



Technical Bulletin / Safety Alert

Unique ID No: DES2009-TBSA-02

Rev: 0

(This document supersedes SMV TBSA0809-02)

Subject: Machine failed to shutdown on “Stop/Run” Valve & Emergency Shutdown Valve (Strangler).

Date: 14/8/09

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:

An operator went to drive a JUG-A-0 UL/UV off the surface washdown pad when he realized that he had hydraulic function issues. He flicked the stop/run valve to the “stop” position and the engine did not fully shutdown. He proceeded to turn the air supply valve off to no effect and then pressed the emergency shutdown valve. The engine was still hunting sporadically at low revs but did not stop.

At this point, he sought the assistance of mechanical tradesman. The machine was restarted and taken to the surface workshop where the engine stilled failed to stop. The shutdown cylinder was checked and found to be holding the fuel rack in the closed position and the strangler valve was indicating it was in the closed position. The tradesman turned the emergency fuel shutoff valve to the closed position which caused the engine to stop.

The machine was sent to VLI Diesel Rutherford for further investigation.

Investigation & Cause:

Testing was carried out with the scrubber emptied of water & the electronic shutdown system defeated to allow a safe test of the strangler without the risk of water ingress to the engine.

Both the fuel pump & strangler were tested in an attempt to replicate the failure found on site. This testing confirmed that both the fuel pump & strangler failed to shut the engine down.

The strangler was removed & it was clearly visible that it was not closing fully around approximately $\frac{1}{4}$ of the circumference of the butterfly plate & also at either end of the main shaft. The replacement of this with a new strangler & subsequent tests proved that the engine would shutdown when strangled every time with the new valve.

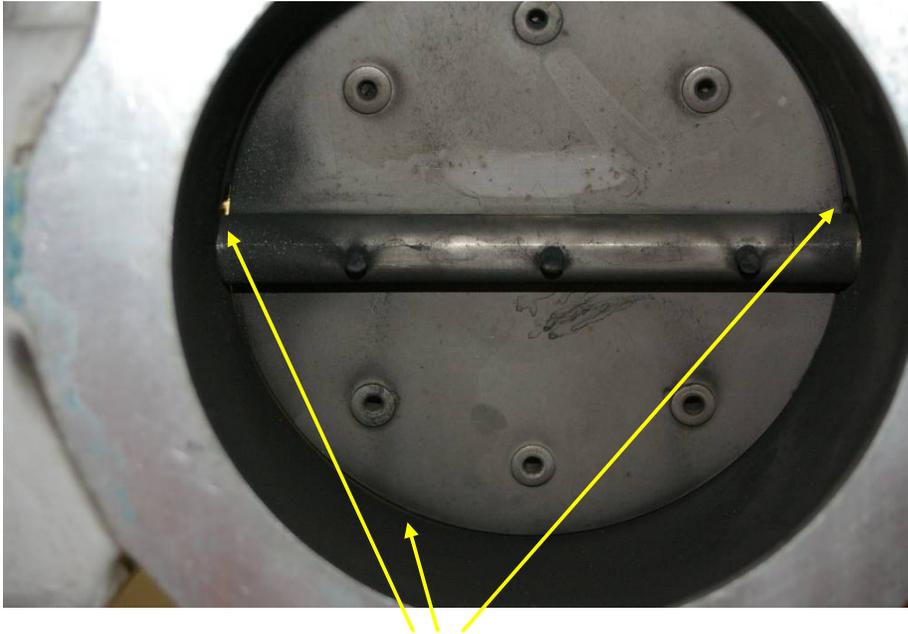


Figure 1 - photo showing gaps around butterfly valve plate & at shaft ends.

The original fuel pump was tested & initially we could not fault the shutdown. It was then found that the shutdown mechanism shaft had approximately 2mm end float. By moving the shaft into different positions to check the shutdown we found that in a certain position it would not shut the engine down & the engine would sit at low rpm & 'hunt'. The fuel pump was replaced & has been sent to the supplier for assessment & report on the findings.

