



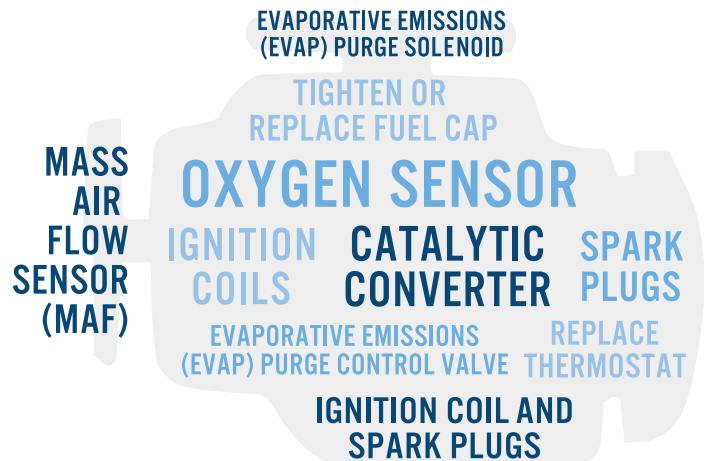
2016 VEHICLE HEALTH INDEX™

INTRODUCTION

The 2016 CarMD® Vehicle Health Index™ reports on the most common check engine light-related problems, repairs and associated repair costs. Published annually since 2011, this Index provides consumers, media, the automotive industry and fleet managers with year-over-year car repair data, shedding light on trends influencing the type and cost of repairs. In this Index you will find:

- 25 most common vehicle repairs in the U.S. – 2015
- Overview of the 10 most common check engine light repairs – 2015
- 10-year history of U.S. car repair costs, including parts & labor – 2006 – 2015
- Breakdown of how vehicle age impacts repair costs (MY 2016, 2011, 2006, 2001, 1996)
- Breakdown of car repair issues by region – 2015
- 10 most expensive check engine light repairs – 2015
- 10 least expensive check engine light repairs – 2015

TOP TEN CHECK ENGINE LIGHT REPAIRS OF 2015



FROM WHERE DOES CarMD'S INDEX DATA ORIGINATE?

Beginning in 1996, the U.S. government mandated on-board diagnostics (OBD2) for all foreign and domestic cars, light trucks, minivans and SUVs sold in the United States. The system provides health and safety information for roughly 80% of a vehicle's systems, and is currently installed on more than 85% of vehicles nationwide, including newer hybrids and diesels. It can be accessed by a range of diagnostic tools used throughout the industry. The system triggers the check engine light when a problem is found; alerting the driver to an issue that may affect emissions output, fuel economy, drivability and cost of ownership.

Since 2001, CarMD has been working with a nationwide network of Automotive Service Excellence (ASE)-certified technicians and Master technicians to build the most comprehensive database of OBD2-related expert fixes and repair costs. The vehicle failures come directly from the cars themselves and the recommended repairs come from the professionals who service them. As a result, CarMD is able to provide unbiased data on repair costs and trends in Index form. This 2016 Index statistically analyzes more than 1 million repairs in the U.S.



SUMMARY OF FINDINGS

For a second consecutive year, 2015 saw virtually no change

(down less than a percent) in car repair costs with a 1.5% increase in parts costs offset by a 4% decrease in average labor costs. The oxygen sensor, which can negatively affect fuel economy by as much as 40%, remained the most common check engine light culprit, followed by the catalytic converter, ignition coil and spark plugs combined, loose gas cap and thermostat. Car repair costs were also down across each U.S. region with the Northeast experiencing the biggest drop – down 6.5%.

Vehicle age also affects frequency, cost and type of repairs.

This Index looked at cars that were new, 5-, 10- and 15-years old. Model year 2006 vehicles accounted for 10% of check engine light incidents in calendar year 2015 while less than 1/100th of a percent of model year 2016 vehicles had check engine light issues. The most common reason a check engine light comes on in a brand new vehicle is a loose gas cap (46% of recommended repairs for MY2016 vehicles). The most common fix on a 2006 vehicle is the catalytic converter (10% of repairs). Model year 2006 vehicles had the highest average repair cost (\$399).

The most expensive repair seen in 2015 by CarMD's network was "replace engine," costing \$7,800.

However, evidencing the notion that drivers should not panic when their car's "check engine" light comes on, some of the least expensive repairs include tighten or replace gas cap, correct transmission fluid level and replace radiator cap. These fixes can cost as little as \$15 or less.

Continuing its rise in repair frequency, "replace thermostat"

moved from the tenth to the fifth most common repair. New to 10 most common repairs in 2015 were "replace evaporative emissions (EVAP) purge control valve" and "replace EVAP purge solenoid." These are both important parts designed to help make sure your car is not emitting too many pollutants. When they are not working properly they will cause your car's check engine light to turn on and keep you from passing an emissions test.

CarMD distributes this Index each April during Car Care Awareness Month as a reminder to pay attention to scheduled maintenance needs to help avoid unscheduled repairs and problems that may trigger the check engine light on.

