONE/LOYALE			
85-87	SOA4786060	RH Carb	333.25
85-87	SOA4786040	LH Carb	333.25
86-94	SOA4786070	RH SPI	333.25
86-94	SOA4786050	LH SPI	333.25
LEONE/LOYALE TURBO			
85-90	SOA4786090	RH	399.92
85-90	SOA4786080	LH	399.92
LEGACY			
90-94	SOA4786010	RH & LH	428.50
95	SOA4786010	RH A/T	428.50
95	SOA4786130	LH A/T	428.50
96	SOA4786140	RH & LH 2.2 M/T	428.50
96	SOA4786140	RH 2.2 A/T	428.50
96	SOA4786150	LH 2.2 A/T	428.50
96	SOA4786200	RH 2.5	457.07
96	SOA4786210	LH 2.5	457.07
97-98	SOA4786160	RH & LH 2.2 M/T	428.50
97-98	SOA4786160	RH 2.2 A/T	428.50
97-98	SOA4786170	LH 2.2 A/T	428.50
97-98	SOA4786180	RH 2.5	457.07
97-98	SOA4786190	LH 2.5	457.07
LEGACY TURBO			
91-94	SOA4786020	RH	671.36
91-94	SOA4786030	LH	671.36

All MSRPs are Net of Core

Years	Part #	Notes	MSRP
IMPREZA			
93	SOA4786100	RH 1.8 Calif. Spec.	399.93
93	SOA4786110	LH 1.8 Calif. Spec.	399.93
93	SOA4786120	RH 1.8 49 State Spec.	399.93
93	SOA4786110	LH 1.8 49 State Spec.	399.93
94-95	SOA4786100	RH 1.8	399.93
94-95	SOA4786110	LH 1.8	399.93
95	SOA4786010	RH 2.2 A/T	428.50
95	SOA4786130	LH 2.2 A/T	428.50
96	SOA4786120	RH & LH 1.8 M/T	399.93
96	SOA4786100	RH 1.8 A/T	399.93
96	SOA4786110	LH 1.8 A/T	399.93
96	SOA4786140	RH & LH 2.2 M/T	428.50
96	SOA4786140	RH 2.2 A/T	428.50
96	SOA4786150	LH 2.2 A/T	428.50
97-98	SOA4786160	RH & LH 2.2 M/T	428.50
97-98	SOA4786160	RH 2.2 A/T	428.50
97-98	SOA4786170	LH 2.2 A/T	428.50
98	SOA4786180	RH 2.5	457.07
98	SOA4786190	LH 2.5	457.07
FORESTER			
98	SOA4786180	RH	457.07
98	SOA4786190	LH	457.07

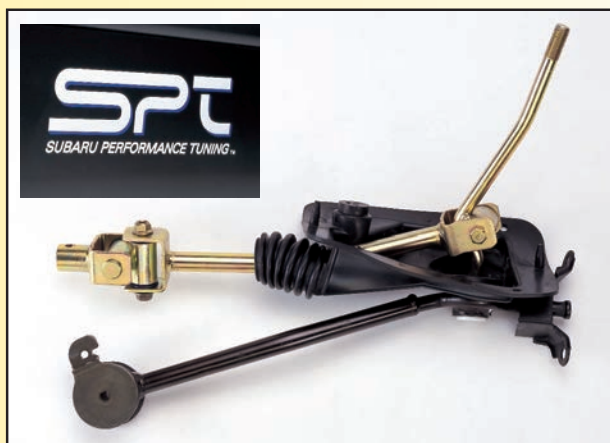
Genuine SUBARU Performance Parts...

...make the Subaru Impreza 2.5 RS and WRX Thrill Rides

The exacting performance standards so prized in Subaru Performance Tuning components are now available in more parts applications than ever. We applied our trophy-winning racing experience to our full line of performance parts for Impreza 2.5 RS back to 1998 as well as new parts for the exciting new WRX. You can offer customers everything from struts and springs to short throw shifters. Drivers looking for quicker steering response, racing-quality shift action and quicker acceleration will find these SPT parts deliver winning performance.

Subaru Enthusiasts Will Love the Extra Kick!

These components enhance the driving experience and add responsiveness that will thrill ardent Subaru drivers – especially new Impreza WRX drivers. Plus, you can offer them performance styling “goodies” such as high-tech carbon fiber shift knobs, performance gauge packages, SPT decals and more.



You'll Love the Extra Business

This line of Subaru Performance Tuning (SPT) parts can help foster a loyalty among your performance enthusiasts, customers who frequently put more money into their cars.

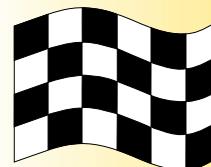
Up to 2001 Impreza 2.5 RS Performance Parts

Description	Part #	MSRP
Rear Differential Protector	B0310AS002	\$68.95
Short Throw Shifter	C1010FA000	\$260.00
Titanium Shift Knob (Sti)	C1010FA100	\$149.95
Carbon Fiber Shift Knob-M/T	C1010FA140	\$175.00
Carbon Fiber Parking Brake Lever	C1010FC121	\$295.00
Strut Tower Brace (Steel)	E4010FA000	\$144.95
Strut Tower Brace (Carbon Fiber)	E4010FA100	\$629.00
Gauge Pack (Performance)	H5010FA034	\$595.00
Gauge Pack Housing (Gray)	H0017FC9100E	
Carbon Fiber Patterned Trim A/T	J1310FA130	\$254.00
Carbon Fiber Patterned Trim M/T	J1310FA140	\$254.00
Carpeted Floor Covers	J5010FS0010E	\$69.95
Front End Cover-Hood	M0010FS111	\$44.95
Front End Cover-Full	M0010FS140	\$119.95
SPT Decal Set (Blue)	SOA588N400	\$59.95
SPT Decal (Silver/Blue)	SOA588N450	\$59.95
Intermediate Pipe and Muffler	SOA8377500	\$495.00
*SPT Struts	SOA837Z1100	\$575.00
*SPT Springs	SOA855Z1100	\$279.95

* Sold “as is” without any warranty coverage. Intended for off-highway application only. May bring vehicle out of compliance with safety and/or emissions standards. Can only be lawfully installed by end user. See dealer for complete details.

Other 2002 Impreza 2.5 RS and WRX Performance Parts

For additional details about SPT parts including our all new 17" cast alloy wheel for the WRX and performance suspension kit for the 2.5 RS, contact your local authorized Subaru dealer.



Genuine SUBARU Performance Parts

A select group of race-proven performance and appearance parts specially engineered and designed to increase your customer's driving pleasure.

Genuine Subaru Performance Mufflers

Application	Part #	Previous Part #	MSRP
96-99 LEGACY GT SEDAN	SOA8376300	44305AC421	\$375.00
96-99 LEGACY GT WAGON	SOA8376400	44305AC411	\$375.00
98-01 IMPREZA RS COUPE & SEDAN	SOA8376500	44305FA100, 110	\$375.00
00-01 LEGACY GT SEDAN	SOA8377300	44300AE14A	\$375.00
00-01 LEGACY GT WAGON	SOA8377400	44300AE10A	\$375.00



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component is damaged or inoperable, it must be replaced.

Do not drop any of the components. This could alter their sensitivity.

All SRS wiring is enclosed in a yellow housing for quick identification. Always use care whenever working near a yellow harness. If accidentally damaged, the SRS system harness must be replaced.

Note: Never make wiring repairs to any circuit in the SRS system.

Always use a digital multimeter when checking the SRS system components or circuits. Use of an analog multimeter may cause accidental airbag deployment.

Never attempt to measure the resistance of the airbag module.

Never place yourself or test equipment between the airbag module and the front seats when servicing the SRS system.

Note: Review all precautions and service procedures outlined in the service manual.

