Form No. 4505-956 Rev B
Reference Guide

# RED Equipped User's Guide

## Diesel Models

## Introduction

**CONGRATULATIONS** on the purchase of your Exmark Mower with RED Technology. The patented RED Technology system is an onboard intelligence platform to help increase fuel efficiency. It enables communication and response between key systems on the mower. The selectable operating modes on RED equipped mowers enable operators to match power to specific mowing conditions. Efficient Mode offers peak performance power with reduced fuel consumption, emissions, noise, and overall wear on the machine. Max Mode provides increased power for operating in demanding conditions. Low Mode enables optimal operation in wet conditions and helps reduce deck packing for a superior cut.

***Important:*** **To maximize safety, performance, and proper operation of this machine, it is essential that all operators carefully read and fully understand the contents of this User's Guide along with the Operator's manual provided with the product. Safe operation of Exmark equipment is essential. Failure to comply with the operating instructions or receive proper training may result in injury. Go to http://www.Exmark.com for additional safe operation information, such as safety tips, training materials, and Operator's manuals.**

The patented RED Technology system:

- monitors engine temperature, oil pressure, and the overall electrical system, placing the machine in Safe Transport Mode when critical thresholds are exceeded–allowing safe return for servicing.
- provides visual and audible warnings of critical system issues.
- increases clutch life and improves operator efficiency by automatically adjusting the engine speed during PTO engagement/disengagement.
- if equipped with a diesel particulate filter (DPF), will monitor the DPF status and allow the user to initiate and control the regeneration process directly on the machine without any additional equipment.

  The system:

  – monitors, controls, and reduces harmful engine exhaust gasses and soot and prevents it from being discharged into the air.

  – collects particulate matter in the filter and performs a regeneration to prevent clogging and decreased engine performance.

This manual will explain the Operator interface to allow users to access information, reset counters, and modify system settings.

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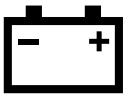
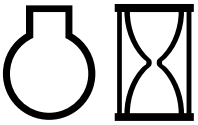
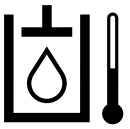
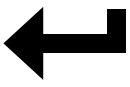
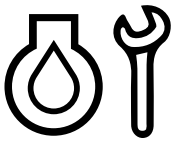
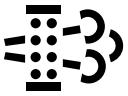
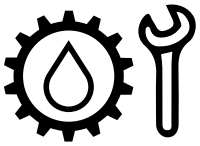
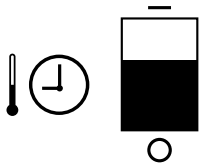
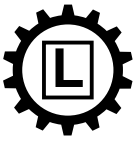
*4505-956*

## 1. Screen Icons

The information screen uses the following icons:

| | |
|---|---|
|  **Gauge and Meters** |  **Processing** |
|  **Advanced Settings** |  **Language** |
|  **Attention Safety Alert** |  **Battery Voltage** |
|  **Maintenance and Service** |  **Engine Hours** |
|  **Hydraulic Oil Temperature** |  **Cancel/Exit** |
|  **PTO** |  **Toggle Between Screens** |
|  **Park brake** |  **Enter/Return** |

| | |
|---|---|
| **N**<br>**Neutral Lock**<br>*Located in top row of Information Screen | **Previous** |
| **OPC (Operator Presence Control)** | **Next** |
| **Max Engine Speed** | **Reset** |
| **Efficient Engine Speed** | **Play/Start** |
| **Low Engine Speed** | **Pause/Stop** |
| **Transmission Oil Maintenance** | **Increase** |
| **Engine Oil Temperature** | **Decrease** |

| | |
|---|---|
|  **Engine Oil Maintenance** | **Y** **Yes** |
|  **Engine Glow Plugs Active** | **N** **No** *Located on bottom row of some menu screens |
|  **Engine Diesel Particulate Filter (DPF)** | **X** **Cancel** |
|  **Engine DPF Regen Inactive/Failed/Interrupted** |  **Engine DPF Soot Percentage** |
|  **Gearbox Oil Maintenance** |  **Recommended Engine Cool Down Time** |
|   **Engine Stop** |  **Error Warning** |
|   **Transmission Low Speed** |   **Transmission High Speed** |

# 2. Product Overview

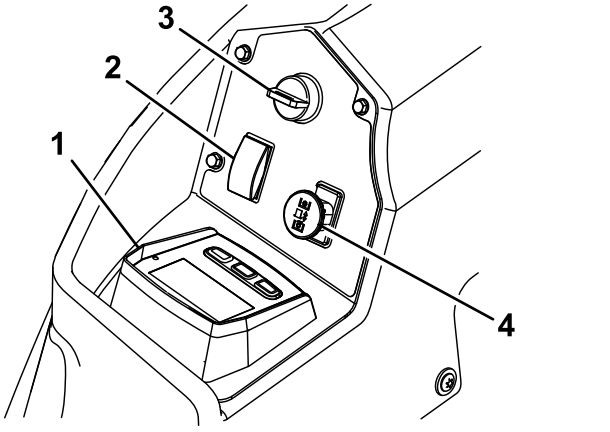



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**Figure 1**

All Models Except 144 Inch Deck Model

1. RED Equipped Logic Display Unit (LDU)
2. Deck lift switch
3. Ignition switch
4. PTO engagement switch

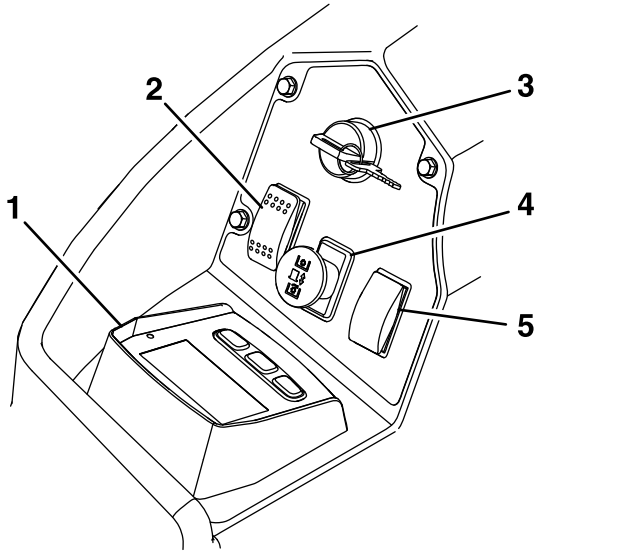


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**Figure 2**

144 Inch Deck Model

1. RED Equipped Logic Display Unit (LDU)
2. Deck lift switch
3. Ignition switch
4. PTO engagement switch
5. Ground drive speed switch

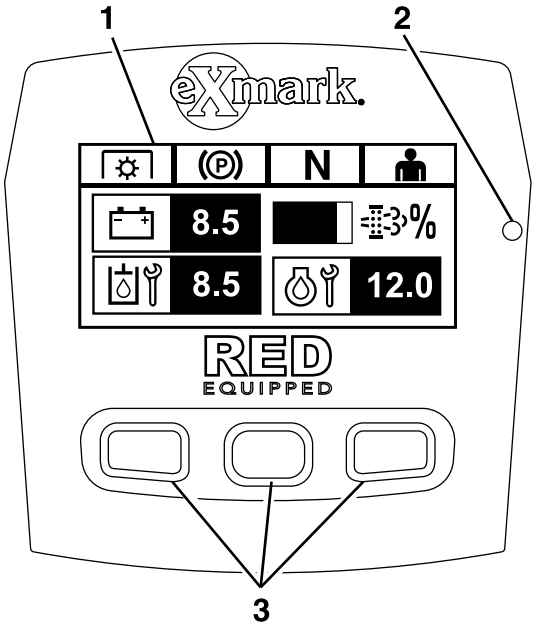


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**Figure 3**

LDU (Logic Display Unit)
All Models Except 144 Inch Deck Model

1. Information screen
2. LED status light
3. Push buttons

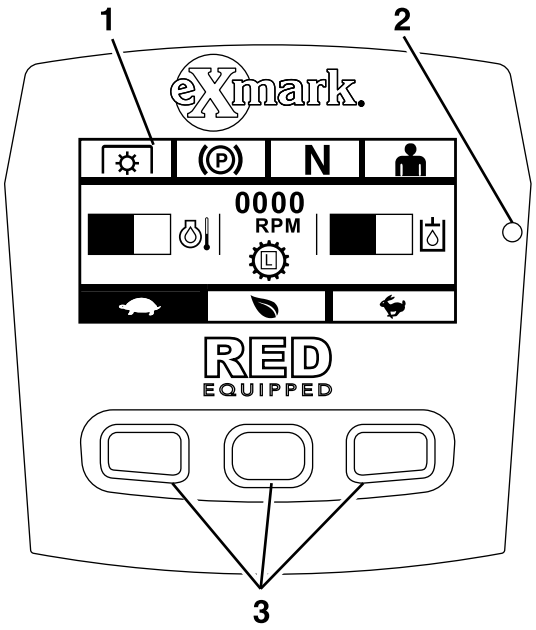


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**Figure 4**

LDU (Logic Display Unit)
144 Inch Deck Model

# 3. Controls

## Information Screen

The information screen displays icons and information relative to machine operation and is backlit for viewing in low light situations. The information screen is located above the push buttons.

Refer to the **Screen Icons** section for descriptions.

## LED Status Light

The LED is multi-colored to indicate the system status and is located on the right side of the panel. During startup, the LED will illuminate red, then orange, then green to verify functionality.

- **Solid Green:** indicates normal operating activity.
- **Blinking Red:** indicates a fault is active.
- **Blinking Green and Orange:** indicates a clutch reset is required.

**Note:** To reset the clutch and engage the blades, push the PTO switch down to the “OFF” position, then pull the PTO switch up to turn it “ON” (engage the blades).

## Push Buttons

The multi-functional push buttons are located at the bottom of the panel. The icons displayed on the information screen above the buttons indicate the current function. The push buttons allow the operator to select the engine speed as well as navigate through system menus.

## Audible Alarm

The audible alarm will sound if an error occurs to indicate the issue to the operator. During startup, the alarm will sound briefly to verify functionality.

When the alarm sounds, the error message will display and the LED will turn red.

- A fast chirp sound indicates critical errors.
- A slow chirping sound indicates less critical errors, such as required maintenance or service intervals.

# 4. Information Screens

The main information screens are:

- **4.1 Start-up Screen**
- **4.2 Engine-Off Screen**
- **4.3 Engine-On Screen**
- **4.4 Engine Diesel Particulate Filter (DPF) Regen Screens For 3TNV88C and 3TNV86CT Engines Only**
- **4.5 Menu Selection Screen**

## 4.1 Start-up Screen

During startup, the module will display the screen shown in Figure 5 for one second and perform a startup check to verify the functionality. The module will then chirp the alarm and illuminate the LED status light. The light will change from red, to orange, and then green.


g030171

**Figure 5**

## 4.2 Engine-Off Screen

When the key is on without the engine running, the default screen is shown in Figure 6.