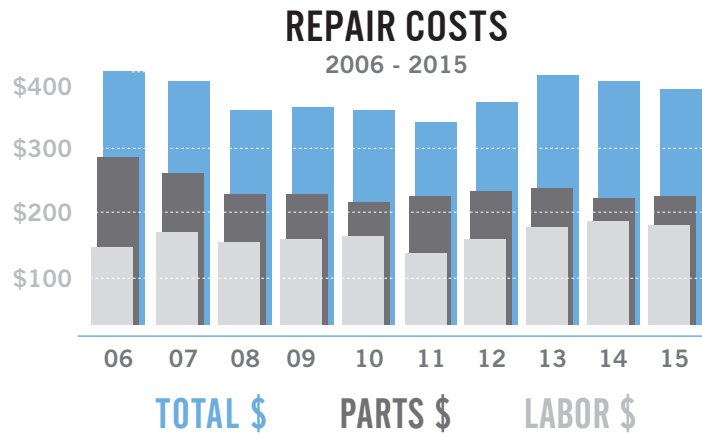


2016 CarMD® VEHICLE HEALTH INDEX™

HIGHLIGHTS

For a second consecutive year, car repair costs across the U.S. were flat in 2015 with virtually no year-over-year change from 2014.

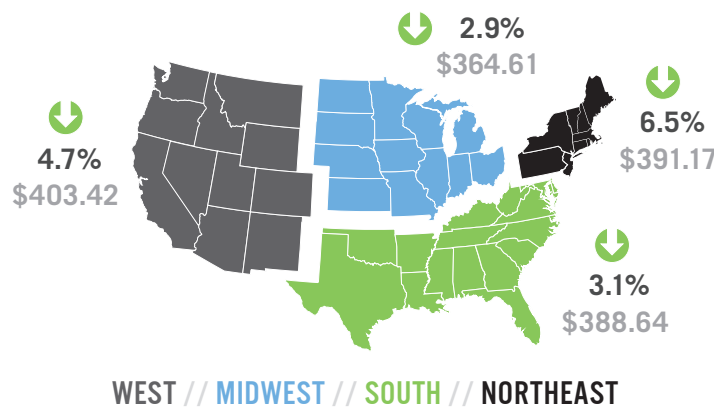
- Average repair costs in 2015 were \$387.31 (comprised of \$155.15 in labor and \$232.16 in parts). This was less than 1% lower than 2014 (\$390.38).
- Labor costs were down 4%.
- Parts costs were up 1.5% (parts based on dealer rate pricing plus markup).



Repair costs vary by region, but drivers in the Northeast saw the largest drop in average repair costs, which were down 6.5% in 2015.

- Drivers in the West paid the most for car repairs (\$403 on average).
- Drivers in the Midwest paid the least for check engine issues (\$364).
- Northeast drivers paid \$391 on average for parts and labor.
- Drivers in the South paid \$388 for repairs.

2015 REGIONAL CAR REPAIR COSTS



2016 CarMD® VEHICLE HEALTH INDEX™

HIGHLIGHTS

Vehicle age affects the type, cost and percentage of check engine light repair incidents.

- Model year 2006 vehicles accounted for over 10% of cars needing repairs last year and had the highest average repair cost at \$399.
- Brand new 2016 vehicles accounted for only 0.01% of repairs and cost on average \$205, usually covered under warranty.



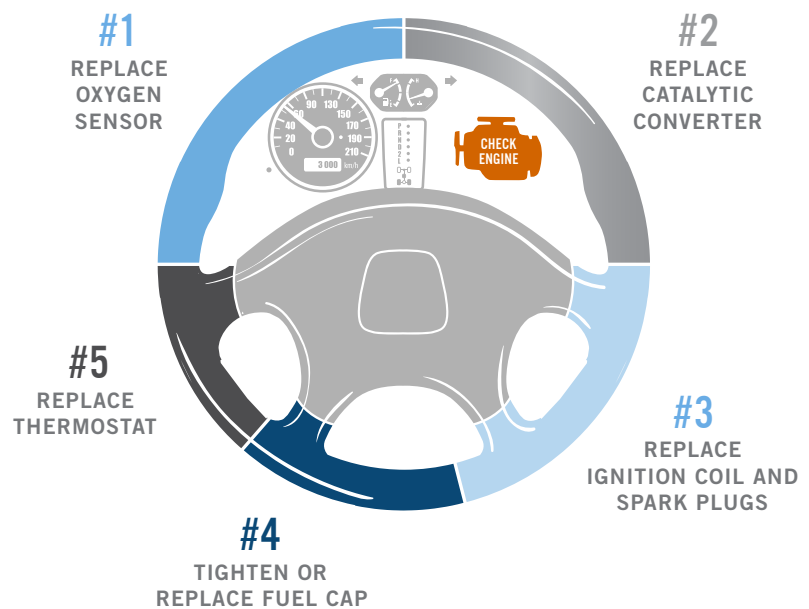
VEHICLE AGE AFFECTS REPAIR COSTS

Vehicle Age	% Of Vehicles Needing Check Engine Repairs In 2015
Model Year 1996	1.63%
Model Year 2001	6.69%
Model Year 2006	10.09%
Model Year 2011	2.94%
Model Year 2016	0.01%

The five most common problems that trigger the “check engine” light on are a faulty oxygen sensor, catalytic converter, ignition coil and spark plug, loose fuel cap and thermostat.

- They range in cost from \$15 on average to replace a gas cap to \$1,100 for a catalytic converter.

