

SECTION 2 MECHANICAL DIAGNOSTICS

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INTRODUCTION

No doubt almost any mechanical problem can be accurately diagnosed under ideal conditions. But what really matters is whether accurate diagnosis can become the norm under everyday conditions. Much of the long term success and acceptance of an engine is actually determined by the efficiency of thousands of shop foremen and technicians.

The purpose of engine diagnostic forms are to provide the customer with satisfaction as well as assist the technician in troubleshooting the T 444E Diesel Engine. Diagnostic forms provide a guide to finding problems quickly and easily and to avoid unnecessary repairs and expense. Engine diagnostic forms should not remain buried in a book in the shop foreman's service library. They should be taken right to the job and used to provide a systematic and time saving method of diagnosing engine problems.

Engine diagnostic forms begin with the basics progressing to the tests that are more difficult. This leads the technician in a path of diagnosis to check the more common problems first and proceed to the less likely. The form should be followed in sequence, starting at test number one (1) and continuing through to the final test. The order of the tests should be followed because some components depend on the function of other components for proper operation. Performing the tests out of order could cause an incorrect conclusion.

Two diagnostic forms are required to properly diagnose the T 444E engine. The first form, **Hard Start/No Start and Performance Engine Diagnostics**, guides the technician through Hard Start or No Start conditions in which the engine does not start or is difficult to start. The Performance Engine Diagnostics portion guides the technician through conditions in which the engine is running with some type of performance problem. An example would be a low power complaint. Illustrations when applicable, are located on the reverse side of the form. They show the location of test points and how to hook up test equipment at each point.

The second form, **Electronic Control System Diagnostics**, lists all engine and vehicle related fault codes on the front side. A circuit index adjacent to each fault code is provided to assist the technician to quickly refer to the appropriate section of the manual for each fault code. Fault code descriptions, comments and probable causes are listed for each fault code listed. This information will allow the technician to understand what the fault code is and the problem associated with it.

The reverse side of this form contains a schematic wiring diagram of the T 444E engine and truck mounted electronic controls. In addition, a chart is supplied which describes the Electronic Control Module's (60 pin) expected signal values under specified conditions. The chart will enable the experienced technician to quickly identify and repair the problem.

DIAGNOSTIC FORMS

INSTRUCTIONS

—IMPORTANT—

BEFORE ATTEMPTING TO PERFORM ANY OF THE DIAGNOSTIC PROCEDURES, IT IS IMPORTANT TO FILL IN THE INFORMATION REQUESTED AT THE TOP OF THE DIAGNOSTIC FORM(S). PROPER INFORMATION IS REQUIRED.

The **DATE**, **MILES** and **HOURS** are important information for warranty purposes.

The **ENGINE SERIAL NUMBER AND VEHICLE IDENTIFICATION NUMBER (VIN)** are important information for ordering parts and referencing service information. The **ENGINE SERIAL NUMBER** is located on a machined pad next to the rear of oil cooler on the engine block. The VIN is stamped on the manufacturer's identification plate located on the chassis.

The **ENGINE HORSEPOWER / EMISSIONS INFORMATION** and **ENGINE FAMILY RATING CODE (EFRC)** is important information to determine if the engine is the correct horsepower for the application and if the VPM (Vehicle Personality Module) is calibrated to the correct horsepower and emissions level. The **ENGINE HORSEPOWER/EMISSIONS INFORMATION** is located on the emission label located on the right valve cover. The **ENGINE FAMILY RATING CODE** can only be accessed with the EST (Electronic Service Tool).

To read the EFRC:

1. Select ENGINE MENU and press "ENTER".
2. Select CALIBRATION DATA MENU and press "ENTER".
3. Select ENG/TRANS SELECT MENU and press "ENTER".
4. Scroll to the ENGINE RATING CODE and it will be displayed on the EST. (Refer to Diagnostic Tool Section for operating the EST.)

The **MECHANIC** and **UNIT** number is useful information for reference only.

Date:	Miles:	Hours:	Mechanic:	Complaint:
Eng. Sn.	VIN		Unit #	
Eng. HP	EFRC:	Ambient Temp.	Coolant Temp..	
← Hard Start/No Start Diagnostics →			← Performance Diagnostics →	

INSTRUCTIONS (Continued)

INSTRUCTIONS FOR ENGINE DIAGNOSTIC FORMS

RECORD THE TEST DATA IN THE "ACTUAL" BOX (FIGURE 2.1-1.) ON THE HARD START NO START & PERFORMANCE ENGINE DIAGNOSTICS FORM. IF THERE ARE ANY DIFFERENCES BETWEEN THE "SPECIFICATION" BOX AND THE "ACTUAL" BOX, CORRECT AS NECESSARY AND REPEAT THE CHECKS. RETAIN THIS INFORMATION FOR FUTURE OPERATING ANALYSIS.

Diagnostic form numbers EGED-130-1 and EGED-135-1 are available in pads of 50 sheets from:

Navistar International Transportation Corporation
Printing, Procurement and Distribution
4956 Wayne Road
Battle Creek, Michigan 49017

FROM FORM EGED-130-1

8. EST TOOL-DATA LIST

- Select and enter the following data as the first three lines in a custom data list
- Monitor the data while cranking the engine for 20 seconds minimum

Data	Spec.	Actual
Bat. voltage	7 volts min.	
Eng. RPM	100 RPM min.	
ICP pressure	800 PSI min.	

- ☐ If voltage is low, proceed to Test 9a.
- ☐ If no RPM is noted, recheck fault codes and proceed to Test 9b.
- ☐ If ICP pressure is low, refer to Test 10.

Figure 2.1-1. – Diagnostic Form (Example)

* – Manual number specified with latest revision will be furnished.