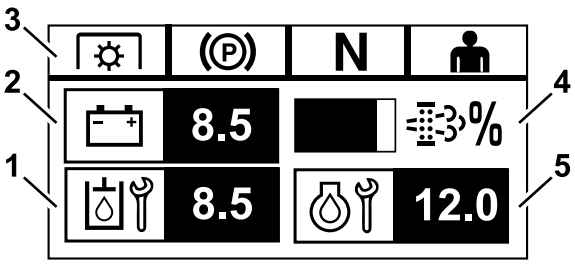



**Figure 6**

1. Screen toggles between hours remaining until transmission oil maintenance and gear box maintenance are required
2. Battery voltage display
3. Safety interlock status indicators will illuminate when each control meets the “safe to start” mode (e.g. the indicator turns on when park brake engaged)
4. Engine Diesel Particulate Filter (DPF) Soot percentage (if applicable) — The level is shown on a bar display. The bar graph will fill in as the soot percentage increases. A high soot percentage indicates that a DPF regeneration may be needed.
5. Screen toggles between hours remaining until engine oil maintenance and non-resettable engine hour counter

## 4.3 Engine-On Screen

When the engine is running, the default screen is shown in .

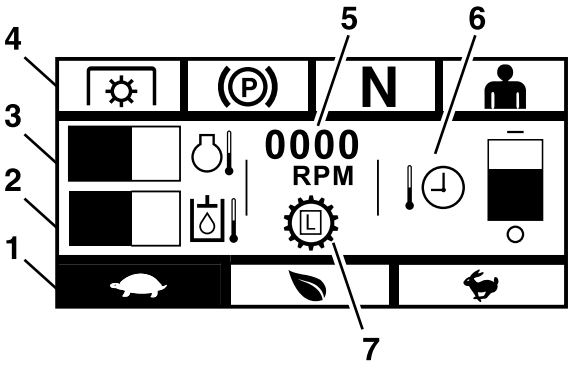



**Figure 7**

1. Engine speed mode (LOW mode)
2. Hydraulic oil temperature
3. Engine temperature
4. Safety interlock status indicators
5. Engine RPM
6. Recommended engine cool down time
7. Transmission speed (144 Inch Models Only)

### Engine Speed Mode

Three modes are available: LOW, EFFICIENT, and MAX.

- **LOW:** Low transport speed/Low idle for reducing deck packing in wet mowing conditions.
- **EFFICIENT:** Medium transport speed and maximum fuel economy and normal mowing conditions.
- **MAX:** Maximum transport speed/High idle for extreme mowing conditions.

The panel will illuminate showing the current engine speed mode (LOW is selected in Figure 7).

### Hydraulic Oil Temperature

A bar graph will display the hydraulic oil temperature. When the temperature is high and approaching an overheat condition, the bar graph will flash. When the transmission has overheated, the bar graph will be completely filled.

### Engine Temperature

A bar graph will display the engine temperature. When the temperature is high and approaching an overheat condition, the bar graph will flash. When the engine has overheated, the bar graph will be completely filled.

### Safety Interlock Status Indicators

These will illuminate when each control meets the “safe to start” mode (PTO disengaged, park brake engaged, motion controls in neutral lock, operator present).

- PTO must be disengaged, brake engaged, and motion control levers out (neutral lock) to start engine. (It is not necessary for the operator to be in the seat to start the engine.)

  **Note:** The starter will crank with the PTO switch in the “ON” (pulled up) position; however, the system will disengage the PTO and a PTO reset error will occur. Engaging the PTO will require the operator to reset the PTO switch by turning it “OFF” (pushed down) and then turning it “ON”.
- Operator must be in seat when PTO is engaged, brake is disengaged, or motion control levers are moved in or engine will stop.
- Engine will stop if either the left, the right, or both levers are moved from neutral lock position while brake is engaged.

  **Note:** Refer to the Operator’s manual, provided with the machine, to check the safety interlock system.

### Engine RPM

Displays the RPM of the engine.

## Recommended Engine Cool Down Time

The recommended time to idle the engine before shut down is shown on a bar display. The level will move towards the bottom of the display as the engine cools and will be empty when it is recommended to shut off the engine. If the engine is shut down before the recommended cool down period has expired, a fault will be logged in the historical fault log.

## Transmission Speed

The transmission of the 144 Inch Model has two speeds. Low speed allows transport and mow speeds of 0-10 mph. High speed allows transport speeds of 0-18 mph. The unit can be configured to enable mowing in high speed in the Advanced Settings Menu. The gear icon in the center of the screen has 'L' in the center of the gear to represent 'low speed'. 'H' in the center of the gear icon represent 'high speed'.

***Important:*** **The machine needs to come to a complete stop before switching speed ranges.**

# 4.4 Engine Diesel Particulate Filter (DPF) Regen Screens For 3TNV88C and 3TNV86CT Engines Only

The diesel particulate filter (DPF) is part of the exhaust system. The diesel-oxidation catalyst of the DPF reduces harmful gasses and the soot filter removes soot from the engine exhaust. As the particulates collect in the filter, the engine performs a regeneration to prevent clogging and decreased engine performance. The DPF regeneration process uses heat from the engine exhaust to incinerate the soot accumulated on the soot filter. It converts the soot to ash and then clears the channels of the soot filter so that filtered engine exhaust flows out of the DPF. Most regenerations are performed in the background and will not impact operation.

***Important:*** **Minimize the amount of time that the engine idles or operates at low engine speed to help reduce the accumulation of soot in the soot filter.**

**⚠ CAUTION**

**During regeneration, the diesel particulate filter becomes extremely hot and can cause serious burns.**

**Keep your body and hands away from the engine during regeneration.**

There are four modes for maintenance: passive regeneration, auto regeneration, stationary regeneration, and recovery regeneration.

1. **Passive Regeneration**

   This is the primary mode of regeneration that occurs automatically during normal operation. When the engine is running at normal loads, the exhaust temperature will keep the DPF above the minimum temperature. During passive regeneration, the DPF processes high heat exhaust gases; oxidizing harmful emissions and burning soot to ash.

2. **Auto Regeneration**

   If the Engine Control Unit (ECU) senses that the DPF backpressure has increased passed an acceptable threshold, an auto regen will occur. During the auto regen, the intake throttle valve limits the air flow into the engine while the injectors add additional fuel. This process increases the DPF temperature which allows accumulated particulate to burn off. The auto regen is completed when necessary. The machine can continue to be used during an auto regen.

   When the engine ECU determines that an auto regen is needed, the module will display the start of regen screen and chirp the audible alarm.

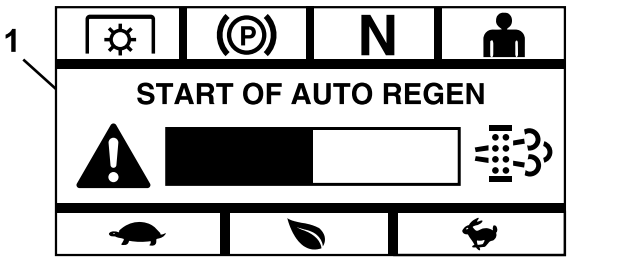



**Figure 8**

1. Start of auto regen

The start of auto regen screen will display a 60 second bar graph timer(see Figure 8). Once the bar graph timer expires, the auto regen process will begin.

***Important:*** **No action is required by the operator and the machine can continue to be used during the auto regen process. Be aware that exhaust gas temperatures may be elevated during this process and caution should be used if operating around flammable material.**

If the engine ECU determines that an auto regen is needed, but operating conditions do not allow the auto regen process to begin, the module will prompt the operator to increase engine RPM and/or load.

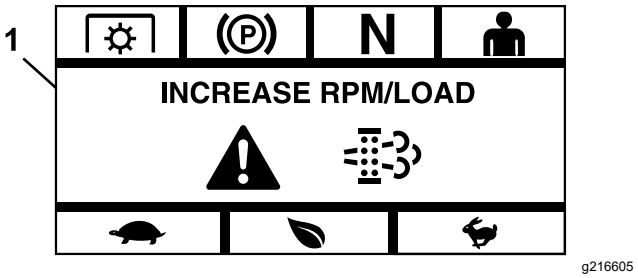



**Figure 9**

1. Increase RPM/Load

Once the conditions are met, the screen will change to indicate that the auto regen process is active.

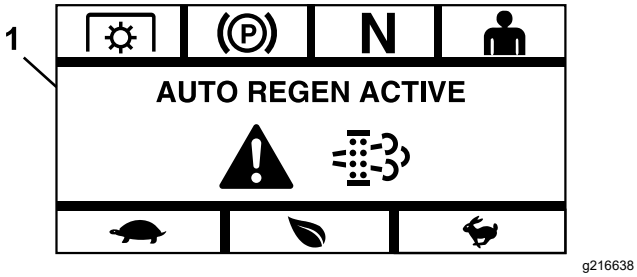



**Figure 10**

1. Auto regen active

If the regen gets interrupted, the following screen displays:

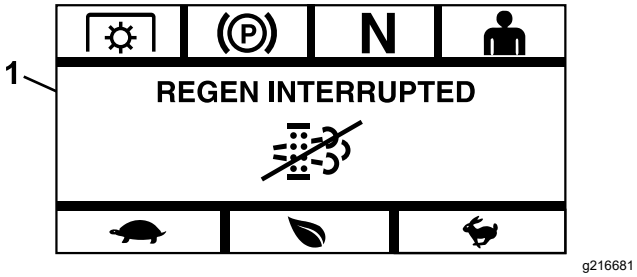



**Figure 11**

1. Regen interrupted

**Note:** If the engine is turned off during an auto regeneration process, the regen will resume once the engine is restarted and required temperature level is reached.

3. **Stationary Regen**

Over time, soot accumulates in the DPF and a passive or auto regeneration is not sufficient to unclog the filter. During the stationary regeneration, the engine ECU controls engine speed, load, and air/fuel mixture to perform a controlled burn of the particulate collected in the DPF.

If a stationary regen is required, it may indicate that the engine has been idled excessively or not run under sufficient load. If multiple successive regens are required, it may indicate that the DPF will require service soon, that an engine problem exists (e.g. incorrect engine fuel or oil) or that a DPF pressure sensor is failing.

***Important:*** **A stationary regeneration can be initiated by the engine ECU or by the operator. The DPF soot percentage can be monitored on the Engine OFF Screen (reference Figure 6) or in the Maintenance and Service Menu. If the DPF Soot percentage is high, the operator may elect to initiate a manual stationary regen on the DPF Soot percentage screen in the Maintenance and Service Menu by selecting "Yes" at the prompt.**

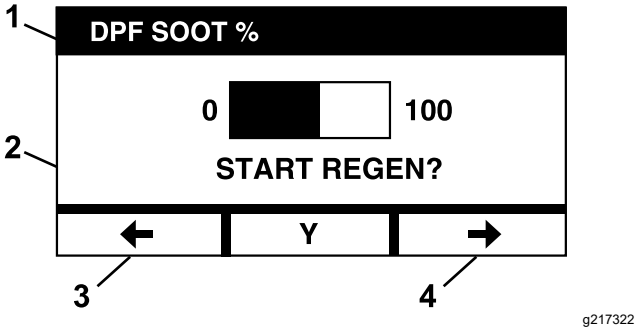



**Figure 12**

1. DPF soot percentage
2. Start regen?
3. Previous
4. Next

***Important:*** **During a stationary regeneration make sure that the machine is parked on a hard, level surface in a well ventilated area. This process runs the machine at a higher exhaust temperature for a period of approximately thirty minutes to burn off collected particulate in the DPF.**

**Note:** The machine cannot be used during a stationary regeneration.

When the engine ECU determines that a stationary regen is required, the module will display an "Allow Stationary Regen?" prompt screen.

