Customer Bulletin

Commercial Products **August 20, 2020**

Best Practices for Hybrid Performance

Reelmaster® 5010-H

Bulletin Type Information Only

Status Final Release

Affected Units

Model Number(s)	Serial Number(s)
03674	315000100 through 499999999

Situation

Important Information

Toro has always stated that any attachment used on a hydraulic fairway unit can be used on the Reelmaster 5010-H hybrid machine. This statement is still true today. However, there are some key points to keep in mind when using this machine for scalping and verticutting.

The Reelmaster 5010-H uses a 24.8 hp diesel engine as its main power source. The engine drives the generator and the machine hydraulic system. Additional horsepower is supplied on-demand from the 48-VDC battery pack and is managed by the PowerMatch™ system. This additional battery power is intended for short periods of time—not for continuous or sustained periods at maximum horse power.

The PowerMatch system is made up of two different processes:

- Shed Mode: When the horsepower requirement is greater than the 24.8 hp of the engine, the generator will gradually reduce charge to the batteries and the 48-VDC battery pack will start driving the reels. This is transparent to the operator. The generator is shedding its power requirement from the engine, and the available engine horse power can go to the traction hydraulics.
- Boost Mode: When the traction power demand continues to increase (e.g., driving on steeper hills) the 48-VDC battery pack powers the generator as an electric motor to assist the diesel engine, and the 48-VDC battery pack will also drive the cutting-unit reels.

As with any battery-powered equipment, the 48-VDC battery pack and electrical components cannot constantly maintain high-power demands. The batteries have a finite amount of energy. Toro utilizes self-preservation modes to protect the battery pack and electrical components from low 48-VDC bus voltage, e-reel motor and generator over-heating, and maximum current.

It is important that you understand that the Reelmaster 5010-H can do the same jobs as a hydraulic machine, but with limitations. Understanding

these limitations will lead to better performance and life from the hybrid electrical components (e.g., e-reel motors and generator).

Corrective Action

Action Required: Monitor and Report

To receive better performance and life from the Reelmaster 5010-H, adhere to the best practices per your specific job:

- **Mowing:**

  During normal fairway mowing, the Reelmaster 5010-H provides a sufficient amount of engine horse power to drive the generator to supply power to the cutting units and machine hydraulic functions.

  Follow these best practices for normal fairway mowing:

  – Maintain reel and bedknife sharpness.
  – Maintain proper reel to bedkife clearance. Toro recommends light contact.
  – Follow and maintain the 1/3rd rule (i.e., only cut 1/3rd of the grass height).
  – Set reel speed and traction speed to obtain the desired clip length.
  – When mowing heavier or wet conditions, open the rear shield of the cutting unit.

- **Scalping/Circle Cutting:**

  The scalping process creates a lot of dust and chaff, so it is important for the reels to process and quickly get the dust and chaff out of the cutting unit. It is critical to keep the rear radiator screen and the air cleaner and generator air inlet screen (Figure 3) cleaned.

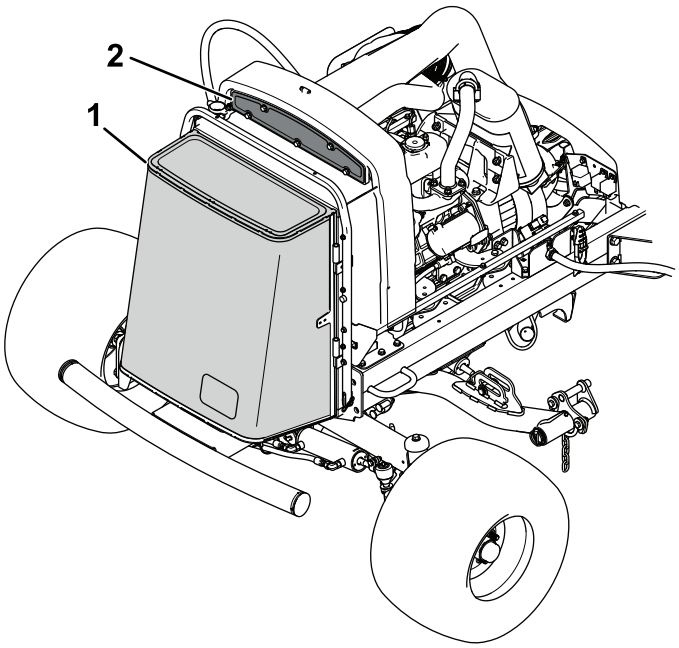

Figure 3

Hood removed for clarity.

1. Rear radiator screen
2. Air cleaner/generator air inlet screen

Follow these best practices for scalping:

Before Operation:

- Check the air cleaner before starting the scalping process.
- Maintain reel and bedknife sharpness.
- Maintain proper reel to bedkife clearance. Toro recommends light contact.
- Follow and maintain the 1/3rd rule (i.e., only cut 1/3rd of the grass height).
- Reduce the reel speed. The reel motors, as with any electric motor, trade speed for torque: at a higher speed, less torque is acquired; at a lower speed, more torque is acquired. The motor will perform better and be more efficient at its desired torque speed. It is best to start the scalping process at the following reel speeds:
  - ◊ Model 03618 (5 inch): Reel Speed 6
  - ◊ Model 03619 (7 inch): Reel Speed 6

    Note: Start at these reel-speed settings. If performance is not satisfactory, try the next-highest reel speed.

