



Engine Conversion Kit

Subaru Powered Walk-Behind Greensmaster® Flex™ 1800, 2100, 1820, or 2120 Mower

Model No. 139-5637

Installation Instructions

Introduction

This engine conversion kit is only for machines with following model and serial numbers:

Model Number	Serial Number
04040	312000001 through 315999999
04041	312000001 through 315999999
04044	316000001 through 999999999
04045	316000001 through 999999999

Light Kit, Model 04064 (Flex 1800/2100/1820/2120 traction units) is compatible with this kit.

Note: Older light kits are not compatible with this kit.

Important: These installation instructions contain engine operation and maintenance information that supersedes the engine operation and maintenance procedures in your machine *Operator's Manual*.

Before operating or maintaining the machine or engine, always refer to the operating and safety instructions in your *Operator's Manual*.

Save these instructions.

Important: The engine warranty is provided by the engine manufacturer. Please refer to the engine manufacturer's warranty and emissions system warranty included in the literature packet. That warranty applies only to the engine. It does not expand or otherwise alter any express or implied warranty terms or warranty period that may apply to the product into which the engine is installed.

⚠ WARNING

CALIFORNIA Proposition 65 Warning

The engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.

Contents

Introduction	1
Safety	2
Safety and Instructional Decals	2
Installation	3
1 Preparing the Machine	3
2 Removing the Existing Engine	3
3 Installing the New Engine	3
4 Lubricating and Adjusting the Machine	5
Product Overview	5
Controls	5
Operation	6
Fuel Specifications	6
Using Stabilizer/Conditioner	6
Filling the Fuel Tank	6
Opening and Closing the Fuel-Shutoff Valve	7
Maintenance	8
Recommended Maintenance Schedule(s)	8
Preparing the Machine for Maintenance	8
Servicing the Engine Oil	9
Servicing the Air Cleaner	11
Servicing the Spark Plug	12

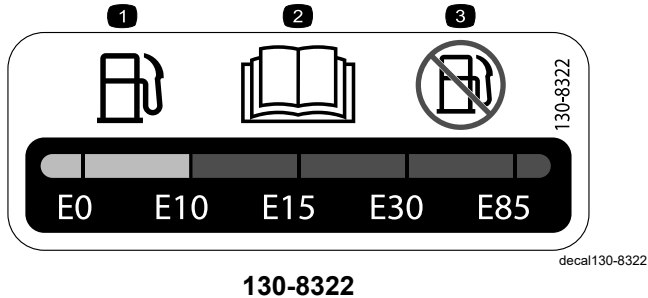


Safety

Safety and Instructional Decals



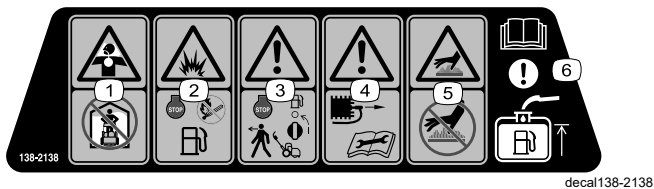
Safety decals and instructions are easily visible to the operator and are located near any area of potential danger. Replace any decal that is damaged or missing.



1. Use only fuel with an alcohol content by volume under 10%.
2. Read the *Operator's Manual* for more information on fuel.
3. Do not use fuel with an alcohol content by volume greater than 10%.



133-8062



1. Poisonous fumes or toxic gases, asphyxiation hazard—do not run the engine in an enclosed space.
2. Explosion hazard—shut off the engine before adding fuel; no fire, open flames, or smoking when adding fuel.
3. Warning—shut off the engine and close the fuel shutoff valve before leaving the machine.
4. Warning—disconnect the spark plug wire before performing maintenance.
5. Hot surface hazard—do not touch the hot surface.
6. Attention—read the *Operator's Manual* for information about filling the fuel tank.

Installation

Note: If the machine is equipped with an incandescent light kit, you may need to order a new kit; contact your authorized Toro distributor for more information.

1

Preparing the Machine

No Parts Required

Procedure

Prepare the machine; refer to [Preparing the Machine for Maintenance](#) (page 8).

2

Removing the Existing Engine

No Parts Required

Procedure

Important: For additional engine-removal instructions and illustrations, refer to the **Greensmaster Flex 1800/1820/2100/2120 Service Manual** on www.Toro.com.

Important: Retain all removed parts for reuse unless otherwise noted.

1. Remove the throttle cable from the engine.
2. Disconnect the electrical connections from the engine and the handle.
3. Remove engine-base assembly (with the engine attached) from machine.
4. Remove the engine from the engine base.
Note: The cap screws, washers, and nuts can be discarded.
5. Remove the engine coupler and the square key from the engine output shaft.
6. Remove the existing coupler guard from the transmission cover ([Figure 1](#)).

