1. Engine Warning & Protection System (General Overview)

The engine warning and protection system (EWPS) feature is designed to protect the engine from damage by monitoring critical engine data such as the engine speed, temperature, oil pressure, and coolant level.

The EWPS feature will alert the operator using a combination of visual and audible warnings if critical engine parameters have been exceeded. Depending on the severity of the problem, there may be a reduction in power associated with the visual warnings.

EWPS also visually alerts the operator if the vehicle speed exceeds a threshold. The vehicle over speed incidents are logged and can be downloaded into a report. Refer to the "Trip Reporting" document for more information.

Programmable parameters within the engine control module (ECM) provide EWPS related options that can be adjusted to suit the customer's needs. For example, the customer may choose whether the EWPS feature shuts down the engine to provide an additional level of engine protection.

To set up the EWPS feature it is recommended that you use one of the example settings, referenced in the "Parameter Setup" section, and then modify only the specific parameters that will help meet your vehicle application.

The document will address the EWPS functionality for MaxxForce® 11 and 13 engines.

1.1. Feature Codes

N/A

2. Definitions/Acronyms

The following terms are referenced in this document:

- **EWPS –** Engine Warning & Protection System
- **ECM** – Engine Control Module
- **ECT** – Engine Coolant Temperature

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3. Description and Operation

3.1. Operation

The operator interaction for this feature works by means of indicator lamps, audible warnings and (optional) engine shutdown, which are explained further in this section. There are no operator switches involved.

It is essential that operators are trained to recognize and understand the warnings associated with EWPS and know what action to take for the feature to be effective.

3.1.1. Amber Warning Lamp

The amber warning lamp (AWL) indicates that a malfunction has occurred. The vehicle should be driven to the nearest authorized dealer as soon as possible.

The AWL also turns on when the vehicle has exceeded either of 2 programmable over speed thresholds. Refer to "Vehicle Over Speed Level 1" (7723) and "Vehicle Over Speed Level 2" (7724) in the Programmable Parameters section for more information.

NOTE: It is important that the customer, owner and driver are aware of the vehicle over speed settings and why they are getting the AWL dash light.

3.1.2. Red Stop Lamp

The red stop lamp (RSL) indicates that a malfunction has occurred which may result in vehicle damage and could affect safe vehicle operation. The vehicle should be safely pulled over and parked as soon as possible.

The EWPS feature will be active as long as the engine is running and there are no active sensor faults.

The EWPS uses the amber warning lamp (AWL) and the red stop lamp (RSL) in the gauge cluster for visual operator indications that critical engine parameters have been exceeded. An audible beep is provided by the cluster as an additional EWPS operator indication.

The EWPS feature is capable of providing up to 2 levels of protection **(See Note 1).** The second level corresponds to the highest severity.

1st Level (warning):

- The amber warning lamp (AWL) turns on steady.
- The gauge cluster sounds 3 short audible beeps.

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2nd Level (shutdown) – Optional:

- The red stop lamp (RSL) flashes in the gauge cluster.
- The gauge cluster sounds a continuous audible beep.
- The engine shuts down 30 seconds (programmable) after the RSL begins to flash.

Note 1: The "EWPS Mode (7700)" parameter setting determines which functionality the EWPS feature uses.

Note 2: The EWPS feature may also de-rate the engine to protect itself from damage. Engine speed and power may be affected during this event.

Additional Notes: As discussed above, if the parameter exceeds the first (less severe) level, the EWPS feature will alert the operator of the problem with the amber warning lamp and 3 short audible beeps. If the second (more severe) level is exceeded and the "EWPS – Warning and Shutdown Enable" option is selected, then the red stop lamp will flash for 30 seconds (programmable) before the engine will automatically shut down. A continuous audible beep will also sound. If the engine shuts down, it can be restarted by cycling the key switch; however, the engine will shut down after 30 seconds if the second (more severe) level is still being exceeded.

3.2. Feature Interaction

The engine warning and protection system (EWPS) feature interacts with the following engine features:

- Vehicle Speed Governor (VSG) – The vehicle over speed warning indication provided by EWPS may occur at different vehicle speeds depending on the accelerator vehicle speed limit setting.

4. Programmable Parameters

The following programmable parameters are related to the EWPS feature. These parameters should be programmed in a manner which provides the appropriate level of warning and protection to meet the customer's needs.

Parameters indicated as "Customer Programmable" can be adjusted differently than the production assembly plant setting to meet the customer's needs. This adjustment can be done before or after the original sale. If the parameter is indicated as non-customer programmable, the parameter setting is preset from the factory and can't be changed without dealer authorization.