    Note: The operation and efficiencies of an electric motor differ from a hydraulic motor. The electric-motor torque occurs at a lower speed. Running the motor at maximum speed places more power demands on the generator, which causes high current and temperature faults.
- Reduce the mowing speed to maximum of 6 km/h (4 mph). Add spacers to the mow-speed limiter as needed to slow down traction speed from your normal mowing speed.
- Open the cutting-unit rear shields.
- Operate the engine at full throttle (3000 rpm).
- Do not use Economy Mode.

During Operation:

- Use the InfoCenter to monitor both engine coolant and generator temperatures (Figure 4).

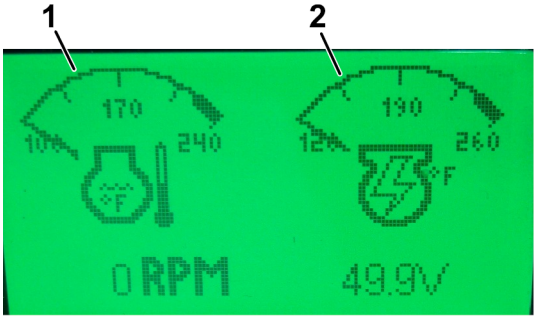

Figure 4

1. Engine-coolant temperature
2. Generator temperature

- Frequently check the rear radiator screen and the air cleaner and generator air inlet screen (Figure 3) above the radiator for chaff build up.

– When possible, reduce long passes, especially when scalping up hills.

- **Verticutting:**

  Verticutting requires the most power from the machine, as this is a ground-engaging process. Depth of the verticutters, reel speed, and traction speed are the variables that must be adjusted correctly for the Reelmaster 5010-H to operate efficiently.

  Follow these best practices for verticutting:

  Before Operation:

  – Reduce the reel speed. The reel motors, as with any electric motor, trade speed for torque: at a higher speed, less torque is acquired; at a lower speed, more torque is acquired. The motor will perform better and be more efficient at its desired torque speed. It is best to start the verticutting process at the following reel speeds:

  ◊ Model 03618 (5 inch): Reel Speed 6

  ◊ Model 03619 (7 inch): Reel Speed 6

  Note: Start at these reel-speed settings. If performance is not satisfactory, try the next-highest reel speed.

  Note: The operation and efficiencies of an electric motor differ from a hydraulic motor. The electric-motor torque occurs at a lower speed; running the motor at maximum speed places more power demands on the generator, which causes high current and temperature faults.

  – Reduce the mowing speed to maximum of 6 km/h (4 mph). Add spacers to the mow-speed limiter as needed to slow down traction speed from your normal mowing speed.

  Note: Traction speed is dependent on turf conditions and verticutter depth. Pushing the verticutters faster than they can process puts more strain on the electric motors and generator.

  – We recommend a maximum 3 mm (1/8 inch) verticutter blade depth for both verticutter models (03618 and 03619). The tendency for verticutting is to go as deep as possible, but the deeper you go, the more power needed.

  – Check the air cleaner before starting the verticutting process.

  – Open the rear shields on the verticutter frame.

  – Do not use Economy Mode for verticutting. Ensure the engine is running at full throttle (3000 rpm).

  – Ensure that the cutting-unit blades are sharp, adjusted correctly, and that none of the blades are bent. Dull and bent blades will require more power.

  – Reducing the blade spacing by adding more blades will increase power consumption. The traction speed may need to be adjusted lower.

  – Ensure that the 48-VDC battery pack is in good condition.

During Operation:

- Use the InfoCenter to monitor both engine coolant and generator temperatures (Figure 4).
- Frequently check the rear radiator screen and the air cleaner and generator air inlet screen (Figure 3) above the radiator for chaff build up.
- When possible, reduce long passes, especially when verticutting up hills.

- **Machine Maintenance:**

  Scalping and verticutting are dirty jobs that create a lot of chaff, dust, and debris. It is critical to keep the rear radiator screen and the air cleaner and generator air inlet screen (Figure 3) cleaned and free from chaff build up. If the air is restricted to the air cleaner, the engine runs richer and creates more heat, which allows heat to build up under the hood and heat soak the engine and generator. Both the engine and generator need unobstructed air flow to keep cool.

  While the 48-VDC batteries are maintenance-free and out of sight, their environment and connections need to checked. Before starting scalping or verticutting, remove the battery covers and clean all the chaff away, and inspect the battery cables and terminals to make sure they are clean and tight, and that no corrosion is present.

  The 48-VDC battery pack plays a large and important part in the overall performance of the Reelmaster 5010-H hybrid system. Without these batteries, the machine is just a 24.8 hp fairway unit.

Safety Awareness

Follow reasonable and customary safety precautions.

Parts

Requirements not specified.

References

Find the latest operator's manuals, service manuals, schematics, parts catalogs, and customer bulletins at www.Toro.com.