

2010 MAXXFORCE 11 & 13

CLEANING MANAGEMENT SYSTEM EGR COOLER CLEANING TRAINING PROGRAM

Study Guide



©2012 Navistar, Inc.
2701 Navistar Drive, Lisle, IL 60532.

All rights reserved.

No part of this publication may be duplicated
or stored in an information retrieval system
without the express written permission of
Navistar, Inc.

TABLE OF CONTENTS

Introduction

MODULE 1: COMPONENTS

Section 1 – Component Identification	5
--	---

MODULE 2: SETUP AND PREPARATION

Section 1 – Preparation	8
Section 2 – Removing EGR Valve	8
Section 3 – Rear EGR Cooler Adaptor Installation	8
Section 4 – Removing EGR Cooler Module Cover	8
Section 5 – Front EGR Cooler Adaptor Installation	8

MODULE 3: CLEANING PROCEDURE

Section 1 – Connecting Cleaning Management System	10
Section 2 – Set the Timer	10
Section 3 – Agitate the Particulate	10
Section 4 – Clear the Hoses	11
Section 5 – Stage Two of Cleaning Cycle	11

MODULE 4: FLUSHING AND REASSEMBLY

Section 1 – Evacuate Reservoir	13
Section 2 – Flush EGR Cooler	13
Section 3 – Reverse Flush	13
Section 4 – Drying the EGR Cooler	13
Section 5 – Drying the Cooler Without Rear Adaptor	14
Section 6 – Reassembly	14
Section 7 – Reassemble the Vehicle	14

CONCLUSION

INTRODUCTION

Welcome to the Cleaning Management System training course for EGR Cooler Cleaning.

NAVIGATION INFORMATION

Arrow one identifies the Forward and Back Arrows: These are used to advance to the next item.

Arrow two identifies the Continue Button: After all items on a given slide have been viewed, the “Click here to continue” button will appear, allowing you to advance to the next module.

Arrow three identifies the Menu Button: Clicking this button will allow you to change the screen layout and view the Chapter Menu. The Chapter Menu can be used to navigate back to previously viewed content.

Arrow four identifies Interactive Images: Images with a magnifying glass symbol in the bottom right corner are expandable. Click it once to expand, and click it again to retract.

Arrow five identifies the Pause/Play Button: Clicking this button will pause, or continue play of, the narration.

Arrow six identifies Slide Interaction: Some slides contain interactive information boxes. Click on each box to view the information within. Each interaction must be viewed before being allowed to advance to the next module.

OBJECTIVES

Upon completion of this program, you will be able to identify the purpose of the Cleaning Management System, identify the Cleaning Management System and EGR Cleaning Kit components, and perform a complete EGR Cooler cleaning service.

MODULES

This course contains four modules: Components, Setup and Preparation, Cleaning, and Flushing and Reassembly.

TOOL PURPOSE

Over time, the EGR cooler may become plugged with soot from the flow of exhaust gases through the cooler. This causes the EGR cooler to become inefficient and can result in de-rating of the engine's power.

The Cleaning Management System, with the assistance of the EGR Cooler Cleaning Kit, a source of clean water, and shop air, removes the soot from the EGR cooler and restores the cooler's efficiency.

MODULE 1: COMPONENTS

Component Identification

This section of the program is intended to familiarize you with all of the Cleaning Management System's components. Click on each of the red numbered markers to learn about the corresponding components. Starting with number one, after each component has been viewed and the narration for each has been played, you will be allowed to move on to the next module.

Cleaning Management System

The Cleaning Management System is the main component of the EGR Cooler Cleaning Tool. The System includes a reservoir, heater, pump, and hose ports. A series of marks inside the reservoir indicate five, ten, and twenty gallon levels of liquid.

Pump

The Pump is mounted on the bottom of the inside of the Reservoir. The Pump is responsible for cycling water and solvent through the EGR Cooler. The Pump cannot be turned on if the Heater is on.

Heater

The Heater is mounted on the bottom right side of the Reservoir. The Heater pre-heats the solvent mixture to increase the effectiveness of the cleaning procedure. The Heater cannot be turned on if the Pump is on.

Timer

The Timer is fixed to the lid of the Cleaning Management System and is used to keep track of key points in the cleaning process.

Heater/Pump Switch

Mounted on the outer right side of the Reservoir are the controls for the Pump and Heater.

The switch is wired so the Pump and Heater will not operate at the same time. This prevents the Heating Element from being damaged if the level of solvent were to drop during the cleaning process.