Ensure that the machine has at least 1/4 tank of fuel. Disengage the blades, move the control levers to the neutral lock position, and engage the parking brake. See Owner's Manual for park brake engagement.

**Note:** Disengaging the parking brake or taking the controls out of neutral at any time will cancel the regen process.

Select "Yes" to acknowledge the stationary regen request and start the process or select "No" to delay the regen.

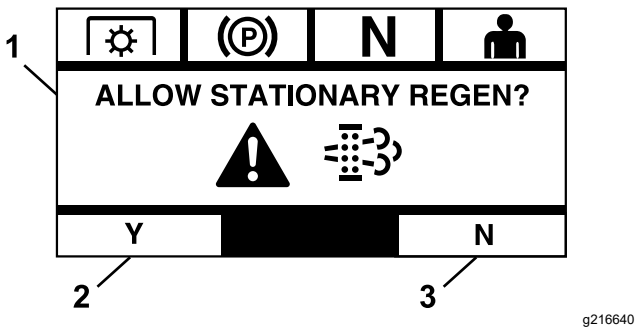



**Figure 13**

1. Allow stationary regen
2. Yes
3. No

- If "No" is selected, module will display a 120 minute count down bar graph screen.

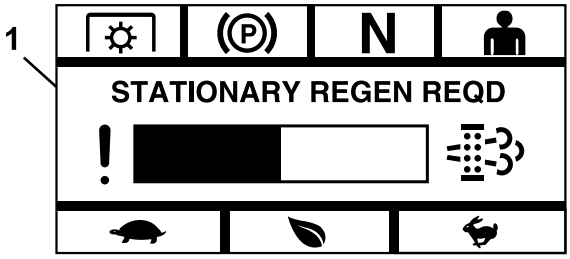



**Figure 14**

1. Stationary regen required

If a stationary regen is not performed before the timer expires, the engine may enter a limp mode and the engine ECU may require a recovery regen to be performed. When the module indicates that the engine has entered limp mode, the engine speed and/or power may be reduced. The module may also prevent clutch engagement and limit engine speed to prevent machine damage.

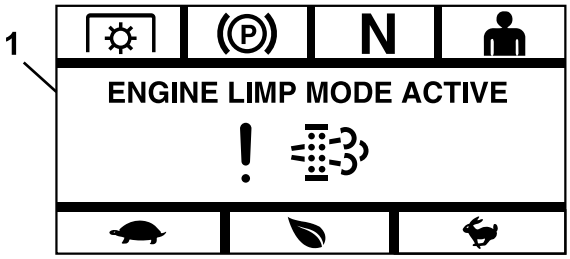



**Figure 15**

1. Engine limp mode active

- If “Yes” is chosen, the module will prompt the operator to start the regen process (reference Figure 13).

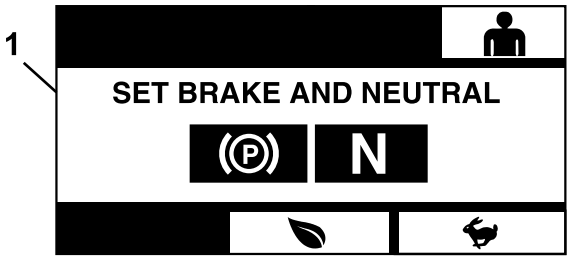



**Figure 16**

1. Set brake and neutral

Stationary regen active – indicates that the stationary regen process is active. The engine ECU will take control of the engine and engine RPM will change automatically. Pressing the cancel button will cancel the regen process.

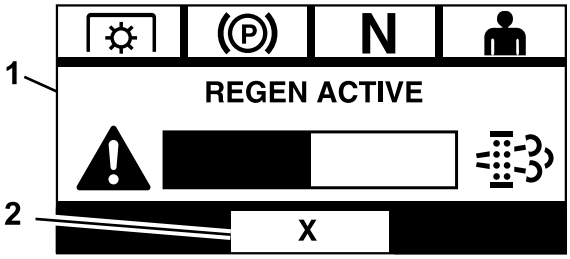



**Figure 17**

1. Regen active
2. Cancel

**One of three outcomes will result:**

– Complete — if the stationary regen process is completed successfully, the module will display a regen complete screen. The regen complete screen includes a 5 minute count down bar graph.

**Note:** If the countdown timer expires and no action is taken by the operator, the module will shut down the engine.

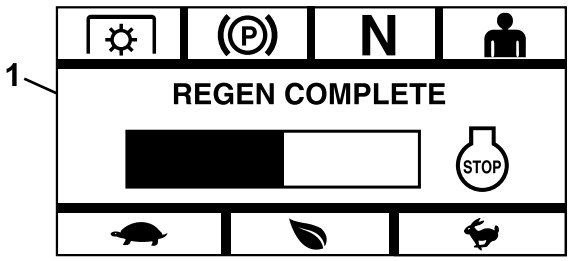



**Figure 18**

1. Regen complete

– Interrupted — if the engine ECU determines that the stationary regen process has been interrupted, the module will display a “Regen Interrupted” screen. If the stationary regen was initiated manually by the user, the module will exit the regen process. If the regen was initiated by the engine ECU, the ECU may place the engine in limp mode and request a recovery regen.

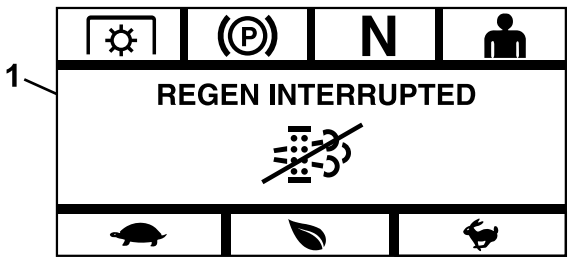



**Figure 19**

1. Regen interrupted

– Failed — If the engine ECU determines that a stationary regen cannot be completed, the

module will display a “Regen Failed-See Dealer” message.

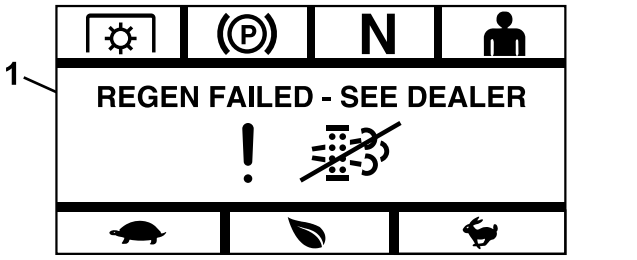



**Figure 20**

1. Regen failed — see Dealer

The engine ECU will request a recovery regen and the module will display the message “Allow Recovery Regen” prompt.

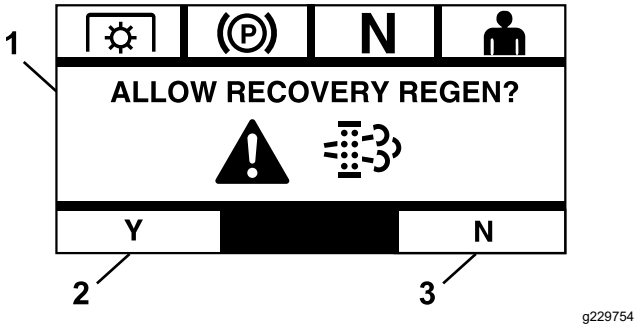



**Figure 21**

1. Allow Recovery Regen
2. Yes
3. No

4. **Recovery Regen**

A recovery regeneration message appears (reference Figure 21):

- if there is a loss of engine power
- a stationary regeneration cannot effectively clean the DPF of soot.
- a stationary regen fails.

If the request for a stationary regeneration is ignored or a stationary regen fails, and the machine continues to operate, a critical amount of soot builds up in the DPF. When the recovery regeneration is needed, the module will display a warning and the engine derates power to 85%. A recovery regeneration requires up to four hours to complete and the machine cannot be used during the process.

Ensure that the machine has at least 1/4 tank of fuel. Disengage the blades, move the control levers to the neutral lock position, and engage the parking brake.

**Note:** Disengaging the parking brake or taking the controls out of neutral at any time will cancel the regen process.

A. Choose “Yes” on the module prompt (see Figure 22) to start the regen process.

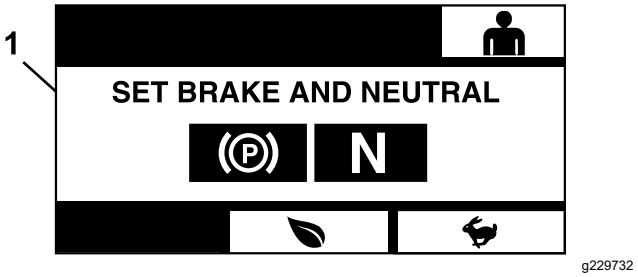



**Figure 22**

1. Set brake and neutral

B. The module will display that the regen process is active. The engine ECU will take control of the engine and engine RPM will change automatically. Pressing the cancel button will cancel the regen process.

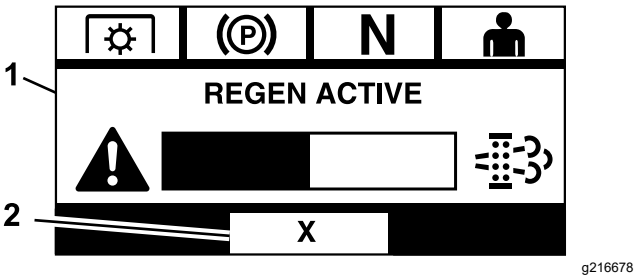



**Figure 23**

1. Regen active
2. Cancel

**One of three outcomes will result:**

- Complete — if the recovery regen process is completed successfully, the module will display a regen complete screen. The regen complete screen includes a 5 minute count down bar graph.

  **Note:** If the countdown timer expires and no action is taken by the operator, the module will shut down the engine.

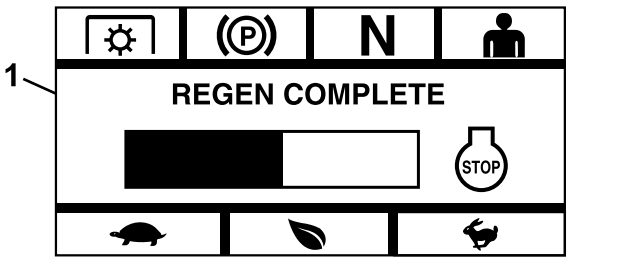
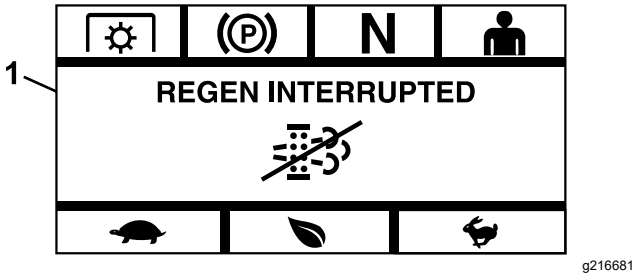



**Figure 24**

1. Regen complete

- Interrupted — if the engine ECU determines that the recovery regen process has been interrupted, the module will display a regen interrupted screen. If the recovery regen was initiated manually by the user, the module will exit the regen process. If the regen was initiated by the engine ECU, the ECU may place the engine in limp mode and request a recovery regen.