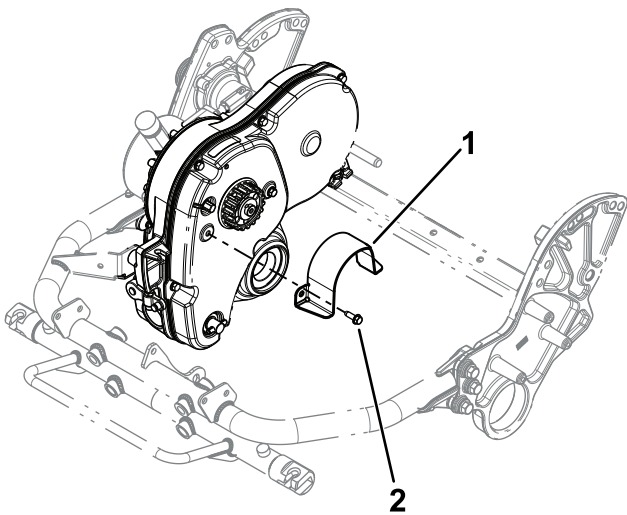


Figure 1

1. Coupler guard
2. Bolt

g314125

3

Installing the New Engine

Parts needed for this procedure:

1	Engine
4	Bolt
4	Nut
4	Spacer
4	Washer
1	Coupler guard
1	Wire harness

Procedure

Important: For additional engine-installation instructions and illustrations, refer to the **Greensmaster Flex 1800/1820/2100/2120 Service Manual** on www.Toro.com.

1. Use 4 bolts, 4 washers, 4 spacers, and 4 nuts to secure the engine to the engine base ([Figure 2](#)).

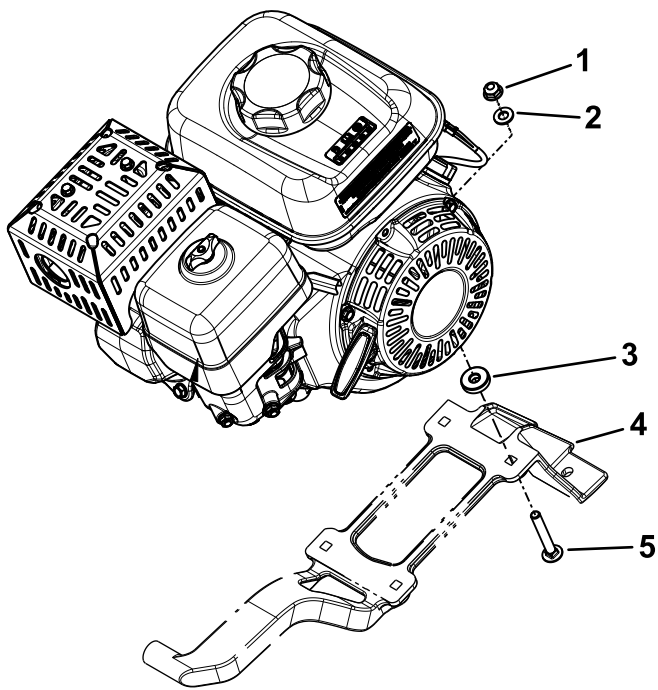


Figure 2

g314123

1. Nut
2. Washer
3. Spacer
4. Engine base
5. Bolt

2. Perform the following steps to install the coupler to the engine-output shaft:

- A. Apply anti-seize lubricant to the top surface of the square key and position the key in the output-shaft keyway.
- B. Slide the coupler onto the output shaft until it contacts the shaft shoulder.
- C. Secure the coupler to the output shaft with the 2 previously-removed set screws.
- D. Torque the set screws to 7 N·m (65 in-lb).

3. Perform the following steps to install the engine base assembly to the machine:

- A. Ensure that the coupler sleeve is placed on the transmission-input-shaft coupler.
- B. Position the engine-base assembly to the machine.
- C. Carefully slide the engine-base assembly toward the transmission, allowing the engine coupler to be inserted into the transmission coupler sleeve.

Note: You may have to turn the engine output shaft to align the engine coupler with the coupler sleeve.

- D. Support the engine-base assembly to allow for fastener installation.
- E. Install and finger-tighten the 2 cap screws, hardened washers, and flange nuts that

secure the engine-base rear to the rear frame.

- F. Align the frame hole with the front mounting boss of the engine base.
 - G. Install and finger tighten the flange head screw and hardened washer that secures the engine base to the frame.
 - H. Position the engine-base front to align the engine and transmission couplers. Fully tighten the flange-head screws to secure the engine-base front.
 - I. Fully tighten fasteners at rear of engine base.
4. Connect the wire harness to the appropriate locations on the engine and the handle:

• **Engine connections:**

- Connect the ground wire (terminal ring) to engine with an existing nut under the fuel tank (Figure 3).