On-Board Diagnostics

Subaru airbag systems are equipped with self-diagnostic capability. When the system is functioning normally, the airbag warning light will remain on for three seconds and go out when the ignition switch is set to ON.

If there is a malfunction, the airbag warning light will either stay ON or OFF continuously. In such cases, perform the on-board diagnostic in accordance with the specified service manual procedure to determine trouble codes. To retrieve stored diagnostic trouble codes:

1. Turn the ignition switch ON (with engine OFF).
2. Locate the diagnostic connector below the driver's side lower cover of the dashboard, above the accelerator pedal. Connect diagnostic terminal (1) to No. 1 terminal of diagnostic connector (2).
3. Check in accordance with the trouble code indicated by the AIRBAG warning light, and record the trouble codes.
4. Turn the ignition switch OFF and remove the diagnostic terminal from No.1 diagnostic connector terminal.

Clear Memory

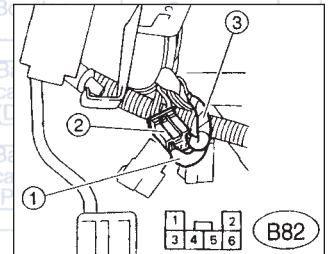
After eliminating the problem according to the trouble code procedures, clear

the memory as follows:

1. Make sure the ignition switch is ON (and engine OFF). Connect one diagnostic terminal (1) on diagnostic connector (2) terminal No.1.
2. While the warning light is flashing, connect the other diagnostic terminal (3) on terminal No. 2 for at least three seconds.
3. After the memory is cleared, the normal warning light flashing rate resumes (Warning light flashes every 0.6 seconds ON-OFF operation.). The memory can't be cleared if an SRS problem still exists.
4. After clearing the memory, remove the diagnostic terminals (1) and (3) from the diagnostic connector (2).

Component Evaluation

If SRS self-diagnosis reveals a fault in the system, or if the vehicle has been involved in



an accident, it will be necessary to evaluate the condition of individual SRS components. Inspection and replacement standards for all Subaru SRS components are detailed in the paragraphs which follow.

Front Sensor(s) (If Applicable)

Inspection Standard:

- Check the front section for damage, regardless of whether or not the airbag deployed; or
- The designated trouble code is outputted during self-diagnosis. Please refer to the diagnostics section in the appropriate service manual for further information.

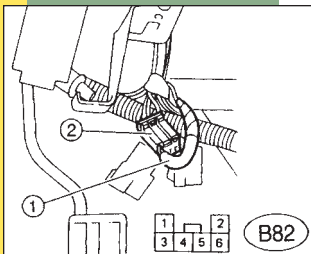


Replace the front sensor(s) if one or more of the following conditions exist:

- Airbag is deployed.



Airbag Warning Light



Reading Diagnostic Codes

Genuine SUBARU Maintenance Parts

Dirt. Dust. Heat. Friction. Contaminants.

They're out there, waiting to rob an automobile of its pep and performance. And its value. Without regular maintenance, even the best designed vehicles soon lose that "new car" feeling.

The answer?

Regular maintenance by trained professionals. And Genuine Subaru Parts, specifically engineered to precise specifications. So they fit right, perform better and last longer.

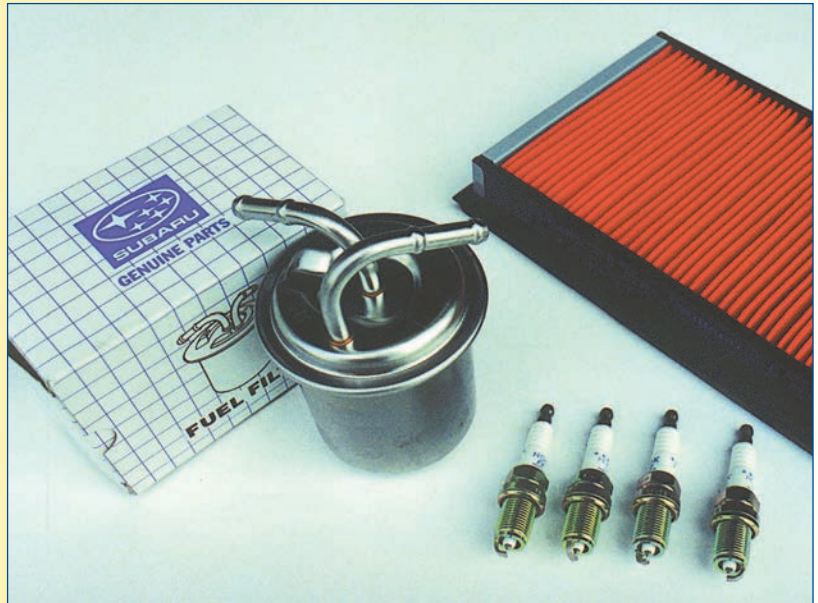
While non-genuine parts may save a few pennies now, car owners often end up paying more for them in the long run. With poor performance. Shorter replacement intervals. And, in some cases, even costly damage as a result of parts that didn't quite fit or didn't quite meet the requirements of the car's original equipment.

Genuine Subaru Parts

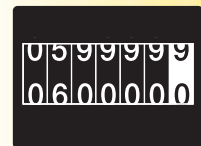
To help Subaru owners get maximum enjoyment and value from their vehicles, your local Subaru dealer maintains a ready supply of frequently needed parts—at prices competitive with off-brand parts. Belts, hoses and spark plugs. Air filters, fuel filters and oil filters. Brake pads and shoes. Ignition wires and everything else you might need to help keep your customers' Subaru vehicles running smoothly. They're all specifically made for Subaru vehicles, and no matter what anyone might tell you, they aren't the same as those aftermarket imitations.

A few examples:

- Genuine Subaru oil filters have a resin-impregnated filter media for high dirt-holding capacity, and are built to rigid Subaru specifications.
- Genuine Subaru air filters have an oiled media of cellulose, synthetic fibers and thermoplastic resins designed for maximum filtering efficiency.
- Genuine Subaru fuel filters have high dirt-holding capacity and stainless steel construction to protect internal components and help prevent leaks.



- Genuine Subaru Micro-V belts are specially constructed with fiber-loaded reinforcement ribs to help resist wear and cracking.
- Subaru V-belts for use in engine drives have thermally active tensile cords for maintenance-free performance.
- Materials of OE brake pads are specifically formulated to be compatible with the rotor surface to help prevent brake judder, noise and excessive heat buildup, which can impair stopping effectiveness.
- Copper spark plugs feature the largest (2.6mm) center electrode in the industry for longer, more effective service life. A solid copper core provides wider heat range for protection from low speed fouling and pre-ignition. A high-alumina ceramic insulator helps resist cracking at high temperatures.
- Platinum spark plugs have up to twice as much platinum as typical aftermarket plugs, which provides long-lasting tune-ups, quicker starts, less wear on ignition components, lower emissions and better fuel economy.



Genuine SUBARU Maintenance Parts

The secret
to long life
and lively
performance:

Regular
maintenance
and Genuine
Subaru Parts.



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- Bracket is cracked, deformed, or damaged in any manner.
- The housing is cracked, deformed, or damaged in any manner.
- The label that identifies the manufacturing number is peeling off or deteriorated.
- Harness circuit is broken, wire core is exposed, corrugated tubing is cracked, etc.
- Front sensor is dropped to the floor or ground.
- Front sensor had been determined to be faulty during self-diagnosis.

Airbag Module (Driver's and/or Passenger's)

Inspection Standard:

- The vehicle is damaged in a collision, regardless of whether or not the airbag deployed; or
- The designated trouble code is outputted during self diagnosis. Please refer to the diagnostics section in the appropriate service manual for further information.