TOP 5 REASONS YOUR CHECK ENGINE LIGHT IS ON



2016 CarMD® VEHICLE HEALTH INDEX™

TOP 25 MOST COMMON CHECK ENGINE REPAIRS IN THE U.S. CALENDAR YEAR 2015

Rank	Vehicle Repair	Total Average Repair Cost (Parts & Labor)	% 2015 Repairs	Change in Rank Since 2014
1	Replace Oxygen Sensor(s) (O2S)	\$249.92	7.01%	No Change
2	Replace Catalytic Converter(s) with new OE Catalytic Converter(s)	\$1,153.49	6.97%	No Change
3	Replace Ignition Coil(s) and Spark Plug(s)	\$390.67	6.19%	Up From No. 4
4	Inspect for Loose Fuel Cap and Tighten or Replace as Necessary	\$15.31	3.84%	Down From No. 3
5	Replace Thermostat	\$210.81	3.70%	Up From No. 8
6	Replace Ignition Coil(s)	\$236.32	3.69%	Down From No. 5
7	Replace Mass Air Flow (MAF) Sensor	\$382.36	3.49%	Down From No. 6
8	Replace Spark Plug Wires and Spark Plugs	\$331.13	3.42%	Down From No. 7
9	Replace Evaporative Emissions (EVAP) Purge Control Valve	\$168.11	2.83%	Up From No. 14
10	Replace Evaporative Emissions (EVAP) Purge Solenoid	\$184.66	2.27%	Up From No. 15
11	Replace Fuel Injector(s)	\$469.06	2.04%	Down From No. 10
12	Replace Exhaust Gas Recirculation (EGR) Valve and Clean All EGR Ports	\$341.09	1.84%	Down From No. 9
13	Replace Evaporative Emissions (EVAP) Canister Vent Solenoid	\$217.53	1.48%	Up From No. 20
14	Replace Camshaft Position Sensor (CMP)	\$204.62	1.43%	Down From No. 13
15	Replace Fuel Tank Pressure (FTP) Sensor	\$322.91	1.35%	Up From No. 24
16	Replace Throttle Body Assembly	\$551.75	1.24%	Up From No. 19
17	Replace Intake Manifold Gasket(s)	\$384.38	1.16%	Down From No. 16
18	Replace Engine Coolant Temperature Sensor (ECT)	\$159.68	1.13%	No Change
19	Replace Spark Plug(s)	\$222.38	1.07%	New To List
20	Replace Knock Sensor(s)	\$372.74	1.07%	New To List
21	Clean Fuel Injector(s)	\$115.86	1.06%	New To List
22	Replace Emission System Integrity Monitor (ESIM)	\$158.55	0.91%	New To List
23	Replace Differential Pressure Feedback (DPFE) Sensor	\$201.47	0.89%	No Change
24	Reprogram Powertrain Control Module (PCM)	\$120.89	0.86%	New To List
25	Replace Evaporative Emissions (EVAP) Canister Vent Valve	\$208.88	0.86%	New To List

(Top 25 most common vehicle repairs are based on 1,019,904 repairs recommended in calendar year 2015 on 1996-2016 model year vehicles. This data applies to > 85% of cars, light trucks, minivans, SUVs and hybrids on the road in the U.S. – foreign and domestic. Source: CarMD.com Corp.)



MOST COMMON REPAIRS, CALENDAR YEAR 2015

1

The most common car repair (7.01%) in 2015 was “replace oxygen sensor.” Extremely important to a car's engine performance and to the environment, the O2 sensor measures the amount of unburned oxygen in the exhaust and tells a car's computer when there is either too much, or not enough fuel as compared with oxygen for ideal operation. O2 sensors fail prematurely due to a variety of causes, including lack of maintenance like neglecting oil changes or engine contamination from internal coolant leaks. A faulty O2 sensor costs about \$250 to fix but can lead to as much as a 40% reduction in gas mileage if ignored. Many drivers ignore the O2 sensor because their car often seems like it's driving just fine, but in reality it's reducing your fuel economy and slowly doing more damage to your car.

- The average cost to replace O2 sensor dropped slightly from \$259 in 2014 to \$249 in 2015, comprised of \$102 for labor and \$147 in parts.

2

The second most common repair, “replace catalytic converter(s),” accounted for 6.97% of repairs in 2015.

In most cases, a catalytic converter won't fail unless a misfire occurs, which can be caused by ignoring a spark plug, ignition coil or engine mechanical problem.

- The average cost to replace a catalytic converter in 2015 was \$1,153, comprised of \$156 in labor and \$997 in parts.

3

“Replace ignition coil and spark plugs” is now the third most common repair accounting for 6.19% of recommended repairs in 2015 – nearly double from 2014 (3.58%).

This is an example of how ignoring a smaller problem like a spark plug can snowball into the need for more than one repair. Spark plugs and ignition coils work together to provide an ignition source for the fuel to combust in the engine. The coils take the battery's 12-volt current and step it up to ignite the spark plugs. Faulty spark plugs can trigger ignition coil failure, which is why they are often replaced simultaneously. High underhood temperatures and age can also cause them to fail.

- The cost to replace ignition coil(s) and spark plug(s) in 2015 was \$390.

4

Once the most common check engine light trigger, “tighten or replace fuel cap” drops to the fourth most common repair.

It accounted for only 3.84% of repairs in 2015 as opposed to 7.10% of repairs in 2014. Missing or damaged gas caps can cost time and money, triggering the check engine light and a repair shop visit. If left unchecked, a gas cap problem can cause reduced fuel economy and harm the environment.

- The average cost to diagnose a loose gas cap is \$15, and most can be purchased at the local auto parts store.

