



CarMD 2019 Vehicle Health Index™

MAKE & MODEL RELIABILITY RANKINGS



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Overview

The 2019 **CarMD® Vehicle Health Index™ Make and Model Reliability Rankings** studies and ranks in-use vehicles and brands based on frequency of check engine light problems and then separately on average cost of repairs. In this report you will find the following:

- **10 brands/makes with the lowest repair incidents/lowest average repair costs**
- **10 vehicles by model year, make and model with the fewest repair incidents/lowest average repair costs**
- **Top three vehicles by category**

This Index report summary also provides insight on the most common repairs associated with the top 10 vehicles in each category. This can be useful to vehicle owners, used car buyers, as well as repair professionals looking to increase their knowledge of trends within the industry. For those who prefer to delve deeper into the data, a full report listing the 100 best vehicles by year, make and model is available online at <https://www.carmd.com/wp/vehicle-health-index-introduction/2019-carmd-manufacturer-vehicle-rankings/>.

Published annually since 2011, the CarMD Vehicle Health Index Make and Model Reliability Rankings is the only ranking that statistically measures check engine failures and repair costs. While other industry reports often rely on subjective survey data, we base our figures on statistical analyses reported directly from model year 1996 to current vehicles on the road in the U.S. over the past year, which is more comprehensive than many first-year owner surveys and studies.

To achieve this unmatched level of accuracy, we have analyzed the vehicle data and health of more than 14.4 million in-use vehicles manufactured from 1996 to 2019 reporting check engine health between Oct. 1, 2018 and Sept. 30, 2019.

More About CarMD

Beginning in 1996, the U.S. government mandated that On-Board Diagnostics (OBD2 or OBD-II) 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 more than 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 repair technicians 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

Please visit <http://www.carmd.com/wp/vehicle-health-index-introduction/list-of-indices/>



Top 10 Makes **Least Likely to Have a Check Engine Light On**



CarMD studied data from more than 14.4 million vehicles from many sources to help identify the makes/brands least likely to need check engine repairs. To rank these brands, CarMD developed an Index frequency score formulated by the lowest percentage of repair incidents per percentage of vehicle population. The lower the score the higher the vehicle make ranking. From this data, CarMD found the following brands were least likely to need a check engine repair over the past year:

CarMD found that over the past year when it comes to repair frequency Mercedes ranked no. 1, with a 0.748 CarMD Index frequency score. Mercedes is followed by Mitsubishi, which ranks no. 2 on the list. Buick ranks no. 3 this year. Rounding out the top 5 brands least likely to need check engine light repairs are RAM and Ford.

RANK (LEAST LIKELY)	BRAND	CARMD INDEX FREQUENCY SCORE 2019*	YEAR-OVER-YEAR COMPARISON
1	Mercedes	0.748	Up from no. 8
2	MITSUBISHI	0.755	Up from no. 5
3	BUICK	0.828	Up from no. 7
4	RAM	0.849	Not listed in 2018
5		0.900	Not listed in 2018
6	ACURA	0.937	Down from no. 2
7		0.942	Not listed in 2018
8	HONDA	0.947	Down from no. 4
9	VOLVO	0.954	Not listed in 2018
10	SUBARU	0.957	Down from no. 6

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

(Top 10 vehicle makes by repair frequency based on model year 1996-2019 vehicles inspected between Oct. 1, 2018 and Sept. 30, 2019, 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.)

Top 10 Vehicles **Least Likely to Have a Check Engine Light On**



Any given brand can have a mix of very reliable vehicles along with some that are inherently known to have more frequent issues. And vehicle reliability can vary from year to year, particularly when a substantial model change occurs. For this reason, our Index drills down to rank vehicles by year, make and model. Three Hondas, three Subarus, two Lexus, and two Acura vehicles comprise this list of 10 vehicles with the lowest check engine light-related repair frequency among the 8,440 different model year 1996 to 2019 vehicles on the road over the past year.

