



U.S. Department  
of Transportation

**National Highway  
Traffic Safety  
Administration**

# ODI RESUME

**Investigation:** EA 16-002  
**Prompted by:**  
**Date Opened:** 02/03/2016 **Date Closed:** 06/24/2016  
**Investigator:** Stephen Mchenry **Reviewer:** Jeff Quandt  
**Approver:** Stephen Ridella  
**Subject:** Vehicle rollaway, engine on

## MANUFACTURER & PRODUCT INFORMATION

**Manufacturer:** Chrysler (FCA US LLC)  
**Products:** 2014-15 Grand Cherokee; 2012-14 Charger & 300 w/3.6L engine  
**Population:** 811,586  
**Problem Description:** Drivers may exit the vehicle when the engine is running and the transmission is not in Park, resulting in unattended vehicle rollaway. Rollaway incidents may result in serious injuries to the driver or passengers as they exit the vehicle or to other pedestrians in the path of the rolling vehicle.

## FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
<b>Complaints:</b>	112	526	686**
<b>Crashes/Fires:</b>	101	199	266**
<b>Injury Incidents:</b>	38	43	68**
<b>Number of Injuries:</b>	38	43	68**
<b>Fatality Incidents:</b>	0	0	0

\*\* Total eliminates duplicates received by ODI and manufacturer.

## ACTION / SUMMARY INFORMATION

**Action:** This Engineering Analysis is closed. Recall 16V-240.

### Summary:

On April 22, 2016, Fiat Chrysler Automotive US LLC, (FCA) submitted a Defect Information Report (DIR) to NHTSA regarding a defect that could result in unattended vehicle rollaway with the engine running in approximately 811,586 model year (MY) 2012 to 2014 Dodge Charger and Chrysler 300 vehicles and MY 2014 to 2015 Jeep Grand Cherokee vehicles equipped with 8-speed transmissions and a monostable gear selector (NHTSA Recall #16V-240, FCA Recall #S27). According to FCA's DIR, "The existing strategies built into these vehicles to deter drivers from exiting the vehicle after failing to put the transmission into PARK have not stopped some from doing so. Drivers erroneously concluding that their vehicle's transmission is in the PARK position may be struck by the vehicle and injured if they attempt to get out of the vehicle while the engine is running and the parking brake is not engaged."

The vehicles recalled by FCA are equipped with Monostable electronic ("shift-by-wire") gearshift assemblies supplied by ZF Group (see Figure 1). The subject Monostable shifter has a single neutral position that it snaps back to when the driver releases the shift knob. Although the Monostable gearshift has the familiar appearance of a conventional console mechanical gearshift assembly, it has an unfamiliar movement that does not provide the tactile or visual feedback that drivers are accustomed to receiving from conventional shifters. Consequently, the driver must take additional time to verify that the desired gear position was achieved by checking the PRNDL display on the shift knob or the Electronic Vehicle Information Center (EVIC) display.

FCA received negative consumer feedback for the Monostable shifters shortly after the subject vehicles entered the market. Field data indicate that the design resulted in higher error rates during attempted shifts to Park and higher rates of powered rollaway incidents. The Monostable design appears to violate several basic design guidelines for vehicle controls,<sup>1</sup> such as: 1) be consistent; 2) controls and displays should function the way people expect them to function; 3) minimize what the user has to remember; and 4) operations that occur most often or have the greatest impact on driving safety should be the easiest to perform. FCA changed to Polystable electronic gearshift assemblies in MY 2015 Charger/300 cars and MY 2016 Jeep Grand Cherokee vehicles (see Figure 2). The Polystable gearshift assemblies stay in the position of the selected gear, similar to a standard mechanical shifter, providing drivers with the expected tactile and visual feedback (i.e., works as expected and does not require additional thought or attention).

Driver awareness of vehicle control logic may also be a contributing factor in driver error rates when attempting to shift to Park or shutoff the engine. For example, as a safety feature to prevent unpowered rollaway incidents, the engines will not shutoff in the subject vehicles when the driver presses the ignition Start/Stop button if the vehicle is not in Park. This interlock function is intended to remind the driver to shift to Park before shutting the engine Off and exiting the vehicle.<sup>2</sup> In addition, to protect the transmission from damage, the vehicle may shift to Neutral by default if a shift to Park is attempted when the vehicle speed is greater than 2 km/h (1.2 mph). Audible chimes and visual warning messages are provided to alert drivers that the vehicle is not in Park when the driver's door is opened. However, as stated in FCA's DIR, these strategies have not been effective in preventing drivers from exiting vehicles with the engine running and the transmission not in Park.