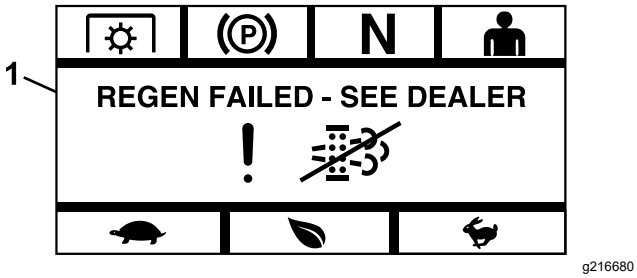



g216681

**Figure 25**

1. Regen interrupted

- Failed — If the engine ECU determines that a recovery regen cannot be completed, the module will display a “Regen Failed-See Dealer” message.



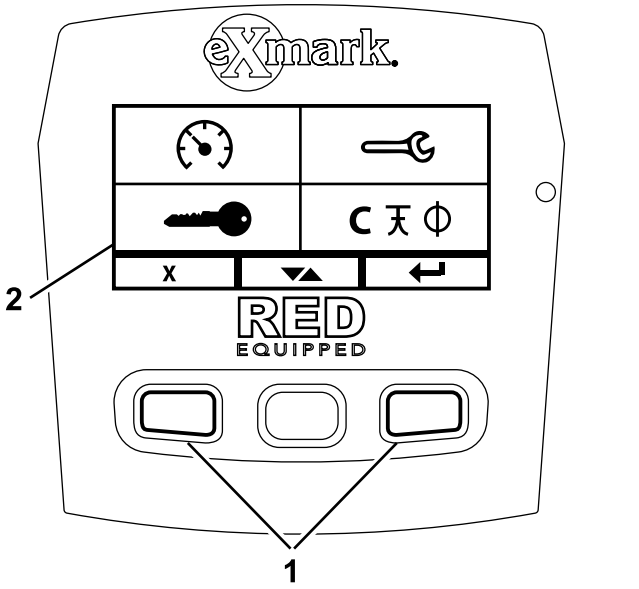

g216680

**Figure 26**

1. Regen failed — see Dealer

## 4.5 Menu Selection Screen

The system will enter the Menu Selection Screen when the motion control levers are placed in the neutral lock position and the two LDU outside push buttons are pressed and held down.




g257053

**Figure 27**

1. Outside push buttons
2. Menu selection screen

# 5. Menu Options

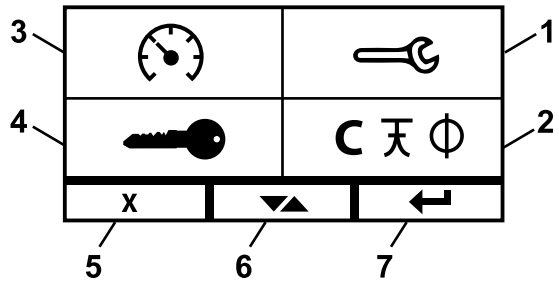
The Menu Selection Screen allows the user to cycle through the different menu options by pressing the toggle button. When the desired menu option is highlighted, press the enter button to select it.

**Note:** All menu options are locked if the motion control levers are not placed in the neutral locked position.

Pressing and holding the two outside buttons returns the module to the default screens.

The menu selection screen allows the user to cycle through four main screens.

- **5.1 Maintenance and Service**
- **5.2 Gauges and Meters**
- **5.3 Advanced Settings**




g257032

**Figure 28**

1. Maintenance and Service
2. Language
3. Gauges and Meters
4. Advanced Settings
5. Cancel/Exit
6. Toggle between screens
7. Enter/Return

# 5.1 Maintenance and Service Menu Option

The user can scroll between the following screens in the Maintenance and Service menu:

- **5.1.1 Status of Inputs**
- **5.1.2 Status of Outputs**
- **5.1.3 Current Error Messages**
- **5.1.4 Hydraulic Transmission Oil Maintenance**
- **5.1.5 Engine Oil Maintenance**
- **5.1.6 Deck Gear Box Maintenance**
- **5.1.7 Machine Information**
- **5.1.8 RED Module Software and Hardware Version**

### 5.1.1 Status of Inputs

This screen lists all of the inputs to the system and highlights the one currently active. Inputs with numerical values will display the current value.

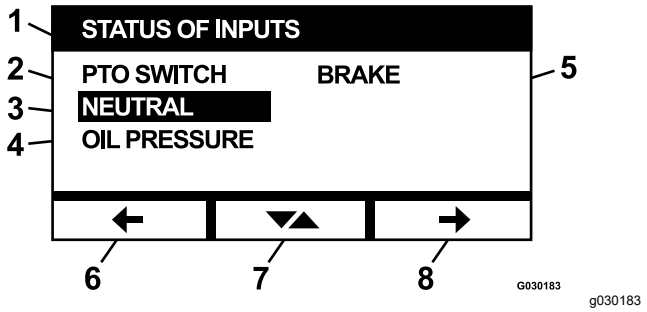



**Figure 29**

Not applicable to Wing Deck Models

1. Status of Inputs
2. PTO switch
3. Neutral
4. Oil pressure
5. Brake
6. Previous
7. Toggle between screens
8. Next

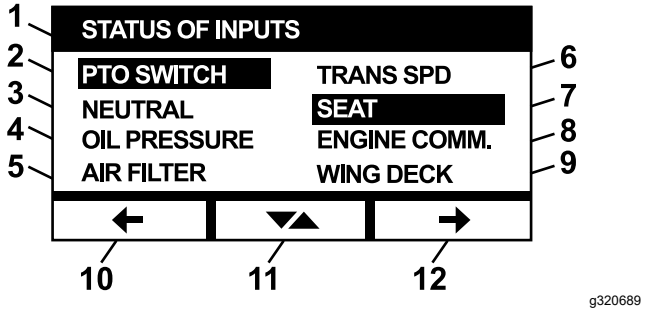



**Figure 30**

All Wing Deck Models

1. Status of Inputs
2. PTO switch
3. Neutral
4. Oil pressure
5. Air Filter
6. Transmission speed
7. Seat
8. Engine communication
9. Wing Deck
10. Previous
11. Toggle between screens
12. Next

- System voltage
- Engine communication (highlights if module is communicating with engine ECU)
- PTO switch (highlights if ON)
- Neutral switch (highlights if ON)
- Brake switch (highlights if ON)
- Seat switch (highlights if ON)
- Oil pressure switch (highlights if ON)
- Engine temperature (shows temperature)
- Transmission temperature(shows temperature)
- Fuel rail pressure (shows pressure if applicable)
- Diesel Oxidation Catalyst (DOC) inlet and outlet temperature (shows temperature if applicable)
- Air Filter Switch(highlight if ON)
- Wing Deck (if applicable—highlight if wing decks are down/ready to mow)
- Transmission Speed (For 144 Inch Deck Model Only)
- Fan Voltage (For 144 Inch Deck Model Only)

### 5.1.2 Status of Outputs

This screen lists all of the outputs from the system and highlights the one currently active. Use the Up/Down arrow to toggle through the screen to see all options. Outputs with numerical values will display the current value.

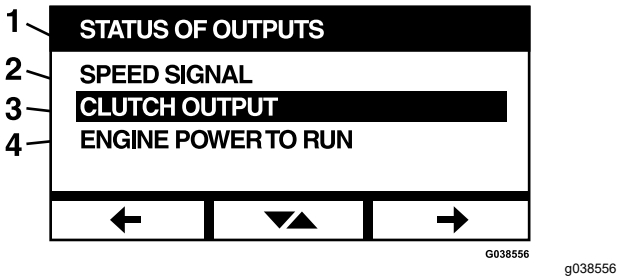


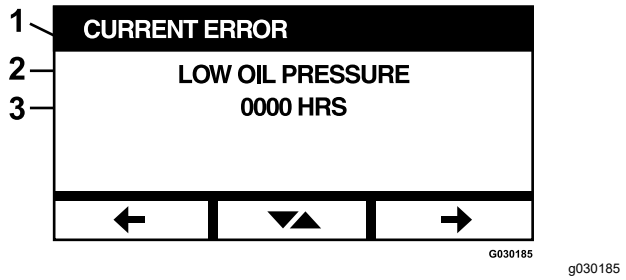

**Figure 31**

1. Status of outputs
2. Speed signal
3. Clutch output
4. Engine power to run

- PTO output (highlights if ON)
- Engine shutdown output (highlights if ON)
- Module communication (highlights if LDU and MCU are communicating)
- Alarm (highlights if ON)
- Starter (highlights if ON)
- Fuel Pump Power(highlight if ON)
- Engine Power to Run(Highlight if ON)
- % (Percentage) of Fan Speed (For 144 Inch Deck Model Only)
- Fan Reverse Delay (For 144 Inch Deck Model Only)

### 5.1.3 Current Error Messages

This screen displays the current error as text with the non-resettable engine hours at which the error occurred. The toggle button allows the user to scroll between screens if multiple errors are active. If only one error occurs, the toggle button will not change screens.



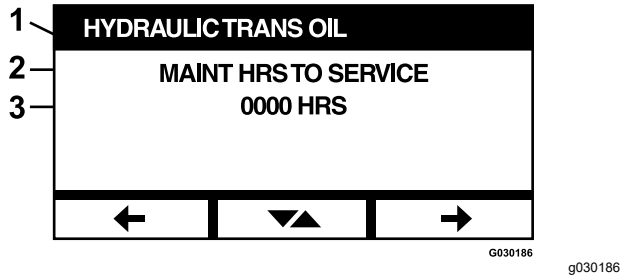

g030185

**Figure 32**

1. Current error
2. Error display (e.g. Low oil pressure)
3. Hour when it occurred

## 5.1.4 Hydraulic Transmission Oil Maintenance

This service reminder screen displays the hours until the specified maintenance is due.

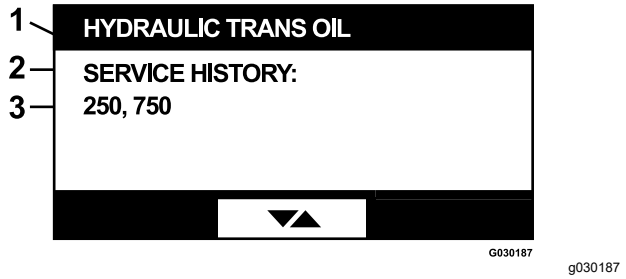



g030186

**Figure 33**

1. Hydraulic trans oil
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service is due

Press the toggle button to also display the non-resettable engine hours at which every service reminder reset was performed.



