SAFETY BULLETIN

Ref Document No.	SB15003	Issue No.	1
Subject	Erratic Accelerator Pedal Position Sensor Operation		
Release Date	09th March 2015		

1. PURPOSE

To advise COALTRAM® owners of possible erratic behaviour the MONEx 11019 (5520002123) series accelerator pedal position sensors.

2. APPLICABILITY

All COALTRAM®'s

3. BACKGROUND INFORMATION

Dendrobium and Clarence Mines have reported separate incidents of COALTRAM®'s experiencing engine response delays and erratic engine speed fluctuations without operator input.

4. ACCELERATOR FAULT SYMPTOMS

- Uncommanded engine response including high engine speed.
- Delay in engine response to accelerator pedal position sensor movements.
- Seemingly low engine power.

5. ACCELERATOR FAILURE CUSTOMER/OPERATOR ACTIONS

5.1 Operator Requirements:

If any of the above symptoms occur, the operator can use any of the following methods to bring the machine to a controlled stop:

- Apply the service brakes.
- Select the directional lever to the NEUTRAL position.
- Apply the park brake.
- Apply engine E-stop (also known as choker valve, strangler, intake butterfly, etc.).

Vehicle to be quarantined:

- Following site specific procedure to move vehicle to a safe location.
- Complete and attach an 'out of service' tag and/or lock.
- Document the nature of the incident or occurrence.
- Report to supervisor.

5.2 Coal mine requirements

Report from operator involved.

Notify PPK immediately.

6. ROOT CAUSE ANALYSIS

An analysis was performed on several failed accelerator pedal position sensors. Regarding the ingress of moisture, the following was observed in units produced under the QAR of a third party, not part of PPK Group.

- In some circumstances, an ingress of moisture to the internal circuit board had occurred.
- Corrosion had also occurred at various points of those circuit boards, presumable due to the moisture ingress.
- There appeared to be no conformal coating on any circuit boards examined. Conformal coating was nominated for certification.
- The silicone encapsulation appeared to vary somewhat in consistency and adhesion to surfaces and components. The wicking of moisture across surfaces of wiring and PCB labels was a prospect.
- Sealing about the internal section of the Deutsch connector had also been compromised.

Failures in the accelerator pedal position sensors response could also be observed where:

- The sensor connection or digital signal had been lost. The last valid commanded engine speed would be maintained for a period of ten seconds. In some circumstances, that could be high engine speed.
- Under variation in the supply voltage or excessive current draw, the sensor could command erratic engine speeds. In some circumstances, that could also be high engine speed or delay in accelerator pedal position sensor response.

7. DETAILED SOLUTION

Considering the compiled failure information of both moisture ingress and electronic faults observed, the following modifications are being implemented with all new accelerator pedal position sensors. They will be made available for change out on all COALTRAM®s.

- A shorter response time has been implemented for a loss of sensor signal and response to a disconnected sensor. The response time has been reduced from ten seconds to below three seconds. A software upgrade to the Display Module of each COALTRAM® is required.
- A brown out voltage monitoring circuit has been implemented to ensure shutdown if the sensor voltage falls below the nominal operating voltage.
- A supplementary certification is underway for changes in circuit board design and other improvements captured in this iteration.
- The accelerator pedal position sensor enclosure has been changed from zinc passivated mild steel to stainless steel.
- Welding of all enclosure seams.
- Increased enclosure size to provide greater “clearance through encapsulation” between the internal circuit board and enclosure.
- Tighter control of encapsulation ratio mixture.
- Improved quality processes in manufacturing.
- Conformal coating of internal circuit boards and associated components.

8. NON-CONFORMING MANUFACTURE

As indicated, the existing accelerator pedal position sensors were manufactured under the QAR of a third party, not part of PPK Group. Through investigating matters relevant to the operation of this sensor, it’s become apparent that conformal coating of the circuit boards is required by the certification. In all samples examined thus far, it appears that no conformal coatings have been applied to the circuit boards and associated components.

The primary method of gas exclusion for the electronic circuits is provided by encapsulating the unit with the specified casting compound. Consideration should also be given to the current usage location of these units and layers of protection in place for that environment. Manufacture of future units under the QAR of PPK Mining Equipment will completely comply with the certification. A re-certification process is occurring to provide both compliance and functionality of these devices.

9. ACTIONS OF PPK

PPK will replace accelerator pedal position sensors from 23/03/2015.

10. COMMISIONING

PPK will create a post replacement test procedure to verify improved functionality from 23/03/2015.

Michael Kearsey
Engine Management Systems – Manager

PPK Mining Equipment Pty Ltd
T: +612 4964 5400
E: m.kearsey@ppkgroup.com.au
www.ppkgroup.com.au