Replace the airbag module if one or more of the following conditions exist:

- The Airbag is deployed.
- The pad surface is scratched, cracked, deformed, or damaged in any manner.
- The harness and/or connector is cracked or deformed, their circuits are broken, wire core is exposed, etc.
- The mounting bracket is cracked, deformed, or damaged in any manner.
- The mounting surface has been fouled with a foreign matter such as oil, grease, water, cleaning solvent, etc.
- The airbag module has been dropped to the floor or ground.
- The airbag module had been determined to be faulty during self-diagnosis.

Airbag Control Module

Inspection Standard:

- The vehicle is damaged in a collision, regardless of whether or not the airbag deployed; or
- The designated trouble code is outputted during self-diagnosis. Please refer to the diagnostics section in the

appropriate service manual for further information.

Replace The Airbag Control Module If One Or More Of The Following Conditions Exist:

- The Airbag is deployed.
- The control module is cracked, deformed or damaged in any manner.
- The mounting bracket is cracked, deformed, or damaged in any manner.
- The connector is scratched, cracked, deformed, or damaged in any manner.
- The control module is dropped to the floor or ground.
- The control module had been determined to be faulty during self-diagnosis.

Inspection Standard:

- The vehicle is damaged in a collision, regardless of whether or not the airbag deployed; or the designated trouble code is outputted during self-diagnosis. Please refer to the diagnostics section in the appropriate service manual for further information.

Replace The Main Harness If One Or More Of The Following Conditions Exist:

- Harness circuit is broken, wire core is exposed, corrugated tubing is cracked, etc.
- Connector is scratched, cracked, deformed, or damaged.
- The designated trouble code is output during self-diagnosis. Please refer to the diagnostics section in the appropriate service manual for further information.



Driver Airbag Module



Passenger Airbag Module



Airbag Control Module



SRS Wiring Harness

Available Now! Additional Applications Through Model Year 1998

Renew Engine Performance... with new Genuine SUBARU Engine Components.



More Reliable than Rebuilts

Restoring an engine's performance with new Genuine Subaru Engine Components is a smart decision. Our new components are far more reliable—and precise—than rebuilt alternatives. Rebuilt engine components are based on existing parts that have failed in service—for example, a rebuilt cylinder head from a core broker or junkyard. A component that has failed once before may fail again—even after rebuilding—for similar reasons.

Rebuilding a component with non-Genuine Subaru parts allows suppliers to shortcut costs by using parts that not only don't meet stringent Subaru standards, but are also inferior in terms of fit and function. With Genuine Subaru Engine Components, you know you're getting the best—whether you're replacing a component or rebuilding an entire engine.

More Affordable than Alternatives

Restoring an engine by using new Genuine Subaru Engine Components may eliminate the expense of purchasing a completely new or rebuilt engine assembly—or even buying a new vehicle! Competitively priced with typical rebuilt parts, Genuine Subaru Engine Components also save time and money during installation compared to non-genuine parts that may require a force-fit. And, most importantly in the long run, they provide the same precise quality

and superb performance as those originally fitted to your customers' engines.

More Easily Available

Most new Genuine Subaru Engine Components are readily available from your Subaru dealer—generally more so than rebuilt engines, which may take weeks to deliver. Genuine Subaru Engine Components mean faster, more convenient turnaround time for your customers.

Why buy an entire engine, new or rebuilt, when all you need is a quality component?

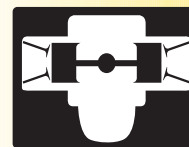
To restore your customers' engines to like-new performance and reliability, specify only the new Genuine Subaru Engine Components that you need.

Quality Tested

100 percent of completed head assemblies are leak-tested after assembly to insure proper seating and sealing of valves.

New Genuine Subaru Engine Components Include:

- Complete Cylinder Head Assemblies, now including additional applications through model year 1998, are all new, not rebuilt, ensuring the best performance and long life. Each assembly is complete, with all-new parts, including the cylinder head itself, valves, springs, seals and retainers. Plus, rebuilding costs are eliminated, since there are no parts or labor charges for servicing and/or rebuilding the old cylinder head(s).
- All-new replacement Short Blocks are manufactured to original equipment specifications, assuring not only precise, hassle-free installation, but predictable performance down the road.



Genuine SUBARU Engine Components

Speed your Subaru engine repair work with the full line of Genuine Subaru Engine Components including oil and water pumps, clutch disks, camshafts, gaskets, seals, belts and more.



**Original Equipment Parts/
Professional Service**

Replace The Combination Switch & Roll Connector If The Following Condition Exists:

- The combination switch or steering roll connector is cracked, deformed, or damaged in any manner.

Steering Wheel

Inspection Standard:

- The vehicle is damaged in a collision, regardless of whether or not the airbag deployed.

Replace The Steering Wheel If One Or More Of The Following Conditions Exist:

- The steering wheel is cracked, deformed, or damaged in any manner.
- Ensure that the new airbag module fits properly in the steering wheel when installed.
- After installing the airbag module, ensure that it is free of interference with the steering wheel. Clearance between all points should be equal.

Steering Column Assembly

Inspection Standard:

- The vehicle is damaged in a collision, regardless of whether or not the airbag deployed.

Replace the steering column assembly if one or more of the following conditions exist:

- Ensure that the steering wheel free play, in axial and radial directions and is within specifications. Please refer to the diagnostics section in the appropriate service manual for further information.
- Ensure that the clearance between the steering column bracket and capsule is within specifications. Please refer to the diagnostics section in the appropriate service manual or Subaru Service Bulletin number 17-01-92, Item 4, for further information.

Side Airbag Module (Driver's and/or Passenger's, If Applicable)

Inspection Procedure:

- The vehicle is damaged in a collision, regardless of whether or not the airbag deployed; or
- The designated trouble code is out-

puted during self diagnosis. Please refer to the diagnostics section in the appropriate service manual for further information.

Replace the side airbag module if one or more of the following conditions exist:

- The Airbag is deployed.
- The pad surface is scratched, cracked, deformed, or damaged in any manner.
- The harness and/or connector is cracked or deformed, their circuits are broken, wire core is exposed, etc.
- The mounting bracket is cracked, deformed, or damaged in any manner.
- The mounting surface is fouled with a foreign matter such as oil, grease, water, cleaning solvent, etc.
- The airbag module has been dropped.
- The airbag module had been determined faulty during self-diagnosis.

Side Airbag Sensor (Driver's and/or Passenger's, If Applicable)

Inspection Standards:

- Check the side section of the vehicle for damage, regardless of whether or not the airbag deployed; or
- The designated trouble code is outputted during self- diagnosis. Please refer to the diagnostics section in the appropriate service manual for further information.

Replace the side airbag sensor(s) if one or more of the following conditions exist:

- Airbag is deployed.
- Bracket is cracked, deformed, or damaged in any manner.
- The housing is cracked, deformed, or damaged in any manner.
- The label that identifies the manufacturing number is peeling off or deteriorated.
- Harness circuit is broken, wire core is exposed, etc.
- Sensor has been dropped.
- Sensor determined faulty during self-diagnosis.

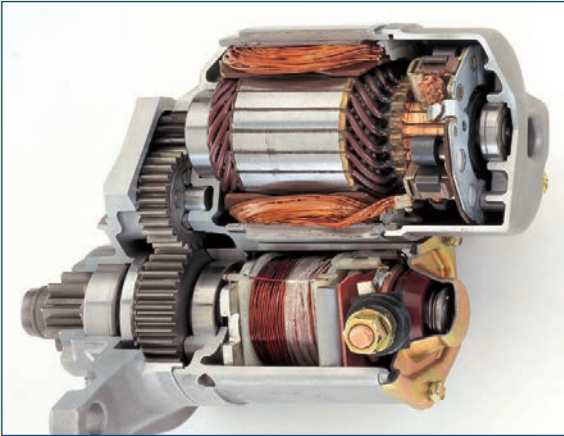


Roll Connector



Steering Column

All Genuine SUBARU Remanufactured Parts...



Meet Strict Subaru of America Authorized Genuine Parts Specifications and Perform Like New...