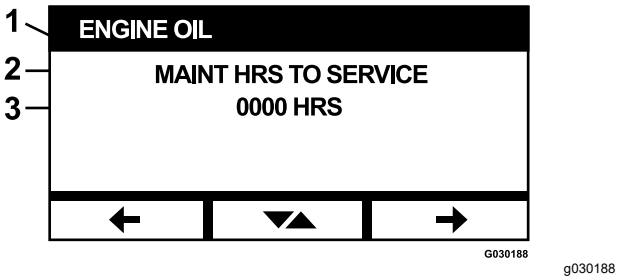

g030187

**Figure 34**

1. Hydraulic trans oil
2. Service history display
3. Service reminder reset was performed (e.g. 250, 750)

## 5.1.5 Engine Oil Maintenance

This service reminder screen displays the hours until the specified maintenance is due.

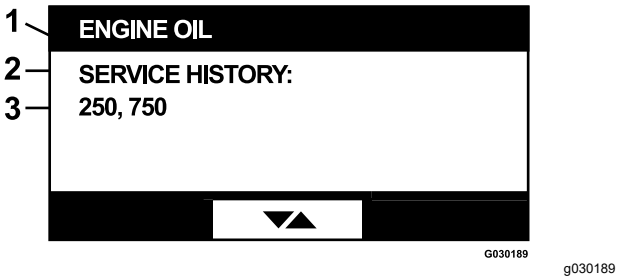



g030188

**Figure 35**

1. Engine oil
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service

Press the toggle button to also display the non-resettable engine hours at which every service reminder reset was performed.



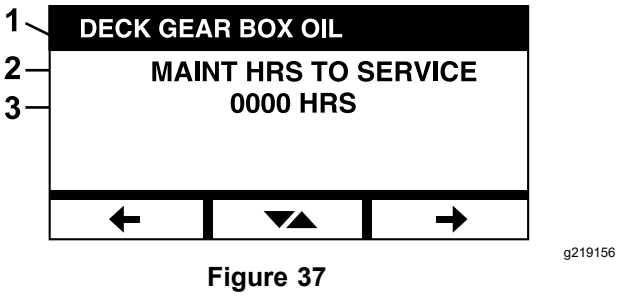

g030189

**Figure 36**

1. Engine oil
2. Service history
3. Service reminder reset was performed (e.g. 250, 750)

## 5.1.6 Deck Gear Box Maintenance

This service reminder screen displays the hours until the specified maintenance is due.




g219156

**Figure 37**

1. Deck gear box maintenance
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service

## 5.1.7 Wheel Drive Gear Box Maintenance (144 Inch Deck Models Only)

This service reminder screen displays the hours until the specified maintenance is due.

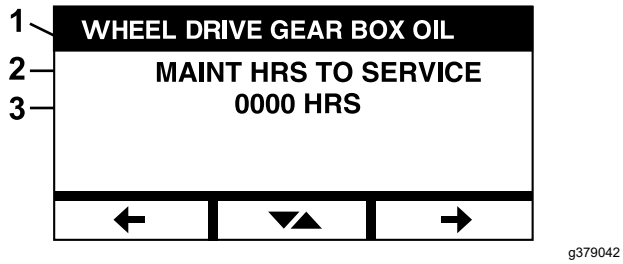



**Figure 38**

1. Wheel drive gear box maintenance
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service

## 5.1.8 Machine Information

The screen displays the serial number and model number of the machine.

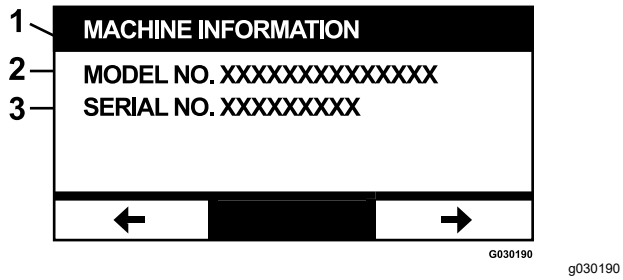



**Figure 39**

1. Machine information
2. Model number
3. Serial number

## 5.1.9 RED Module Software and Hardware Version

The screen displays the current installed version of software and hardware for both the LDU (Logic Display Unit) and the MCU (Master Control Unit). Select the toggle button to see the MCU screen.

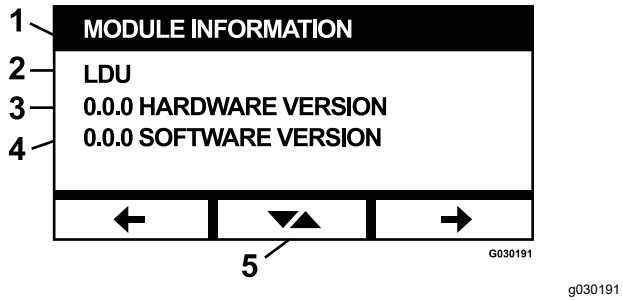



**Figure 40**

1. Module information
2. LDU
3. Hardware version
4. Software version
5. Toggle

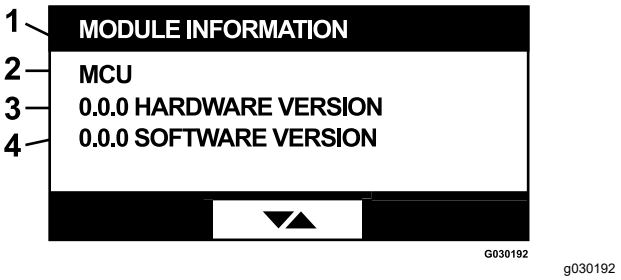



**Figure 41**

1. Module information
2. MCU
3. Hardware version
4. Software version

To exit the screen, press the previous or next arrow keys. Pressing the enter button takes the user back to the Menu Selection screen.

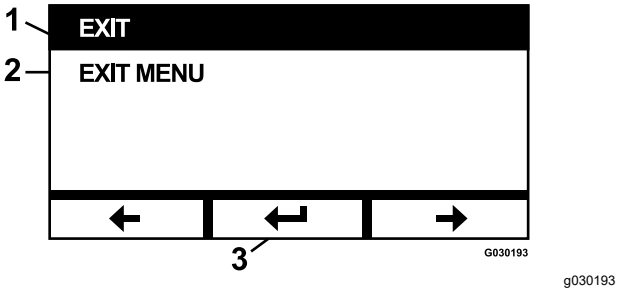



**Figure 42**

1. Exit
2. Exit menu
3. Enter/Return

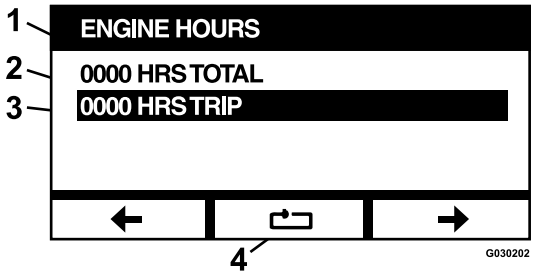
## 5.2 Gauges and Meters Menu Option

The user can scroll between the following screens in the Gauges and Meters menu:

- **5.2.1 Engine Hour Counter**
- **5.2.2 PTO Hour Counter**
- **5.2.3 Total Gallons/Liters of Fuel Used (For 3TNV88C and 3TNV86CT Only)**
- **5.2.4 Fuel Economy Gallons/Liters of Fuel Used Per Hour (For 3TNV88C and 3TNV86CT Only)**
- **5.2.5 Property/Trip Statistics**

### 5.2.1 Engine Hour Counter

This screen displays a non-resettable total engine hour counter and resettable trip counter.

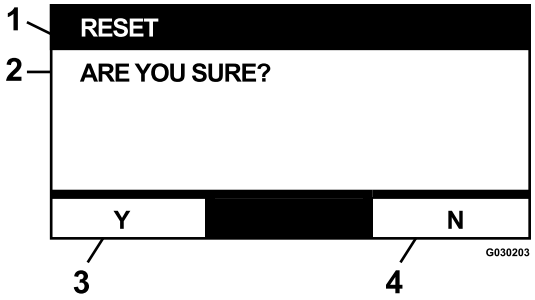



g030202

**Figure 43**

1. Engine hours
2. Non-resettable total hours
3. Trip hours
4. Reset trip hours

To reset the hour meter, highlight the trip hour meter and press the reset button; to confirm the reset press Y (yes) or N (no) to cancel.



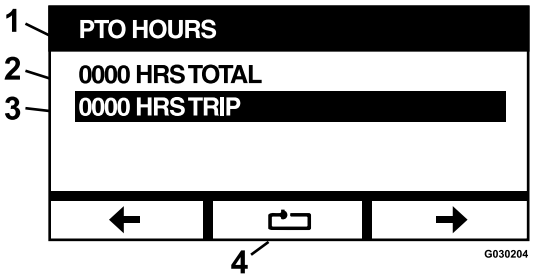

g030203

**Figure 44**

1. Reset
2. Are you sure?
3. Y (yes)
4. N (no)

### 5.2.2 PTO Hour Counter

This screen displays a non-resettable (total) PTO hour counter and a resettable (trip) counter.




g030204

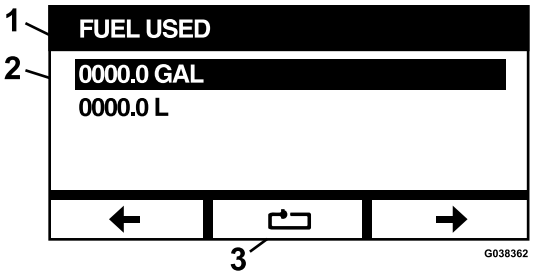
**Figure 45**

1. PTO hours
2. Non-resettable total hours
3. Trip hours
4. Reset trip hours

To reset the hour meter, highlight the hour meter and press the reset button; to confirm the reset press Y (yes) or N (no) to cancel (reference Figure 44).

### 5.2.3 Total Gallons/Liters of Fuel Used (For 3TNV88C and 3TNV86CT Only)

This screen displays the total gallons/liters of fuel used from the last time it was reset. Pressing the reset button will reset the fuel used counter.



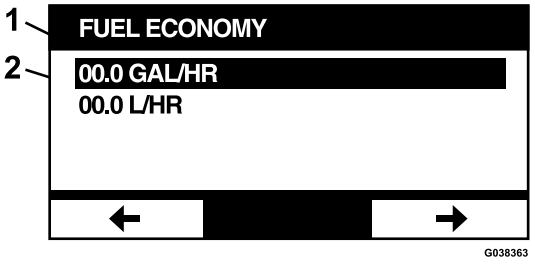

g038362

**Figure 46**

1. Fuel used
2. Displays gallons used
3. Reset

### 5.2.4 Fuel Economy Gallons/Liters of Fuel Used Per Hour (For 3TNV88C and 3TNV86CT Only)

This screen displays the instantaneous gallons/liters of fuel used per engine hour.




g038363

**Figure 47**

1. Fuel economy
2. Displays gallons per hour

## 5.2.5 Property/Trip Statistics

There are five trip statistics screens to scroll through and view.

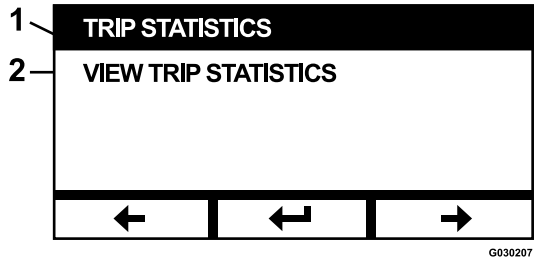



**Figure 48**

1. Trip statistics
2. View trip statistics

Each screen features resettable counters for the following parameters: Engine ON hours, PTO ON hours, and total gallons/liters of fuel used.

