CarMD®
VEHICLE HEALTH INDEX

10

A DECADE OF
DATA

CarMD 2020 Vehicle Health Index™

MAKE & MODEL RELIABILITY RANKINGS

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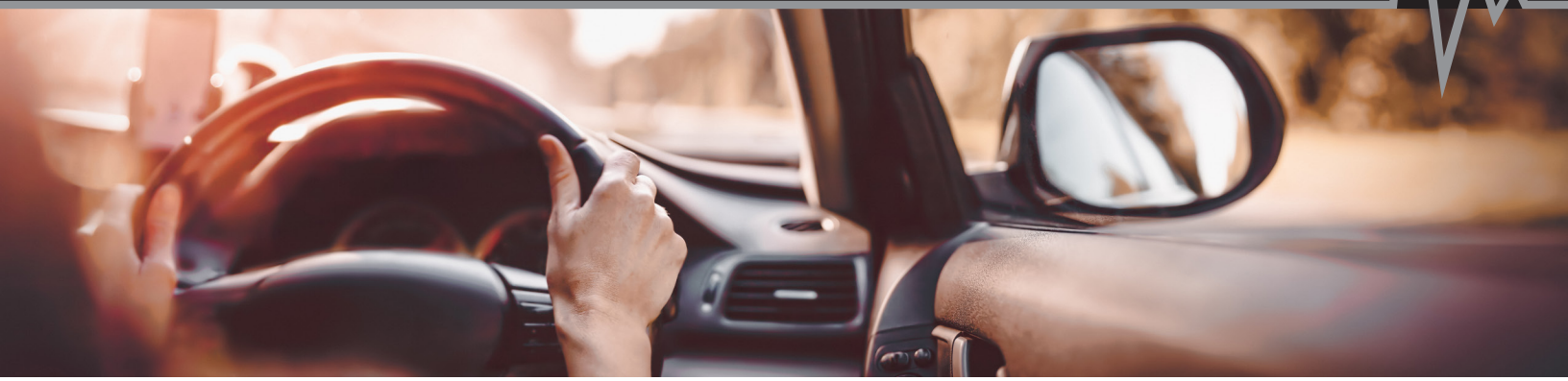


Overview

Having a reliable vehicle to drive and reducing the likelihood of costly car repairs is particularly important as we wrap up 2020 – a year that has brought many challenges. Continuing its decade-long tradition of reporting on which vehicles have required the fewest check engine light repairs, and which cost the least to fix when they do need work, CarMD is pleased to publish its **2020 CarMD® Vehicle Health Index™ Make and Model Reliability 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 19.5 million in-use vehicles manufactured from 1996 to 2020 reporting check engine health between Oct. 1, 2019 and Sept. 30, 2020.

In this report you will find a listing of:

- **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**

The 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/2020-carmd-manufacturer-vehicle-rankings/.

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% of a vehicle's system, and is installed on more than 90% 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 compiled a dynamic 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-indexes/

10 Makes Least Likely to Have a Check Engine Light On

CarMD studied data from more than 19.5 million vehicles to help identify the makes/brands least likely to need check engine repairs over the past year. 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.

Mitsubishi ranks no. 1, with a 0.66 CarMD Index frequency score. Mitsubishi is followed by Mercedes, down from the no. 1 ranking last year. Volkswagen ranks no. 3 this year. Rounding out the top five brands least likely to need check engine light repairs are Buick and Ford.

RANK (LEAST LIKELY)	BRAND	CARMD INDEX FREQUENCY SCORE 2020*	YEAR-OVER-YEAR COMPARISON
1	**Mitsubishi**	0.66	Up from no. 2
2	**Mercedes**	0.74	Down from no. 1
3	**Volkswagen**	0.81	Not listed in 2019
4	**Buick**	0.84	Down from no. 3
5	**Ford**	0.89	No change
6	**Mazda**	0.93	Not listed in 2019
7	**BMW**	0.94	Not listed in 2019
8	**GMC**	0.97	Not listed in 2019
9	**Subaru**	0.99	Up from no. 10
10	**Cadillac**	0.99	Not listed in 2019

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

(Top 10 vehicle makes by repair frequency based on model year 1996-2020 vehicles inspected between Oct. 1, 2019 and Sept. 30, 2020, 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.)

