U.S. Department of Transportation

National Highway Traffic Safety Administration

ODI RESUME

Investigation: RQ 17-005
Date Opened: 08/04/2017 **Date Closed:** 07/03/2018
Investigator: Frederick Lamance **Reviewer:** Jeff Quandt
Approver: Stephen Ridella
Subject: Door Latch Open While Driving

MANUFACTURER & PRODUCT INFORMATION

Manufacturer: LAND ROVER
Products: 2013-2016 Range Rover and 2014-2016 Range Rover Sport
Population: 119,183 (Estimated)

Problem Description: Consumers report incidents of doors opening while driving or failure to latch.

FAILURE REPORT SUMMARY

	ODI	Manufacturer	Total
Complaints:	5	39	41**
Crashes/Fires:	0	1	1
Injury Incidents:	1	0	1
Number of Injuries:	1	0	1
Fatality Incidents:	0	0	0
Other*:	0	564	564

***Description of Other:** Warranty claims related to the alleged defect.

** Total eliminates duplicates received by ODI and manufacturer.

ACTION / SUMMARY INFORMATION

Action: This Recall Query has been upgraded to an Engineering Analysis (EA18-004).

Summary:

On June 11, 2015, Jaguar-Land Rover (JLR) submitted a Defect Information Report (DIR) to NHTSA describing a defect condition in the electronically controlled door latch systems of approximately 65,372 model year (MY) 2013-2016 Range Rover and MY 2014-2016 Range Rover Sport that may result in incidents of door opening while driving (NHTSA Recall No. 15V-385, JLR Recall P068).

On August 4, 2017, the Office of Defects Investigation (ODI) opened Recall Query RQ17-005 to investigate claims of doors failing to latch and/or inadvertently opening while driving (latch malfunctions) on MY 2013-2016 Range Rover and MY 2014-2016 Range Rover Sport vehicles that had received the remedy for 15V-385 or were built after the recall remedy had been implemented in production (the subject vehicles). ODI has received 5 unique reports (VOQs) related to the alleged defect in the subject vehicles. All five VOQs allege experiencing at least one incident of a door opening inadvertently while the vehicle was in motion and were repaired by replacing the malfunctioning latch assembly. One minor injury was reported where the consumer did not seek medical care.

ODI's analysis of information provided by JLR in response to the Information Request (IR) letter for RQ17-005 identified 43 additional complaints and field reports related to door latch malfunctions in the subject vehicles, including 14 additional allegations that a door opened while the vehicle was in motion. In addition, ODI's analysis of JLR warranty claim data provided in the IR response identified an additional 564 vehicles that received latch replacements to address customer concerns with latch malfunctions, including 72 additional incidents of doors opening while in motion based on ODI's analysis of customer concern narratives.

ODI has upgraded this investigation to an Engineering Analysis (EA18-004) to further assess the recall remedy, scope, and frequency. See attached pages for additional information.

The subject vehicles are equipped with JLR's Unilatch Keyless Vehicle (KV) entry system. The front and rear side door latches in these vehicles have multiple functions, including open-by-wire (KV Function) and power closing (“Soft-Close” or Cinching Function). JLR’s response to the IR letter included the following description of the defect condition and remedy associated with 15V-385 (JLR Recall No. P068):

> ***During the course of [JLR’s] internal defect investigation, completed to understand the recognised defect now remedied through recall reference P068, a number of aspects of the door latch system operation were investigated. The conclusion of the investigation – and the identified root cause – was determined as an electrical system specification difference. A short circuit was applied to the Keyless Vehicle (KV) release motor directly after energizing for a keyless vehicle passive entry actuation, whereas the latch supplier specification stated a preference for open circuit. This short circuit effectively turns the motor into a brake, slowing or in some cases stopping the KV lever from returning to its home position. If the KV lever is held away from its home position then the pawl is constantly in a state of clearance to the claw – the claw is free to rotate, and release. This means that during a standard door closure operation the latch appears to take the striker and the door can be closed, but the door is not securely retained by the latch.***
>
> ***The recall remedy of updating the Remote Function Actuator module (also called the Keyless Vehicle Module) software, to allow an open circuit at the keyless vehicle release motor, was proven effective through extensive testing by the latch supplier, Brose.***