The user can pause or stop the collection of statistics and play or start the collection of trip statistics. For example, when Trip Statistics 1 is paused, the statistics are highlighted and the reset button is available. Pressing the reset button resets all three parameters. Pressing the play button will start data collection.

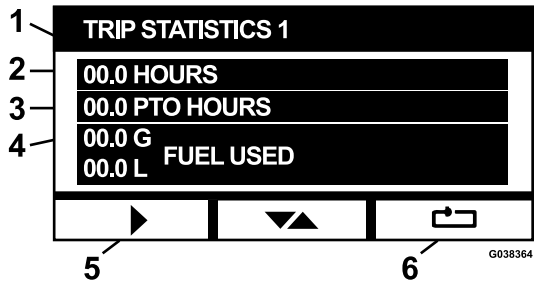



**Figure 49**

1. Trip statistics 1
2. Displays engine ON hours
3. Displays PTO ON hours
4. Displays gallons/liters of fuel
5. Play/Start
6. Reset

When one of the trip statistics is playing, the statistics are not highlighted and the reset button is blacked out and not available. Pressing the pause button will stop the collection of data.

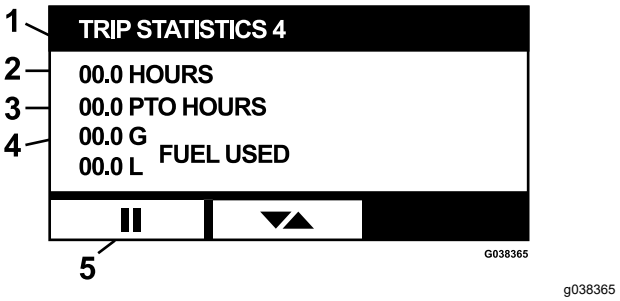



**Figure 50**

1. Trip statistics 4
2. Displays engine ON hours
3. Displays PTO ON hours
4. Displays gallons/liters of fuel
5. Pause/Stop

Pressing the toggle button on the trip statistics 5 screen allows the user to go back to the main trip statistics screen.

## 5.3 Advanced Settings Menu Option

When the advanced settings menu is selected, the module prompts the user for a 4 digit passcode. The default digits on the display screen are 0 0 0 0.

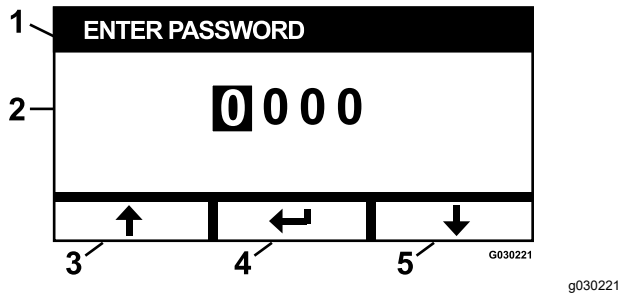



**Figure 51**

1. Enter password
2. Active digits
3. Increase
4. Enter/Return
5. Decrease

The passcode is **1 9 8 2**. When the active digit is highlighted, press the increase or decrease buttons to scroll through digits 0–9. Press enter to select the highlighted digit.

If the incorrect password is entered, the module will take the user back to the menu select screen. When the correct password is entered, the user can scroll between the following screens:

- **5.3.1 Reset Engine Oil Maintenance Reminder**
- **5.3.2 Reset Transmission Oil Maintenance Reminder**
- **5.3.3 Reset Deck Gear Box Oil Maintenance**
- **5.3.4 Reset Wheel Drive Gear Box Oil Maintenance (For 144 Inch Deck Model Only)**
- **5.3.5 Access Historical Error Log**
- **5.3.6 Activate/Deactivate The Alarm Output For Individual Errors**
- **5.3.7 Adjust Engine Speed Set Points**
- **5.3.8 Adjust the Fan Settings (For 144 Inch Deck Model Only)**
- **5.3.9 Reset Options Back To The Factory Default Settings**

### 5.3.1 Reset Engine Oil Maintenance Reminder

The engine oil maintenance reminder screen allows the user to reset the number of hours until the engine oil service is due.

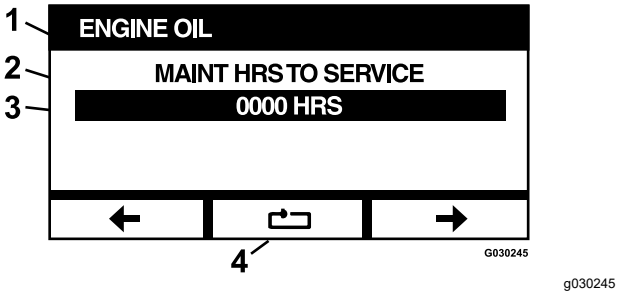



**Figure 52**

1. Engine oil
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service
4. Reset

Pressing the reset button brings up a screen asking to select a reset option.

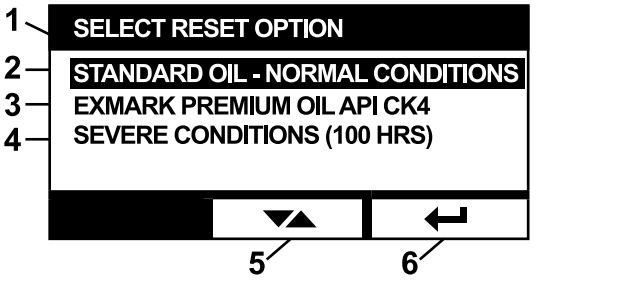
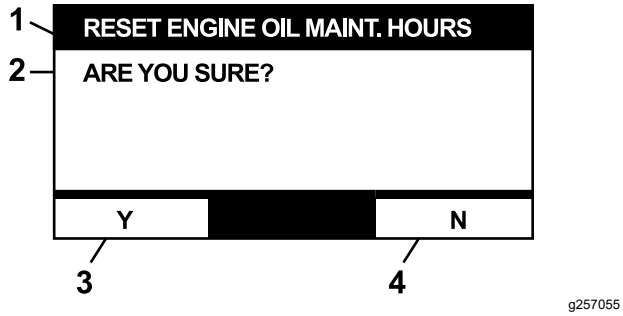



**Figure 53**

1. Select reset option
2. Standard oil — normal conditions
3. Exmark Premium Oil API CK4
4. Severe conditions (100 hours)
5. Toggle button
6. Enter/Return

Press the toggle button to scroll through the different reset options. Pressing the Enter button selects the highlighted reset option.

To confirm the reset, press Y (yes). To cancel the reset, press N (no).



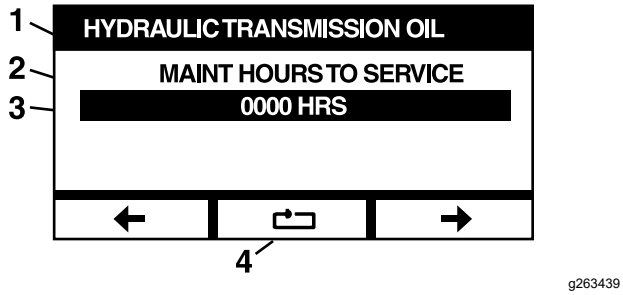

g257055

**Figure 54**

1. Reset engine oil maintenance hours
2. Are you sure?
3. Y (yes)
4. N (no)

## 5.3.2 Reset Transmission Oil Maintenance Reminder

This reminder screen allows the user to reset the number of hours until the hydraulic transmission oil service is due.

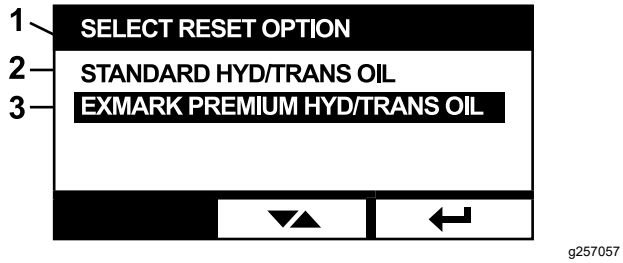



g263439

**Figure 55**

1. Hydraulic transmission oil
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service
4. Reset

Pressing the reset button brings up a screen asking to select a reset option.



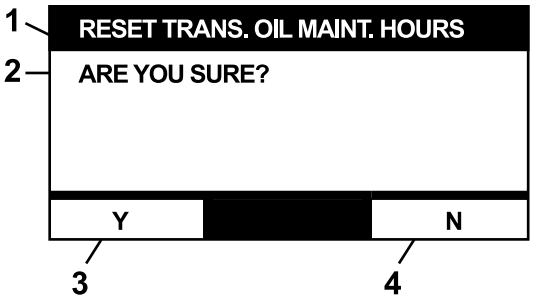

g257057

**Figure 56**

1. Select reset option
2. Standard hydraulic/transmission oil
3. Exmark Premium hydraulic/transmission oil

Press the toggle button to scroll through the different reset options. Pressing the Enter button selects the highlighted reset option.

To confirm the reset, press Y (yes). To cancel the reset, press N (no).



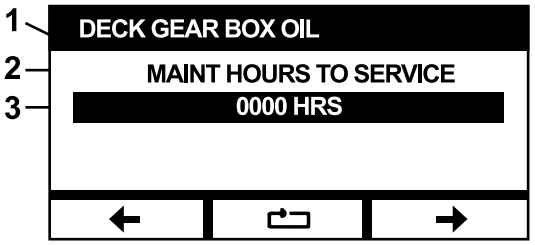

g257056

**Figure 57**

1. Reset transmission oil maintenance hours
2. Are you sure?
3. Y (yes)
4. N (no)

## 5.3.3 Reset Deck Gear Box Oil Maintenance

This reminder screen allows the user to reset the number of hours until the deck gear box oil service is due.




g267030

**Figure 58**

1. Deck gear box oil
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service
4. Reset

Pressing the reset button brings up a screen asking to confirm the reset reminder.

To confirm the reset, press Y (yes). To cancel the reset, press N (no).

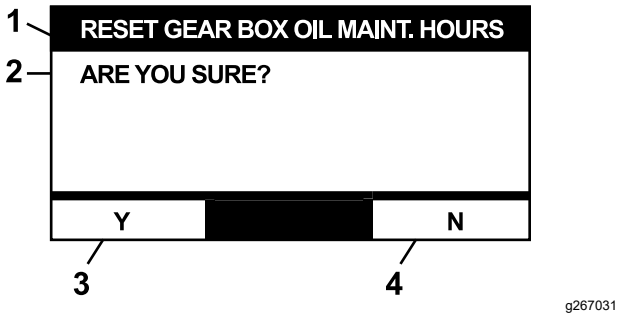



**Figure 59**

1. Reset gear box oil maintenance hours
2. Are you sure?
3. Y (yes)
4. N (no)

## 5.3.4 Reset Wheel Drive Gear Box Oil Maintenance (For 144 Inch Deck Model Only)

This reminder screen allows the user to reset the number of hours until the deck gear box oil service is due.

