VEHICLE HEALTH INDEX™

2017 MAKE AND MODEL RELIABILITY RANKINGS

With the release of our 2017 **CarMD® Vehicle Health Index™ Make and Model Reliability Rankings**, we at CarMD® continue to strive toward excellence and innovation in the automotive repair solutions industry.

We offer the only annual manufacturer and vehicle ranking system that statistically compares check engine failures and repair costs. While other industry reports often rely on subjective survey data, we base our figures on statistical analyses. This Index looks at the population of 1996 to current model year vehicles on the road, which is more comprehensive than many first-year owner surveys and studies.

2017 Index Ranks Brands and Vehicles

CHECK ENGINE LIGHT FREQUENCY BY:

- 10 BRANDS with the lowest repair incidents
- 10 VEHICLES (year, make, model) with the lowest repair incidents

AVERAGE COST OF REPAIRS BY:

- 10 BRANDS with the lowest average repair costs
- 10 VEHICLES (year, make, model) with the lowest repair incidents

- TOP 3 VEHICLES listed by category (compact, midsize, etc.)

WANT TO SEE MORE?

For those who prefer more detail, we also include a list of the 100 best vehicles by year, make and model in each category is available online at https://www.carmd.com/wp/vehicle-health-index-introduction/2017-carmd-manufacturer-vehicle-rankings/.

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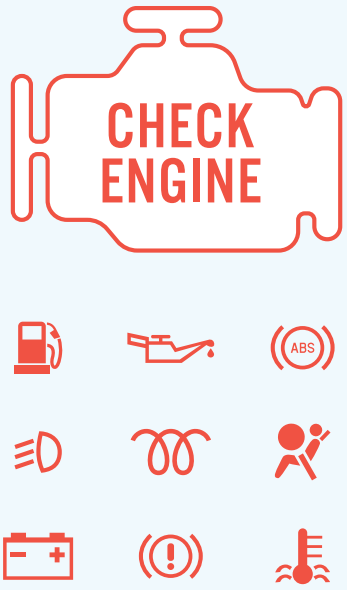
To achieve this unmatched level of accuracy, we have analyzed the check engine health of more than 4.2 million models that span from 1996 to 2017. Each data point was administered on real in-use vehicles reporting check engine health between Oct. 1, 2016 and Sept. 30, 2017. Consumers, used car buyers and fleet managers have a goal to minimize vehicle upkeep, while OE manufacturers and aftermarket providers look to increase their knowledge of trends within the industry. This Index offers insight to improve on what every consumer and business cares about – the bottom line.

Recognizing that today's consumers want personalized, real-time information, CarMD also offers a free, real-time search so vehicle owners can get a Vehicle Health Report by VIN or year, make, model and mileage at www.carmd.com/Garage. The report includes upcoming maintenance, recalls, technical service bulletins, predicted repairs, warranty status and other cost of ownership insight.

CarMD also offers a free service called CarMD® Garage
to see if your vehicle has any maintenance due, technical service bulletins or upcoming check engine light problems. Available online at: www.carmd.com/garage

MORE ABOUT CARMD

Beginning in 1996, the U.S. government mandated that On-Board Diagnostics (OBD2) be included on all foreign and domestic cars, light trucks, vans and SUVs driven in the U.S. This system provides vital health and safety information for roughly 80 percent of a vehicle's system, and is installed on nearly 90 percent of the vehicles in the U.S. today, including newer model hybrids and diesels. The system triggers the check engine light when a problem is found; alerting drivers and fleet managers to an issue that may affect emissions output, fuel economy, drivability and cost of ownership. CarMD has been compiling a robust database of information from in-use vehicles from a range of sources that tap into this OBD2 data. Recommended repairs are validated by CarMD's nationwide network of Automotive Service Excellence (ASE)-certified technicians.



CURRENT AND ARCHIVED INDICES ARE AVAILABLE AT

http://www.carmd.com/wp/vehicle-health-index-introduction/list-of-indexes/.

