



## **Technical Bulletin / Safety Alert**

**Unique ID No:** DES2013-TBSA-01

**Rev:** 0

(This document supersedes all previous versions of the above TBSA – N/A)

**Subject:** JUG-A-0 Machine Shutdown System – Methane Bypass Switch Box

**Date:** 20<sup>th</sup> November 2013

**Applicable to:** All JUG-A-0 UL/UV Diesel Engine System Design Registration Nos.  
MDR074246DES, MDR074246DES-1 & MDR114991DES

**Note:** Minimum PPE required to carry out any inspections contained in this TBSA shall be protective clothing & footwear, safety glasses, hearing protection & any site specific requirements. A JSA or equivalent should be carried out prior to performing these tasks.

### **Occurance:**

VLI was recently alerted to reported incidents where water ingress to the inside of the VLI JUG-A-0 UL/UV Machine Shutdown System Methane Bypass Switch Box resulted in the shorting of the bypass switch control wiring terminals, allowing the methane shutdown systems to be operated in bypassed mode unintentionally. Refer attached Queensland Department of Natural Resources and Mines Mining safety and health newsflash, “Water ingress causing the methane monitoring protection to bypass”.

### **Investigation & Cause:**

VLI has investigated the failure scenarios of the reported incidents in collaboration with Nautitech Mining Systems (NTMS), the original equipment manufacturer of the JUG-A-0 Methane Shutdown System.

VLI can confirm that in the event of a methane bypass switch fault the methane monitoring system display provides indication, and will display either the message ‘ch4 bypass’, indicating the machine is operating with the methane monitoring function bypassed, or the message ‘bypass switch fault’ as shown in Figure 1 below. When a ‘bypass switch fault’ is displayed, the system will begin a 5 minute countdown before going to automatic shutdown.



**Figure 1:** Photographs showing the JUG-A-0 Shutdown System Display when in “ch4 bypass’ mode or when a “bypass switch fault’ is detected.

There are three (3) styles of VLI Methane Bypass Switch Box in use as follows:

VLI Part No.	Material of Manufacture	Ingress Protection (IP) Rating
0704-50003	Pressed Metal / Powder Coat	N/A
0704-50003SS	Stainless Steel	N/A
0704-50019	Brass	IP67

The stainless steel and pressed metal boxes will not provide protection against the ingress of water due to machine hose down / cleaning, and therefore direct hosing down of these boxes must be avoided. Additional protection measures to avoid water ingress, such as the addition of protective rubber flaps are also recommended.

The brass bypass switch boxes will provide protection from water ingress (hence the IP67 rating). The brass boxes will be susceptible to accumulation of moisture due to condensation. This moisture condensation can be addressed with the use of silica bags inside the box.

It is important to note that the temperature monitoring and shutdown functions of the shutdown system are not affected whether the methane detection is bypassed intentionally or unintentionally. The temperature probes used are a simple device with an intrinsically safe (IS) current loop and operate in the current range of micro amps, with increasing current equating to increasing temperature. The most likely temperature probe related failure mode due to water ingress to the bypass switch box is a short circuit which will increase the current draw and report a higher than actual temperature, leading to automatic shutdown of the system, effectively failing to safety.

### **Conclusions:**

Incidents have been reported where water ingress to the inside of the VLI JUG-A-0 UL/UV Machine Shutdown System Methane Bypass Switch Box has resulted in the shorting of the bypass switch control wiring terminals, allowing the methane shutdown systems to be operated in bypassed mode unintentionally.

In the event of a methane bypass switch fault the methane monitoring system display provides indication, and will display either the message 'ch4 bypass', or the message 'bypass switch fault'.

The temperature monitoring and shutdown functions of the VLI JUG-A-0 UL/UV shutdown system is not affected when the methane detection is bypassed (intentionally or unintentionally).

### **Recommendations:**

VLI recommends the installation of the brass methane bypass switch box (VLI Part No. 0704-50019) as this style currently provides the greatest level of protection from water ingress.

VLI recommends the use of silica bags inside the brass methane bypass switch box in order to assist with absorption of condensation moisture. Silica bags must be replaced at regular intervals and VLI suggests every 1000 hours, however equipment owners and operators should review this frequency for specific site conditions and alignment with site based maintenance strategies.

VLI recommends direct hosing down of all methane bypass switch boxes be avoided, and consideration of additional protection measures to avoid water ingress, such as the addition of protective rubber flaps.

**Immediate Action:**

Equipment owners and end users to inspect all VLI JUG-A-0 UL/UV methane bypass switch box installations for water ingress.

Discuss and implement recommended solutions in consultation with your VLI representative.

**Future Action:**

VLI will review the design of the brass methane bypass switch box and investigate opportunities to improve the ingress protection and moisture removal capabilities of the box and switching mechanism.

**Supporting Documentation:**

Queensland Department of Natural resources and Mines Mining safety and health newsflash, "Water ingress causing the methane monitoring protection to bypass".

Please ensure this document is circulated to all relevant personnel within your organisation.

Should you have any further queries please contact your VLI Representative.

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