5

“Replace thermostat” is now the fifth most common repair, and it only appeared on the CarMD rankings for the first time last year.

A car's thermostat regulates the engine coolant temperature to warm and cool to ideal “operating temperature.” It opens and closes as needed to regulate temperature. When a thermostat fails, it often gets stuck open. If the vehicle's computer doesn't see the engine coolant temperature rise to “operating temperature” within a fixed amount of time, it will set the check engine light. A vehicle's thermostat can rust and fail if the coolant is not changed at recommended mileage intervals, or the vehicle is subjected to extreme temperatures.

- The average cost to replace a thermostat was \$210 in 2015.

MOST COMMON REPAIRS, CALENDAR YEAR 2015

6

The no. 6 most common repair (3.69%) in 2015 was “replace ignition coil(s).” Ignition coils provide an ignition source for the fuel to combust in the engine. They take the battery’s 12-volt current and step it up to ignite the spark plugs. Your car may have only one ignition coil, or as many as it has cylinders. Several conditions can contribute to its failure, including faulty spark plugs, high underhood temperatures and age. A driver should pay attention to possible symptoms surrounding engine coil failure as it will soon affect other vehicle systems, such as the costly catalytic converter, and can leave them stranded by the roadside.

- The cost to replace ignition coil(s) in 2015 was \$236.

7

The seventh most common repair (3.49%) is “replace mass air flow sensor (MAF),” which is responsible for metering the air coming into your car’s engine and determining how much fuel to inject into the engine. When malfunctioning, it can lower fuel economy by 10% to 25%.

- It costs on average \$382 on average to repair, but is vital to saving dollars at the pump.

8

The spark plug drops to the eighth most common check engine-related repair (3.42%). Spark plugs are responsible for igniting a car’s air/fuel charge or mixture (the computer is trying to keep the ratio at 14.7:1). When they fail they can cause a “misfire,” reduce gas mileage and eventually damage a catalytic converter. When the weather turns cold fuel doesn’t vaporize as easily so droplets can form and foul the plug. The cost to replace a spark plug yourself can be as little as \$10, but can save thousands down the road.

- The average cost to replace spark plug(s) and spark plug wire(s) in 2015 was \$331, comprised of \$179 in labor and \$151 in parts.

9

The ninth most common check engine-related repair is “replace evaporative emissions (EVAP) purge control valve,” which is up from no. 14 in 2014. This valve is part of the car’s EVAP system, which prevents fuel tank vapors from escaping into the atmosphere. When the engine is running and fully warmed up, the engine computer gradually opens the purge valve to allow some amount of fuel vapor to be moved from the charcoal canister to be burned in the engine. If the purge flow is less or more than is expected, the car’s computer turns on the “check engine” light. When purge valves get stuck they often need to be replaced, which is a fairly simple fix.

- The average cost to replace an EVAP Purge Control Valve in 2015 was \$168, comprised of \$98 in labor and \$69 in parts.

10

Rounding out the top 10 is “replace evaporative emissions (EVAP) purge solenoid,” which is up from no 15 in 2015. Also part of the car’s EVAP system, it also helps control how much fuel vapor escapes into the atmosphere from your car. The purge solenoid is controlled by the engine control module or powertrain control module. It operates on a duty cycle and could be left partially open.

- The average cost to have a fuel injector replaced was \$184 in 2015.

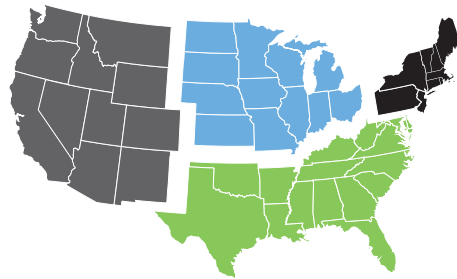
2016 CarMD® VEHICLE HEALTH INDEX™

REPAIR COSTS & NATIONAL DATA

**U.S. Average Car Repair Cost Trends (10-Year History)
(2006 – 2015); Source: CarMD.com Corp.**

Year	Labor	Parts	Total Average Repair Cost
2015	\$155.15	\$232.16	\$387.31
2014	\$161.61	\$228.77	\$390.38
2013	\$157.23	\$235.26	\$392.49
2012	\$138.96	\$228.88	\$367.84
2011	\$118.61	\$215.32	\$333.93
2010	\$143.61	\$212.44	\$356.04
2009	\$138.37	\$221.13	\$359.50
2008	\$135.21	\$220.98	\$356.19
2007	\$152.92	\$256.98	\$409.91
2006	\$131.06	\$291.30	\$422.36

**U.S. National & Regional Average Check Engine-Related Repair Costs
2015 vs. Previous Year (Source: CarMD.com Corp.)**



Region	Total Average Repair Costs (2014)	Total Average Repair Costs (2015)	% Increase / Decrease From Previous Year
U.S.	\$390.38	\$387.31	↓ Down 0.78%
West	\$423.38	\$403.42	↓ Down 4.71%
South	\$400.88	\$388.64	↓ Down 3.05%
Northeast	\$418.55	\$391.17	↓ Down 6.54%
Midwest	\$375.41	\$364.61	↓ Down 2.87%

2016 CarMD® VEHICLE HEALTH INDEX™

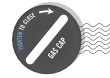
REPAIR COSTS & NATIONAL DATA

How Does Vehicle Age Impact Average Repair Costs and Type of Repairs?