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Top 10 *MOST* Reliable Makes

Brands least likely to have a check engine light on

At least 10 percent of the cars and trucks on the road in the U.S. have a check engine light on at any given time, so chances are good that most vehicle owners will experience the hassle of needing a check engine light-related repair at some point. But which brands are least likely to need check engine repairs? To rank these brands, CarMD developed a formula that accounts for those with the lowest percentage of repair incidents per percentage of vehicle population. Based on this data, an Index frequency score is assigned. The lower the score the higher the vehicle make ranking.

CarMD found that over the past year when it comes to repair frequency Acura ranks no. 1, with a 1.40 CarMD Index frequency score. Acura is followed by Honda, which ranks no. 2 on the list for the second consecutive year. Toyota ranks no. 3 this year, down from its ranking in the top spot in 2016. Rounding out the top five brands least likely to need check engine light repairs are Mercedes and Mitsubishi.

1 **ACURA**
RANKS NO.1
least likely to have check engine light on

2 **HONDA**
RANKS NO.2
least likely to have check engine light on

3 **TOYOTA**
RANKS NO.3
least likely to have check engine light on

2017 RANK LEAST LIKELY	BRAND	CARMD INDEX FREQUENCY SCORE*	YEAR-OVER-YEAR COMPARISON	MOST COMMON CHECK ENGINE LIGHT REPAIR
No.1	Acura	1.40	New to top 10 ↑	Replace O2 Sensor(s)
No.2	Honda	1.43	No change	Replace O2 Sensor(s)
No.3	Toyota	1.46	Down from no. 1 ↓	Tighten/Replace Fuel Cap
No.4	Mercedes	1.52	New to top 10 ↑	Replace Thermostat
No.5	Mitsubishi	1.53	New to top 10 ↑	Replace O2 Sensor(s)
No.6	Nissan	1.75	Down from no. 3 ↓	Replace Mass Air Flow Sensor
No.7	Volvo	1.80	New to top 10 ↑	Replace Mass Air Flow Sensor
No.8	Volkswagen	1.82	Down from no. 5 ↓	Replace Ignition Coil(s)
No.9	Subaru	1.83	New to top 10 ↑	Replace Catalytic Converter(s)
No.10	Lexus	1.87	New to top 10 ↑	Replace O2 Sensor(s)

**The lower the Index frequency score, the higher the ranking.*

(Top 10 vehicle makes by repair frequency based on model year 1996-2017 vehicles inspected between Oct. 1, 2016 and Sept. 30, 2017, and determined to have the fewest percentage of CarMD repair incidents, per vehicle population. Sources: CarMD.com Corp., with vehicle population data provided by R.L. Polk.)

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Top 10 *MOST* Reliable Vehicles

Vehicles with the lowest repair frequency (YEAR, MAKE, MODEL)

Any given brand can have a mix of very reliable vehicles along with some that are inherently known to have more frequent issues. For this reason, our Index drills down to rank vehicles by year, make and model. Three Toyotas, two Fords, two Hondas, one Jeep, one Nissan and one RAM truck comprise this list of 10 vehicles with the lowest check engine light-related repair frequency among the 8,900 different model year 1996 to 2017 vehicles on the road over the past year.

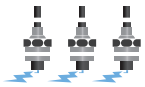
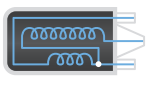
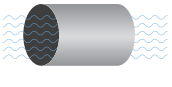
1 **2013 HONDA CIVIC** RANKS NO.1
least likely to have check engine light on

