

# TECHNICAL BULLETIN

Ref Document No.	TB15003	Issue No.	1
Subject	Accelerator pedal position sensor - Hardware upgrade		
Release Date	12/03/15		
Associated Bulletins	TB15001, TB15002		

### Purpose

To advise COALTRAM® owners of;

1. Improved electronic hardware within accelerator pedal position sensors.
2. Supply voltage stability improvement for internal electronic circuits.

### Applicability

Applies to all COALTRAM® vehicles

### Background

In certain operational and fault conditions, the existing accelerator pedal position sensors could exhibit undesirable internal supply voltage transitions. The supplied electronic circuits require a stable 5V supply with on and off transitions directly between 0V and 5V. It was observed that where the supply voltage would fall below the minimum allowed for operation, the electronic circuits could partially function. In that circumstance, specified operation of the electronic circuits could become erroneous.

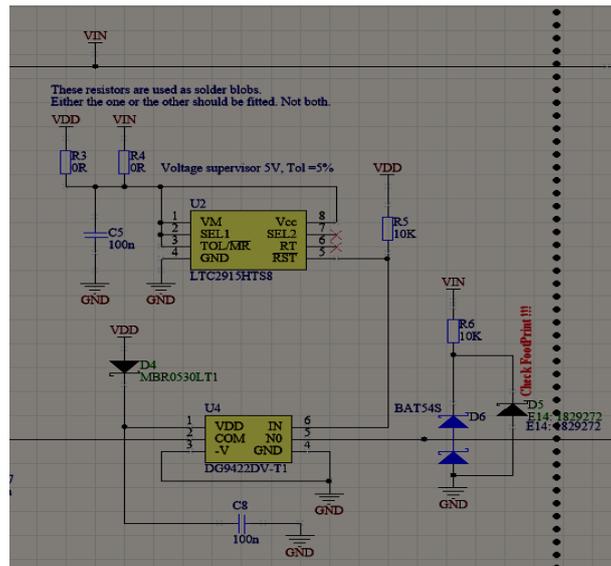
An additional operational problem was observed where the sensors supply voltage was disconnected. The sensor is able to be powered and intermittently communicate through its remaining signal line connection. While in this fault condition, the internal voltage supply to the electronics would fall to the region of 2.5V. While in this state, erratic engine speeds were intermittently observed during testing.

Through examining several failed sensors, water ingress and corrosion of the internal circuit board was also apparent on some occasions.

## Findings / Outcomes

A design modification commenced with the intension of monitoring the incoming supply voltage and blocking return currents on the signal line. Tests were conducted with a voltage monitor and analog switch modified into the existing electronic circuit. The intended protection against unstable supply and erroneous signal line reverse currents were achieved with the intended circuits.

A supplementary certification of the new sensor with the additional circuits is now in place. The certificate is attached. The following figure depicts the circuit improvement.



As moisture ingress reaching the internal circuit board has commonly occurred, the following improvements have been made to parts and assembly. These mechanical changes have also been captured in the certification.

- Two dipped conformal coating layers applied to the internal circuit board.
- Internal wiring routed to remain away from internal parts. Previous wicking along cable creepage was possible with poor silicone adhesion.
- The unit is encapsulated with a silicone casting compound. A tightly regulated control of the silicone mixture is now in place to ensure maximum adhesion of the encapsulation.
- The enclosure material has been altered to stainless steel.
- Full seam welds of the enclosure.
- Increased enclosure size to allow greater clearance through encapsulation between the PCB and enclosure.
- Incoming cable loom and connection are now over moulded to prevent moisture ingress. A short extension lead has been included.
- Sensor connector is now positioned and protected higher in the foot well.

**Recommendations**

PPK recommends ALL COALTRAM® owners / end users immediately implement the accelerator pedal position sensor – mechanical upgrade TB15002.

**Michael Kearsey**  
**Engine Management Systems – Manager**

PPK Mining Equipment Pty Ltd

T: +612 4964 5400

E: [m.kearsey@ppkgroup.com.au](mailto:m.kearsey@ppkgroup.com.au)

[www.ppkgroup.com.au](http://www.ppkgroup.com.au)