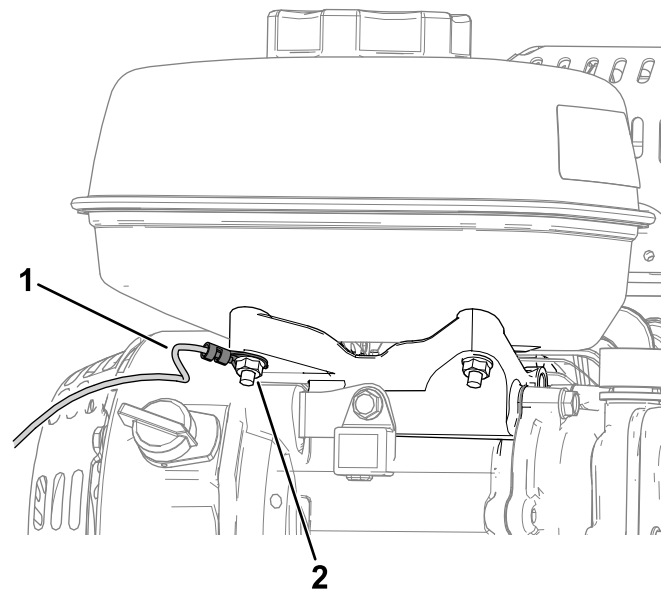


Figure 3

g314124

1. Ground wire
2. Nut

- Refer to the following table for the appropriate machine and engine wire harness connections:

Machine-wire-harness connector	Engine-wire-harness connector
Black	Red
Grey	Black
Green	Blue

- **Handle connections:** Connect the wire harness to the engine switch, hour meter, interlock module, and the light kit connections (if equipped).

5. Connect the throttle cable to engine.
6. Use the previously-removed bolts to secure the new coupler guard to the transmission cover.

4

Lubricating and Adjusting the Machine

No Parts Required

Procedure

1. Lubricate the machine according to the instructions in your *Operator's Manual*.
2. Fill the engine crankcase with oil; refer to [Servicing the Engine Oil \(page 9\)](#).
3. Adjust the engine speed to the following specifications:

High idle (no load)	3450 ± 100 rpm
Low idle (no load)	1900 ± 100 rpm

Product Overview

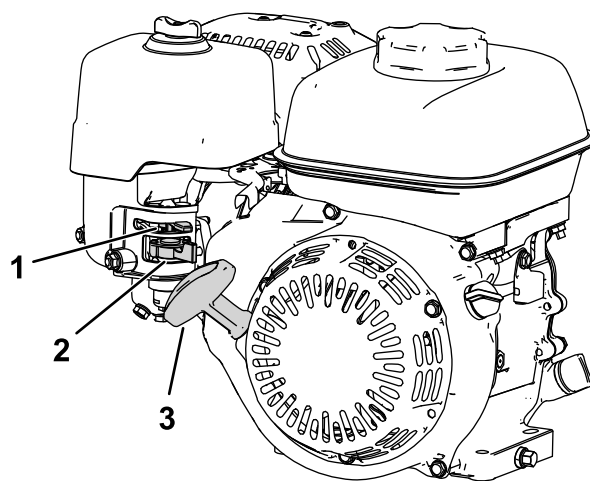


Figure 4

1. Choke lever
2. Fuel-shutoff valve
3. Recoil starter handle

Controls

Choke Control

The choke control is located on the side of the engine ([Figure 4](#)); you use it to help start a cold engine

Note: Do not start or run a warm engine with the choke in the CLOSED position.

- Move the choke lever all the way to the left (away from starter handle) to set the choke to the CLOSED position.
- Move the choke lever all the way to the right (toward starter handle) to set the choke to the OPEN position.

Fuel-Shutoff Valve

The fuel-shutoff valve is located on the side of the engine below the choke control ([Figure 4](#)).

Note: Close the fuel-shutoff valve when the machine is not used for a few days, during transport to and from the job site, or when the machine is parked inside a building; refer to [Opening and Closing the Fuel-Shutoff Valve \(page 7\)](#).

Operation

Fuel Specifications

Fuel tank capacity: 2.0 L (0.59 US gallons)

Recommended fuel: Unleaded gasoline with an octane rating of 87 or higher ((R+M)/2 rating method)

Ethanol: Gasoline with up to 10% ethanol (gasohol) or 15% MTBE (methyl tertiary butyl ether) by volume is acceptable. Ethanol and MTBE are not the same. Gasoline with 15% ethanol (E15) by volume is not approved for use.