RANK	YEAR	BRAND/MAKE	MODEL	CARMD INDEX FREQUENCY SCORE 2019	MOST COMMON REPAIR WHEN THE CHECK ENGINE LIGHT COMES ON
1	2017	Honda	CRV	0.007	Reprogram Powertrain Control Module (PCM) and Change Engine Oil and Filter
2	2017	Subaru	Outback	0.011	Tighten/Replace Fuel Cap
3	2016	Lexus	NX	0.014	Tighten/Replace Fuel Cap
4	2017	Subaru	Legacy	0.015	Remove Object of Debris Obstructing Active Grill Shutter Assembly
5	2017	Honda	Civic	0.017	Tighten/Replace Fuel Cap
6	2017	Honda	HR-V	0.017	Tighten/Replace Fuel Cap
7	2015	Lexus	NX	0.019	Tighten/Replace Fuel Cap
8	2016	Subaru	Forester	0.019	Tighten/Replace Fuel Cap
9	2015	Acura	MDX	0.020	Tighten/Replace Fuel Cap
10	2015	Acura	RDX	0.021	Tighten/Replace Fuel Cap

Top 10 Brands with Lowest Average Repair Cost



Of the 14.4 million unique vehicles analyzed by CarMD as needing repairs this past year, which brands cost their owners the least? CarMD found that the brand with the lowest average check engine-related repair cost this past year was Kia (\$321). Last year, Kia ranked second with an average repair cost of \$319. Mazda (\$332) drops one spot from first to second this year. Hyundai (\$333) moves up one spot from fourth to third. Rounding out the top five are Chrysler (\$337), which moves up one spot from fifth to fourth and Dodge (\$350). Joining this year's list of the 10 vehicle brands with the lowest average repair costs are Ford and Buick, debuting at no. 9 and no. 10 respectively.




RANK	BRAND	AVERAGE CHECK ENGINE LIGHT REPAIR COST	YEAR-OVER-YEAR COMPARISON (2018 RANKING/COST)	MODEL WITH THE LOWEST AVERAGE CEL REPAIR COST
1	Kia	\$321.43	No. 2 (\$319.97)	2017 Kia Soul (\$82)
2	Mazda	\$332.38	No. 1 (\$285.70)	2012 Mazda 3 (\$224)
3	Hyundai	\$333.01	No. 4 (\$328.32)	2017 Hyundai Tucson (\$79)
4	Chrysler	\$337.73	No. 5 (\$329.43)	2013 Chrysler 200 (\$234)
5	Dodge	\$349.50	No. 3 (\$326.41)	2017 Dodge Durango (\$127)
6	Chevrolet	\$366.54	No. 7 (\$341.19)	2017 Chevrolet Traverse (\$132)
7	GMC	\$375.73	Not listed in 2018	2016 GMC Acadia (\$140)
8	Volkswagen	\$379.63	No change - No. 8 (\$357.92)	2016 VW Passat (\$206)
9	Ford	\$385.15	Not listed in 2018	2016 Ford Mustang (\$189)
10	Buick	\$420.73	Not listed in 2018	2016 Buick Enclave (\$147)

(Top 10 vehicle manufacturers based on model year 1996-2019 vehicles inspected by CarMD's network, found to need repairs and receiving parts and labor estimates between Oct. 1, 2018 and Sept. 30, 2019.)

Top 10 Brands with Lowest Average Repair Cost



The vehicle brand with the lowest average repair cost for CHECK ENGINE problems in 2019? Kia, which had an average recommended parts & labor estimate of \$321.

	#1	\$321	<div style="width: 100%; height: 10px; background-color: #76b82a;"></div>
mazda	#2	\$332	<div style="width: 98%; height: 10px; background-color: #76b82a;"></div>
HYUNDAI	#3	\$333	<div style="width: 97%; height: 10px; background-color: #76b82a;"></div>
CHRYSLER	#4	\$337	<div style="width: 95%; height: 10px; background-color: #76b82a;"></div>
<i>Dodge</i>	#5	\$349	<div style="width: 92%; height: 10px; background-color: #76b82a;"></div>
CHEVROLET	#6	\$366	<div style="width: 85%; height: 10px; background-color: #76b82a;"></div>
GMC	#7	\$375	<div style="width: 80%; height: 10px; background-color: #76b82a;"></div>
	#8	\$379	<div style="width: 78%; height: 10px; background-color: #76b82a;"></div>
	#9	\$385	<div style="width: 75%; height: 10px; background-color: #76b82a;"></div>
BUICK	#10	\$420	<div style="width: 60%; height: 10px; background-color: #76b82a;"></div>

Top 10 Vehicles with Lowest Average Repair Cost



When the check engine light comes on, here are the 10 vehicles with the lowest average repair cost among the 8,440 different year, make and model vehicles on the road today.