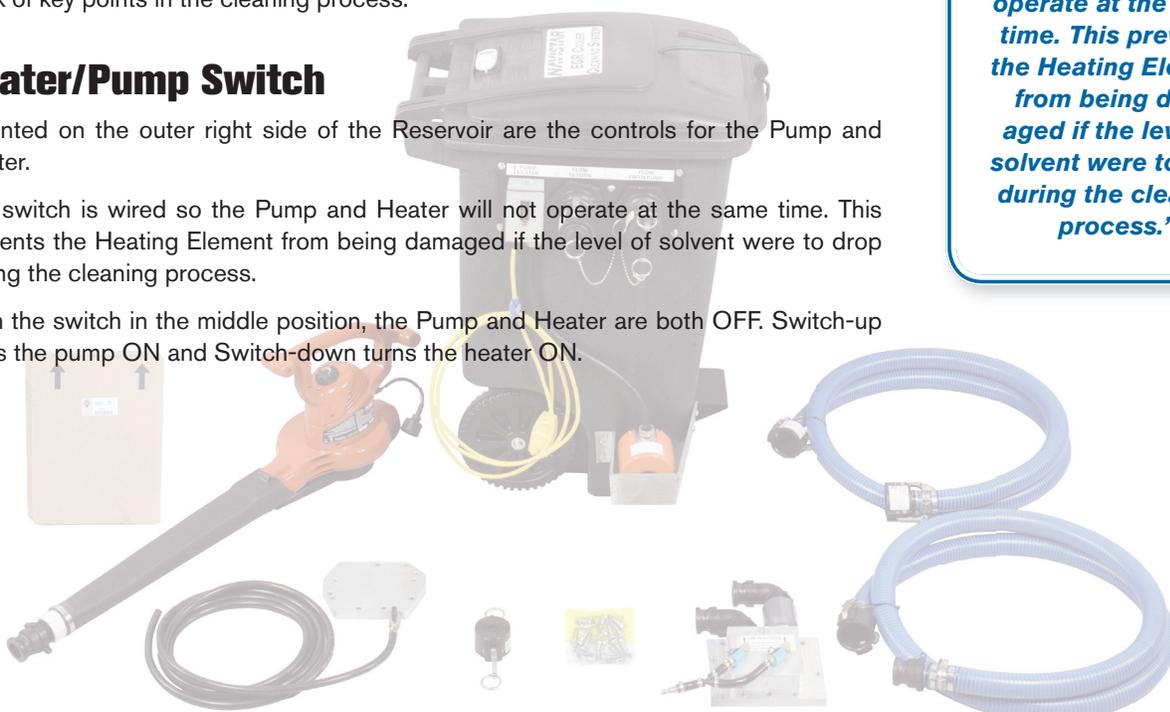
With the switch in the middle position, the Pump and Heater are both OFF. Switch-up turns the pump ON and Switch-down turns the heater ON.

“A series of marks inside the Reservoir indicate five, ten, and twenty gallon levels of liquid. Do not let the Heater operate dry.”

NOTE

Always add the correct level of water and solvent before turning the Heater ON. Do not let the Heater operate dry.

“The switch is wired so the Pump and Heater will not operate at the same time. This prevents the Heating Element from being damaged if the level of solvent were to drop during the cleaning process.”



MODULE 1: COMPONENTS (continued)

Flow Return and Flow From Pump Ports

The FLOW RETURN and FLOW FROM PUMP ports are mounted on the exterior of the Reservoir.

The left port is the return port to the Reservoir, and right port is the pressure port from the Pump.

To ensure proper hose orientation, the Reservoir-end of the pressure and return ports are each fitted with unique couplers.

“To ensure proper hose orientation, the Reservoir-end of the pressure and return ports are each fitted with unique couplers.”

Front EGR Cooler Adaptor

The Front EGR Cooler Adaptor has two identical hose fittings. This allows both the FLOW RETURN Hose and the FLOW FROM PUMP Hose to connect to either fitting.

On the front of the adaptor are two momentary valves. Both valves are connected to a shop air fitting. These valves are used to pulse air through the EGR Cooler during the cleaning process.

Rear EGR Cooler Adaptor

The Rear EGR Cooler Adaptor has a small drain valve that allows leftover solvent to be evacuated from the EGR Cooler after cleaning.

Bolt Kit

A set of specific length bolts must be used to fasten the Front and Rear EGR Cooler Adaptors to the EGR Cooler Module. The EGR Cooler Module bolts are too long and will strip the threads on the cooler module if used to fasten the Adaptors.

“A set of specific length bolts must be used to fasten the Front and Rear EGR Cooler Adaptors to the EGR Cooler Module.”