Since they are remanufactured by Subaru original suppliers, they incorporate the latest design enhancements, meet the latest, most stringent OEM specifications and perform exactly like new Genuine Subaru parts.

Provide Exact Replacement and Perfect Fit...

They're designed and engineered to be exact replacements for the original part that was installed on the car. All Subaru approved remanufacturing processes meet precise engineering standards.

Ensure Long Term Reliability...

The highest level of quality control and meticulous attention to detail means you can count on long term, best possible performance.

Assure Uncompromised Safety...

Because you don't just repair or replace items that are defective, worn out or broken, but instead replace all critical components with new Genuine Subaru parts, your customers can depend on miles of trouble-free driving and unsurpassed safety.

Are backed by Genuine Subaru Parts Limited Warranty...

Since they're as good as new, they're backed by the Genuine Subaru Parts Limited Warranty. Contact your dealer for complete details on all Genuine Subaru Remanufactured Parts Limited Warranties.

Are Fully Restored...

Many components that some rebuilders consider satisfactory are automatically replaced with new components in our remanufactured parts. Remanufacturing parts may cost a little more than rebuilding, but it's the only way to ensure the same quality, performance and safety standards provided by an original part. And there are still substantial savings over new replacement parts.

Must Pass the Same Tests as New Parts...

Unlike rebuilt parts—which are repaired just enough to pass the rebuilder's tests—our remanufactured parts must pass the same tests as a new part at each stage of reassembly. At the end of the line, every part must meet all of the quality control standards—the same tolerances and specifications—that the factory has established for new parts. Parts that don't pass all this precision testing never leave the factory.

And Cost Less Than New Parts.

Genuine Subaru Remanufactured Parts cost less only because they cost less to build. Instead of raw material, they start with a "core"—a used part that's been returned. Every core that's returned is checked by factory inspectors. If it's worn out, it's thrown out. Otherwise, it is disassembled, cleaned, machined and refitted with new components.



Genuine SUBARU Remanufactured Parts

In short, Genuine Subaru Remanufactured Parts offer great value: the same quality and performance as a new unit, but at a reasonable price with substantial savings.



Original Equipment Parts/
Professional Service

Subaru

Air Suspension

Part Two — Diagnosis

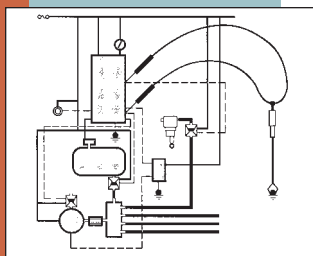
In the previous *End Wrench* (Summer 2001), we discussed the operation of the Subaru air suspension system (*Subaru Air Suspension Part One - Operation*, page 16). In this article, we will explain the diagnostic procedures and tools necessary to repair this system.

Testing a Solenoid Valve

To test the solenoid valve in an individual strut, perform the following steps:

- turn the ignition switch to OFF,
- connect a fused jumper wire between a known good ground and the strut solenoid's terminal in the control unit connector (back-probe connector at the control unit, do not disconnect)
- connect a fused jumper wire between a known good ground and the air charge solenoid's terminal in the control unit connector (back-probe connector at the control unit, do not disconnect),
- turn ignition switch to ON.

The strut should now begin to raise with pressure from the tank. When tank pressure drops to 109 psi, the pressure switch should close, and the control unit should turn on the compressor. If either solenoid fails to energize, make sure your connections are good, then check the solenoid with a multimeter.

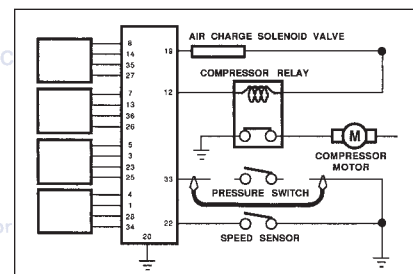


Energizing Two Solenoids to Inflate Strut

Compressor Does Not Run

If the compressor fails to run during any strut-inflation checks, the pressure switch may be faulty. The following paragraphs describe several checks you can make.

You can bypass the pressure switch to see if that causes the control unit to turn the compressor on. To do that, separate the connector from the pressure switch. On the harness side, connect a jumper between the two terminals. This should



Air Suspension Electrical Circuit

Genuine SUBARU Replacement Mufflers...

for Perfect Fit and Function.

Unlike typical generic mufflers, ONLY Genuine Subaru Replacement Muffler Assemblies offer these unique advantages...

Welded, One-Piece Assembly

A Genuine Subaru Replacement Muffler Assembly is a complete, all-welded, one-piece unit that ensures easy and precise installation and fit—the same exact fit as the assembly supplied on the vehicle as original equipment. A Genuine Subaru Replacement Muffler Assembly eliminates the need to deal with the all-too-common combination of leak-prone pipe adapters; cumbersome, multiple clamps; and adaptable hangers that never fit quite right.

Fully Aluminized Steel Construction

A Genuine Subaru Replacement Muffler Assembly is a heavy-duty, integrated unit of thicker materials than typical aftermarket mufflers. Special corrosion-resistant aluminized steel construction allows for long life. Sound absorbing materials help subdue sound without hampering performance—

unlike typical replacement mufflers with few baffles to suppress exhaust noise.

Specifically Designed for Your Customers' Cars

A Genuine Subaru Replacement Muffler Assembly is designed for each Subaru vehicle application—not “cross-fitted” to multiple makes and rigged with adapters. All mounting parts precisely match the original Subaru assembly for easy, safe, no-rattle replacement.

Backed by Warranty

A Genuine Subaru Replacement Muffler Assembly is backed by the Genuine Subaru Parts warranty that covers the entire, integrated unit—not just the muffler itself—including welded-on pipes, clamps, and hardware.

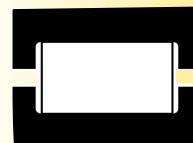
Typical warranties cover the muffler “box” only. When it rusts out and is replaced under warranty, you still pay for the related pipes, adapters, clamps and hangers used during replacement—unless you’ve chosen a Genuine Subaru Replacement Muffler Assembly, with no hidden costs. Contact your dealer for complete warranty details.



Genuine Subaru Replacement Mufflers Now Includes Performance Mufflers 1996–2001

Application	New Part Number	Previous Part Number	MSRP
82-87 BRAT	SOA8375100	SOA5225119	\$89.95
80-84 STATION WAGON & 4-DOOR SEDAN			
81-89 HATCHBACK	SOA8375200	SOA5225119	\$89.95
87-94 JUSTY	SOA8375300	744304451	\$89.95
85-93 LEONE/LOYALE SEDAN	SOA8375600	44301GA211	\$69.95
85-90 LEONE/LOYALE SEDAN-TURBO		44301GA221	
86-90 LEONE/LOYALE 3-DOOR	SOA8375600	44301GA211	\$69.95
86-90 LEONE/LOYALE 3-DOOR-TURBO		44301GA221	
85-94 LEONE/LOYALE WAGON	SOA8375700	44301GA231	\$69.95
85-90 LEONE/LOYALE WAGON-TURBO		44301GA241	
85-87 XT (THRU 12/86) INCL. TURBO	SOA8375800	44304GA321	\$129.95
87 XT TURBO (FROM 1/87)		44304GA341	
87-91 XT (FROM 1/87)		44304GA361	
87-91 XT6			
90-94 LEGACY (2WD) WAGON	SOA8375500	44304AA080	\$129.95
90-94 LEGACY (2WD) SEDAN	SOA8376000	44304AA110	\$129.95
90-94 LEGACY (4WD) SEDAN	SOA8375900	44304AA120	\$129.95
90-94 LEGACY (4WD) WAGON	SOA8375400	44304AA130	\$129.95
93-96 IMPREZA 1.8L (2WD)	SOA8376100	44305FA061	\$129.95
93-96 IMPREZA 1.8L (4WD)	SOA8376200	44305FA071	\$129.95
95-97 LEGACY (2WD) 2.2L WAGON	SOA8376800	44305AC110	\$129.95
95-97 LEGACY (2WD) 2.2L SEDAN	SOA8377100	44305AC090	\$129.95
95-97 LEGACY (AWD) 2.2L SEDAN	SOA8377000	44305AC100	\$129.95
95-97 IMPREZA (ALL) 2.2L; 97 1.8L (ALL)	SOA8377200	44305FA100	\$129.95
Genuine Subaru Performance Mufflers			
96-99 LEGACY GT SEDAN	SOA8376300	44305AC421	\$375.00
96-99 LEGACY GT WAGON	SOA8376400	44305AC411	\$375.00
98-01 IMPREZA RS COUPE & SEDAN	SOA8376500	44305FA100, 110	\$375.00
00-01 LEGACY GT SEDAN	SOA8377300	44300AE14A	\$375.00
00-01 LEGACY GT WAGON	SOA8377400	44300AE10A	\$375.00