10 Vehicles Least Likely to Have a Check Engine Light On

Any given brand can have a mix of very reliable vehicle models as well as 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. Four Toyotas, three Hondas, one Hyundai, one Ford and one Nissan comprise this list of 10 vehicles with the lowest check engine light-related repair frequency among the 10,145 different model year 1996 to 2020 vehicles on the road over the past year.

RANK	YEAR	BRAND/MAKE	MODEL	CARMD INDEX FREQUENCY SCORE 2020
1	2018	TOYOTA	TACOMA	0.041
2	2015	HONDA	CR-V	0.050
3	2018	TOYOTA	CAMRY	0.055
4	2017	HONDA	ACCORD	0.060
5	2017	TOYOTA	TACOMA	0.061
6	2018	HYUNDAI	SANTA FE SPORT	0.061
7	2014	HONDA	CR-V	0.065
8	2017	FORD	EXPLORER	0.073
9	2018	NISSAN	ROGUE	0.079
10	2016	TOYOTA	TACOMA	0.080

10 Brands with Lowest Average Repair Cost

Of the 19.5 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 again this year was Kia ($322). Ranking second is Chrysler ($333), moving up from fourth. Mazda ($339) dropped a spot from second to third. Hyundai dropped from third to fourth with an average cost of $352. Rounding out the top five is Dodge, which remains in fifth. Joining this year's list of the 10 vehicle makes with the lowest average repair costs is Jeep, which was not listed in the top 10 last year.

RANK	MAKE	AVERAGE CHECK ENGINE LIGHT REPAIR COST	YEAR-OVER-YEAR COMPARISON (2019 RANKING/COST)
1	Kia	$322.43	No change – No. 1 ($321.43)
2	Chrysler	$332.83	No. 4 ($337.73)
3	Mazda	$339.35	No. 2 ($332.38)
4	Hyundai	$352.41	No. 3 ($333.01)
5	Dodge	$355.92	No change—No. 5 ($349.50)
6	Jeep	$359.13	Not listed in 2019
7	Chevrolet	$375.78	No. 6 ($366.54)
8	Ford	$381.63	No. 9 ($385.15)
9	GMC	$384.40	No. 7 ($375.73)
10	Volkswagen	$413.06	No. 8 ($379.63)

(Top 10 vehicle manufacturers based on model year 1996-2020 vehicles inspected by CarMD's network, found to need repairs and receiving parts and labor estimates between Oct. 1, 2019 and Sept. 30, 2020.)

10 Brands with Lowest Average Repair Cost

The vehicle brand with the lowest average repair cost for CHECK ENGINE problems in 2020? Kia, which had an average recommended parts & labor estimate of $322. This accounts for the average cost for recommended check engine light-related repairs on model year 1996 to 2020 vehicles reporting check engine health to CarMD last year. Note that while model year 2020 vehicles are included in the study, it's rare to see check engine light-related issues on brand new vehicles.

KIA	#1	$322
CHRYSLER	#2	$333
MAZDA	#3	$339
HYUNDAI	#4	$352
DODGE	#5	$355
JEEP	#6	$359
CHEVROLET	#7	$376
FORD	#8	$382
GMC	#9	$384
VOLKSWAGEN	#10	$413

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 10,145 different year, make and model vehicles on the road today reporting check engine health. The most common repair for 9 out of 10 of the vehicles with the lowest average check engine light-related repair cost is a loose, missing or damaged gas cap or fuel cap gasket. For instance, the most common repair on the 2018 Hyundai Tucson is to replace or tighten the gas cap, accounting for nearly half of recommended repairs, while the national average for gas cap-related repairs is 4.5%. As vehicles age, the type of repair changes and the average cost to repair typically increases.