RANK	YEAR	BRAND/MAKE	MODEL	AVERAGE CHECK ENGINE LIGHT-RELATED CAR REPAIR COST
1	2017	Subaru	Outback	\$59.92
2	2016	Toyota	Prius	\$67.71
3	2017	Hyundai	Tucson	\$79.12
4	2017	Kia	Soul	\$82.05
5	2016	Mercedes-Benz	C	\$84.51
6	2017	Toyota	Prius	\$85.02
7	2017	Subaru	Legacy	\$85.73
8	2016	Hyundai	Tucson	\$96.69
9	2015	Mercedes-Benz	ML	\$99.93
10	2016	Kia	Forte	\$106.94

Top 3 Vehicles By Category: Fewest Repair Incidents



The following is a list of the top three vehicles by category using data reported from Oct. 1, 2018 through Sept. 30, 2019, according to CarMD, which based its ranking on the used vehicles with the fewest and those with the lowest cost check engine-related problems reported by or to our network:



Compact

- 1. 2017 Honda Civic
- 2. 2016 Honda Civic
- 3. 2017 Mazda 3



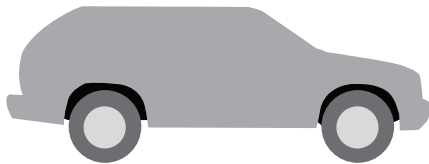
Minivan

- 1. 2017 Honda Odyssey
- 2. 2017 Toyota Sienna
- 3. 2016 Toyota Sienna



Midsize

- 1. 2017 Subaru Legacy
- 2. 2015 Acura LX
- 3. 2017 Infiniti Q50



Full-Sized SUV

- 1. 2015 Acura MDX
- 2. 2014 Acura MDX
- 3. 2017 GMC Acadia



Wagon / Crossover SUV

- 1. 2017 Honda CR-V
- 2. 2017 Subaru Outback
- 3. 2016 Subaru Forester



Truck

- 1. 2016 Toyota Tacoma
- 2. 2017 Ford F-150
- 3. 2017 Honda Ridgeline

Top 3 Vehicles By Category: Lowest Average Repair Costs



The following is a list of the top three vehicles by category using data reported from Oct. 1, 2018 through Sept. 30, 2019, according to CarMD, which based its ranking on the used vehicles with the fewest and those with the lowest cost check engine-related problems reported by or to our network:



Compact

- 1. 2017 Kia Soul (\$82)
- 2. 2016 Kia Forte (\$107)
- 3. 2015 Kia Forte (\$128)



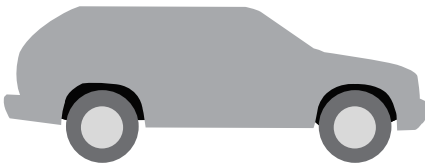
Minivan

- 1. 2016 Honda Odyssey (\$178)
- 2. 2018 Chrysler Town & Country (\$266)
- 3. 2009 Toyota Sienna (\$355)



Midsize

- 1. 2017 Subaru Legacy (\$86)
- 2. 2011 Kia Optima (\$129)
- 3. 2016 Toyota Camry (\$134)



Full-Sized SUV

- 1. 2017 Dodge Durango (\$126)
- 2. 2017 Chevrolet Traverse (\$132)
- 3. 2016 GMC Acadia (\$140)



Wagon / Crossover SUV

- 1. 2017 Subaru Outback (\$59)
- 2. 2017 Hyundai Tucson (\$79)
- 3. 2016 Hyundai Tucson (\$97)



Truck

- 1. 2015 Chevrolet Colorado (\$187)
- 2. 2016 Chevrolet Colorado (\$194)
- 3. 2017 Nissan Frontier (\$196)

Index 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 2019 Index statistically analyzes more than 14.4 million model year 1996 to 2019 vehicles reporting in-use repairs that apply to an estimated vehicle population of 238 million vehicles, taking place in the United States during the Oct. 1, 2018 to Sept. 30, 2019 date period. The data for the 2019 CarMD® Vehicle Health Index was pulled, analyzed and validated between Oct. 9, 2019 and Nov. 13, 2019, by CarMD’s internal team.

For the 2019 Vehicle Health Index Make and Model Reliability Rankings, CarMD included model year 1996-2019 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, 2018 - Sept. 30, 2019. 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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