IMPORTANT NOTE: Federal and California law prohibits use of these parts in making repairs covered under emissions-related warranties extended on the vehicle at the time of its original purchase. No claims under those warranties will be honored unless OEM parts are used.



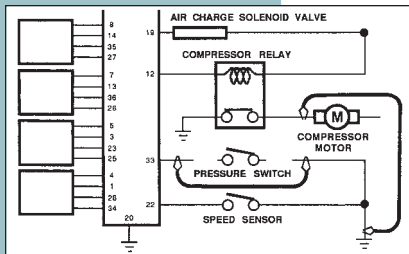
Genuine SUBARU Replacement Mufflers

Wouldn't your customers prefer Genuine Subaru Replacement Mufflers? They're domestically-sourced and competitively priced with aftermarket mufflers.

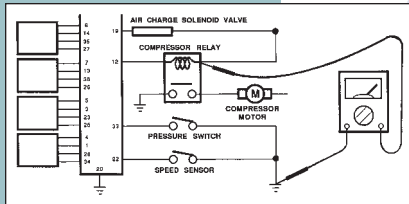


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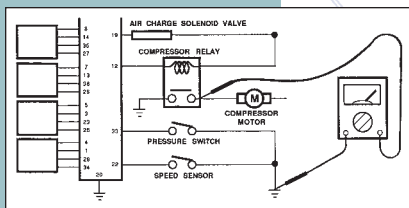
have the same effect as if the pressure switch had closed its contacts.



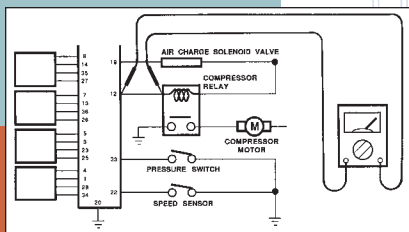
Bypassing Pressure Switch with Jumper Wire



Bypassing Compressor Relay with Jumper Wire



Checking for Voltage at Relay Coil Input



Checking for Continuity Between Relay Coil and Control Unit

If the compressor now runs, you know the pressure switch is faulty. Replace it and re-test the system. If the compressor still does not run, bypass the compressor relay. To do that, connect a second jumper between a known good ground and the compressor motor.

If the compressor runs, check the relay next. You can either try a new relay or continue checking with the jumper wire. If the relay is good, next make sure its coil and contacts are getting power.

If you do not measure battery voltage at the relay terminals, check the fuse connectors and wiring between the relay and the battery. If the relay is getting power, check for continuity between the relay and the control unit (at pin 12).

If you find continuity between the coil of the relay and the control unit, then the control unit is not closing a path to ground for the compressor. Replace the control unit and re-test the system.

Note: A failed control unit is the least likely failure in the system. Make sure you have properly done all the other tests before replacing the control unit.

Unusual and Deceiving Faults

Leak

An air leak in the system will likely cause the control unit to shut off the system after 8 to 10 minutes. In most cases, an air leak will eventually cause the control unit to run the compressor for that length of time, trying to either inflate a strut or raise pressure in the tank.

Valve Stuck Open

If a strut solenoid valve sticks open, the following sequence of events will occur (example deals with a right front strut valve):

- When the control unit tries to raise the rear of the vehicle, the right front strut also raises.
- Soon the right front strut height sensor

reports that it is too high.

- Because control unit logic commands “lower before raise,” the control unit stops trying to raise the rear and begins to lower the right front strut.
- When the right front strut height sensor reports that it has been lowered to the normal position, the control unit once again begins trying to raise the rear.
- Again the right front strut raises along with the rear.

This process can continue indefinitely. The system would not recognize that a fault existed. The owner might report that the compressor seems to be running a lot.

Bad Pressure Switch

A defective pressure switch can give some misleading symptoms. Here is just one example:

- Air pressure in the tank is low, but the pressure switch fails to close; the control unit does not know pressure needs to be raised.
- While driving, the control unit gets a signal from the right front strut height sensor that the air spring is low.
- The control unit opens the air charge valve and the right front strut valve.
- The expected result is that the air spring in that strut should inflate, but because tank pressure is low, this does not happen. The control unit keeps the two valves open for 8 to 10 minutes, then shuts off the system and flashes the height indicator.
- Control units with self-diagnostic capabilities (see next section) may incorrectly set a fault code indicating a failed strut solenoid.

Self-Diagnostics

Model year 1988 and later L-series vehicles are equipped with control units that have self-diagnostic capabilities. To use the self-diagnostic feature in 1988 and later L-series vehicles, command the control unit to enter diagnostic mode using the following steps in sequence, all within one minute:

- turn the ignition switch OFF and set the height switch to ON (high),
- turn the ignition switch ON then OFF,

Genuine SUBARU Automotive Chemicals...

Provide Protection and Enhance Performance.

When it comes to fluids and other chemicals you put in a car, there's only one way to be sure you're meeting the same high standards of original Subaru equipment: Use Genuine Subaru Automotive Chemicals.

Subaru Now Offers A Full Line of Quality Tested Aerosols and Fluids

This line covers all the essential service chemicals. From coolant and automatic transmission fluid to brake fluid and fuel injector cleaner, these premium chemicals are all approved by Subaru for use in Subaru vehicles. Each automotive chemical is engineered to assure maximum performance and trouble-free driving. And because they're competitively priced, you can use it day in and day out on all your service work and make extra money at the same time.

All Refrigerants Are Not Created Equal!

Genuine Subaru R-134a Refrigerant, unlike many after-market products, is manufactured



and packaged to the stringent Air Conditioning and Refrigerant Institute (ARI) 700 standard. This means possible contaminants are meticulously controlled, including moisture and non-condensable gases that can cause premature compressor failure and result in costly repair.