RANK	YEAR	BRAND/MAKE	MODEL	AVERAGE CHECK ENGINE LIGHT-RELATED CAR REPAIR COST
1	2018	HYUNDAI	TUCSON	$33.80
2	2019	SUBARU	IMPREZA	$37.74
3	2016	MERCEDES-BENZ	GLE	$39.79
4	2017	MITSUBISHI	MIRAGE	$57.14
5	2018	KIA	SOUL	$69.69
6	2017	MITSUBISHI	OUTLANDER SPORT	$72.56
7	2019	HONDA	HR-V	$73.45
8	2017	HYUNDAI	TUCSON	$75.35
9	2018	SUBARU	LEGACY	$78.09
10	2017	SUBARU	LEGACY	$79.93

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, 2019 through Sept. 30, 2020, according to CarMD, which based its ranking on the model year 1996 to 2020 vehicles with the fewest check engine-related problems reported by or to our network:

Compact / Sub-Compact Car

1. 2015 Honda Civic
2. 2014 Honda Civic
3. 2015 Mazda 3

Minivan / Van

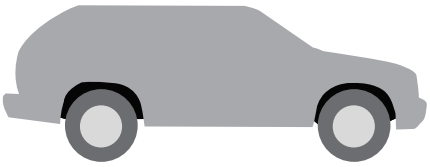
1. 2019 Dodge Grand Caravan
2. 2015 Toyota Sienna
3. 2014 Toyota Sienna

Midsize Sedan

1. 2018 Toyota Camry
2. 2017 Honda Accord
3. 2016 Honda Accord

Compact SUV

1. 2018 Nissan Rogue
2. 2016 Mazda CX-5
3. 2018 Ford Escape



Full-Sized SUV

1. 2018 Hyundai Santa Fe Sport
2. 2017 Ford Explorer
3. 2017 Honda Pilot

Wagon/Crossover SUV

1. 2015 Honda CR-V
2. 2014 Honda CR-V
3. 2015 Subaru Forester

Truck

1. 2018 Toyota Tacoma
2. 2017 Toyota Tacoma
3. 2016 Toyota Tacoma

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, 2019 through Sept. 30, 2020, according to CarMD, which based its ranking on the vehicles with the lowest cost check engine-related problems reported by or to our network:

Compact / Sub-Compact Car

1. 2019 Subaru Impreza ($38)
2. 2017 Mitsubishi Mirage ($57)
3. 2018 Kia Soul ($70)

Minivan / Van

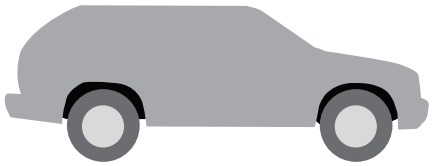
1. 2016 Honda Odyssey ($185) second year in a row
2. 2017 Honda Odyssey ($198)
3. 2018 Chevrolet Express G2500 ($201)

Midsize Sedan

1. 2018 Subaru Legacy ($78)
2. 2017 Subaru Legacy ($80)
3. 2016 Toyota Camry ($107)

Compact SUV

1. 2018 Hyundai Tucson ($34)
2. 2019 Honda HR-V ($73)
3. 2018 Hyundai Kona ($99)



Full-Sized SUV

1. 2017 Mitsubishi Outlander Sport ($73)
2. 2019 Toyota 4Runner ($92)
3. 2018 Dodge Durango ($92)

Wagon/Crossover SUV

1. 2017 Kia Soul ($148)
2. 2016 Subaru Outback ($187)
3. 2017 Honda CR-V ($250)

Truck

1. 2019 Toyota Tundra ($135)
2. 2016 Chevrolet Colorado ($169)
3. 2019 Ford F-150 ($170)

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 2020 Index statistically analyzes more than 19.5 million model year 1996 to 2020 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, 2019 to Sept. 30, 2020 date period. The data for the 2018 CarMD® Vehicle Health Index was pulled, analyzed and validated between Nov. 1, 2020 and Nov. 12, 2020, by CarMD's internal team.

For the 2020 Vehicle Health Index Make and Model Reliability Rankings, CarMD included model year 1996-2020 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% 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, 2019 - Sept. 30, 2020. To be included in the ranking makes need to comprise at least 1% 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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