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Parameter Name	Description	Possible Values	Customer Programmable?	Recommended Setting
EWPS Mode (7700)	This parameter determines how the EWPS feature reacts if critical engine operating limits are exceeded. If set to (1): – The EWPS feature provides a visual and audible indication if critical engine operating limits exceed a threshold. If set to (2): – The EWPS feature provides 2 levels of protection: • (Less Severe) – A visual and audible indication occurs if critical engine operating parameters exceed the 1st threshold. • (More Severe) – The EWPS feature will shut down the engine if critical engine operating parameters exceed the 2nd threshold.	1: EWPS – Warning Enable 2: EWPS – Warning and Shutdown Enable	YES	2: EWPS – Warning and Shutdown Enable
EWPS Fault Mode (7719)	This parameter determines how the EWPS feature reacts to sensor faults. • If set to 0: The EWPS feature is disabled if a sensor fails. • If set to 1: A visual warning occurs if a sensor fails. • If set to 2: The engine shuts down if a sensor fails.	0: Sensor Faults Disable EWPS 1: Sensor Faults Cause Warning Actions 2: Sensor Faults Cause Protection Actions	YES	1: Sensor Faults Cause Warning Actions
EWPS Shutdown Time (7731)	This parameter sets the time from which the red stop lamp (RSL) begins to flash before the engine shuts down. This allows the operator time to safely pull over and park the vehicle. For example, if set to a value of 30 the engine will shut down 30 seconds after the RSL begins to flash.	30 to 300 seconds	YES	30 seconds
Vehicle Over Speed Level 1 (7723)	This parameter sets the speed at which the 1st vehicle over speed warning will occur. The amber warning lamp (AWL) will turn on when the vehicle speed has exceeded this value. **Note 1:** It is recommended to set this parameter 5 mph above the "Accelerator Vehicle Speed Limit" (7902) parameter setting. See "Example Programmed Values".	0 to 125 (mph)	YES	Customer Chosen **(See Note 1)**

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Vehicle Over Speed Level 2 (7724)	This parameter sets the speed at which the 2nd vehicle over speed warning will occur. The amber warning lamp (AWL) will turn on when the vehicle speed has exceeded this value. **Note 2:** It is recommended to set this parameter 7 mph above the "Accelerator Vehicle Speed Limit" (7902) parameter setting. See "Example Programmed Values".	0 to 125 (mph)	YES	Customer Chosen **(See Note 2)**

Example Programmed Values for Vehicle Over Speed Parameters:

Assuming that the following parameter values are set:

- "Accelerator Vehicle Speed Limit" (7902) is set to 65 mph (Refer to the "Vehicle Speed Governor" document).
- "Vehicle Over Speed Level 1" (7723)" is set to 70 mph.
- "Vehicle Over Speed Level 2" (7724)" is set to 72 mph.

Ensure that the "Accelerator Vehicle Speed Limit" (7902) parameter is set at the customer's expectation in mph. The "governed" vehicle speed in this example will be limited to 65 mph. If the vehicle speed exceeds 70 mph (level 1) OR 72 mph (level 2) then the amber warning lamp (AWL) will be turned on. The AWL will remain on until the vehicle speed has dropped below 70 mph (level 1).

5. Parameter Setup

5.1. Possible EWPS Applications

This section describes one possible application of the feature and how the programmable parameters can be effectively configured for that application. This is not a comprehensive list, and does not include all possible applications that an owner/operator might encounter.

Please review the description and operation section and the programmable parameters for a better understanding of how the various EWPS parameters might be best configured for your vehicle.

(Example A) – Customer Desires EWPS with Engine Shutdown Option Enabled and Standard Vehicle Over Speed Warnings.

In this example, let's assume that the customer desires both engine protection levels (warning and shutdown) along with a visual warning if a sensor has failed. This example also assumes that the customer desires the amber warning lamp (AWL) to be turned on if the vehicle speed has exceeded one or more programmable limits.

Adjust parameters as follows:

Parameter Name	Action Required
EWPS Mode (7700)	Set to "2"
EWPS Fault Mode (7719)	Set to "1"
EWPS Shutdown Time (7731)	Set to "30"

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Vehicle Over Speed Level 1 (7723)	Set 5 mph above the "Accelerator Vehicle Speed Limit" (7902) parameter setting.
Vehicle Over Speed Level 2 (7724)	Set 7 mph above the "Accelerator Vehicle Speed Limit" (7902) parameter setting.

6. Frequently Asked Questions

Q. Can I restart the engine immediately after the EWPS feature has shut the engine down?

A. Yes, just cycle the key switch and restart the engine. However, if the critical operating condition is still present then the engine will shut down again after 30 seconds (programmable time).

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