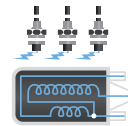
- The most common reason the check engine light comes on in brand new model year 2016 vehicles is a loose gas cap, accounting for 46% of check engine light incidents last year.
- The most common fix for a model year 2011 vehicles is “replace ignition coil and/or spark plugs,” accounting for 7% of repairs.
- 10% of repairs on model year 2006 vehicles were “replace catalytic converter(s).”
- The most common repair on 15-year old model year 2001 vehicles is to replace the oxygen sensor, accounting for 8% of repairs.
- 20-year-old 1996 vehicles also needed to “replace oxygen sensor” 14% of the time the check engine light was on last year.

MOST COMMON VEHICLE REPAIRS BY MODEL YEAR

2016
LOOSE GAS CAP



2011
REPLACE IGNITION COIL AND / OR SPARK PLUGS



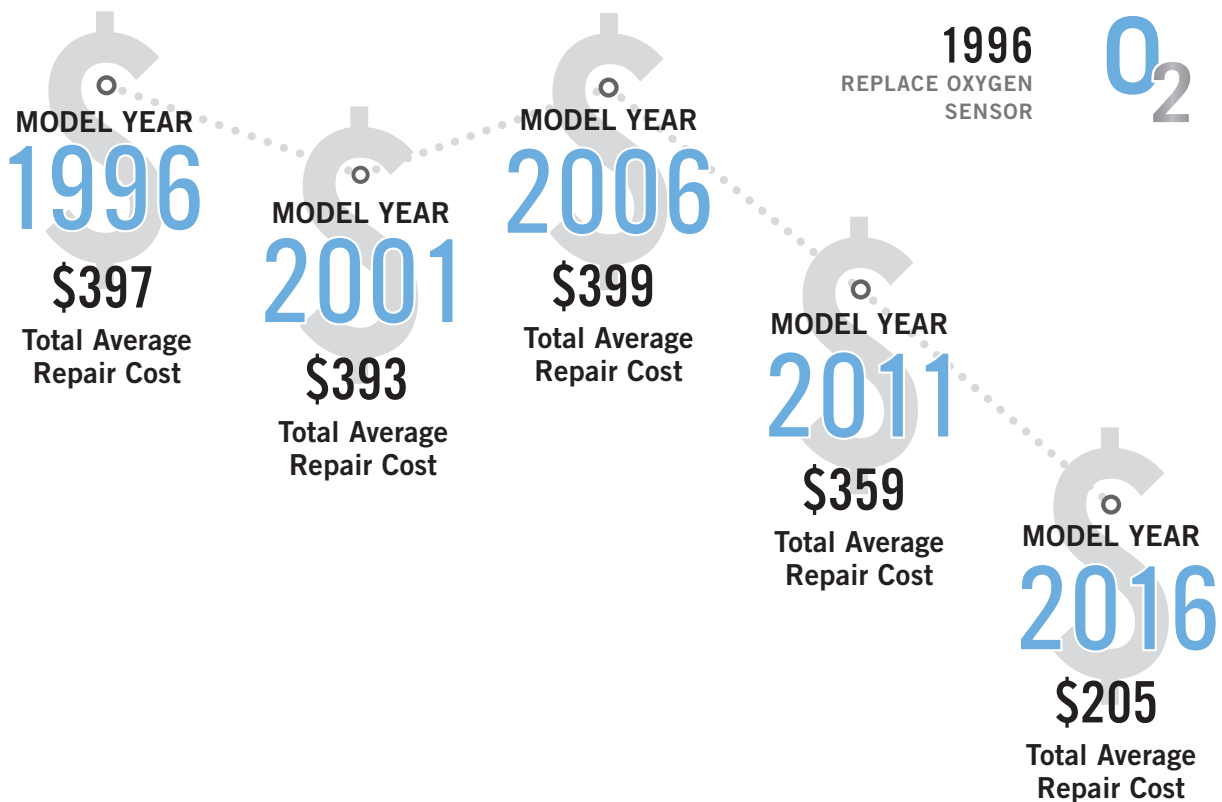
2006
REPLACE CATALYTIC CONVERTER



2001
REPLACE OXYGEN SENSOR











1996
REPLACE OXYGEN SENSOR



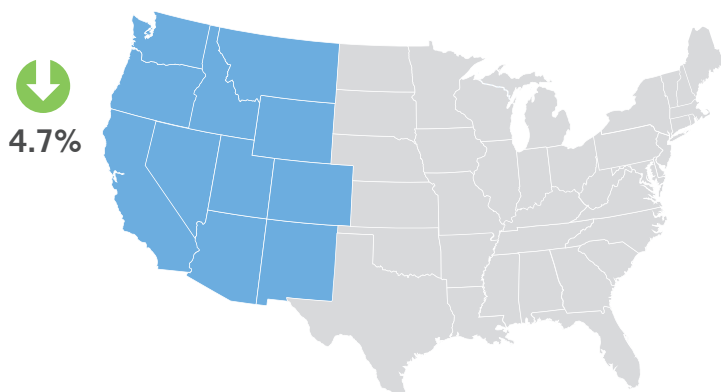
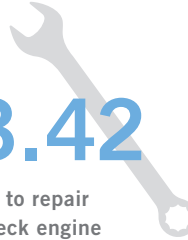
2016 CarMD® VEHICLE HEALTH INDEX™