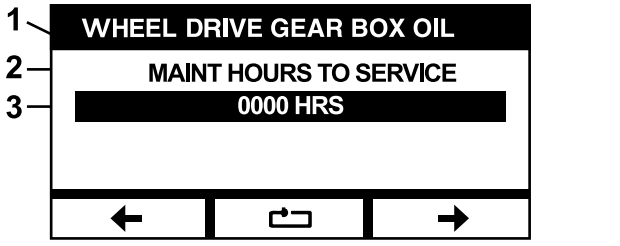



**Figure 60**

1. Wheel drive gear box oil
2. Reminder display (e.g. Maintenance hours to service)
3. Remaining hours until service

Pressing the reset button brings up a screen asking to confirm the reset reminder.

To confirm the reset, press Y (yes). To cancel the reset, press N (no).

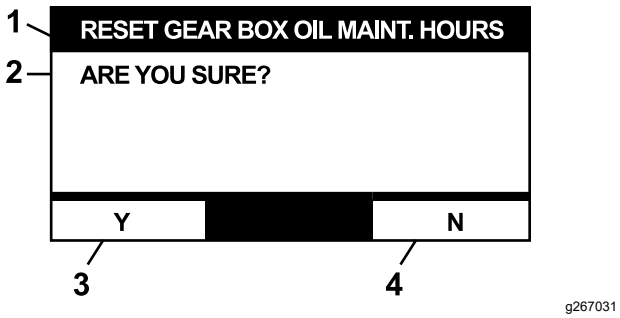



**Figure 61**

1. Reset gear box oil maintenance hours
2. Are you sure?
3. Y (yes)
4. N (no)

## 5.3.5 Access Historical Error Log

The historical error log displays errors that are no longer active. The log keeps a running count of the number of times the error has occurred during the life of the machine and the non-resettable engine hour at which the last occurred. The log displays the errors starting with the most recent occurrence.

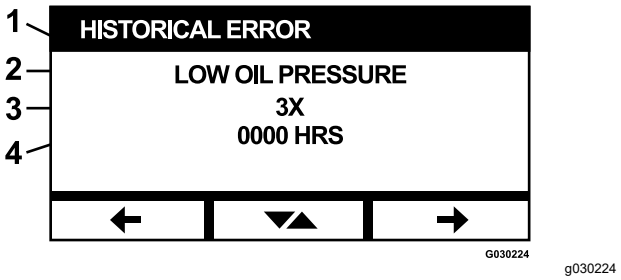



**Figure 62**

1. Historical error
2. Current error (e.g. Low oil pressure)
3. Number of times error occurred during life of machine (e.g. 3X)
4. Hour occurred

## 5.3.6 Activate/Deactivate The Alarm Output For Individual Errors

The alarms screen allows the operator to activate and deactivate the audible alarm for individual errors. Pressing the enter button prompts the user to activate or deactivate the audible alarm for individual errors.

**Note:** Not all audible alarms can be deactivated.

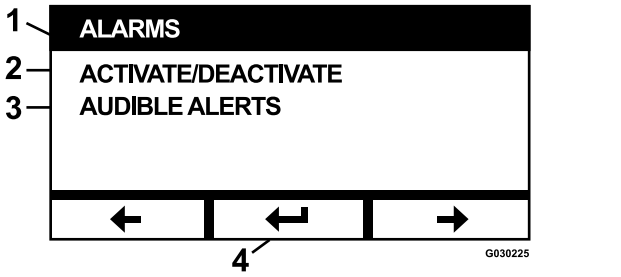



**Figure 63**

1. Alarms
2. Activate/Deactivate
3. Audible alert
4. Enter/Return

The highlighted error name indicates that the audible alarm is active. Pressing enter modifies the status of the audible alarm to ON or OFF.

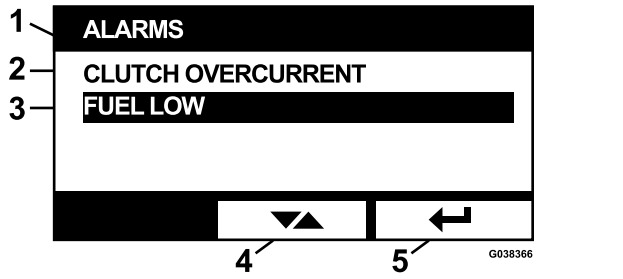



**Figure 64**

1. Alarms
2. Clutch overcurrent
3. Fuel low
4. Toggle
5. Enter/Return

The audible warning for the following errors can be deactivated:

- Service Air Filter
- Service Engine Oil
- Service Gear Box Oil
- Service Transmission Oil
- Trans Over Temp
- Clutch Overcurrent
- Clutch Reset Required
- Engine Error Codes
- System Overvoltage>16VDC
- System Undervoltage<9VDC
- System Voltage Low
- Anti-Stall

## 5.3.7 Adjust the Engine Speed Set Points

The screen allows the user to adjust the engine speed at the **Max, Efficient,** and **Low** set points for both transport (clutch disengaged) and mow (clutch engaged) modes in 50 RPM increments.

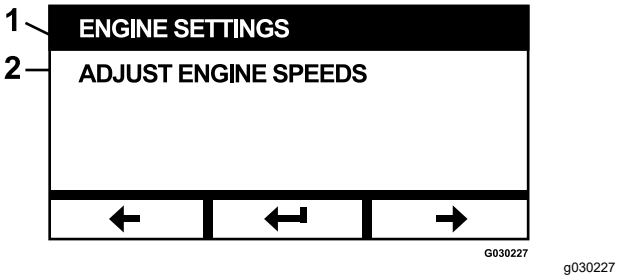



**Figure 65**

1. Engine settings
2. Adjust engine speeds

Pressing the up arrow will increase the engine speed while pressing the down arrow will decrease the engine speed. Pressing the enter button confirms the speed and automatically moves to the next screen/engine speed set point.

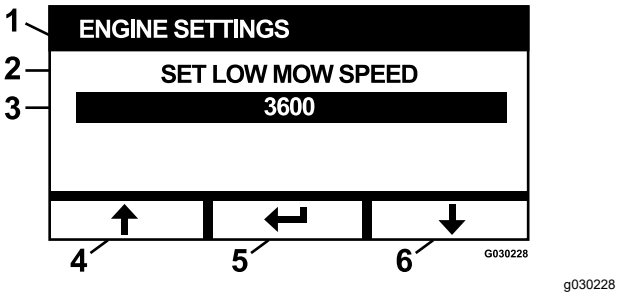



**Figure 66**

1. Engine settings
2. Set low mow speed
3. Engine speed set point (e.g. 3600)
4. Up arrow–Increase
5. Enter/Return
6. Down arrow–Decrease

The system will not allow the following to occur:

- The efficient speed can not be set higher than the max speed.
- The low speed can not be set higher than the efficient speed.

**Note:** The user can set the max=efficient mow speed to use the efficient mode while mowing.

For 144 Inch Deck Models: This screen will also allow mowing in high ground speed.

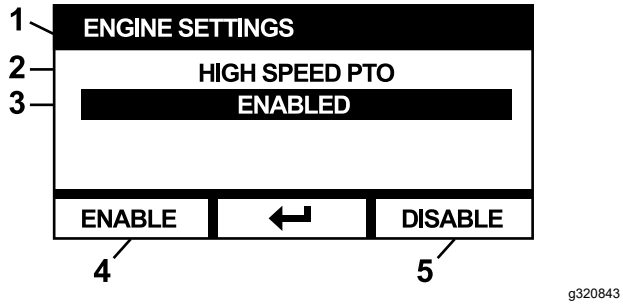



**Figure 67**

1. Engine settings
2. High speed PTO
3. Enabled
4. Enable
5. Disable

## 5.3.8 Adjust the Fan Settings (For 144 Inch Deck Model Only)

These screens are used to adjust how often the fan reverses.

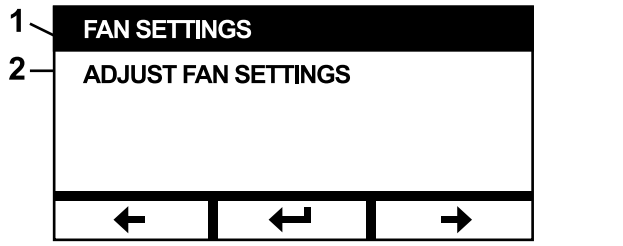



**Figure 68**

1. Fan settings
2. Adjust fan settings

Change the fan reversal time interval by pressing a down arrow to decrease the minutes, or pressing an up arrow to increase the minutes (ranging 5–60 minutes). After completing the change, press enter.

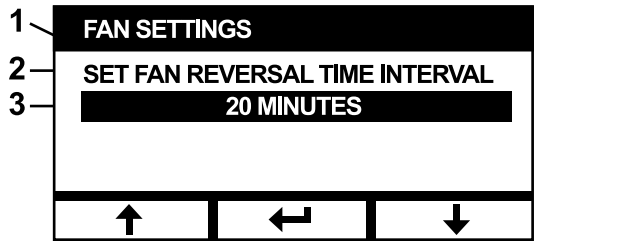



**Figure 69**

1. Fan settings
2. Set fan reversal time interval
3. 20 minutes (current fan reversal interval)

This screen allows the user to monitor the outputs and initiate a manual reversal.

**Note:** The delay is converted to seconds as shown in Figure 70.

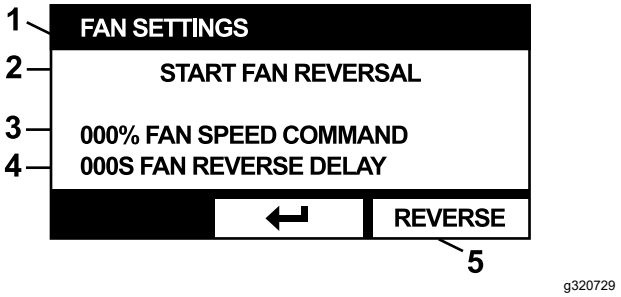



**Figure 70**

1. Fan settings
2. Start fan reversal
3. 000% fan speed command
4. 000s fan reverse delay
5. Reverse (initiate fan reversal cycle)

## 5.3.9 Reset Options Back To The Factory Default Settings

The factory defaults screen allows the user to reset system settings back to the factory default settings. Pressing the enter button brings up confirmation screen – Y (yes) to reset or N (no) to cancel.

**Note:** Resetting the system will return the engine speed settings and alarm settings back to the factory default settings.

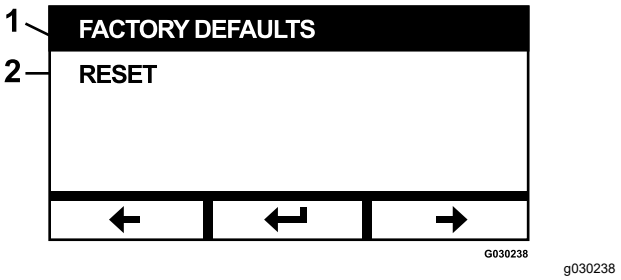



**Figure 71**

1. Factory defaults
2. Reset

When the exit screen appears, press the enter button to go back to the menu selection screen.

## 6. Returning to Default Screen (Engine-On or Engine-Off)

There are three ways to return to the default screen:

1. Press the previous or next arrow keys until the Exit screen appears. Pressing the enter button takes the user back to the Menu Selection screen.
2. Turn the ignition key to the “OFF” position and either restart the engine or turn the key to the “ON” position.
3. Press and hold the two outside buttons.