2 **2015 TOYOTA CAMRY** RANKS NO.2
least likely to have check engine light on

3 **2015 TOYOTA COROLLA** RANKS NO.3
least likely to have check engine light on

2017 RANK	YEAR	BRAND/ MAKE	MODEL	CARMD INDEX FREQUENCY SCORE*	MOST COMMON CHECK ENGINE LIGHT REPAIR
No.1	2013	Honda	Civic	0.07	Replace Thermostat
No.2	2015	Toyota	Camry	0.08	Tighten/Replace Gas Cap
No.3	2015	Toyota	Corolla	0.08	Tighten/Replace Gas Cap
No.4	2014	Toyota	Camry	0.10	Tighten/Replace Gas Cap
No.5	2013	Honda	Accord	0.10	Tighten/Replace Gas Cap
No.6	2015	Jeep	Grand Cherokee	0.10	Replace Emission System Integrity Monitor
No.7	2015	Ford	Escape	0.10	Replace EVAP Purge Solenoid
No.8	2015	Ford	F150	0.11	Reprogram PCM
No.9	2016	RAM	1500	0.11	Replace EVAP Control Valve
No.10	2015	Nissan	Altima	0.11	Replace Mass Air Flow Sensor

**The lower the Index frequency score, the higher the ranking.*

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Brands with *LOWEST* Repair Cost

Top 10 brands with lowest average repair cost

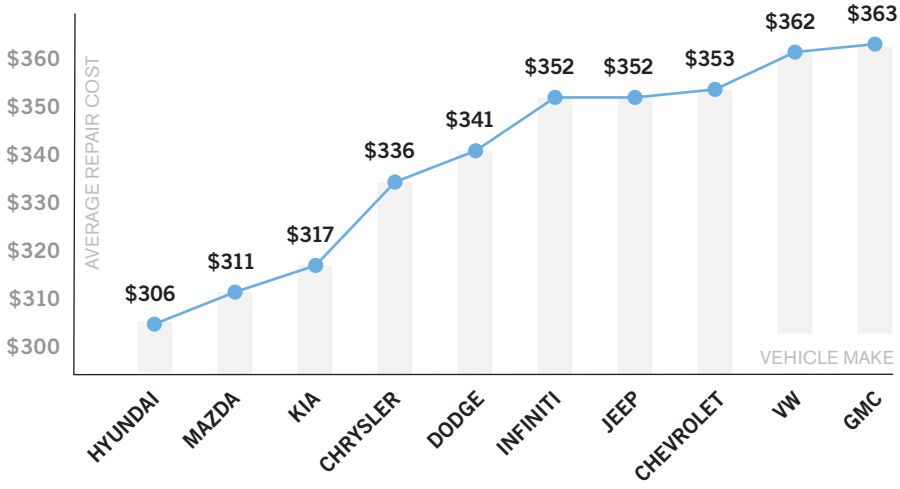
Cars and trucks will need repairs from time to time. Of the 4.2 million vehicles analyzed by CarMD for needing repairs this past year, which makes cost their owners the least? CarMD found that the brand with the lowest average check engine light-related repair cost again this year was Hyundai at an average cost of $306, which is nearly 4 percent less than last year. Mazda ($310) remained the brand with the second lowest repair cost, and Kia ($317) retained its third-place ranking. Chrysler and Dodge rounded out the top five, ranking fourth and fifth respectively. New to the list this year are Infiniti and Volkswagen, which debut at no. 6 and no. 9 respectively.

2017 RANKING LOWEST COST	MAKE	YEAR-OVER-YEAR COMPARISON (2016 RANKING/COST)	YEAR-OVER-YEAR COMPARISON (2016 RANKING/COST)	MODEL WITH THE LOWEST AVERAGE CEL REPAIR COST
No.1	HYUNDAI	$306.50	No.1 ($318.50)	2014 Elantra ($164)
No.2	MAZDA	$310.89	No.2 ($334.82)	2012 5 ($109)
No.3	KIA	$317.47	No.3 ($338.57)	2014 Forte ($150)
No.4	CHRYSLER	$336.23	No.5 ($347.86)	2016 200 ($193)
No.5	DODGE	$340.97	No.6 ($351.05)	2010 Caliber ($188)
No.6	INFINITI	$352.10	Not Ranked	2011 G37 ($255)
No.7	JEEP	$352.11	No.7 ($357.97)	2015 Patriot ($181)
No.8	CHEVROLET	$352.70	No.4 ($347.28)	2015 Traverse ($152)
No.9	VOLKSWAGEN	$361.93	Not Ranked	2012 Beetle ($208)
No.10	GMC	$362.99	No.8 ($362.76)	2015 Acadia ($156)

(Top 10 vehicle manufacturers based on model year 1996-2017 vehicles inspected by CarMD's network, found to need repairs and receiving parts and labor estimates between Oct. 1, 2016 and Sept. 30, 2017.)