The KV lever is spring biased to return to its home position after each passive entry actuation. As stated by JLR in its IR response, if the KV lever does not return to its home position, the latch pawl may not be able to engage the claw latch detents as designed, possibly resulting in “Failure-to-Latch” or “False-Latch” conditions (see Figure 1, “False-Latch”). Forces that may resist the KV lever spring force and cause the lever to stick before reaching its home position, include the motor back emf condition addressed by JLR’s recall remedy and conditions that introduce mechanical frictional forces in the KV drive unit. For example, increased motor bearing friction may occur due to water intrusion into the KV drive unit, which has resulted in motor bearing corrosion.

Incidents of doors opening while in motion have occurred in vehicles with motor bearing corrosion after the recall remedy software update had been applied. For example, VOQ 10983285 reported a left-front door opened while in motion on May 2, 2017 in a 2014 Range Rover Sport vehicle that had the 15V-385 recall remedy completed January 28, 2016. Field return analysis of the latch assembly found the KV lever had not returned to the home position and evidence of motor bearing corrosion (Figures 2-5). A design countermeasure to seal the water intrusion path was introduced in production in February 2015. In addition, binding of components in the KV clutch unit may also prevent the latch pawl from properly engaging with the claw. In addition, sticking or binding components in the KV clutch unit or other door latch assembly components may also interfere with free movement of the latch pawl. Incidents occurring after the motor control and water intrusion countermeasures were implemented are likely to be caused by other such mechanisms.

Table 1 provides a breakdown of field experience by sub-groups and failure mode[1]. Sub-Group A1 shows the field experience for the vehicles recalled in 15V-385 at the time the recall was initiated. Sub-Group A2 shows the experience for the recalled vehicles after receiving the remedy. Sub-Group B shows the experience for MY 2015-2016 vehicles built in the 16-month period after the recall build range and Sub-Group C shows the experience for the remainder of MY 2016-2017 Range Rover and Range Rover Sport vehicles equipped with the subject door latch system. This investigation has been upgraded to an Engineering Analysis (EA18-004) on MY 2013-2016 Range Rover and 2014-2016 Range Rover Sport vehicles built through June 2016. The primary focus of the investigation is the effectiveness of the 15V-385 remedy in addressing door latch safety concerns in the recall population (Sub-Group A2). The investigation will also examine door latch performance in MY 2015-2016 vehicles not included in 15V-385 that were built through June 2016 (Sub-Group B).

Sub-Group	Recall Scope	Recall Repair Status	Production range	Population	Unlatched in Motion		Failure to Latch or Unlatched in Motion	
					No	IPTV	No.	IPTV
A1	Yes	Before	9/12-3/15	65,539	7	0.11	63	0.96
A2	Yes	After	9/12-3/15	48,769	81	1.66	549	11.26
B	No	N/A	3/15-6/16	53,644	10	0.19	56	1.04
C	No	N/A	7/16-9/17	35,648	1	0.03	5	0.14

Table 1. Field Experience by recall scope, recall completion status and production range.

The ODI complaints cited above involved door latch failures while driving can be viewed at www.safercar.gov under the following ODI identification numbers:

11098484, 10983285, 10908506, 10883256, 10819201.

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[1] The field experience summary counts are conservative, as they only show incidents for unique VINs. A number of vehicles have data indicating the alleged defect may have occurred at multiple door positions at different service intervals.