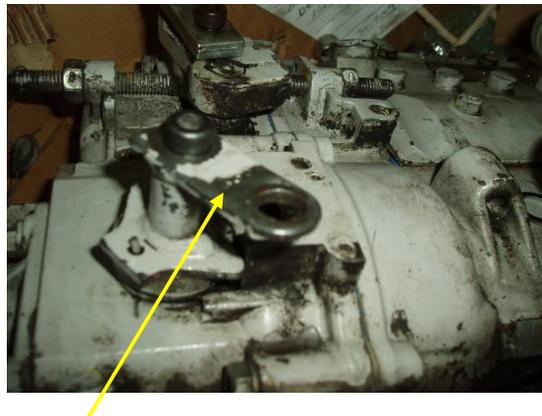


Figure 2 - fuel shutdown lever.

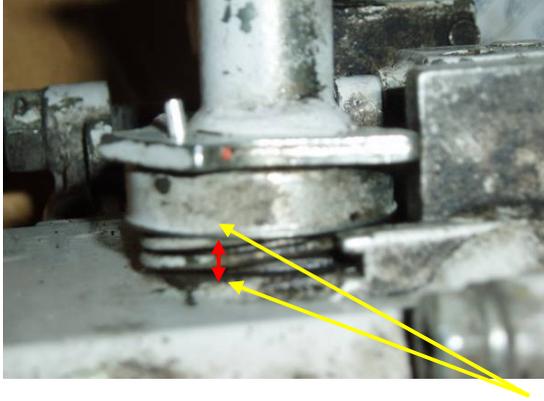


Figure 3 – end float in shutdown lever shaft. (2mm)

Recommendations:

Immediate Action:

The following fuel & emergency shutdown checks should be carried out on all machines, these must be done on the surface or in an approved & designated area by authorised personnel:-

Carry out a normal “stop/run” valve shutdown on the machine & check that all standard 103 inspection shutdown tests are working.

Perform the following test if the previous tests failed.

Remove the shutdown cylinder from the injector pump shutdown lever & check the endfloat in the lever shaft, there will be approximately 0.5mm endfloat when the pump is new.

Manually hold the pump at the “fuel on” position, start the machine & turn the lever to the “fuel off” position & check the engine will shutdown.

Carry this out a number of times in differing endfloat positions on the pump to ensure the engine shuts down in all positions.

Reconnect the shutdown cylinder.

To test the Emergency Shutdown (Strangler) Valve. - Every 250hrs (Monthly)

Isolate the water supply to the exhaust scrubber tank & drain the water from the exhaust scrubber.

Disconnect & plug the safety air supply line to the shutdown float valve.

Disconnect the air “input” & “output” lines from the Nautitech enclosure & join them together – this will bypass the electronic shutdown system.

Start the engine & allow a few seconds to stabilize at idle.

Crimp off the air supply line to the shutdown cylinder to hold the injector pump in the “fuel on” position.

Remove the lanyard from the Emergency Shutdown Valve & depress the valve.

The engine should shutdown.

Should any of the above inspections show a failure, please contact the OEM.

Note: - Ensure the engine system is returned to its original in service condition after all checks are carried out.

Future Action:

OEM to investigate if there is an engineering modification that can be done to the Fuel Injection Pump to increase service life.

OEM to review the inspection & service regime of the Fuel Injection Pump & Emergency Shutdown Valve.

Supporting Documentation:

Refer to the “JUG-A-0 UL/UV V2 & V3 Emergency Shutdown Test Procedure” attached with this document.

Conclusion:

A review of the fuel pump will take place after receiving the manufacturers report on the failure

Though the Strangler valve is inspected & tested on code D mechanical inspections the inspection regime is under review by VLI Diesel & outcomes will be communicated in the near future.

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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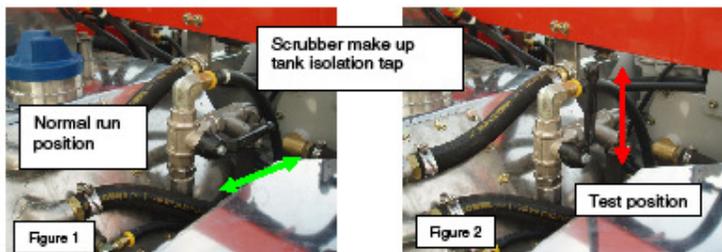
**RTD Exhaust Overtemp and Emergency
Shutdown Test Procedure.**
(every 250hrs)



WARNING: This test need to be carried out on the surface or in a designated safe well ventilated position underground because when the scrubber drain tap is open the engine package is no longer flame proof.