Flow From Pump and Flow Return Hoses

The FLOW FROM PUMP and FLOW RETURN Hoses are used to cycle solvent, water, and air, through the EGR cooler during the cleaning process.

The hoses can be identified by their connectors. The FLOW FROM PUMP Hose has two female connectors. The FLOW RETURN Hose has one male and one female connector.

“The FLOW FROM PUMP Hose has two female connectors. The FLOW RETURN Hose has one male and one female connector.”

Cam Lock Cap

The Cam Lock Cap is used to block off one half of the Front EGR Cooler Adaptor when purging the EGR cooler of leftover solvent.

Air Blower

The Air Blower is used to empty the cooler of residual water after the cleaning is completed.

EGR Cooler Cleaning Kit

The EGR Cooler Cleaning Kit includes new bolts and gaskets for the EGR Valve and EGR Module Cover; two 2.5 gallon bottles of a specially formulated solvent; and instruction sheets.

MODULE 2: SETUP AND PREPARATION

Preparation

To begin the EGR Cooler Cleaning Procedure, park the vehicle to be serviced within 10 feet, or 3 meters, of a suitable drain. Ensure that the Cleaning Management System reservoir is clean, and that the filter sock is undamaged and free of large debris.

Verify the HEATER/PUMP switch is in the center, or OFF, position.

Plug the Cleaning Management System into a 110 volt outlet.

Next, fill the reservoir to the 5 gallon mark with tap water, and then add two 2.5 gallon containers of the EGR cleaning solvent.

Turn the Heater ON before you begin to disassemble the vehicle. This will allow the temperature of the cleaning solution to rise prior to beginning the cleaning process. Heating the solution is necessary for effective cleaning of the EGR Cooler.

Removing EGR Valve

Remove the heat shields and the EGR valve from the cooler following the steps in the engine service manual. After the valve is removed, wipe down the fins at the EGR Cooler inlet to remove any debris that will prevent the Rear EGR Cooler Adaptor from properly sealing.

Rear EGR Cooler Adaptor Installation

Install the Rear EGR Cooler Adaptor and gasket with the supplied bolt kit and torque the bolts to 18 foot pounds, or 24 Newton meters.

Now, check the drain valve on the Rear EGR Cooler Adaptor and ensure it is in the closed position.

Removing EGR Cooler Module Cover

Remove the bolts fastening the EGR outlet tubes to the EGR module cover. Discard the gaskets, they will be replaced. Remove the bolts attaching the EGR module cover to the cooler. Remove the cover and save the outlet seal. Wipe down the fins on the outlet of the cooler, as well as the center divider between the fins. Make sure to remove any sign of debris that may prevent the Front EGR Cooler Adaptor from properly sealing.

Front EGR Cooler Adaptor Installation

Install the Front EGR Cooler Adaptor and gasket with the supplied bolt kit and torque the bolts to 18 foot pounds, or 24 Newton meters.

“Ensure that the Cleaning Management System reservoir is clean, and that the filter sock is undamaged and free of large debris.”

“Turn the Heater ON before you begin to disassemble the vehicle.”

“Remove the bolts attaching the EGR module cover to the cooler. Remove the cover and save the outlet seal.”

MODULE 3: CLEANING PROCEDURE

Connecting Cleaning Management System

Identify the FLOW FROM PUMP Hose. Attach the hose between the FLOW FROM PUMP port on the reservoir and the tall port on the Front EGR Cooler Adaptor.

The cleaning procedure is done in two stages to allow the solvent mixture equal time to flow in both directions through the EGR Cooler. Because of this, the FLOW FROM PUMP Hose will later be installed on the opposite Front Adaptor port.

Connect the FLOW RETURN Hose to the unused port on the adaptor and FLOW RETURN port on the reservoir.

Connect shop air to the air fitting on the Front EGR Cooler Adaptor.

Set the Timer

To begin the cleaning process, set the timer for 20 minutes and turn the Pump ON.

Agitate the Particulate

The flow of cleaning solution through the EGR Cooler will now work to break free and remove the soot and particulate matter that has clogged the Cooler.

At 5 minute intervals during the cleaning process, pulse the button valve that is in-line with the FLOW FROM PUMP hose. Shop air should be pulsed 8 times at 1 second ON, 2 second OFF intervals.

Avoid rapid and/or extended pulses of pressurized air into the cooler, as this will cause excessive amounts of foaming in the solution.

For effective cleaning of the EGR Cooler, you must wait for the entire twenty minute duration of the cleaning cycle before moving on to the next step.

“The cleaning procedure is done in two stages to allow the solvent mixture equal time to flow in both directions through the EGR Cooler.”

“Shop air should be pulsed 8 times at 1 second ON, 2 second OFF intervals.”