FIGURES

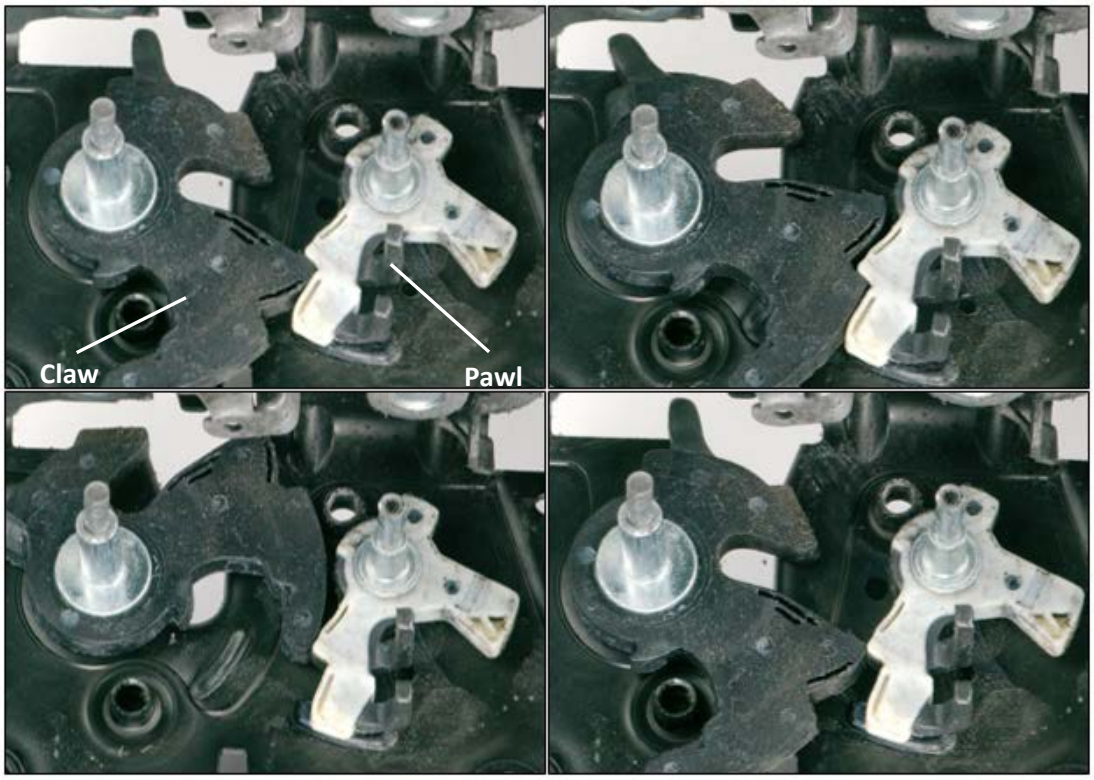

Figure 1. Clockwise from upper left: 1) fully latched position (pawl on claw primary latch; 2) door ajar position (pawl on claw secondary latch); 3) "False-Latch" position (pawl in "tip-to-tip" engagement with claw primary latch); 4) unlatched position.