HYUNDAI
RANKS NO.1

The vehicle brand with the **lowest average repair cost** for CHECK ENGINE problems? Hyundai, which had an average recommended parts & labor estimate of $306.



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Vehicles with *LOWEST* Repair Cost

Top 10 vehicles with lowest average repair cost (YEAR, MAKE, MODEL)

When the check engine light comes on, here is the list of the 10 vehicles with the lowest average repair cost among the 8,900 different year, make and model vehicles on the road today. Many drivers are surprised to learn that a loose, damage or missing gas cap is one of the most common check engine light triggers. Vehicles that have a high percentage of finicky gas caps often have lower average repair costs, but spend time getting it diagnosed nonetheless.

1 **2012 MAZDA 5** RANKS NO.1 with lowest average repair cost of $109.30

2 **2015 KIA FORTE** RANKS NO.2 with lowest average repair cost $150.02

3 **2015 CHEVROLET TRAVERSE** RANKS NO.3 with lowest average repair cost $152.60

2017 RANKING LOWEST COST	YEAR	BRAND/MAKE	MODEL	AVERAGE CHECK ENGINE LIGHT-RELATED CAR REPAIR COST	MOST COMMON CEL REPAIR (AVG. ASSOCIATED COST)
No.1	2012	Mazda	5	$109.30	Tighten/Replace Gas Cap (<$10)
No.2	2014	Kia	Forte	$150.02	Tighten/Replace Gas Cap (<$10)
No.3	2015	Chevrolet	Traverse	$152.60	Replace EVAP Canister Purge Control Valve ($100)
No.4	2011	Kia	Optima	$155.54	Replace Manifold Absolute Pressure (MAP) Sensor ($214)
No.5	2015	GMC	Acadia	$155.72	Replace EVAP Canister Purge Control Valve ($130)
No.6	2014	Hyundai	Elantra	$164.26	Replace Ignition Coil(s) & Spark Plug(s) ($230)
No.7	2015	Chevrolet	Impala	$166.83	Replace EVAP Purge Control Valve ($118)
No.8	2014	Hyundai	Sonata	$167.55	Change Engine Oil & Filter (costs vary)
No.9	2011	Kia	Sportage	$171.61	Replace MAP Sensor ($182)
No.10	2015	Chevrolet	Camaro	$172.14	Replace EVAP Purge Control ($156)

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Top 3 Vehicles By Category

The following is a list of the top three vehicles by category using data reported from Oct. 1, 2016 through Sept. 30, 2017, according to CarMD, which based its ranking on the vehicles with the fewest and those with the lowest cost check engine-related problems reported by or to our network:

CATEGORY	FEWEST REPAIR INCIDENTS	LOWEST AVERAGE REPAIR COSTS
COMPACT 	**1.** 2013 Honda Civic **2.** 2015 Toyota Corolla **3.** 2015 Ford Fusion	**1.** 2014 Kia Forte ($150) **2.** 2014 Hyundai Elantra ($164) **3.** 2015 Chevrolet Sonic ($173)
MINIVAN 	**1.** 2015 Dodge Grand Caravan **2.** 2009 Honda Odyssey **3.** 2000 Toyota Sienna	**1.** 2008 Chrysler Town & Country ($280) **2.** 2010 Honda Odyssey ($350) **3.** 2008 Toyota Sienna ($381)
MIDSIZE 	**1.** 2015 Toyota Camry **2.** 2014 Toyota Camry **3.** 2013 Honda Accord	**1.** 2011 Kia Optima ($156) **2.** 2015 Chevrolet Impala ($167) **3.** 2014 Hyundai Sonata ($168)
COMPACT SUV 	**1.** 2015 Jeep Cherokee **2.** 2015 Chevrolet Equinox **3.** 2014 Kia Sorento	**1.** 2011 Kia Sportage ($172) **2.** 2015 Jeep Patriot ($181) **3.** 2013 Jeep Patriot ($185)
FULL-SIZED SUV 	**1.** 2015 Jeep Grand Cherokee **2.** 2013 Honda Pilot **3.** 2008 Toyota Highlander	**1.** 2015 Chevrolet Traverse ($153) **2.** 2015 GMC Acadia ($155) **3.** 2016 Dodge Journey ($194)
WAGON/CROSSOVER SUV 	**1.** 2015 Ford Escape **2.** 2011 Honda CR-V **3.** 2011 Subaru Outback	**1.** 2012 Mazda 5 ($109) **2.** 2015 Ford Escape ($255) **3.** 2012 Subaru Outback ($273)
TRUCK 	**1.** 2015 Ford F-150 **2.** 2016 RAM 1500 **3.** 2015 Chevrolet Silverado	**1.** 2016 RAM 1500 ($200) **2.** 2014 RAM 1500 ($202) **3.** 2015 Ford F-150 ($247)
HYBRID 	**1.** 2016 Toyota Prius **2.** 2016 Toyota Prius V **3.** 2016 Chevrolet Volt	**1.** 2016 Toyota Prius ($47) **2.** 2015 Toyota Prius ($69) **3.** 2013 BMW Active Hybrid ($277)

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Methodology

CarMD has compiled the industry's most comprehensive database of expert repairs for check engine-related problems provided by automotive technicians and vehicle owners since 1996.

Each CarMD® Vehicle Health Index™ draws from this database and CarMD's network of Automotive Service Excellence (ASE)-certified technicians who have input and validated failures and fixes into this database. Outputs are based on the input received from CarMD's customers and network.

The number of vehicles included in each Index report varies by quantity of vehicle incidents and repairs reported for each given Index report period. The Index is based on downloaded information from each vehicle's government-mandated onboard diagnostic computer, combined with uploaded repair information from CarMD's network of automotive technicians. Repair costs are based on original equipment retail MSRP. Labor rates are procured from several sources as well as the average amount of time required for each repair. Both are updated annually.

The 2017 Index statistically analyzes more than 4.2 million model year 1996 to 2016 vehicles reporting in-use repairs that apply to an estimated vehicle population of 237 million vehicles, taking place in the United States during the Oct. 1, 2016 to Sept. 30, 2017 date period. The data for the 2016 CarMD® Vehicle Health Index was pulled, analyzed and validated between Oct. 18, 2017 and Nov. 2, 2017, by CarMD's internal team.

For the 2017 Vehicle Health Index Make and Model Reliability Rankings, CarMD included model year 1996-2017 vehicles. In determining the Top 10 makes and Top vehicles per category, CarMD included all makes and models that were listed among the U.S. vehicle population, according to R.L. Polk data, and had a visit or repair need logged by a member of CarMD's professional repair technicians. The data in the Index is applicable to nearly 90 percent of the vehicles on the road, giving a unique perspective on vehicles driven and repaired in the U.S. In determining the most common repairs by manufacturer, this Index looked at the entire OBD2 vehicle population (1996-current) vehicles for each make/brand from Oct. 1, 2016 - Sept. 30, 2017. To be included in the ranking makes need to comprise at least 1 percent of the vehicle population report.

CarMD contracted with a third-party web-based project management company to program a formula that factored in the number of registered vehicles on the road for each make, model and year. A CarMD Vehicle Health Index rating was then assigned using the total number of red reports (or failures) per vehicle (or make) divided by the total number of vehicles in the population. Vehicles and makes are separately ranked based on average repair cost for vehicles needing OBD2-related repairs during the Index period.

On a daily basis, CarMD's nationwide network of thousands of factory-trained OE (original equipment) and independent automotive repair 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 a larger sampling of expert fixes and repair costs.

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