Genuine Subaru Automotive Chemicals

ITEM	CONTENTS	CASE QTY.	PART #	NOTES	UNIT MSRP
AEROSOLS					
Brake Cleaner	18 oz. net wt.	12	SOA868V9100		\$ 3.15
N/C Brake Cleaner	14 oz. net wt.	12	SOA868V9110	Non-Chlorinated	\$ 3.15
Carburetor Cleaner	11.3 oz. net wt.	12	SOA868V9120		\$ 2.73
Glass Cleaner	18 oz. net wt.	12	SOA868V9130		\$ 2.73
Aerosol Fuel Injector Cleaner	7 oz. net wt.	12	SOA868V9140	Aerosol/Rail Applied	\$ 15.08
Application Tool for Fuel Injector Cleaner			SOA868V9410		\$ 232.22
Application Tool Adapters			SOA868V9420	Incl. Hose Adapters, Fuel Block-off Clamps, etc.	\$ 77.33
Pour Fuel Injector Cleaner	16 fl. oz.	12	SOA868V9150	Fluid/Gas Tank Additive	\$ 5.67
Top Engine Cleaner	11 fl. oz.	24	SOA868V9160		\$ 2.73
Application Tools for Top Engine Cleaner			SOA868V9430	Incl. Tubes, Connectors, etc.	\$ 33.72
Throttle Plate Cleaner	4 oz. net wt.	12	SOA868V9170		\$ 1.68
Silicone Lubricant	12.5 oz. net wt.	12	SOA868V9200		\$ 2.94
FLUIDS					
Factory Fill Coolant	1 gal.	6	SOA868V9210	Required for warranty repairs	\$ 12.04
Brake Fluid	12 fl. oz.	24	SOA868V9220	Required for warranty repairs	\$ 2.83
Factory Fill Windshield Washer Concentrate	16 fl. oz.	24	SOA868V9230		\$ 2.53
Factory Fill Auto Trans Fluid/Power Steering Fluid	32 fl. oz.	12	SOA868V9240	Required for warranty repairs	\$ 3.22
REFRIGERANT					
R-134a Refrigerant	30 lbs.	1	SOA868V9310		\$ 188.78

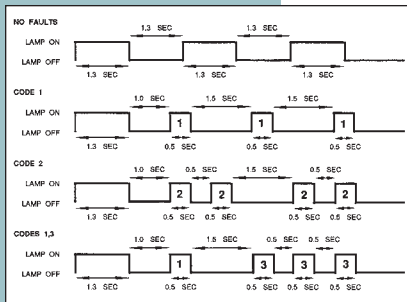


Genuine SUBARU Automotive Chemicals

Now you can provide your customers with Genuine Subaru Chemicals that are tested and approved by Subaru engineers to meet the operating specifications of Subaru vehicles.



Original Equipment Parts/
Professional Service



Interpreting Fault Codes

CODE #	ITEM TO CHECK	PROBABLE FAULT	POSSIBLE CAUSE
1	HEIGHT SENSOR (right front)	"IMPOSSIBLE" SIGNAL	FAULTY HEIGHT SENSOR
2	HEIGHT SENSOR (left front)	* More than 2 switches closed	SHORT CIRCUIT IN HARNESS
3	HEIGHT SENSOR (right rear)	* "illegal" combinations of continuity	SHORT CIRCUIT IN CONNECTOR
4	HEIGHT SENSOR (left rear)		
5	SOLENOID VALVE (right front)		FAULTY STRUT VALVE
6	SOLENOID VALVE (left front)	ECU TIME-OUT	LEAK OR CLOG IN AIR LINE
7	SOLENOID VALVE (right rear)	* Tried to raise strut for more than 6-10 minutes	FAULTY ECU
8	SOLENOID VALVE (left rear)	* Tried to lower strut for more than 6-10 minutes	SHORT CIRCUIT OR OTHER FAULT IN WIRING HARNESS
9	COMPRESSOR RELAY		FAULTY RELAY LEAK IN AIR TANK FAULTY STRUT VALVE SHORT CIRCUIT IN HARNESS FAULTY WIRING
10	AIR DISCHARGE SOLENOID VALVE	CODE 5, 6, 7, or 8 was detected while this solenoid was on	FAULTY DISCHARGE VALVE FAULTY STRUT VALVE CLOSED AIR LINE SHORT CIRCUIT IN HARNESS FAULTY WIRING

Troubleshooting Air Suspension with Fault Codes

- set the height switch to OFF,
- turn the ignition switch ON then OFF,
- set the height switch to ON,
- turn the ignition switch ON.

The height indicator will now flash to indicate any fault codes present. To read the fault codes, count the number of blinks as shown in the illustration.

To command the control unit to exit the diagnostic mode, turn the ignition switch to OFF, then to ON. If the system malfunction has not been eliminated, the height indicator will again flash (either immediately or after the 8-10 minute delay, depending on the fault).

When you have successfully repaired a malfunction, clear the control unit's memory of fault codes. To do that, momentarily remove Fuse #5 (with the ignition switch set to OFF) or disconnect the negative battery terminal.

Self-Diagnostics For Vehicles Not So Equipped

The control units in pre-1988 model year L Series and XT Series vehicles do not have self-diagnostic capabilities. However, it is possible to temporarily install a control unit with self-diagnostic capabilities for the purpose of troubleshooting.

To perform this procedure, you will need the control unit and (depending on the vehicle) two other items:

- electronic control unit (P/N 88045GA100)
- height switch (P/N 83002GA620)
- test connector (check code) (P/N 81805GA990)

The first step is to replace the vehicle's Air Suspension control unit with the test control unit. Then you will need a method of commanding the control unit to enter diagnostic mode. Recall that the height switch is used in combination with the ignition switch to command the control unit to enter diagnostic mode.

Height switches in 1988 and later

L-series vehicles are push-on/push-off type switches. Early model year height switches are of a momentary contact type. Also, XT models with VIN JF1 have no height switch at all.

If you are working on a vehicle with a momentary contact type switch or without any switch, you can compensate in one of several ways:

- hold a momentary type switch in the ON position manually during those parts of the sequence where the switch must be ON,
- replace a momentary type switch with a 1988 or later type switch,
- install the test connector, then connect a detached height switch to the test connector,
- use a jumper to short the test connector (simulate having height switch to ON by shorting two terminals in the test connector).

To use the test connector on XT models, connect it in place of the 21-pin control wing switch connector. Connect a detached height switch to the test connector. Remember when doing this procedure that the normal control wing switch functions will then be inoperative. When you have set up one of the above mentioned methods of signaling the control unit, enter the diagnostic mode by doing the following steps in sequence, all within one minute:

- turn the ignition switch OFF and set the height switch to ON (high),
- turn the ignition switch ON then OFF,
- set the height switch to OFF,
- turn the ignition switch ON then OFF,
- set the height switch to ON,
- turn the ignition switch ON.

The height indicator will now flash to indicate any fault codes present. Refer to the table to interpret any fault codes blinked out by the height indicator.

Select Monitor Diagnostics

The Select Monitor can be used to diagnose air suspension systems on 1990 and later model year Legacy vehicles. Use cartridge P/N 498347700 for this application.

Use the Select Monitor to activate the solenoids and the compressor, to read



96% OUT OF 100

SUBARU VEHICLES SOLD IN THE LAST 10 YEARS ARE STILL ON THE ROAD*

People love their Subaru cars so much, they hold on to them longer than other cars. And they're willing to invest in them, even when high mileage necessitates engine and transmission replacement.

Fortunately, commitment for them means opportunity for you! And to help you meet your customers' needs (and budget), Subaru offers a broad line of competitively priced Genuine Subaru Engine components and Remanufactured Parts. To find your local dealer call **1-800-SUBARU3** or visit us online at **www.subaru.com**.

* Based on R.L. Polk & Co. Registration statistics as of 7/1/2000.

SUBARU 
Genuine Parts



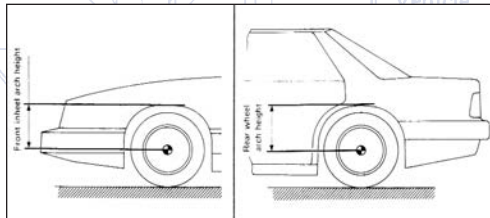
**New Cylinder Head Assemblies (1985-1998) • New Replacement Short Blocks and related engine parts (1985-2001)
Remanufactured parts including Automatic Transmissions (1990-2001) • Brake Calipers • Starters • Alternators • Front Drive Axles**

signals from the height sensors and the speed sensor and to read fault codes.

Refer to the appropriate model year Subaru service manual and the Select Monitor user's guide for additional instructions.

Measuring Ride Height

When you evaluate a system for proper ride height, it is important to know where the specifications should be measured. The measurement method is not the same for every vehicle. As an example, ride height for the Legacy is measured as the distance between the center of the wheel hub and the top of the wheel arch in the fender.



