



## **Technical Bulletin / Safety Alert**

**Unique ID No:** DES2011-TBSA-01

**Rev:** 0

**Subject:** Bypassing the JUG-A-0 UL/UV Diesel Engine Shutdown System (Nautitech)

**Date:** 31/01/2011

**Applicable to:** All JUG-A-0 UL/UV V2 & V3 Machines

**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:**

The Department of Industry and Investment – Mine Safety Operations recently issued the following incident notification:

*Gents, (Underground Mechanical Engineers)*

*Diesel Equipment.*

*A recent incident occurred with a JUG -A- O V2 fitted with a Nautitech methane monitoring equipment / Electronic Shutdown System.*

*The JUG was under repairs at a third party repair provider and the methane monitor battery went flat. Repairs were completed and the machine was sent to site with an Out of Service Tag fitted to it and the methane monitor flameproof compartment bypassed by connecting the supply & delivery hoses. The machine was sent to the mine.*

*After passing thru a number of hands, this machine was placed into service still with the methane monitor bypassed at the flameproof enclosure.*

*Note: The JUG is Design Registered with the methane monitoring system in place and disconnecting the hoses from the flameproof enclosure makes the DES not explosion protected and therefore not designed registered.*

*The methane monitoring system needs to be operational as this controls the temperature R.T.D's in the scrubber system.*

*Check your machines if you have them on site.*

*The OEM will be issuing a Technical Bulletin in the near future.*

*Regards  
Paul Drain  
Inspector of Mechanical Engineering  
Mine Safety Operations  
Industry and Investment NSW*

## **Investigation & Cause:**

As highlighted by the incident notification above, the Nautitech system has the ability to be bypassed, in this case to charge a flat battery. In this incident the bypass was inadvertently left in place when the machine returned to service.

When the air solenoid in the Nautitech system is bypassed, the methane monitoring function and exhaust scrubber RTDs are no longer functional.

It should be noted that when the air solenoid in the Nautitech system is bypassed, a message to this effect will be displayed on the Nautitech display and the four (4) lower LEDs on the display will flash simultaneously every 10 seconds, refer supporting documentation.

## **Recommendations:**

It is the recommendation of Valley Longwall International Diesel Division (VLIDD) that the Nautitech Diesel Engine Shutdown System installed on JUG-A-0 UL/UV machines **NOT** be bypassed under any circumstances by third party repairers or end users, since bypassing the system removes the explosion protection properties, control of methane detection and control of the water based scrubber system RTDs.

In the circumstance where the Nautitech system battery is flat, it is recommended the battery is removed from the system and replaced with a new or recharged battery. Specific mine site procedures must be followed when accessing the explosion protected Nautitech control box to change a battery.

It is also recommended that all end users review the Nautitech system documentation that is supplied with machine documentation and ensure all employees associated with the operation and maintenance of JUG-A-0 machines are familiar with the functions and capabilities of the Nautitech shutdown system.

**Immediate Action:**

End users to review and re-familiarize themselves with the capabilities and functions of the Nautitech system. Supporting documentation for the Nautitech system is supplied with machine documentation.

**Future Action:**

Adherence to the recommendations provided in this TBSA.

**Supporting Documentation:**

**Juganaut System – Quick Reference Guide Rev B**

<b>CH4 BYPASS</b>	Engine has been Turned On in Bypass Mode and system will operate regardless of Gas level. Note: Temperature sensors will continue normal operation regardless of Bypass Switch state.
<b>AIR SOL FAULTY</b>	Air Solenoid Open Circuit has been detected. Check Coil Resistance – nominal 22R. Check Wire 19 and 17 to the Solenoid
<b>AIR SW/SUPP FLT</b>	Air Switch or Air Supply is Faulty. Alternator Voltage detected but Air Switch indicates Open Circuit
<b>CHECK ISOL SW</b>	Check if Isolator Switch is not in Isolate Mode. Alternator Voltage detected but Battery Volts is at DV. This can also indicate faulty Battery.
<b>SYSTEM OFF TURN AIR OFF</b>	CH4 System has been trying to turn Battery Power Off but Air Circuit is holding Battery in the On state. This could also indicate Faulty (Always On) Air Switch
<b>ALL COMMS FAULTY</b>	Indicates lost Comms between Display, Sensor & Charger. Most likely short circuit between wires CAN+ and CAN-
<b>CHARGER COMM ERR</b>	Indicates lost Comms between Display & Charger. Most likely Open Circuit on CAN Bus or faulty Charger PCB
<b>CH4 HEAD COMM ERR</b>	Indicates lost Comms between Display & CH4 Head. Most likely Open Circuit on CAN Bus or Faulty CH4 Head PCB
<b>BATTERY V. LOW</b>	Indicates that the Battery is fully discharged. Restart Machine in Override Mode and allow min. 15 min for batt. to charge. Observe Batt Volts on LCD
<b>SENSOR PROTECTED</b>	Indicates that level of CH4 at the sensor exceeded 3.5% and Power to the Sensor has been turned Off to protect it's circuitry. Turn Air Off, Check CH4 level and restart.
<b>REPL CH4 SENS&gt;en</b>	Indicates that Internal Fault has been detected within CH4 Sensor. Replace sensor and return faulty sensor to manufacturer.
<b>← CH4 TRIP → REQ DEPUTY RESET</b>	Deputy has to Reset CH trip by following: 1. Remove Lock from Deputy Override Switch 2. Move Switch to Override Position 3. Start the Engine 4. Place Switch back to Normal position 5. Replace Lock on the Switch



LEDs  
Flash

- TEMPERATURE WARNING**  
At least one Temperature Sensor detected temperature above 82 deg C
- TEMPERATURE TRIP**  
At least one Temperature Sensor detected temperature above 85 deg C
- TEMP SENS# FAULT**  
Indicates open or short circuit of Temperature Sensor.  
Note: Temp Sensor cannot be measured with Ohm meter. Turn System On and measure voltage across sensor. Should be around 5V
- AIR BYPAS !!!**  
Internal Solenoid is Off but Engine has been started.  
Indicates that Air Shutdown circuit has been bypassed
- BYPASS SW FAULTY**  
Indicates that wire to Bypass switch is either short or open circuit. Alternatively resistors inside junction box are incorrectly connected.

**AIR BYPAS !!!**

Internal Solenoid is Off but Engine has been started.  
Indicates that Air Shutdown circuit has been bypassed

**Conclusion:**

The Nautitech Diesel Engine Shutdown System installed on JUG-A-0 UL/UV machines should **NOT** be bypassed under any circumstances by third party repairers or end users.

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

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

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