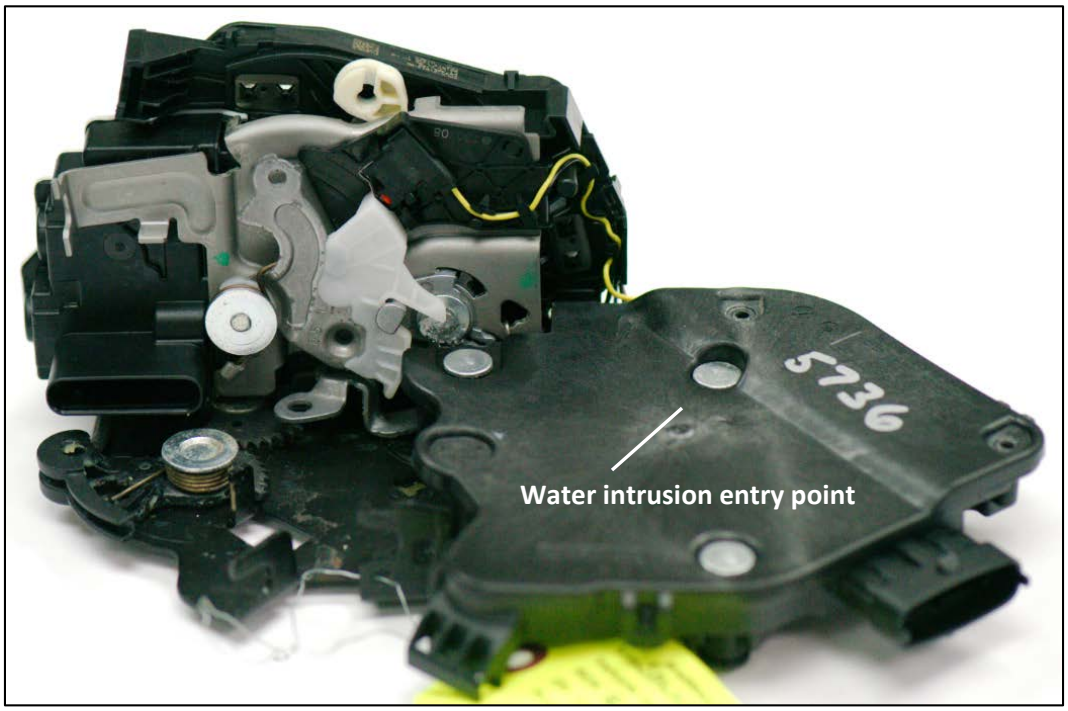

Figure 2. KV latch assembly field return (VOQ 10983285).

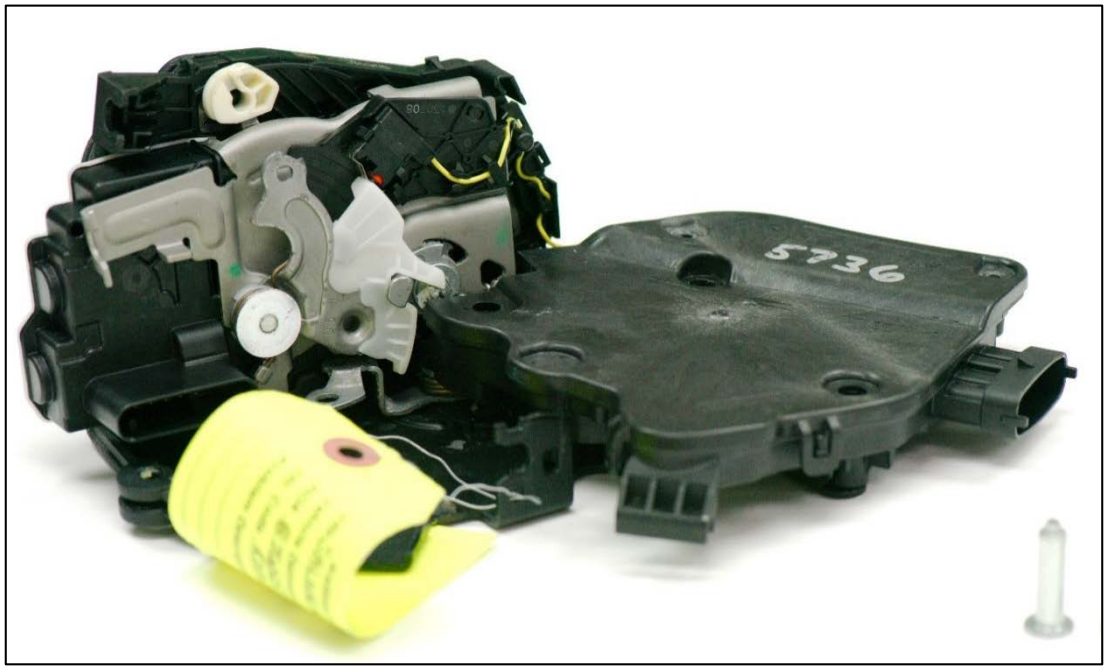

Figure 3. KV latch assembly, drive unit cover rivets removed (VOQ 10983285).