Measuring Legacy Ride Height

On the other hand, ride height for L-series and XT vehicles is measured as ground clearance (the distance between a specific suspension part and the ground).

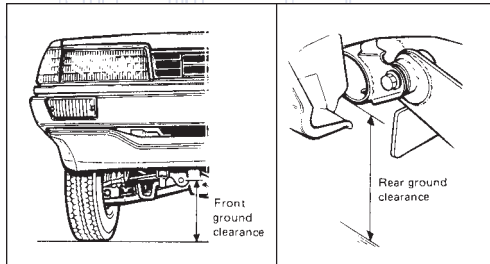


Figure 10 Measuring L-series Ride Height

Check the appropriate model year service manual for the specifications and the method that apply to the vehicle you are testing.

Air Leaks

To make air pressure checks in various parts of the air suspension system, connect the three-way joint (P/N 926940000) into the line, with a pressure gauge connected to the third port. You can use the high side gauge of an A/C gauge set to measure pressure.

When you need to remove or install an air pipe, be sure to use the special tool (P/N 926520000).

This will prevent damage to the air pipe and its fittings.



Spray Bottle for Leak Detection

To isolate a leak, connect the three-way joint into the system at the point where you think the leak may be. Use your fused jumper to energize solenoid valves as needed to pressurize that part of the system. Then watch the gauge to see if pressure holds or leaks.



Figure 12 Air Leak Soap Bubbles

In-Dash Cigarette Lighter Usage

Some Subaru owner's manuals state that the in-dash cigarette lighter cannot be used as an accessory power outlet. Fuji Heavy Industries included the statement in the manuals in the interest of customer safety.

If the in-dash lighter receptacle is ever used for a plug-in accessory such as a cellular phone, the portion of the receptacle's internal mechanism (bi-metal) that causes a cigarette lighter plug to 'pop out' after its lighter element is heated may be damaged. Placing a lighter plug in a receptacle that has been damaged by a plug-in accessory may cause the plug to stick and overheat, which may in some cases cause a fire in the receptacle that can spread to surrounding areas.

In the interest of customer satis-

faction, Fuji Heavy Industries has agreed to change subsequent owner's manuals to allow the use of the in-dash receptacle as an accessory plug, but only if it is not also used as a cigarette lighter.

Note: The cigarette lighter receptacle can be used as a cigarette lighter or an accessory plug, but cannot be used as a cigarette lighter and an accessory plug. If the lighter socket is used even once for an accessory plug-in item, then it must never be used to operate the cigarette lighter element. The entire socket must be replaced with a genuine Subaru cigarette lighter element if the customer ever wants to use it as a cigarette lighter again.

Legacy A/C Compressor

Due to laws concerning refrigerant release into the atmosphere, air conditioning manufacturers are recommending alternative system

flushing procedures to comply with the Montreal protocol.

If you encounter a customer complaint of A/C blowing warm air and after basic diagnostics (gauge readings, etc.), the compressor is found to be seized or not pumping, examine the oil from the failed compressor for metal particles. If you find metal particles, make sure the entire system is flushed using a solvent such as "Brake Clean" and shop compressed air. Permatex, CRC, Snap and others offer a brake parts cleaner that dries with no residue. Just changing a receiver dryer may not be enough to stop the particles from clogging the expansion valve and possibly the bellows valve in the compressor. Compressed air may contain moisture, so evacuate the system longer than the 30 minutes allowed for a new system that has not been opened to the atmosphere.

Continued on page 24.

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Electrical Problems? Check The Fuse

These little circuit protectors are frequently misdiagnosed as being good, when, in fact, they are bad. They can be misdiagnosed as good if they are checked with a test light while still installed in the fuse box, using the exposed metal areas of the fuse. Many times, voltage in a circuit with a blown fuse, will “back-track” through the electrical system and allow voltage to be present at both sides of a blown fuse when checked with your test light.

The best way to avoid being fooled by a blown fuse is to physically remove it from the fuse box and look at it. This procedure may take a little longer than the test light method. However, in the long run, it could save you a lot of time and aggravation.

Changing Wire Colors

Electrical component wiring from the unit to the connector can change wire color due to the vendor’s choice and won’t always match the Service Manual schematic.

However, wire colors from the vehicle’s harness should match your service manual schematics. Always verify wire color when testing a circuit. Pin number terminals are a safe bet when testing. How to read service manual connectors:

- Component connectors viewed from the front are numbered right to left.
- Vehicle harness connectors viewed from the front are numbered left to right.

Diagnostic Trouble Codes

Any time you look up any diagnostic trouble code, a small schematic is also shown on the page along with a trouble tree to diagnose for that code. These schematics are for quick reference and do not show the many connectors between the Electronic Control Unit (ECU) and the component. Also, many times the wire colors shown on the trouble code schematic are for a particular model, such as an air suspension-equipped vehicle, but the vehicle you are working on may not have the same equipment.

Whenever testing or researching a harness problem for a trouble code, always consult the full wiring schematics in the service manual for a more complete and accurate view of a connector location and harness routing.

Models Equipped With Knock Sensors

The knock sensor is designed to sense knocking signals from each cylinder. The knock sensor is a piezo-electric type element which converts knocking vibrations into electrical signals. The electrical signal is sent to the ECM, which changes the ignition timing to reduce the engine knock or ping. For this system to work correctly, the sensor must first hear the engine ping. The driver of the vehicle may also hear a small engine ping. A delay of approximately 1-2 seconds is normal, depending on the fuel quality, engine load, air temp, etc. At this time, the ECM will retard the timing.

This function can be viewed on the Select Monitor RTRD mode. When the knock is eliminated, the timing is gradually advanced to the specified setting. If engine ping is heard again this process is repeated. This will continue until the knock sensor no longer hears the engine knock or ping.

Note: this is normal operation of the knock sensor. Do not try to repair it.

When you have a customer complaint of an engine ping, make sure you ask the right questions.

Before Repair:

1. When do you hear the engine ping (hot, cold, engine load, uphill, etc.)?
2. How long does it last (seconds)?
3. What type of fuel is in the vehicle (is it the right fuel, turbo/SVX)?
4. When did this condition start (since new or at what mileage)?

When Repairing:

1. Always duplicate the condition first (maybe it’s a normal condition).
2. Always check the engine with the select monitor.
3. Always check the fuel quality at the filter (dirt, water, etc.).

Six-Step Electrical Troubleshooting Method

Step 1: Verify The Problem. Does the problem exist?

Step 2: Determine Related Symptoms. What else doesn't work?

Step 3: Isolate The Problem. Narrow diagnosis to a specific circuit.

Step 4: Identify The Cause. What is wrong in the circuit?

- open circuit?
- short circuit?
- loose connection?
- failed component?

Step 5: Repair The Problem. Fix what is wrong.

Step 6: Verify The Operation. Does it work?

Split-Half Technique

1. Use the proper wiring diagram.
2. Divide the circuit in half.
3. Check half the circuit at a time.

4. Repeat the process until the problem is found.

Ignition Relays

Ignition relays are available separately and do not have to be replaced as an assembly (relay and mounting bracket). It is advisable that only the relay be ordered when only the relay needs to be replaced, especially if this is a warranty repair. Also, regardless of supersessions listed in the parts system or not, the latest part number should be used for all applications.

The typical symptom of an ignition relay failure includes some or all of the following conditions:

1. No engine start, hard engine starting or rough idle after starting, especially with a cold engine.
2. No reading on the Select Monitor while the rough idle is occurring.
3. Check Engine light on after starting the engine.