- **Never use gasoline that contains more than 10% ethanol by volume**, such as E15 (contains 15% ethanol), E20 (contains 20% ethanol), or E85 (contains up to 85% ethanol).
- **Do not** use gasoline containing methanol.
- **Do not** store fuel either in the fuel tank or fuel containers over the winter unless a fuel stabilizer is used.
- **Do not** add oil to gasoline.
- For best results, use only clean, fresh (less than 30 days old) fuel.
- Using unapproved gasoline may cause performance problems and/or engine damage, which may not be covered under the warranty

Using Stabilizer/Conditioner

Important: Do not use fuel additives containing methanol or ethanol.

Add the correct amount of fuel stabilizer/conditioner to the gasoline.

Note: A fuel stabilizer/conditioner is most effective when mixed with fresh gasoline. To minimize the chance of varnish deposits in the fuel system, use fuel stabilizer at all times.

Filling the Fuel Tank

⚠ DANGER

In certain conditions, fuel is extremely flammable and highly explosive. A fire or explosion from fuel can burn you and others and can damage property.

- **Fill the fuel tank outdoors, in an open area, when the engine is cold. Wipe up any fuel that spills.**
- **Never fill the fuel tank inside an enclosed trailer.**
- **Do not fill the fuel tank completely full. Add fuel to the fuel tank until the level is 6 to 13 mm (1/4 to 1/2 inch) below the bottom of the filler neck. This empty space in the tank allows fuel to expand.**
- **Never smoke when handling fuel, and stay away from an open flame or where fuel fumes may be ignited by a spark.**
- **Store fuel in an approved container and keep it out of the reach of children. Never buy more than a 30-day supply of fuel.**
- **Do not operate without entire exhaust system in place and in proper working condition.**

⚠ DANGER

In certain conditions during fueling, static electricity can be released, causing a spark which can ignite the fuel vapors. A fire or explosion from fuel can burn you and others and can damage property.

- **Always place fuel containers on the ground away from your vehicle before filling.**
- **Do not fill fuel containers inside a vehicle or on a truck or trailer bed because interior carpets or plastic truck-bed liners may insulate the container and slow the loss of any static charge.**
- **When practical, remove equipment from the truck or trailer and fuel it on the ground. If this is not possible, then fuel such equipment with a portable container rather than from a fuel-dispenser nozzle.**
- **If you must use a fuel-dispenser nozzle, keep the nozzle in contact with the rim of the fuel tank or container opening at all times until fueling is complete.**

⚠ WARNING

Fuel is harmful or fatal if swallowed. Long-term exposure to vapors can cause serious injury and illness.

- Avoid prolonged breathing of vapors.
- Keep your face away from the nozzle and fuel tank or conditioner bottle opening.
- Avoid contact with skin; wash off spills with soap and water.

1. Park the machine on a level surface and shut off the engine.
2. Allow the engine to cool.
3. Clean around the fuel-tank cap and remove it (Figure 5).

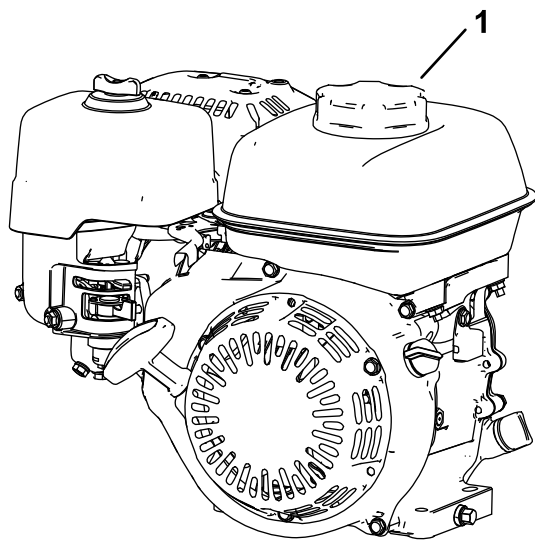


Figure 5

1. Fuel-tank cap

4. Fill the tank with fuel until the level is just inside the mesh filter basket.

Do not fill into the filler neck of the tank.

Important: Do not fill the tank more above the filler mesh because the fuel needs room to expand.

5. Install the fuel-tank cap securely.
6. Wipe up any spilled fuel.

Opening and Closing the Fuel-Shutoff Valve

Control fuel flow to the engine with the fuel-shutoff valve as follows:

- To open the fuel valve, turn the fuel-shutoff valve handle toward the recoil starter handle (Figure 6).
- To shut the fuel valve, turn the fuel-shutoff valve handle away from the recoil starter handle (Figure 6).