Based on ODI's interviews with complainants, in some incidents the driver believed they had left the vehicle idling in Park when they exited, but the vehicle was not in Park. In other incidents the drivers believed they had turned the engine Off after shifting to Park, but failed to recognize that the engine did not shutoff and the vehicle was not in Park. The engine noise at idle is not obvious to many drivers who may not recognize that the engine continues to run after attempted shutoff.

In addition to the crashes and injuries documented in this closing resume, ODI is aware of a fatal incident involving a recalled 2015 Jeep Grand Cherokee that occurred over the weekend of June 18-19, 2016 in Studio City, California that may be related to the alleged defect. The incident is being investigated by the Los Angeles Police Department and FCA.

FCA's recall remedy involves the development of revised control logic to provide "Auto Park" shift strategies as countermeasures for the following scenarios that have resulted in incidents of powered rollaway in the subject vehicles:

---

<sup>1</sup> Green, P., Levison, W., Paelke, G., & Serafin, C. (1995). *Preliminary human factors design guidelines for driver information systems*, pgs 9-11. Washington, DC: Federal Highway Administration (FHWA-RD-94-087). <https://deepblue.lib.umich.edu/bitstream/handle/2027.42/1098/88512.0001.001.pdf>

<sup>2</sup> Since the subject vehicles use electronic keys with push-button engine Start/Stop functionality (sometimes referred to as "keyless ignition"), an Ignition-Park interlock that prevents removal of a mechanical key from an ignition cylinder when the transmission is not in Park is not available as a safety interlock.

**Scenario 1**

Driver believes they put the vehicle in Park and attempts to shutoff the vehicle using the ignition On/Off button, and then exits the vehicle without realizing that the vehicle is not in Park and the engine continues to run.

**FCA countermeasure:** Automatically shift to Park and shut the engine off when the vehicle speed is 1.2 mph or less and the ignition On/Off button is pressed.

**Scenario 2**

Driver believes the vehicle is in Park, intentionally leaves the vehicle running and attempts to exit the vehicle.

**FCA countermeasure:** Automatically shift to Park if the transmission is not in Park, the vehicle speed is 1.2 mph or less, the driver's seat belt is unbuckled, the driver's door is ajar and the brake pedal is not depressed.

**Scenario 3**

Driver attempts to shift into Park when the vehicle is moving, but the vehicle speed is too high to engage Park. The vehicle may default to Neutral in this situation. The EVIC displays a message "Vehicle Speed is too high to shift."

**FCA countermeasure:** Automatically shift to Park if vehicle speed drops to 1.2 mph or less within 5 seconds of the attempted shift to Park.

FCA is conducting owner notification mailings for the final software remedy in phases. Owner notification mailings for Jeep Grand Cherokee vehicles began June 24, 2016. Owner notification mailings for Dodge Charger and Chrysler 300 vehicles are planned for July 2016. For more details on owner notification mailings see the document file for recall 16V-240 on [safercar.gov](http://safercar.gov).<sup>3</sup>

**Interim Notification**

The "Auto Park" software remedy was not ready when FCA submitted the DIR in April 2016. On May 14, 2016, FCA mailed interim notification letters to owners with the following description of the defect and safety precautions to observe when parking the vehicle:

***Your vehicle may roll away striking and injuring you, your passengers, or bystanders, if the vehicle's engine is left running, the parking brake is not engaged, and the vehicle is not in the "PARK" position before exiting the vehicle.***

***Drivers may inadvertently fail to achieve the "PARK" position before exiting the vehicle. The electronic shift lever in your vehicle does not move like a conventional shifter. Your shift lever is spring loaded and returns to the same center position like a joystick, always returning to the center position after the desired gear is selected.***

---

<sup>3</sup> <http://www-odi.nhtsa.dot.gov/owners/SearchSafetyIssues>

***NOTE: ALWAYS DO A VISUAL CHECK that your vehicle is in "PARK" by looking for the "P" in the Electronic Vehicle Information Center (EVIC) or on the shift lever knob. Always fully apply the parking brake before exiting the vehicle. Please refer to the enclosed Electronic Shifter Quick Reference Information card for detailed information.***

FCA's interim notification letters included Quick Reference cards with detailed information about safety parking procedures. The cards included pictures of the EVIC, Monostable gearshift and parking brake (see Figures 3a-3c).

This investigation is hereby closed based on the FCA recall.



