

TOYOTA AVENSIS

ELECTRONIC PARKING BRAKE SYSTEM (EPB) FAILURES

SEALED BOX - WATER INGRESS

28 February 2014

We design high reliability electronic systems. We neither supply nor repair automotive parts. Repair possibility: IF corrosion has not seriously damaged any circuit tracks or components then it might work after washing the board using a small paintbrush with PCB cleaner and then spraying with Electrolube contact cleaner oil to halt further corrosion. It is conceivable this could be achieved by 'keyhole surgery' through the Bowden cable hole.

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Our home 1973-2002 – the flood prone Forge

Broadcast equipment research, design and manufacture since 1969

ANALYSIS OF WINTER EPB FAILURES

HISTORY

Toyota Avensis Tourer, first registered 2 December 2009, 31,000 miles.
Kept in driveway.

EPB fail, November 2011, stranded two hours after a 12 mile journey.
Warranty repair. One year guarantee.

EPB fail, December 2013, stranded 10 minutes after a 6 mile journey.

INVESTIGATION

Two failures of the Parking Brake System, without apparent cause, provoked this investigation.

The most recently failed unit was dismantled and electrolytic corrosion found covering a 25mm patch of the circuit board.

The damage is caused by water. The location is at the rear of the motor and below the entry point of the parking brake release Bowden cable. From end to end the Bowden cable assembly is not airtight, as noted in the handbook on page 569.

Moisture in the air within the Bowden cable condenses and then drips into the EPB since the cable slopes downwards. In addition, air within the EPG box will expand when warm then contract when cold, thus creating a vacuum which sucks in water from the Bowden cable.

In Britain's climate, failures can be expected during winter months on vehicles which are not garaged.

Several hours each week spent in the warmth and lower humidity of a garage may allow condensate to evaporate before any damage is caused. A higher mileage, with associated increased air movement, might also reduce the risk.

REMEDIES to overcome condensation (and standing water) damage

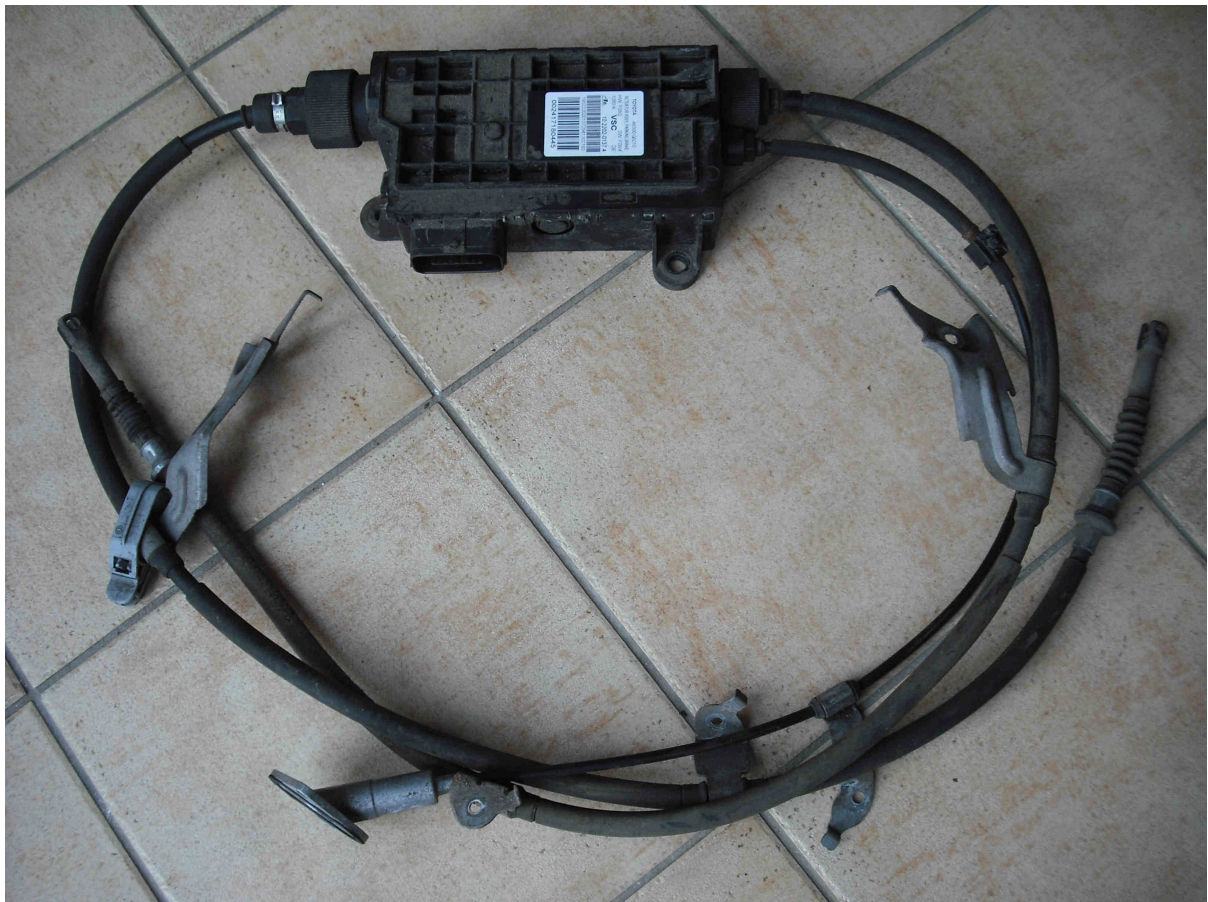
- Toyota specify a hermetically sealed replacement Bowden cable assembly.
Update, April 2014: *"We are confident that the known moisture issue on the Avensis electronic parking brake system has been acknowledged and there has been a change in design of this part which has improved the seals. The design of the main box has also been improved."* – Toyota.
- Fit a threaded cap to seal the EPB's parking brake release hole properly, then cap and tie off the Bowden cable safely. Clearly, refitting would be required if manual parking brake release were ever needed.