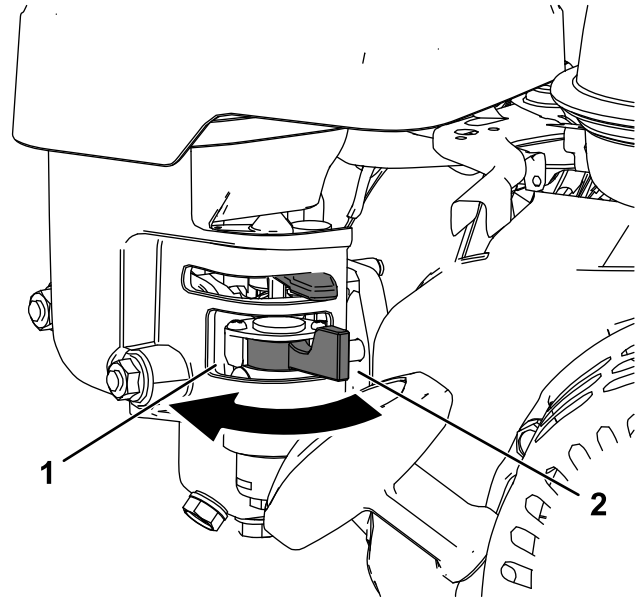


Figure 6

1. Turn the fuel valve lever to the ON position
2. Fuel valve lever in the OFF position

Maintenance

Important: Refer to your engine owner's manual for additional maintenance procedures.

Important: The engine gearbox (Figure 7) does not require maintenance, as it is filled with a high-performance, long-life synthetic semi-fluid grease.

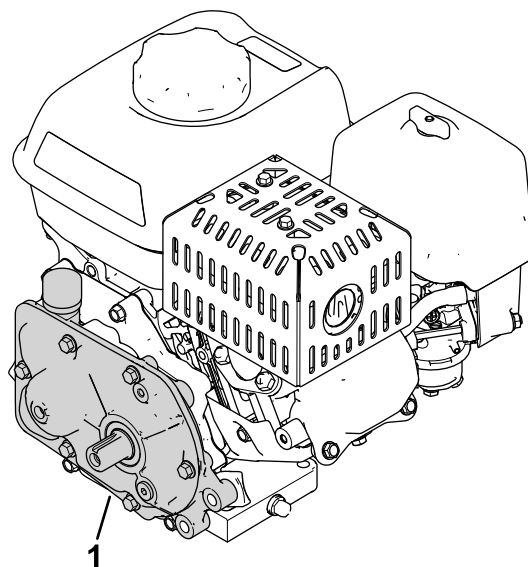


Figure 7

g312416

1. Gearbox

Recommended Maintenance Schedule(s)

Maintenance Service Interval	Maintenance Procedure
After the first 20 hours	<ul style="list-style-type: none">• Change the engine oil.
Before each use or daily	<ul style="list-style-type: none">• Check the engine-oil level.• Inspect the air-filter elements.
Every 50 hours	<ul style="list-style-type: none">• Clean the air-filter elements.
Every 100 hours	<ul style="list-style-type: none">• Change the engine oil.• Inspect and adjust the spark plug; replace it if necessary.
Every 300 hours	<ul style="list-style-type: none">• Replace the paper filter element (More frequently in dusty operating conditions).• Replace the spark plug.

Preparing the Machine for Maintenance

⚠ WARNING

While you are maintaining or adjusting the machine, someone could start the engine. Accidentally starting the engine could seriously injure you or other bystanders.

Remove the key from the ignition, engage parking brake, and pull the wire(s) off the spark plug(s) before you do any maintenance. Also push the wire(s) aside so it does not accidentally contact the spark plug(s).

Perform the following before servicing, cleaning, or making any adjustments to the machine.

1. Park the machine on a level surface.
2. Shut off the engine and remove the key from the machine (if equipped).
3. Engage the parking brake.
4. Wait for all moving parts to stop and allow the engine to cool before servicing or storing.
5. Disconnect the spark-plug wire (Figure 8).