REPAIR COSTS & REGIONAL DATA

The Top 10 Most Common Check Engine Vehicle Repairs in the Western U.S. – 2015

Rank	Vehicle Repair	Total Average Repair Cost (Parts & Labor)	% 2015 Western U.S. Repairs	Change In Western Rank Since 2014
1	Replace Catalytic Converter(s) with new OE Catalytic Converter(s)	\$1,178.82	6.79%	2 - 
2	Replace Oxygen Sensor(s) (O2S)	\$269.00	6.17%	1 - 
3	Inspect for Loose Fuel Cap and Tighten or Replace as Necessary	\$13.77	5.02%	4 - 
4	Replace Ignition Coil(s) and Spark Plug(s)	\$411.03	4.95%	7 - 
5	Replace Thermostat	\$227.92	4.83%	8 - 
6	Replace Mass Air Flow (MAF) Sensor	\$402.53	4.02%	3 - 
7	Replace Spark Plug Wires and Spark Plugs	\$347.01	3.35%	5 - 
8	Replace Ignition Coil(s)	\$245.34	3.30%	6 - 
9	Replace Evaporative Emissions (EVAP) Purge Control Valve	\$180.61	2.25%	New to West Top 10
10	Replace Evaporative Emissions (EVAP) Purge Solenoid	\$201.04	1.90%	New to West Top 10

Top 10 most common vehicle repairs in the Western U.S. are based on 120,224 repairs in 2015 in AK, AZ, CA, CO, HI, ID, MT, NM, NV, OR, UT, WA and WY. This data applies to roughly 85% of cars, light trucks, minivans and SUVs on the road in the U.S. – foreign and domestic. Source: CarMD.com Corp.






\$403.42

Average cost to repair a vehicle's check engine light problem in the Western U.S. in 2015.

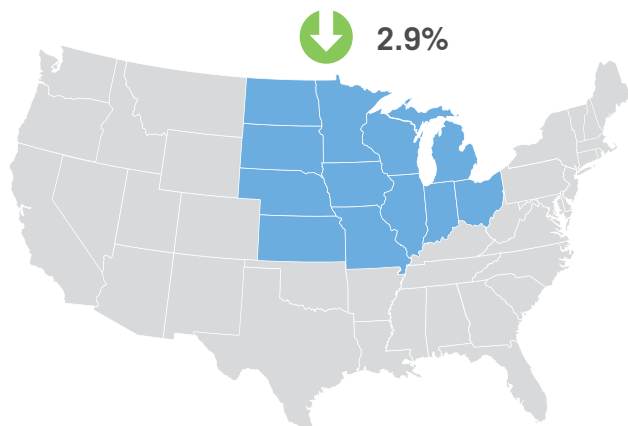
2016 CarMD® VEHICLE HEALTH INDEX™

REPAIR COSTS & REGIONAL DATA

The Top 10 Most Common Check Engine Vehicle Repairs in the Midwestern U.S. – 2015

Rank	Vehicle Repair	Total Average Repair Cost (Parts & Labor)	% 2015 Midwestern U.S. Repairs	Change In Mid-West Rank Since 2014
1	Replace Oxygen Sensor(s) (O2S)	\$240.11	8.01%	No Change
2	Replace Catalytic Converter(s) with new OE Catalytic Converter(s)	\$1,134.96	6.92%	No Change
3	Replace Ignition Coil(s) and Spark Plug(s)	\$387.41	5.29%	8 - 
4	Inspect for Loose Fuel Cap and Tighten or Replace as Necessary	\$13.11	4.65%	3 - 
5	Replace Thermostat	\$209.94	4.39%	10 - 
6	Replace Spark Plug Wires and Spark Plugs	\$326.88	3.84%	4 - 
7	Replace Ignition Coil(s)	\$236.69	3.38%	No Change
8	Replace Evaporative Emissions (EVAP) Purge Control Valve	\$164.03	3.28%	New to Mid-West top 10
9	Replace Mass Air Flow (MAF) Sensor	\$372.59	3.03%	6 - 
10	Replace Evaporative Emissions (EVAP) Purge Solenoid	\$180.38	2.71%	New to Mid-West Top 10

Top 10 most common vehicle repairs in the Midwestern U.S. are based on 209,296 repairs in 2015 in IA, IL, IN, KS, MI, MN, MO, ND, NE, OH, SD and WI. This data applies to roughly 85% of cars, light trucks, minivans and SUVs on the road in the U.S. – foreign and domestic. Source: CarMD.com Corp.







\$364.61

Average cost to repair a vehicle's check engine light problem in the Midwestern U.S. in 2015.