**Figure 1. Monostable gearshift, 2014-15 Jeep Grand Cherokee.**



**Figure 2. Polystable gearshift, 2016 Jeep Grand Cherokee.**

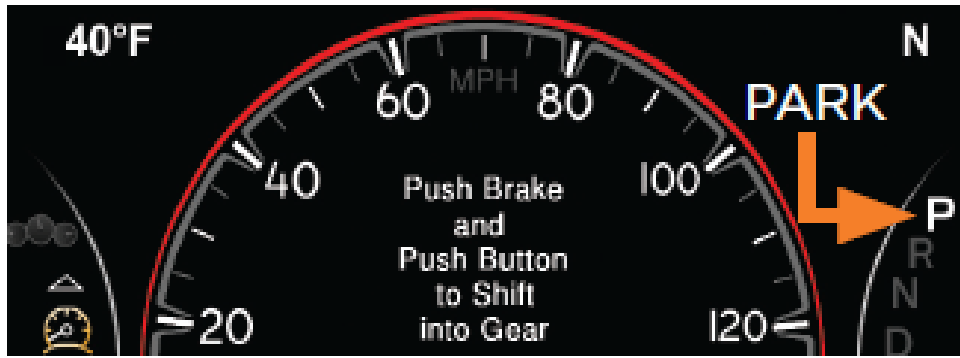


Figure 3a. Electronic Vehicle Information Center (EVIC), Gear Position Indication.



Figure 3b. Monostable Gearshift, Gear Position Indication.



Figure 3c. Parking Brake.

The Vehicle Owner Questionnaires (VOQs: complaints submitted to NHTSA by the public) associated with the closing of this investigation are:

Jeep Grand Cherokee: 10875341, 10875328, 10875290, 10875247, 10875195, 10874862, 10874636, 10874355, 10873978, 10873439, 10872786, 10872522, 10872521, 10872512, 10872370, 10871852, 10871834, 10871557, 10871391, 10870677, 10870595, 10870571, 10870340, 10870334, 10870332, 10870303, 10870288, 10865868, 10865590, 10865480, 10865176, 10864826, 10864408, 10863787, 10862334, 10862221, 10862203, 10862165, 10861720, 10861490, 10861260, 10861139, 10861046, 10861041, 10861007, 10860985, 10859883, 10859858, 10859802, 10854992, 10854989, 10854911, 10853352, 10852774, 10851654, 10851513, 10851479, 10851352, 10851339, 10851265, 10851253, 10851131, 10851063, 10851007, 10851001, 10850962, 10850950, 10850931, 10850904, 10850897, 10850771, 10850712, 10850699, 10850433, 10840344, 10840121, 10840106, 10839940, 10838846, 10838813, 10838645, 10837926, 10837865, 10837388, 10837169, 10836722, 10836633, 10836415, 10826121, 10826089, 10825981, 10825930, 10825867, 10825852, 10825562, 10825520, 10825466, 10825432, 10825396, 10825381, 10825289, 10825285, 10825276, 10825263, 10825262, 10825228, 10825218, 10825209, 10825207, 10825190, 10825183, 10825139, 10825110, 10825105, 10825098, 10825079, 10825078, 10825071, 10825057, 10825051, 10825037, 10825030, 10825020, 10825019, 10825018, 10825007, 10825006, 10824989, 10824972, 10824968, 10824962, 10824960, 10824923, 10824919, 10824876, 10824819, 10824782, 10824042, 10823099, 10822939, 10820488, 10817252, 10810551, 10810051, 10809691, 10809024, 10807839, 10807416, 10794318, 10787947, 10787576, 10785790, 10783597, 10778854, 10775391, 10767488, 10766494, 10763333, 10763284, 10763082, 10762457, 10761498, 10760980, 10760729, 10760702, 10760081, 10759979, 10759669, 10759622, 10759568, 10759548, 10759533, 10759433, 10759419, 10759287, 10759278, 10759198, 10759186, 10759171, 10759157, 10759131, 10759102, 10759082, 10759066, 10759047, 10759046, 10733158, 10730952, 10725429, 10716526, 10715401, 10711893, 10683556, 10679497, 10676998, 10668651, 10662619, 10662308, 10631167, 10605865, 10583366, 10567538, 10555901, and 10537653.

Chrysler 300: 10864591, 10863977, 10851074, 10837379, 10825219, 10825003, 10824981, 10714355, 10693300, 10672445, 10670681, and 10566108.

Dodge Charger: 10851599, 10825000, 10824970, and 10595813.

#