## 7. Setting Engine Speeds

- At startup, the system will default to the low transport engine speed. The icon on the information screen will be highlighted.
- Pressing the button below the efficient speed mode screen icon will increase the engine speed to the efficient speed; the efficient speed mode screen icon will be highlighted.
- Pressing the button below the max speed mode screen icon will increase the engine speed to the max speed; the max speed mode screen icon will be highlighted.
- Engaging the PTO switch at any speed setting will increase the selected engine speed from the transport speed to the mow speed.

## 8. Electronically Controlled Low Mow Mode Speed Adjustment

When operating in low mow mode, the user can manually ramp the engine speed down to 2250 RPM by pressing and holding the low speed mode button. Pressing the low speed mode button again will return the engine to the default low mow mode engine speed.

## 9. Auto Idle Down Mode

If the operator leaves the seat and the safety interlocks allow the engine to remain running, the system will enter the auto idle mode and automatically set the engine speed to the low transport speed. When the operator returns to the seat, the system will automatically return to the previously selected engine speed mode If the operator selects another engine speed setting, the system will exit the auto idle mode and the engine will run at the selected speed.

## 10. Error Messages

If an error occurs, a message will display in place of the engine temperature, engine rpm, and fuel level. In addition to displaying the fault as text, the system will turn the LED red and sound the audible alarm.

- The system is capable of displaying the following errors:
  - **Service Air Filter:** air filter is required.
  - **Service Engine Oil:** engine oil maintenance is required.
  - **Service Deck Gearbox Oil:** deck gearbox oil maintenance required.
  - **Service Transmission Oil:** transmission oil maintenance is required.
  - **Low Oil Pressure:** low engine oil pressure is detected.
  - **Engine Over Temperature:** engine over temperature detected.
  - **Transmission Over Temperature:** tranmission over temperature detected.
  - **System Overvoltage>16VDC:** system voltage is too high (greater than 16 volts).
  - **System Undervoltage<9VDC:** system voltage is too low (greater than 9 volts).
  - **Clutch Overcurrent:** cutting clutch current is too high.
  - **Clutch Reset Required:** indicates that the PTO switch must be turned off and then on to reactivate the PTO clutch. It may also indicate that the wing deck switch has been tripped, or an attempt to mow in high ground speed when that option has not been enabled (if applicable).
  - **Engine Error Codes:** the system displays engine error codes provided by the engine manufacturer.
  - **Clutch Output Failure Module:** Clutch output failure.
  - **System Voltage Low:** Voltage too low (less than 12.3 volts).
  - **Engine Communication Error:** communication lost between engine and module.
  - **Module Communication Error:** communication is lost between the LDU and MCU modules.
  - **Anti-Stall Active:** the cutting deck has been disengaged in order to prevent engine stalling.
  - **Engine Limp Mode Active:** The engine ECU has placed the engine into limp mode, which may limit engine speed and/or decrease engine power. As a result, the module will disengage the clutch.
  - **Wing Deck Interlock Fault (for applicable models):** The signal from the deck sensors indicates wing deck has not been fully deployed.
- Some of the errors listed above can be acknowledged and silenced. This is allowed when the motion control levers are in the neutral lock position and the LDU middle push button is pressed down and held.

  Acknowledging an error will remove the error message from the engine temperature, engine rpm, or fuel level icon area and silence the audible alarm. However, the error will continue to display on the active error screen in the Maintenance and Service Menu and the status LED will continue to be illuminated red.
  - The following errors will emit a slow chirping sound and can be acknowledged and silenced:
    - ◊ **Service Engine Oil**
    - ◊ **Service Transmission Oil**
    - ◊ **Clutch Overcurrent**
    - ◊ **Clutch Reset Required**
    - ◊ **Engine Error Codes**
    - ◊ **Anti-Stall Active**

- ◊ **Service Air Filter**
- ◊ **Service Deck Gear Box**
- ◊ **Service Wheel Drive Gear Box (For 144 Inch Deck Model Only)**

– The following errors emit a fast chirping sound and can be acknowledged and silenced:

- ◊ **System Overvoltage>16VDC**
- ◊ **System Undervoltage<9VDC**

– The following error codes emit a fast chirping sound and cannot be acknowledged or silenced.

- ◊ **Low Oil Pressure**
- ◊ **Engine Over Temperature**
- ◊ **Engine Communication Error**
- ◊ **Module Communication Error**
- ◊ **Clutch Output Failure**
- ◊ **Engine Limp Mode Active**

– The following error codes emit a fast chirping sound and can be acknowledged, but cannot be silenced.

**Transmission Over Temperature**

• In order to protect the system components from exceeding threshold limits, the RED technology system is designed to limit the engine speed and/or disengage the clutch which allows the machine to be driven onto a trailer or returned to a service area.

There are five errors:

1. **Clutch Overcurrent**

   If an overcurrent event occurs, the system will limit the engine speed to the default Efficient Transport Mode speed and place the machine in “Safe Transport Mode”. Safe Transport Mode limits the engine speed, locks out the PTO, and disengages the clutch; a “Clutch Overcurrent” error message will display. Cycling the key switch to “OFF” and then to the “ON” position will clear the fault.

2. **System Overvoltage>16VDC**

   If the voltage exceeds 16 volts, the system will disengage the clutch and display a “System Overvoltage>16VDC” error message.

3. **System Undervoltage<9VDC**

   If the voltage is less than 9 volts, the system will not allow clutch engagement and will display the error “System Undervoltage<9VDC”. If the clutch was engaged before the error occurred, the system will allow the clutch to remain engaged; however, low voltage may cause the clutch to disengage itself.

4. **Low Oil Pressure**

   If low engine oil pressure is detected, the system will limit engine speed to the default Efficient Transport Mode speed and place the machine in “Safe Transport Mode”. Safe Transport Mode limits the engine speed, locks out the PTO, and disengages the clutch; a “Low Oil Pressure” message will display. Cycling the key switch to “OFF” and then to the “ON” position will clear the fault.

5. **Engine Over Temperature**

   When the engine begins to overheat, the system will flash the engine temperature bar graph and chirp the audible alarm. If the temperature rises above the upper limit, the system will restrict the engine speed to the default Efficient Transport Mode speed and place the machine in “Safe Transport Mode”. Safe Transport Mode limits the engine speed, locks out the PTO, and disengages the clutch; an “Engine Over Temperature” message will display. The fault will clear once the temperature falls below a safe limit.

6. **Transmission Over Temperature**

   When the transmission begins to overheat, the system will flash the transmission temperature bar graph and chirp the audible alarm. If the temperature rises above the upper limit, the system will restrict the engine speed to the default Efficient Transport Mode speed and place the machine in “Safe Transport Mode”. Safe Transport Mode limits the engine speed, locks out the PTO, and disengages the clutch; a “Transmission Over Temperature” message will display. The fault will clear once the temperature falls below a safe limit.

7. **Engine Limp Mode Active**

   If the engine ECU determines that a significant engine issue has occurred or that the DPF requires a Recovery Regen, it may place the engine in a limp or back-up mode where engine speed and/or decrease engine power. In order to protect the system components, the module will lock out the PTO and display an “Engine Limp Mode Active” message.

# 11. Troubleshooting

| System Error Message | Status LED | System Actions | Issue Description | Recommended Corrective Action |
|---|---|---|---|---|
| **Service Engine Oil** | Blink Red | | Engine oil service is due. | Replace engine oil and filter. Follow reset procedure (section 5.3.1). |
| **Service Transmission Oil** | Blink Red | | Transmission oil service is due. | Replace transmission oil and filter(s). Follow reset procedure (section 5.3.2). |
| **Service Gear Box Oil** | Blink Red | | Gear box oil service is due | Replace gear box oil. Follow reset procedure (section 5.3.3). |
| **Service Wheel Drive Gear Box Oil** | Blink Red | | Gear box oil service is due | Replace gear box oil. Follow reset procedure (section 5.3.4). |
| **Low Oil Pressure** | Blink Red | RED limp mode - engine limited to efficient and PTO disengaged. | Engine oil pressure is below limit. | Cycle key switch to clear fault. Check oil level. Contact an Authorized Service Dealer. |
| | Green | Single alarm chirp and temperature display flashes. | Engine temperature is high. | Check oil and coolant level. Clean debris from radiator and oil cooler. Inspect engine fan. Contact an Authorized Service Dealer. |
| **Engine Over Temperature** | Blink Red | RED limp mode - engine limited to efficient and PTO disengaged. | Engine temperature above limit. | Check oil and coolant level. Clean debris from radiator and oil cooler. Inspect engine fan. Contact an Authorized Service Dealer. |
| **Fuel Low** | Blink Red | | Fuel level low. | Check fuel level and refuel as necessary. |
| **System Overvoltage >16VDC** | Blink Red | Disallow clutch engagement/Disengage clutch. | System voltage excessive/above 16 volts. | Check battery and engine charging system. Contact an Authorized Service Dealer. |
| **System Voltage Low** | Blink Red | | System voltage below 12.3 volts. | Check battery and engine charging system. Contact an Authorized Service Dealer. |
| **System Under voltage<9VDC** | Blink Red | Disallow clutch engagement/Disengage clutch. | System voltage below lower limit of 9 volts. | Check battery and engine charging system. Contact an Authorized Service Dealer. |
| **Clutch Overcurrent** | Blink Red | RED limp mode - engine limited to efficient and PTO disengaged. | Clutch current is above limit. | Cycle key switch to clear fault. Check PTO clutch condition and related wiring. Contact an Authorized Service Dealer. |
| **Clutch Reset Required** | Alternating green/orange | | PTO switch is in up/engaged position and the module has latched the clutch output OFF. | Cycle PTO switch OFF and then back ON to re-engage clutch. |
| **Clutch Output Failure** | Blink Red | | Clutch output short or open. | If the clutch is stuck “ON”, discontinue use and contact an Authorized Service Dealer. Check clutch connection and associated wiring for open circuit. |

| System Error Message | Status LED | System Actions | Issue Description | Recommended Corrective Action |
|---|---|---|---|---|
| **Engine MIL Errors** | Blink Red | | Engine ECU has detected a fault. | See engine manual for error description and troubleshooting information. |
| **Engine Communication Error** | Blink Red | | Communication between the module and the engine ECU has been lost. | Check electrical connections at module, interconnect between engine wire harness and chassis harness, and check connections at engine ECU. Contact an Authorized Service Dealer. |
| **Module Communication Error** | Blink Red | RED limp mode - engine limited to efficient and PTO disengaged. | Communication between the LDU module and MCU module has been lost. | Check electrical connections at LDU and MCU module. |
| **Wing Deck Interlock Fault (for applicable models)** | Blink Red | Disallow clutch engagement / Disengage clutch | Wing deck not fully deployed. | Deploy wing deck then cycle PTO switch “OFF” and then back “ON” to re-engage clutch. Contact an Authorized Service Dealer. |
| **High Speed Mowing Fault (for applicable models)** | Alternating Green/Orange | | High speed mowing is **NOT** allowed. | Switch ground speed to Low or enable high speed mowing as shown in 5.3.7. |