



# MANAGEMENT SYSTEM MANUAL

## KNR 8.5 R/V Knorr Main Engine Safety Shutdown Procedures

Originator:

Steve Walsh

Approved By:

Albert F. Suchy.

### 1. Purpose

The purpose of this procedure is to set forth guidelines for conducting tests of the main engine safety shutdowns.

### 2. Responsibility

It is the responsibility of the Chief Engineer to ensure that the safety shutdowns for the main engines are tested in accordance with Coast Guard Regulations.

### 3. Procedure

#### A. Main Engine Over Speed Shutdown

The recommended procedure for testing the over speed shutdown on the main engines is to run the engine at idle speed and with the "75% Verify" test button pushed in, bring the engine up to full speed. Observe the tachometer and note the speed at shutdown. Both the SR3 relay light and the "75% Verify" light should come on at shutdown. The speed at shutdown should be approximately 1035 RPM, plus or minus 21 RPM (2%).

Some Coast Guard Inspectors may require a full over speed so that the air shutoff is tested. This is performed by bringing the engine to idle speed and securing the engine using the Emergency Manual Shutoff knob on the Hydramechanical Device. To test this, conduct the following:

- Bring the engine to full speed.
- Using an adjustable wrench on the actuator's linkage, lift the wrench. This lowers the actuator arm to increase speed, until shutdown, which is approximately 1380 RPM, plus or minus 27 RPM (2%).
- Reset air damper shutoff once the engine has stopped.
- Reset the ESS Overspeed Switch.

The following procedure is for adjusting the Hydramechanical Device set point. The hydramechanical shutdown is set (see Hydramechanical Protective System for 3500 series engines pg. 49-50 Shutoff Speed Adjustment) by the following procedure:

- Remove over speed adjusting bolt's lock wire.
- If the over speed trip occurs 27 RPM above 1380 RPM, then turn the Hydramechanical Shutdown Device's "over speed adjusting bolt" one turn counter clockwise. Turn the bolt clockwise if it occurs before 1380 RPM -27 RPM.



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- Over speed the engine again and fine tune the over speed adjusting bolt to get the shutdown to occur at 1380 RPM +/- 27 RPM.
- Replace the lock wire on the adjusting bolt.

### B. Low Lube Oil Pressure Shutdown Test

The recommended procedure for testing the low lube oil pressure shutdown on the main engines is to first, with the engine secured, disconnect the oil line from the engine to the ESS Box oil manifold. Disconnect it at the manifold end. Put a plug into the Aeroquip hose fitting on the hose going to the engine and connect the pressure release testing device to the ESS oil manifold. Pump up the testing device to 40 PSI and start the engine. Slowly release the pressure in the testing device. The engine should shutdown at approximately 28 PSI.

### C. Main Engine High Jacket Water Temperature Shutdown (HJWT)

The recommended procedure for testing the main engine high jacket water shutdown set point is to first remove the high JW temperature shutdown switch and plug the opening where the switch was installed. Set the switch up so that the "Normally Open" contact (white - common; black - NO; red - NC) is connected to a meter for testing continuity so that when the switch closes it is noted. Using 50% Main Engine Lube Oil and 50% Anti-freeze in the HJWT Testing Device (steel heat sink), with the switch installed in it, slowly heat the oil and glycol to 225 degrees F (107C) on a hotplate and observe the switch closing\*.

To check for the engine's high JW shutdown, reinstall the shutdown switch in the engine, start the engine. Disconnect the switch's wiring connector and jumper out the engine's side of the connector's male and female pins. The engine should shutdown.

\*You may also use the dry-well heater instead of the oil, antifreeze and hotplate method for testing the switches.

## 4. Reporting

Tests of the main engines are recorded in NS5 or in the Periodic Safety Test Procedure when verifying these tests as part of the testing.