Steps-

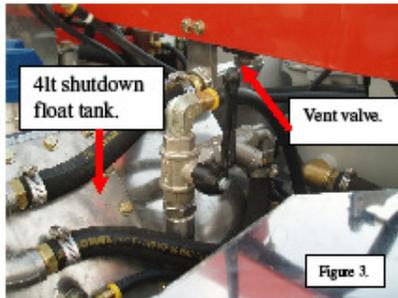
1. Turning the scrubber water make up tank isolation valve to the test position. Figures 1 & 2, next,



2. Open the 3 way scrubber water test / drain tap.

3. The water will start to drain from the 4lt shutdown float tank out of the 3 way test / drain tap.





4. The 4lt shutdown float tank is hoses up to a vent valve that is mounted under the D/S engine cover rail that will start to leak air once the water level starts to drop prior to shutting down the engine. Figure 3.

5. The safety circuit is designed to shut the engine down when the water level in the 4lt shutdown float tank gets low.



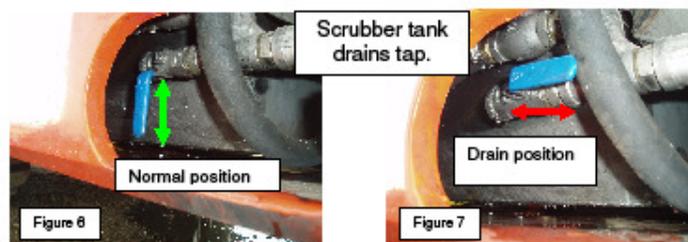
WARNING: If the engine fails to shut down when there is no water running out of the 3 way test / drain tap, the machine needs to be tagged out of service and has to be repaired before the machine can commence work.



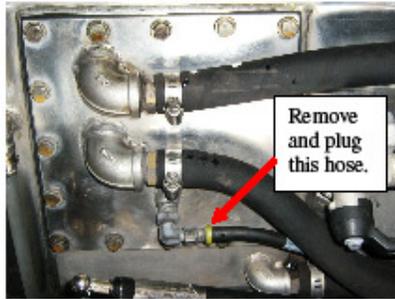
NOTE: Once the engine has shutdown the scrubber flame trap is to be cleaned by back flushing it with clean water into the scrubber tank with the scrubber drain tap open.

6. Switch the RUN / STOP valve to the STOP position to save air pressure.

7. Open the scrubber tank drain tap positioned at the bottom of the scrubber tank. Figures 6&7



8. Drain all of the water from the opened tap.
9. The air line that supplies regulated safety circuit air pressure to the shutdown float in the make up tank needs to be removed and plugged and capped as the engine will not start with out water in the shutdown float tank.



10. Restart the engine.

11. At idle activate the Emergency Shutdown System by pushing the red button in the long top dash board in the long top dash board to test the system and shut the engine down.



12. Reset the Emergency Shutdown System by turning the red knob.



NOTE: The engine will not crank over if the Emergency Shutdown System is in the activated position.

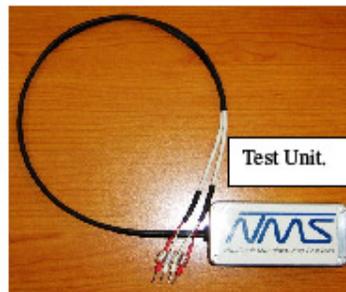
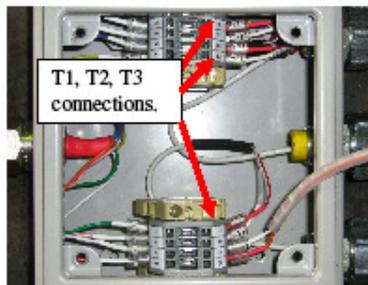
13. Restart the engine.