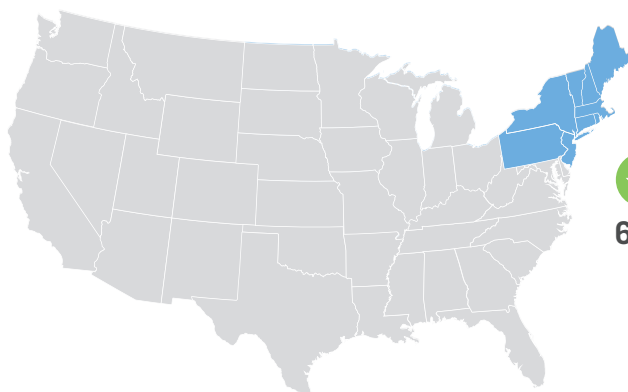
2016 CarMD® VEHICLE HEALTH INDEX™

REPAIR COSTS & REGIONAL DATA

The Top 10 Most Common Check Engine Vehicle Repairs in the Northeastern U.S. – 2015

Rank	Vehicle Repair	Total Average Repair Cost (Parts & Labor)	% 2015 Northeastern U.S. Repairs	Change In NE Rank Since 2014
1	Replace Oxygen Sensor(s) (O2S)	\$260.57	8.69%	No Change
2	Replace Catalytic Converter(s) with new OE Catalytic Converter(s)	\$1,153.52	7.96%	No Change
3	Inspect for Loose Fuel Cap and Tighten or Replace as Necessary	\$12.30	5.89%	No Change
4	Replace Ignition Coil(s) and Spark Plug(s)	\$379.65	5.39%	5 - 
5	Replace Ignition Coil(s)	\$231.05	3.67%	4 - 
6	Replace Spark Plug Wires and Spark Plugs	\$327.26	3.57%	7 - 
7	Replace Mass Air Flow (MAF) Sensor	\$382.02	3.51%	6 - 
8	Replace Thermostat	\$214.95	3.42%	New to NE Top 10
9	Replace Evaporative Emissions (EVAP) Purge Control Valve	\$169.73	2.64%	New to NE Top 10
10	Replace Evaporative Emissions (EVAP) Purge Solenoid	\$190.22	2.15%	New to NE Top 10

Top 10 most common vehicle repairs in the Northeastern U.S. are based on 57,702 repairs in 2015 in CT, MA, ME, NH, NJ, NY, PA, RI and VT. This data applies to roughly 85% of cars, light trucks, minivans and SUVs on the road in the U.S. – foreign and domestic. Source: CarMD.com Corp.




6.5%






\$391.17

Average cost to repair a vehicle's check engine light problem in the Northeastern U.S. in 2015.

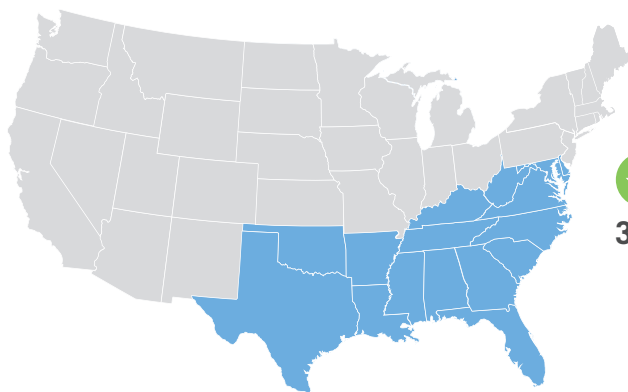
2016 CarMD® VEHICLE HEALTH INDEX™

REPAIR COSTS & REGIONAL DATA

The Top 10 Most Common Check Engine Vehicle Repairs in the Southern U.S. – 2015

Rank	Vehicle Repair	Total Average Repair Cost (Parts & Labor)	% 2015 Southern U.S. Repairs	Change In Southern Rank Since 2014
1	Replace Catalytic Converter(s) with new OE Catalytic Converter(s)	\$1,153.14	7.02%	2 - 
2	Replace Ignition Coil(s) and Spark Plug(s)	\$389.81	6.68%	3 - 
3	Replace Oxygen Sensor(s) (O2S)	\$249.27	6.62%	1 - 
4	Inspect for Loose Fuel Cap and Tighten or Replace as Necessary	\$15.41	3.97%	No Change
5	Replace Ignition Coil(s)	\$235.10	3.87%	No Change
6	Replace Mass Air Flow (MAF) Sensor	\$380.87	3.52%	No Change
7	Replace Thermostat	\$206.48	3.41%	8 - 
8	Replace Spark Plug Wires and Spark Plugs	\$329.50	3.35%	7 - 
9	Replace Evaporative Emissions (EVAP) Purge Control Valve	\$167.39	2.75%	New to South Top 10
10	Replace Evaporative Emissions (EVAP) Purge Solenoid	\$182.57	2.15%	New to South Top 10

Top 10 most common vehicle repairs in the Southern U.S. are based on 657,465 repairs in 2015 in AL, AR, DC, DE, FL, GA, KY, LA, MD, MS, NC, OK, TN, VA, SC, TX and WV. This data applies to roughly 85% of cars, light trucks, minivans and SUVs on the road in the U.S. – foreign and domestic. Source: CarMD.com Corp.




3.1%


\$388.64

Average cost to repair a vehicle's check engine light problem in the Southern U.S. in 2015.

MOST / LEAST EXPENSIVE CAR REPAIRS – 2015

The **most expensive repair** in the CarMD database in 2015 was “replace Engine” (\$7,821). This repair is indicative of the fact that cars are being made to outlast parts such as their engine. The good news is that most expensive repairs remain extremely rare in terms of percentage of occurrence. **The top 15 most expensive repairs** combined only **account for less than 1% of all repairs** seen by CarMD’s network of thousands of certified technicians last year.



