

Maintenance Procedure

No. P256

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TASK DESCRIPTION
PERFORM LOAD TEST ON HEAD END POWER ENGINE
BUILDER'S OR VENDOR'S MAINTENANCE INSTRUCTIONS
SPECIAL TOOLS REQUIRED:
RELATED MAINTENANCE PROCEDURES MODIFICATIONS, POINTERS, ETC. Woodward 2301A Speed Control Manual – 8202A Caterpillar 3412 Operation and Maintenance Manual EMD F59 Locomotive Service Manual
SAFETY PRECAUTIONS: CONTRACTOR TO ASSUME RESPONSIBILITY FOR SAFETY RULES AND COMPLIANCE.
PREPARATION:

PROCEDURE

- 1 Before connecting or disconnecting cables, ensure that locomotive is not on wayside power and that auxiliary engine is shut down.
- 2 Make sure that all switches on load box control panel are in the OFF (OPEN) position.
- 3 Place load box adjacent to locomotive at end to be connected to. Block wheels and apply stands. Ensure that load box is level.
- 4 Remove dummy plugs from locomotive (one from each side) and connect load box cables to open receptacles. Ensure TLC lights in cab are illuminated.
- 5 To avoid a potential thermal overload condition ensure the control breaker for the SEL 701 motor protection relay is in the OFF position before proceeding with load test.

Note: *The control breaker is mounted on the front exterior door of the HEP relay control breaker.*

- 6 Check HEP engine oil and water levels before starting engine. Start engine and run in low idle.
- 7 Switch HEP engine governor control to the RATED SPEED position. Once engine speed stabilizes, check that voltage output is at 575 VAC and frequency is 60.0 Hz. Adjust voltage regulator or governor controls as required.

DATE OF FIRST ISSUE	May 1997	AUTHORIZED BY:
REVISION 2	February 19, 2008.	TITLE: Manager, Rail Equipment

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- 8 At load box place the CONTROL POWER switch in the ON position. Press the BLOWER START button. Ensure that AIR FAILURE indicator light remains on until fan achieves operating speed.
- 9 With MASTER LOAD switch in the OFF position, set cumulative resistive load to 500 KW (250 kW + 200 kW + 50 KW switches). With alternator unloaded, wait until engine reaches operating temperature.
- 10 When engine is at normal operating temperature, turn MASTER LOAD switch ON to apply load to alternator. Engine speed will droop but must recover with a few seconds. If speed drops excessively low or takes too long to recover this indicates a problem with electronic governor settings or hydraulic actuator. Make necessary adjustments or repairs before continuing load test.
- 11 When load is applied voltage will also drop significantly but should recover quickly. If output voltage does not respond quickly this could indicate a problem with voltage regulator or excitation circuits. Make necessary adjustments or repairs.
- 12 If engine and alternator are operating properly increase the load to 550 KW. Maintain for half hour. Confirm the engine continues to operate normally (no overheating, etc.).
- 13 After load test has been completed reduce load to 150 KW. Ensure that engine speed stabilizes within a few seconds.
- 14 Open HEP contactor and run engine at no load for 5 minutes. Switch engine speed control to LOW IDLE and run for an additional two (2) minutes before shutting down to allow sufficient time for oil turbocharger cooling.

Warning: *Failure to perform this step will cause permanent damage to turbocharger bearings. This damage is cumulative and is not usually detected until bearing failure.*

- 15 Open all switches on load box control panel and disconnect cables.
- 16 Return the control breaker for the SEL 701 motor protection relay to CLOSED position.
- 17 Complete attached data sheet recording the Head End Power load test results.
- 18 Report any discrepancies to immediate supervisor.

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Data Sheet: Head End Power Load Test

Locomotive Number: _____ Date of Test: _____

Engine Make _____, Model _____, Serial No. _____

Generator Make _____, Model _____, Serial No. _____

Automatic Voltage Regulator Make _____, Model _____ Serial No. _____

Reason for conducting load test: _____

Serial Number of Load Box: _____

Date of Load Box Certification: _____

Setup

- 1 Load box instrumentation reads properly: Yes / No
- 2 HEP system warmed up for _____ minutes.

Load Test

- 1 Apply 500 KW load: Voltage _____ Volts.
Current _____ Amps
Power _____ Watts
Frequency _____ Hertz

- 2 Apply 550 KW.

Allow the system to operate for half hour. At this time ensure the engine continues to operate normally (no overheating).

Record time spent at full load: _____ Min.
 Voltage _____ Volts
 Current _____ Amps
 Power _____ Watts
 Frequency _____ Hertz

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