4. Any combination of trouble codes 24 and 35 in memory and/or D Check.

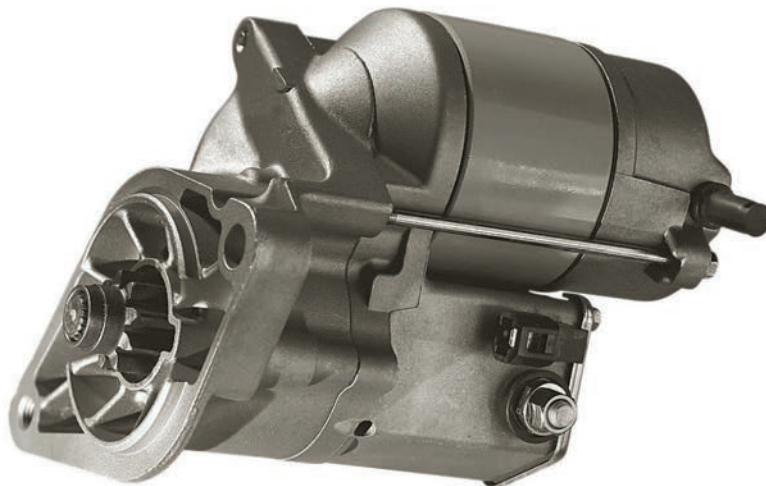
These symptoms do not necessarily indicate that the relay is the cause of the complaint but they can be used as a guideline to aid in the diagnosis.

1995 Legacy Speed Limiting Device

Incorporated in the fuel injection computer logic is an injector cutoff at 113 mph. Since there is no public road in the United States that has a legal speed limit anywhere near that high, this information was not included in the Owner's Manual. From a technical point of view, however, it is good for you to know about it in case of speed sensor malfunction. If the Select Monitor erroneously show a speed of 113 mph or higher, you can expect the injectors to be cut off until the speed-indication on the monitor displays under that speed.

Continued on page 30.

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Subaru Oil Change Service Information

When performing an oil change service on Subaru vehicles, don't confuse the drain plugs and filters located under the vehicle. Subaru models produced over the past several years feature an under-engine cover. This cover greatly reduces the accumulation of dirt and grime on the engine and also reduces the overall coefficient of drag of the vehicle. However, it does limit the access to the engine oil drain plug and engine oil filter.

Items to remember when performing services on Subaru vehicles:

- The engine oil filter is located at the front of the engine.
- The engine oil pan and 17 mm oil drain plug are painted black and are located directly under the engine — above the under-engine cover.
- The engine oil dipstick is located under the hood, on the front driver's corner of the engine.
- The transmission front differential is bright aluminum with a gold-colored 21 mm drain plug. This housing is bolted directly behind the engine and is filled with GL-5 gear oil.
- The differential dipstick is located under the hood near the firewall, on the passenger side of the differential housing.
- The transmission pan is black. Its 17 mm drain plug is located on the driver's side of the pan. The drain plug is normally silver in color, but black drain plugs have also been installed on occasion. The transmission is filled with Dextron II ATF.
- 1999 and later Subaru vehicles equipped with automatic transmissions have a screw-on filter on the driver's side of the transmission. Do not confuse this with the engine oil filter. The transmission filter does not require service under normal conditions.
- The automatic transmission fluid dipstick is under the hood, on the driver's side of the car near the firewall.
- All three dipsticks have yellow handles for easy identification.
- Always confirm proper lubricant levels in each unit after performing any service.

1995 Subaru Legacy - DTC P0325: Knock Sensor Circuit Malfunction

If you encounter a CHECK ENGINE light with a DTC P0325 on a 1995 Subaru Legacy, check to see if the knock sensor mounting bolt has been torqued too tightly upon installation. Also check the threads of the sensor mounting bolt and the thread surfaces of the block to see that they are clean and not corroded. Any corrosion should be removed before installing the bolt.

The correct torque for the mounting bolt is 15-19 ft. lbs. This information is not found in the service manual.

Subaru Legacy - DTC P0130: Front Oxygen Sensor Circuit Malfunction

If you encounter a DTC P0130 on a 1995 Subaru Legacy, check that the BR wire in connector B22 (16 pin/light gray—Main Engine Harness) is properly inserted into the connector. This connector is not shown in any wiring diagram related to this code.

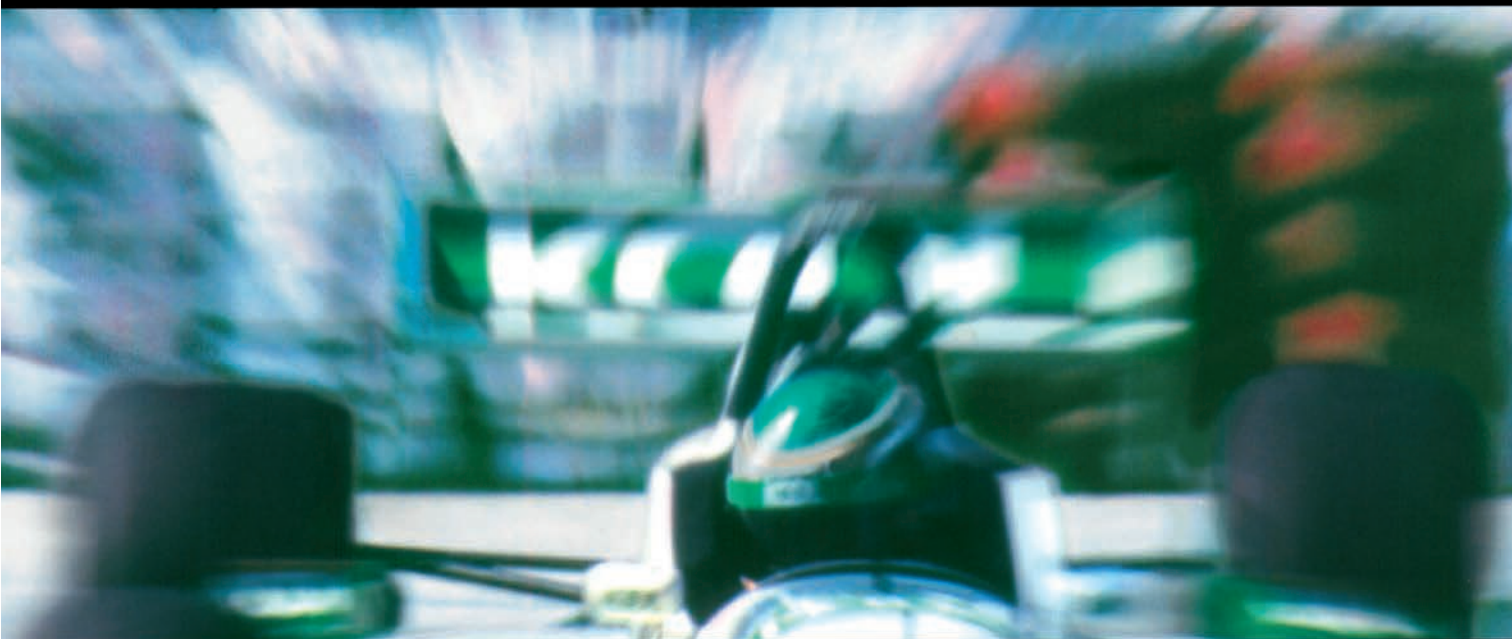
Electrical Problems? Check The Alternator

If you encounter a customer complaint of the speedometer needle jumping, dash warning light(s) on/glowing dimly, or an engine driveability problem, etc., check the alternator. One of the simplest ways to see if the alternator is causing the problem is to unplug it. The vehicle will/should run fine with the alternator out of the picture.

If the problem is gone with the alternator disconnected, then quite possibly you have found the source of the problem. It's now up to you to check the alternator/charging system more closely to determine the exact cause.

The battery is only used to start the vehicle and to back up the charging system when/as necessary. When the vehicle is running, it's the alternator's job to supply electrical energy. If the alternator isn't capable of supplying the correct voltage/amps (too much or too little), you can have a problem. It's a pretty simple test if you have the correct equipment. Many shops do, yet fail to utilize this equipment. This may save you and the customer, a lot of time.

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