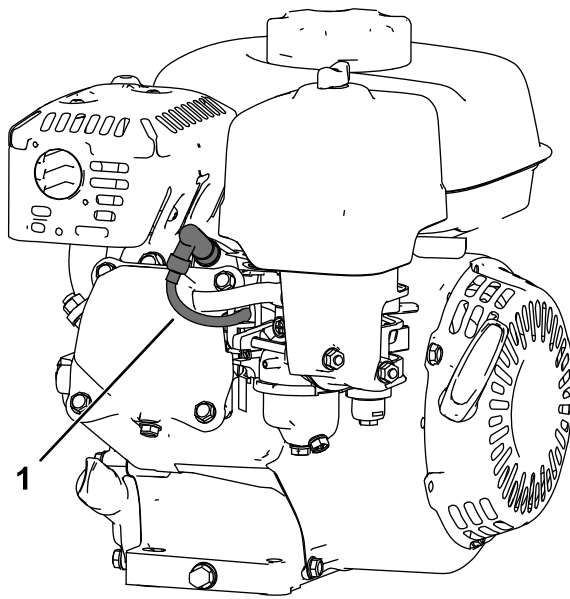


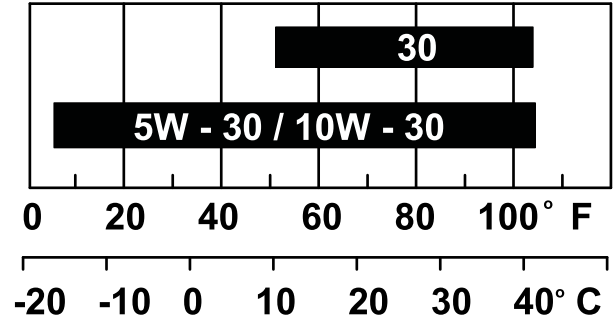
Figure 8

1. Spark-plug wire

g265998

Servicing the Engine Oil

Fill the crankcase with approximately 0.56 L (19 fl oz) of the proper viscosity oil before starting. The engine uses a high-quality oil that has the American Petroleum Institute (API) service classification of SJ or higher. Select the proper oil viscosity (weight) based on the ambient temperature. Figure 9 illustrates the temperature/viscosity recommendations.



g013375

g013375

Figure 9

Note: Multi-grade oils (5W-20, 10W-30 and 10W-40) increase oil consumption. Check the engine-oil level more frequently when you use these oils.

Checking the Engine-Oil Level

Service Interval: Before each use or daily

The ideal time to check the engine-oil level is when the engine is cool or before you have started the engine for the day. If you have already ran the engine, allow the oil to drain back down to the sump for at least 10 minutes before you check the engine-oil level.

1. Shut off the engine and wait for all moving parts to stop; refer to [Preparing the Machine for Maintenance](#) (page 8).
2. Position the machine so that the engine is level, and clean the area around the oil-fill tube ([Figure 10](#)).

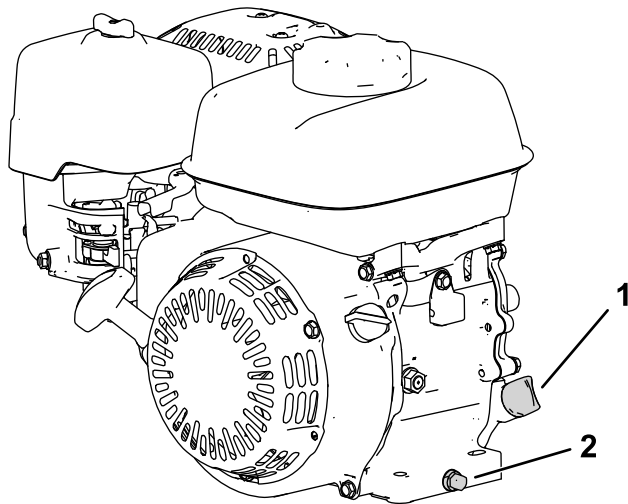


Figure 10

1. Dipstick
2. Drain plug and washer

3. Remove the dipstick by rotating it counterclockwise.
4. Remove the dipstick and wipe the end clean.
5. Insert the dipstick fully into the oil-fill tube, **but do not thread it in**.
6. Remove the dipstick and check the engine-oil level ([Figure 11](#)).

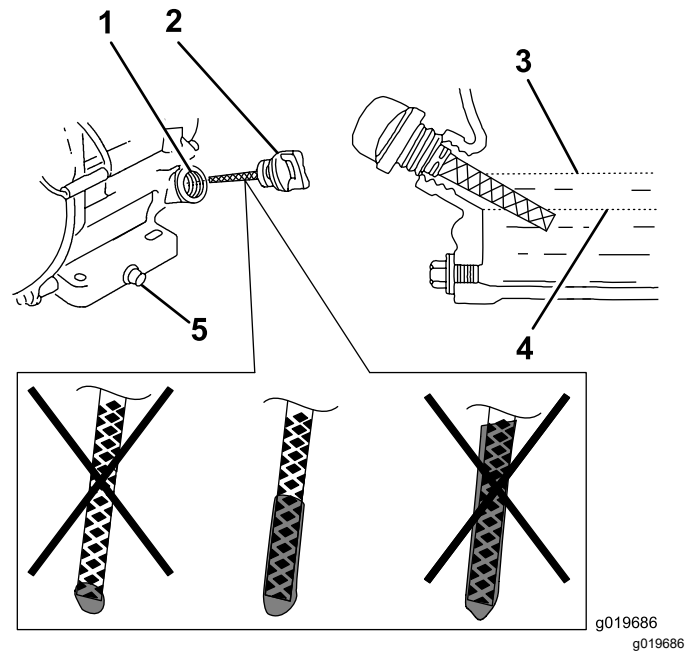


Figure 11

1. Filler tube
2. Dipstick
3. Upper limit
4. Lower limit
5. Drain plug

7. If the engine-oil level is incorrect, add or drain oil to correct the level; refer to [Changing the Engine Oil](#) (page 10).