PHOTOGRAPHS

Toyota Avensis: two electric parking brake system failures in four years:



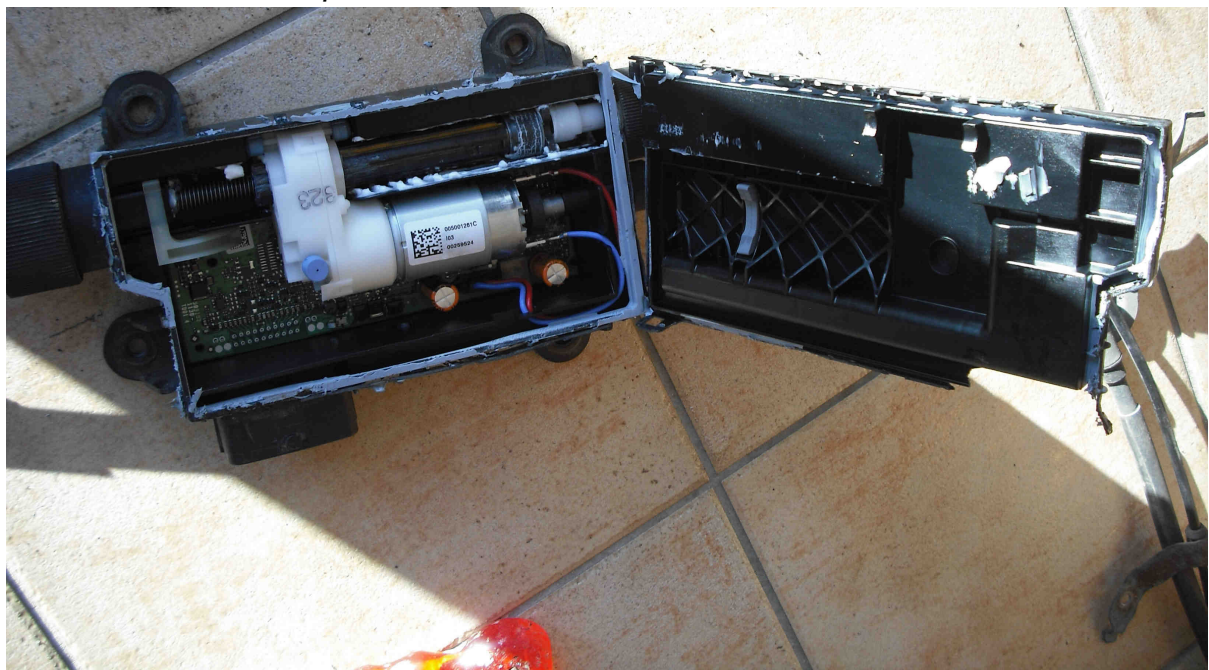
Faulty EPB removed:



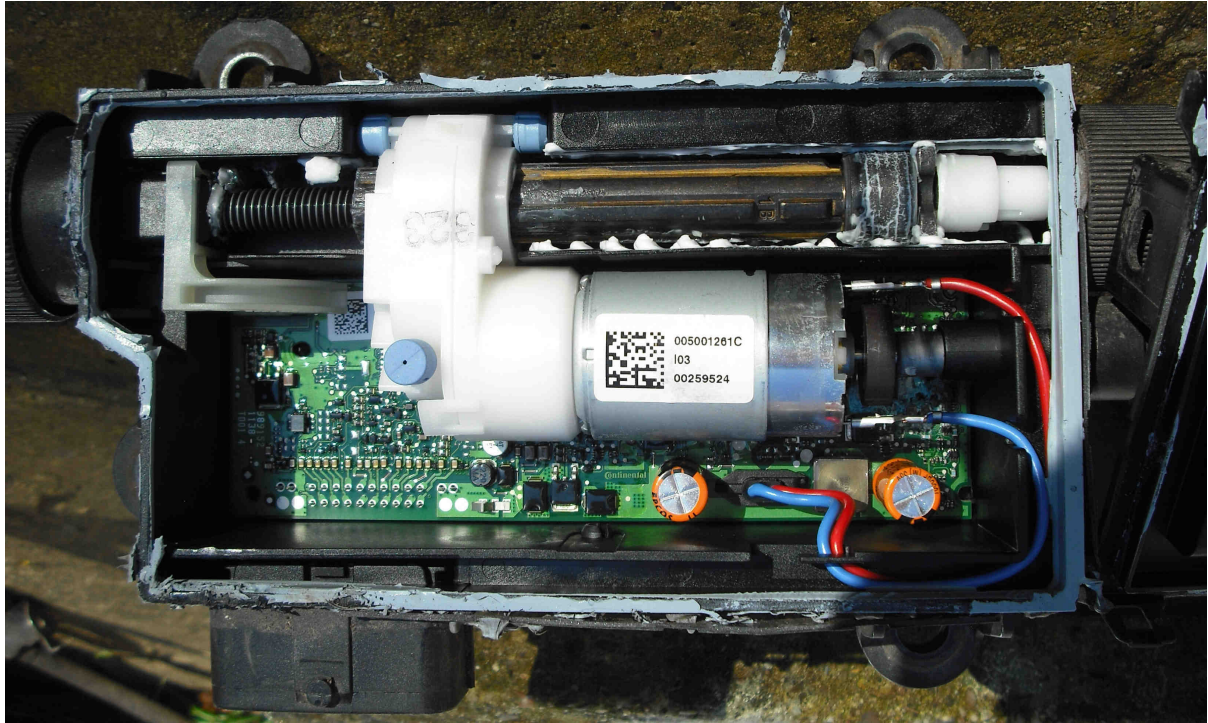
Part Number 46300-05010



The box seal broken open:

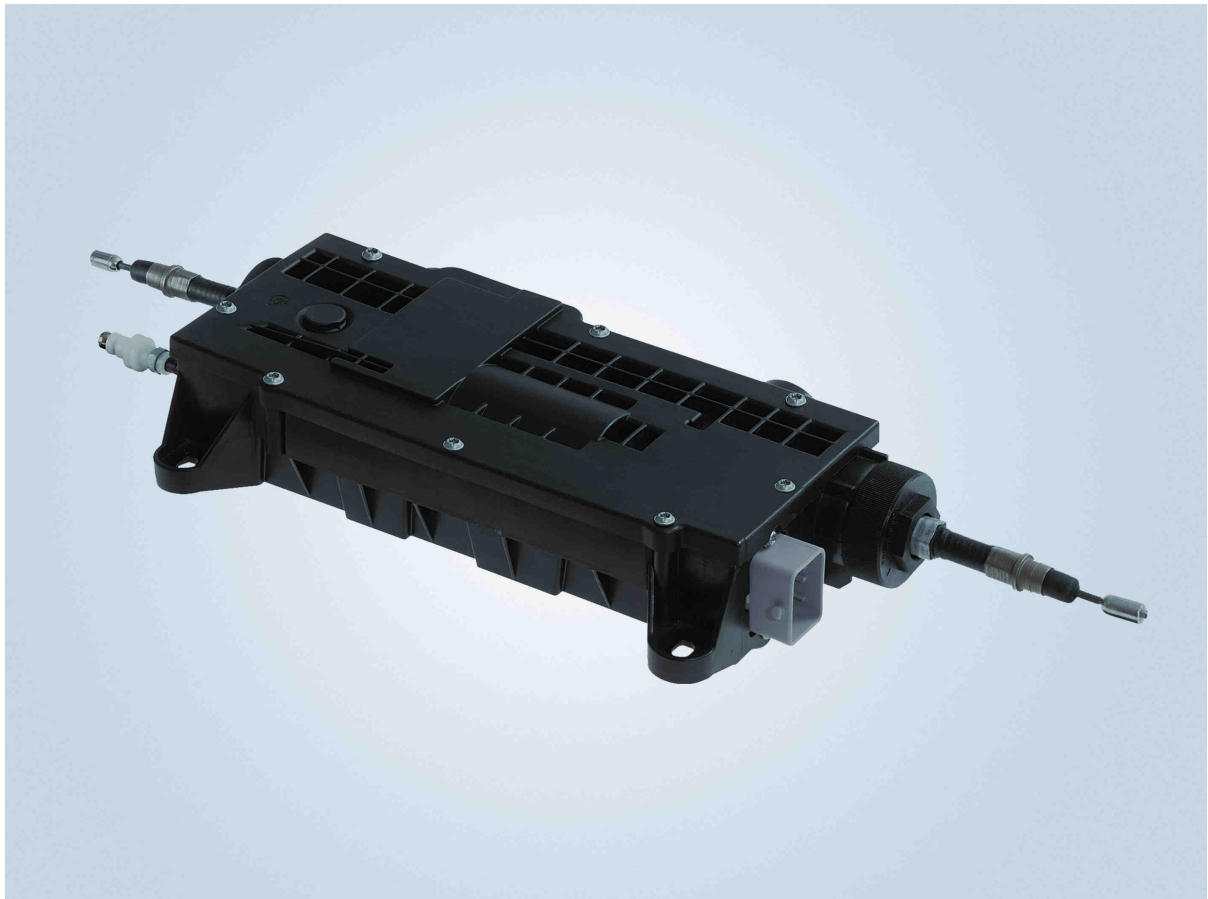


Circuit board inside with its 'Continental' logo:

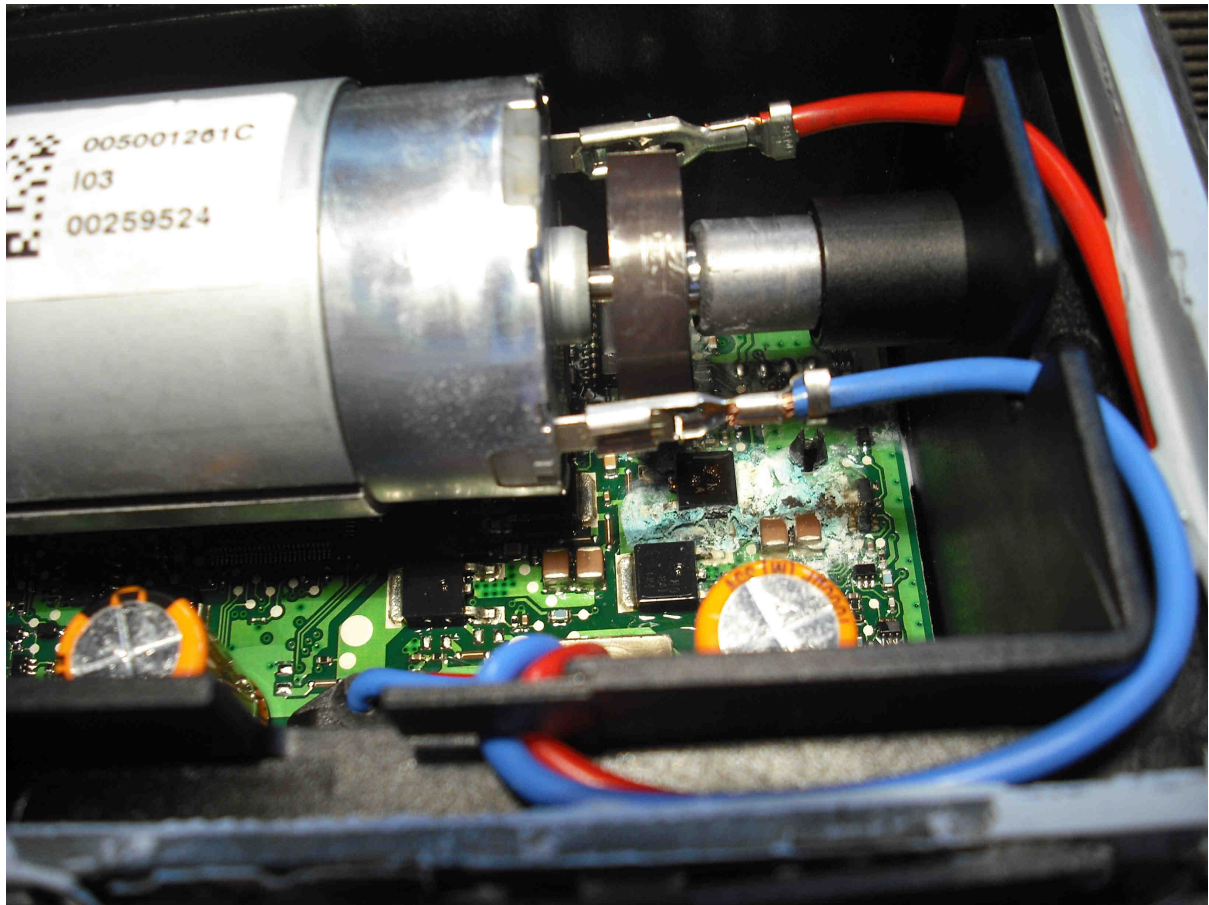


Variant of the Continental 129889_en:

http://mediacenter.conti-online.com/internet/generator/MAM/index.templateId=Folder_2FrenderDefault.jsp.html?method=show&action=/details.do&oid=1579086



White corrosion salts on the circuit board below the manual parking brake release:



Electronic Parking Brake mounted above a strut between the rear wheels:



Manual parking brake release Bowden cable descending from the rear boot area:

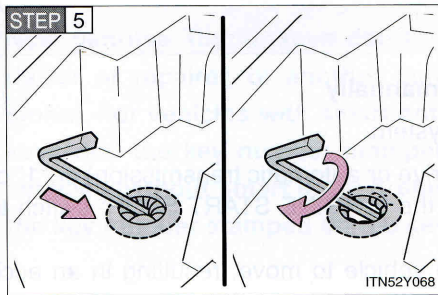


Parking brake release Bowden cable and a brake actuator connected to the EPB:



The manual notes how a missing or damaged seal could allow standing water to flow into the parking brake release and consequently require EPB replacement:

5-2. Steps to take in an emergency



Push the parking brake release tool in as far as it will go, making sure that it does not move when your hand is released, and turn it clockwise until the clutch sound is heard. (approx. 600 revolutions, approx. 20 minutes)

It spins free if rotate the releasing tool in counterclockwise direction.

After releasing the parking brake, make sure to remove the release tool and place it in the tool tray.

■ When the seal is damaged

The seal needs to be replaced by any authorized Toyota dealer or repairer, or another duly qualified and equipped professional.

If the trunk has flooded with water when the seal has been broken or is missing (for example, if the vehicle has been left outside in the rain with the trunk lid open or removed), the parking brake system will need to be replaced.

■ Manual operation of the parking brake

The parking brake cannot be set manually.

5

When trouble arises