MODULE 3: CLEANING PROCEDURE (continued)

Clear the Hoses

After the 20 minute cleaning cycle has expired, turn the pump OFF and apply continuous shop air for approximately 5 seconds independently on each momentary valve.

This will clear the cleaning solution from the fluid hoses and minimize spilling the solution when the hoses are removed.

Stage Two of Cleaning Cycle

To begin the second stage of the cleaning cycle, interchange the FLOW FROM PUMP and RETURN FLOW hoses at the Front EGR Cooler Adaptor.

Set the timer for 20 minutes and turn the Pump ON.

Allow the Pump to run for an additional 20 minutes with the hoses connected in the reverse direction. Again, pulse air using the appropriate button valve at the 5, 10, and 15 minute marks of the cleaning process.

The full twenty minute duration must be completed for effective cleaning of the EGR Cooler.

After the second 20 minute cleaning cycle has completed, turn the Pump OFF and purge the lines by depressing each button valve on the Front EGR Cooler Adaptor for 5 seconds.

The cleaning process is over. The reservoir and EGR Cooler must now be flushed.

“To begin the second stage of the cleaning cycle, interchange the FLOW FROM PUMP and RETURN FLOW hoses at the Front EGR Cooler Adaptor.”

MODULE 4: FLUSHING AND REASSEMBLY

Evacuate Reservoir

Remove the FLOW RETURN hose from the reservoir and direct it towards a suitable drain.

Turn the Pump ON and let it run until all of the solution has been evacuated from the reservoir.

Then, turn the pump OFF.

Disconnect the FLOW FROM PUMP hose from the reservoir and tip the unit on its side over a suitable drain.

Use clean water to rinse out any remaining debris and solution from the reservoir.

Flush EGR Cooler

Fill the reservoir with 20 gallons of clean water and reconnect the FLOW FROM PUMP hose.

Turn the Pump ON to flush the EGR Cooler. Once the reservoir is empty, turn the Pump OFF.

Reverse Flush

Refill the reservoir with 20 gallons of clean water and reverse the position of the hoses on the Front EGR Cooler Adaptor.

Ensure the FLOW RETURN hose from the EGR cooler is still directed to a suitable drain, turn the Pump ON, and flush the cooler in the opposite direction.

Turn the Pump OFF once the reservoir becomes empty.

Drying the EGR Cooler

Disconnect the return hose from the Front EGR Cooler Adaptor and install the Cam Lock Cap on the open fitting.

Open the drain valve on the Rear EGR Cooler Adaptor.

Remove the FLOW FROM PUMP Hose from the reservoir and connect the Air Blower to the hose.

Turn the blower ON and dry out one side of the cooler until water from the hose at the Rear EGR Cooler Adaptor is reduced to a fine mist. Then, turn the blower OFF.

Reverse the positions of the cap and hose on the Front Adaptor and turn the blower ON until the water draining from the EGR cooler is again reduced to a fine mist.

WARNING

To prevent engine damage, all of the remaining water must be removed from the EGR cooler.

NOTE

Prior to evacuating the EGR cleaning solution, consult your local and state regulations for proper disposal procedures.

NOTE

The inside of the vehicle must be protected from spray coming from the end of the EGR cooler assembly so that the solution does not soil the interior of the vehicle while performing the next two steps.

MODULE 4: FLUSHING AND REASSEMBLY (continued)

Drying the Cooler Without Rear Adaptor

Remove the Rear EGR Cooler Adaptor.

Turn the blower ON and evacuate as much water as possible from both sides of the EGR cooler, being sure to switch the position of the Cam Lock Cap and hose at the Front Adaptor.

Once the cooler has been thoroughly dried, turn the blower OFF.

Reassembly

Remove the Front EGR Cooler Adaptor after all the solution has been removed from the EGR cooler.

Using the saved EGR cover outlet seal and new EGR outlet tube gaskets, install the EGR module cover. Using the supplied new EGR valve gasket and new bolts, install the EGR dual flap valve.

Always follow the correct installation procedures found in the appropriate Engine and Chassis Service Manuals when installing components.

Reassemble the Vehicle

Completely reassemble the vehicle following the procedures in the Engine Service manual found on ISIS. Check for and clear all current fault codes using ServiceMaxx, and verify proper operation of the engine.

CONCLUSION

This concludes the Cleaning Management System – EGR Cooler Cleaning Training program.

Thank you for your participation.

You are now required to take a post-test.

“Using the saved EGR cover outlet seal and new EGR outlet tube gaskets, install the EGR module cover. Using the supplied new EGR valve gasket and new bolts, install the EGR dual flap valve.”