Changing the Engine Oil

Service Interval: After the first 20 hours
Every 100 hours

⚠ WARNING

Oil may be hot after the engine has been run, and contact with hot oil can cause severe personal injury.

Avoid contacting the hot engine oil when you drain it.

1. Shut off the engine and wait for all moving parts to stop; refer to [Preparing the Machine for Maintenance](#) (page 8).
2. Raise the engine off the ground and place a pan under the drain plug to catch the oil.
3. Remove the drain plug ([Figure 10](#)).
4. When the oil has drained completely, lower the engine to the ground, replace the drain plug and washer, and torque the plug to 18 N·m (13 ft·lb).

Note: Dispose of the used oil at a certified recycling center.

5. Remove the dipstick, and slowly pour oil into the oil-fill hole until the oil is at the correct level.

6. Ensure that the oil is at the correct level on the dipstick; refer to [Checking the Engine-Oil Level \(page 9\)](#).
7. Replace and secure the dipstick.
8. Wipe up any spilled oil.
9. Connect the wire to the spark plug.

Servicing the Air Cleaner

Service Interval: Before each use or daily

Every 50 hours

Every 300 hours/Yearly (whichever comes first)

Important: Do not operate the engine without the air filter assembly; extreme engine damage will occur.

1. Shut off the engine and wait for all moving parts to stop; refer to [Preparing the Machine for Maintenance \(page 8\)](#).
2. Remove the wingnut securing the air-cleaner cover (Figure 12).
3. Remove the air-cleaner cover.

Note: Ensure that no dirt or debris from the air-cleaner cover fall into the base.

4. Remove the foam and paper elements from the base.
5. Remove the foam element from the paper element.
6. Inspect the foam and paper elements; replace them if they are damaged or excessively dirty.

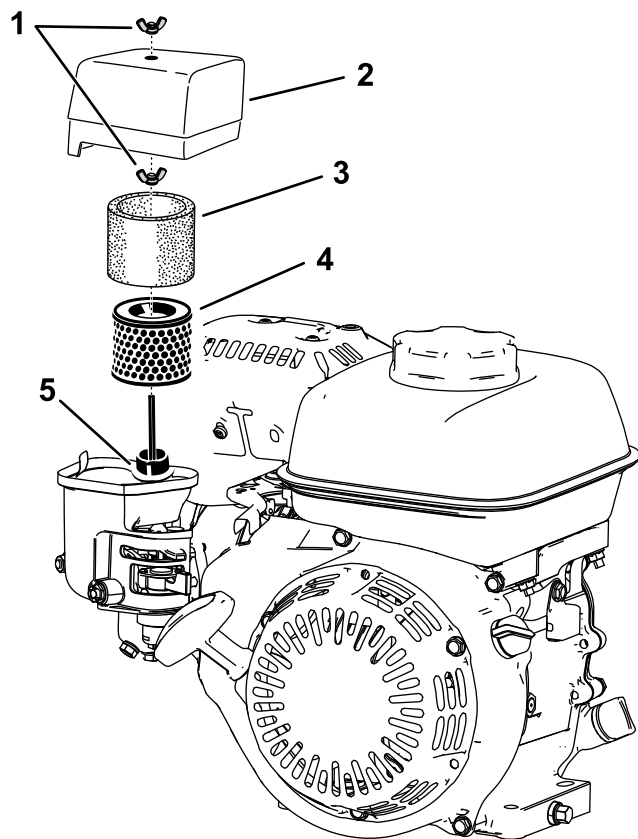


Figure 12

g265999

- | | |
|----------------------|-------------------------|
| 1. Wing nut | 4. Paper filter element |
| 2. Air-cleaner cover | 5. Gasket and air duct |
| 3. Foam element | |

7. Clean the paper element by tapping it gently to remove the dirt.

Note: Do not try to brush dirt off the paper element; brushing forces the dirt into the fibers. Replace the element if tapping it fails to remove the dirt.

8. Clean the foam element in warm, soapy water or in a nonflammable solvent.

Note: Do not use gasoline to clean the foam element because it could create a risk of fire or explosion.

9. Rinse and dry the foam element thoroughly.

10. Wipe dirt from the base and the cover with a moist rag.

Note: Ensure that dirt and debris do not enter the air duct leading to the carburetor.