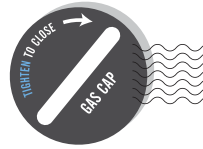
The 10 Most Expensive Check Engine-Related Vehicle Repairs in the U.S. – 2015

Rank	Vehicle Repair	Type of Vehicle(s)	Most Expensive Repair Cost (Parts & Labor)
1	Replace Engine	Various Vehicles	\$7,821
2	Replace Engine Block Assembly	Various Vehicles	\$6,883
3	Replace Steering Column	Various Vehicles	\$6,139
4	Replace Transmission Assembly and Reprogram Electronic Control Module (ECM)	Various Vehicles	\$5,191
5	Replace Transmission and Torque Converter	Various Vehicles	\$5,145
6	Replace Hybrid Battery and Reprogram Engine Control Module (ECM)	Various Hybrid Vehicles	\$4,282
7	Replace Audio and Visual (AV) Control Unit	2006-2007 Infiniti M35 Vehicles	\$4,095
8	Replace Transmission Case and Torque Converter	Various Vehicles	\$4,077
9	Replace Transmission Assembly	Various Vehicles	\$3,723
10	Replace Transmission Speed Sensor and Reprogram Transmission Control Module (TCM)	Various Vehicles	\$3,504

Ten most/least expensive repairs are based on 1,019,904 verified repairs made and input into the CarMD database by the company's team of factory trained repair professionals in 2015. This data is for model year 1996 to 2015 OBD2 cars, light trucks, minivans and SUVs in the U.S. – foreign and domestic. Source: CarMD.com Corp.

MOST / LEAST EXPENSIVE CAR REPAIRS – 2015

The **least expensive repair** is “Inspect for Loose Fuel Cap and Tighten or Replace as Necessary” at an average cost of \$15.



The 10 Least Expensive Check Engine-Related Vehicle Repairs In The U.S. – 2015

Rank	Vehicle Repair	Most Expensive Repair Cost (Parts & Labor)
1	Inspect for Loose Fuel Cap and Tighten or Replace as Necessary	\$15.31
2	Reset Inertia Fuel Shutoff (IFS) Switch	\$19.12
3	Correct Transmission Fluid Level	\$25.94
4	Replace Fuel Tank Gas Cap	\$26.43
5	Clean Fuel Filler Neck Flap	\$43.34
6	Re-torque Throttle Body Assembly and Perform Idle Air Relearn Procedure	\$47.79
7	Replace Radiator Cap	\$59.07
8	Adjust Exhaust Wastegate Actuator (EWGA)	\$63.36
9	Inspect For Correct Air Filter and Air Box Is Securely Latch Properly	\$63.43
10	Inspect Intake System and Engine Air Filter	\$64.49

Ten most/least expensive repairs are based on 1,019,904 verified repairs made and input into the CarMD database by the company's team of factory trained repair professionals in 2015. This data is for model year 1996 to 2015 OBD2 cars, light trucks, minivans and SUVs in the U.S. – foreign and domestic. Source: CarMD.com Corp.

2016 CarMD® VEHICLE HEALTH INDEX™

INDEX METHODOLOGY

CarMD HAS COMPILED THE INDUSTRY'S MOST COMPREHENSIVE DATABASE OF OBD2-RELATED PROBLEMS AND ASSOCIATED FIXES UPLOADED BY AUTOMOTIVE TECHNICIANS AND VEHICLE OWNERS SINCE 1996.

The data for the 2015 CarMD® Vehicle Health Index™ was procured from repairs uploaded to the CarMD diagnostic database from Jan. 1, 2015 to Dec. 31, 2015. This same database is also used to support the consumer automotive tools, used car and Software as a Service (SaaS) products offered by CarMD.

The data was pulled and analyzed between Feb. 18, 2016 and Mar. 2, 2016.

Virtually all makes and models of cars, light trucks, minivans, SUVs and hybrids made since 1996 – foreign and domestic – with on board diagnostic second generation (OBD2) technology are included in the Index. Those makes and models with more registered vehicles on the road may have a larger statistical weighting in the Index findings, as will those vehicles that experience more failures.

The 2016 Index statistically analyzes 1,019,904 repairs. Each repair has also been reviewed and validated by CarMD's team of ASE-certified Master Technicians and then output based on a probability algorithm that takes into account the vehicle's year, make, model, mileage, postal code, DTCs and similar vehicle problems to produce a most likely repair. Because the data stems from those U.S. vehicle owners and automotive technicians who elected to use the diagnostic devices and/or upload data into the CarMD database; no estimates of theoretical sampling error can be calculated.

All 50 U.S. states, plus the District of Columbia, are represented in this Index. The states with larger registered vehicle populations and participating ASE-certified technicians may have a larger quantity of logged repairs; however, all have been averaged into the overall Index findings. For regional data, CarMD used the U.S. Census Bureau Regions and Division Map to define regions.

Repair costs are based on parts and dealer list plus 10% markup. Labor rates are procured from several sources, including the *Undercar Digest National* and Regional Hourly Shop Labor Rate reports, as well as the average amount of time required for each repair. Both are updated annually.

CarMD has contracted with an independent consulting company to create and maintain the database for compiling and generating this Index.

On a daily basis, CarMD's nationwide network of thousands of automotive service excellence (ASE)-certified technicians recommend, confirm and upload repairs and costs by region to the CarMD database. As a result, subsequent CarMD Vehicle Health Index reports will draw from an updated sampling of diagnostic trouble codes, expert fixes and repair costs.

**MEDIA
CONTACT:**

Kristin Brocoff
CarMD.com Corp.
M: 949.400.4899
KristinB@CarMD.com