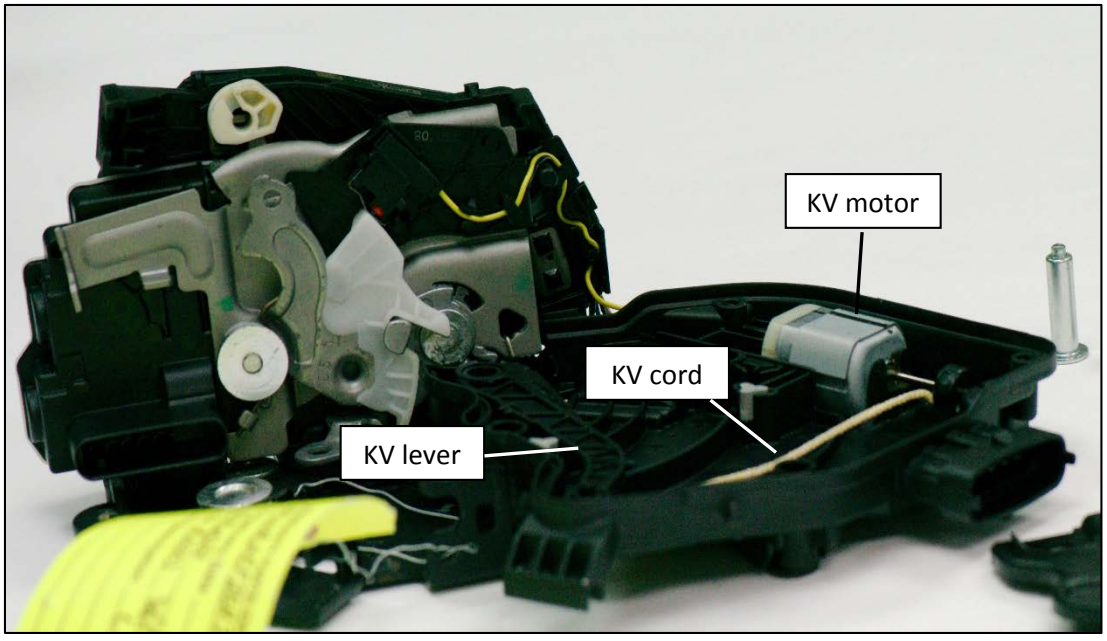

Figure 4. KV drive unit components, cover removed (VOQ 10983285).

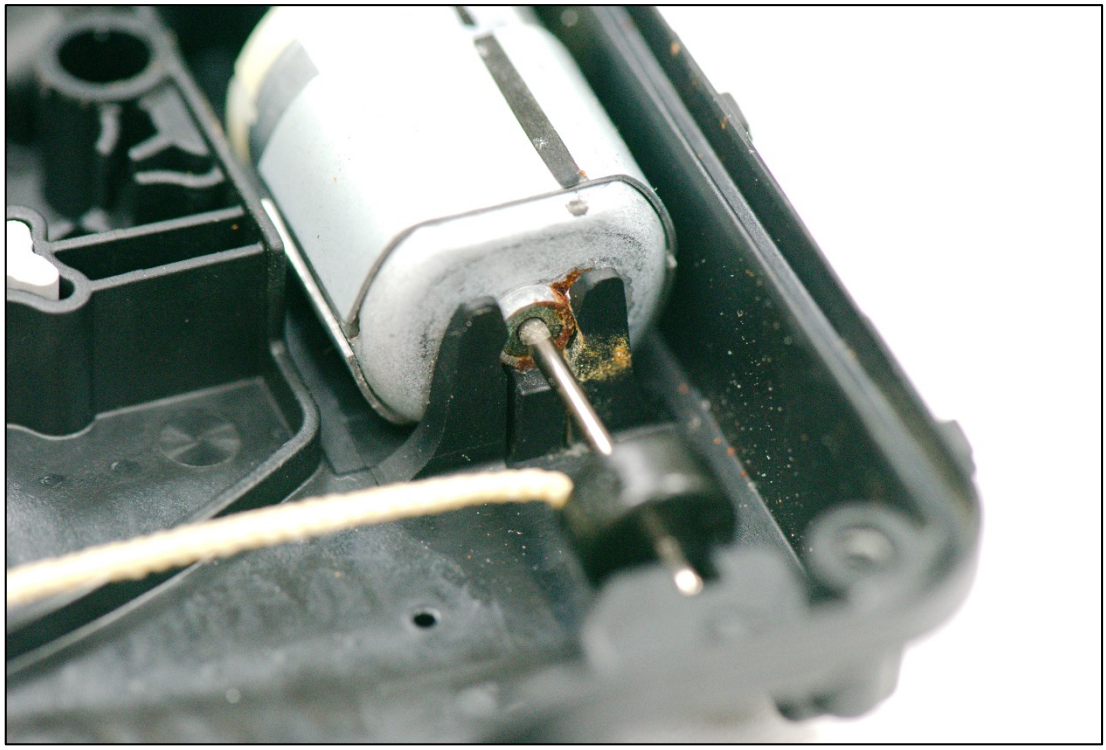

Figure 5. KV motor bearing corrosion (VOQ 10983285).