11. Install the air-cleaner elements and ensure that they are properly positioned. Install the lower wing nut.

12. Install the cover and install the upper wing nut to secure it.

Servicing the Spark Plug

Service Interval: Every 100 hours

Every 300 hours

Use an NGK BPR6ES spark plug or equivalent.

1. Shut off the engine and wait for all moving parts to stop; refer to [Preparing the Machine for Maintenance](#) (page 8).

2. Clean around the spark plug.

3. Remove the spark plug from the cylinder head.

Important: Replace a cracked, fouled, or dirty spark plug. Do not sand blast, scrape, or clean the electrodes because engine damage could result from grit entering the cylinder.

4. Set the gap on the plug to 0.7 to 0.8 mm (0.028 to 0.031 inch)

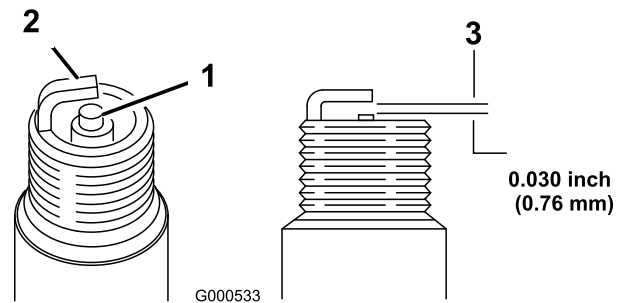


Figure 13

1. Center-electrode insulator
2. Side electrode
3. Air gap

5. Carefully install the spark plug by hand (to avoid cross threading) until it is hand tight.

6. Tighten the spark plug an additional 1/2 turn if it is new; otherwise, tighten it an additional 1/8 to 1/4 turn.

Important: A loose spark plug can become very hot and can damage the engine; overtightening a spark plug may damage the threads in the cylinder head.

7. Connect the wire to the spark plug.

Notes:

Notes:

Notes:

California Proposition 65 Warning Information

What is this warning?

You may see a product for sale that has a warning label like the following:



WARNING: Cancer and Reproductive Harm—www.p65Warnings.ca.gov.

What is Prop 65?

Prop 65 applies to any company operating in California, selling products in California, or manufacturing products that may be sold in or brought into California. It mandates that the Governor of California maintain and publish a list of chemicals known to cause cancer, birth defects, and/or other reproductive harm. The list, which is updated annually, includes hundreds of chemicals found in many everyday items. The purpose of Prop 65 is to inform the public about exposure to these chemicals.

Prop 65 does not ban the sale of products containing these chemicals but instead requires warnings on any product, product packaging, or literature with the product. Moreover, a Prop 65 warning does not mean that a product is in violation of any product safety standards or requirements. In fact, the California government has clarified that a Prop 65 warning "is not the same as a regulatory decision that a product is 'safe' or 'unsafe.'" Many of these chemicals have been used in everyday products for years without documented harm. For more information, go to <https://oag.ca.gov/prop65/faqs-view-all>.

A Prop 65 warning means that a company has either (1) evaluated the exposure and has concluded that it exceeds the "no significant risk level"; or (2) has chosen to provide a warning based on its understanding about the presence of a listed chemical without attempting to evaluate the exposure.

Does this law apply everywhere?

Prop 65 warnings are required under California law only. These warnings are seen throughout California in a wide range of settings, including but not limited to restaurants, grocery stores, hotels, schools, and hospitals, and on a wide variety of products. Additionally, some online and mail order retailers provide Prop 65 warnings on their websites or in catalogs.

How do the California warnings compare to federal limits?

Prop 65 standards are often more stringent than federal and international standards. There are various substances that require a Prop 65 warning at levels that are far lower than federal action limits. For example, the Prop 65 standard for warnings for lead is 0.5 µg/day, which is well below the federal and international standards.

Why don't all similar products carry the warning?

- Products sold in California require Prop 65 labelling while similar products sold elsewhere do not.
- A company involved in a Prop 65 lawsuit reaching a settlement may be required to use Prop 65 warnings for its products, but other companies making similar products may have no such requirement.
- The enforcement of Prop 65 is inconsistent.
- Companies may elect not to provide warnings because they conclude that they are not required to do so under Prop 65; a lack of warnings for a product does not mean that the product is free of listed chemicals at similar levels.

Why does Toro include this warning?

Toro has chosen to provide consumers with as much information as possible so that they can make informed decisions about the products they buy and use. Toro provides warnings in certain cases based on its knowledge of the presence of one or more listed chemicals without evaluating the level of exposure, as not all the listed chemicals provide exposure limit requirements. While the exposure from Toro products may be negligible or well within the "no significant risk" range, out of an abundance of caution, Toro has elected to provide the Prop 65 warnings. Moreover, if Toro does not provide these warnings, it could be sued by the State of California or by private parties seeking to enforce Prop 65 and subject to substantial penalties.