14. Using a Nautitech magnetic pencil, change the display screen to the RTD page by touching the 'Enter' (ENT) key.



15. Remove the front cover off the RTD terminal box by removing the four Phillips screws.

16. Remove the 'T2' and 'T3' connections and fit the Nautitech test unit in line.



17. Start the engine and stall the engine down at half throttle in third gear. Watch the display unit as the temperature rises on 'T1' and take note that the display starts flashing at 83^o C. The engine should shutdown at 85^o C.



NOTE: If the machine does not shutdown when the RTD temperature reaches 85 degrees the RTD will require replacement.

18. Switch the RUN / STOP valve to the STOP position to save air pressure.
19. Remove the two 'T1' connections and move the Test units connections from the 'T2' position to the 'T1' position.
20. Reconnect the 'T2' RTD to its original position. This will now allow 'T2' to be tested.
21. Restart the engine and stall the engine down at half throttle in third gear. Watch the display unit as the temperature rises on 'T2' and take note that the display starts flashing at 83^o C. The engine should shutdown at 85^o C.



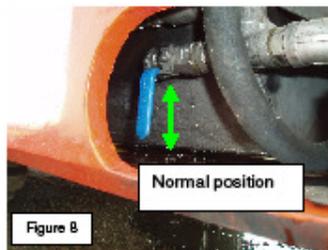
NOTE: If the machine does not shutdown when the RTD temperature reaches 85 degrees the RTD will require replacement.

22. Switch the RUN / STOP valve to the STOP position to save air pressure.
23. Remove the two 'T2' connections and move the Test units connections from the 'T3' position to the 'T2' position.
24. Reconnect the 'T3' RTD to its original position. This will now allow 'T3' to be tested.
25. Restart the engine and stall the engine down at half throttle in third gear. Watch the display unit as the temperature rises on 'T3' and take note that the display starts flashing at 83^o C. The engine should shutdown at 85^o C.

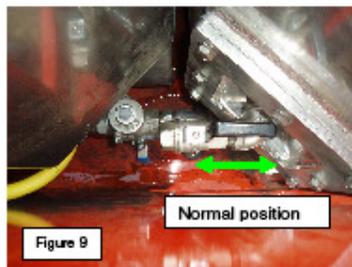


NOTE: If the machine does not shutdown when the RTD temperature reaches 85 degrees the RTD will require replacement.

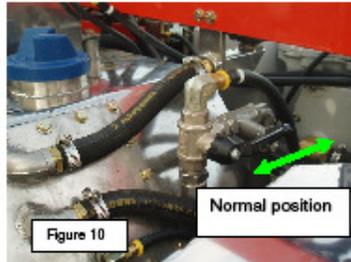
26. Record the results.
27. Reconnect the RTD's back to normal and refit the front cover to the RTD terminal box.
28. Once the engine has shut down the RTD's will take about 30secs to cool down before the engine can be restarted.
29. Close the scrubber tank drain tap back to the normal position. Figure 8.



30. Turn the 3 way test / drain tap back to the normal position. Figure 9



31. Turn the scrubber make up tank isolation tap to the normal run position. Figure 10.



32. Remove the plug and cap from the safety circuit air line for the shutdown float and reconnect the hose to the fitting.
33. Switch the STOP / RUN valve in the operators station to the RUN position to allow the Methane Monitor to warm up and carry out a gas test. This has to happen before the water starts being pushed from the main scrubber make up tank into the 4lt shutdown float tank. From there through to the scrubber make up float in the scrubber tank.



NOTE: It is normal for air to be heard coming from the 4lt shutdown float tank vent valve as water starts to move through the system.

The scrubber tank make up float will close once the water in the scrubber tank has reached the predetermined level.

The water will then continue to fill the 4lt shutdown float tank until it is 100% full.



NOTE: It is normal for the air pressure that can be heard coming from the 4lt shutdown float tank vent valve to increase as the tank gets close to being totally full.

34. The 'Fault log' can now be cleared. This is done by touching the 'Arrow Up' key with the Nautitech magnetic pencil.



35. The log will now roll through any recorded faults. Now press the 'Enter'(ENT) key with the magnetic pencil.



36. This will then bring up the text 'Delete all Messages...ent'. Touch the 'ENT' key. This will delete all recorded faults.
37. The machine is now ready to go back to work.



NOTE: DO NOT forget to refill the SCRUBBER MAKE UP TANK with water before operating the machine.