

OIL RECOMMENDATIONS

Use a high quality detergent oil classified "For Service SF, SG, SH, SJ" or higher. Do not use special additives.

SAE 30 40 °F and higher (5 °C and higher)

is good for all purpose use above 40°F, use below 40°F will cause hard starting.

10W-30 0 to 100 °F (-18 to 38 °C)

is better for varying temperature conditions. This grade of oil improves cold weather starting, but may increase oil consumption at 80°F (27°C) or higher.

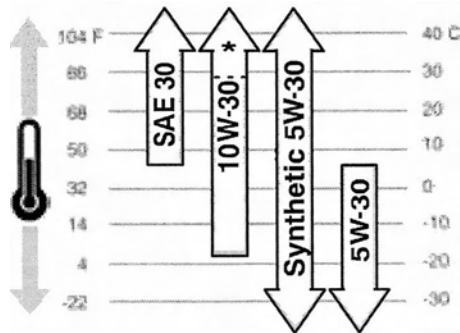
★ Check oil level frequently at higher temperatures.

Synthetic 5W-30 -20 to 120 °F (-30 to 40 °C)

provides the best protection at all temperatures as well as improved starting with less oil consumption.

5W-30 40 °F and below (5 °C and below)

is recommended for winter use, and works best in cold conditions.



OIL CAPACITY

Approximately 1-1/2 quarts (48 ounces or 1.6 liters) when changing oil and filter. (Oil capacity will be greater if engine is equipped with remote oil filter.)

CAUTION: Engine is shipped from Briggs & Stratton without oil. Before starting engine, fill to FULL mark on dipstick with oil. Do not over fill.

ADDING OIL – SEE FIGURE 2

1. For first use or when performing oil change, add 1 liter (32 ounces). ①
2. Start and run engine at idle for 30 seconds. Shut engine off and wait 30 seconds.
3. Then add more oil slowly to bring level to FULL mark ② on dipstick. Check for oil leaks.
4. Tighten dipstick firmly before starting engine.

CHECKING OIL

1. Place engine on level surface and clean around oil fill ①.
2. Remove dipstick ②, wipe with clean cloth. Insert dipstick firmly ③, then remove and check oil level.
3. Oil should be at FULL mark ④. If oil is required, add oil slowly. ⑤
4. Tighten dipstick firmly before starting engine.

OIL PRESSURE

If engine runs low on oil, an oil pressure switch (if engine is equipped) will either activate a warning device or stop the engine. (Read the operating instructions supplied by the equipment manufacturer to determine which way your engine is equipped.) See Maintenance for further information.

FUEL RECOMMENDATIONS

GASOLINE POWERED ENGINES

This engine is certified to operate on gasoline. The emission control system for this engine is EM (Engine Modifications).

Always use gasoline that meets these requirements and follow these guidelines:

- Clean, fresh unleaded gasoline.
- A minimum of 87 octane/87 AKI (91 RON). If operating at high altitude, see below.
- Gasoline with up to 10% ethanol (gasohol) or up to 15% MTBE (methyl tertiary butyl ether), is acceptable.
- Use of any gasoline other than those approved above will void the engine warranty. In some local areas fuel pumps may be marked if the gasoline contains alcohols or ethers. If you are unsure about the gasoline you purchase check with your fuel provider.
- Do not modify the engine fuel system or carburetor to run on alternative fuels.
- Never mix oil with gasoline.

All gasoline is not the same. If you experience starting or performance problems after new gasoline has been used in your engine, switch to a different fuel provider or change fuel brands.

CAUTION: Some fuels, called oxygenated or reformulated fuels, are fuels blended with alcohols or ethers. Excessive amounts of these blends can damage the fuel system or cause performance problems. If any undesirable operating symptoms occur, use gasoline with a lower percentage of alcohol or ether.

FUEL STABILIZER

To protect the fuel system from gum formation, mix in a fuel preservative when adding fuel. Briggs & Stratton recommends using FRESH START™ fuel stabilizer, available as a liquid additive, concentrated liquid cartridge or granular additive.

HIGH ALTITUDE USE

At higher altitudes (over 5,000 feet), 85 octane/85 AKI (89 RON) gasoline can be used. Operation at high altitude may require a high-altitude carburetor jet kit to improve performance and decrease fuel consumption. See an Authorized Briggs & Stratton dealer for more information.

ADDING GASOLINE

Clean around fuel fill before removing cap. Remove cap. Fill tank to approximately 1-1/2 inches below top of neck to allow for fuel expansion. Be careful not to overfill.

LIQUID PROPANE GAS (LPG)

NATURAL GAS (NG) POWERED ENGINES

- Use clean, dry fuel, free of moisture or any particulate material. Using fuels outside the following recommended values may cause performance problems.
- In engines set up to run on LPG, commercial grade HD5 LPG is recommended. Recommended fuel composition is fuel with a minimum fuel energy of 2500 BTU's/ft³ with maximum propylene content of 5% and butane and heavier gas content of 2.5% and minimum propane content of 90%.
- LPG or NG engines are certified to operate on liquid propane or natural gas.

ADDING FUEL

Read the operating instructions supplied by the equipment manufacturer for information on refueling LPG or NG engine.

WARNING

LPG/NG Engines: The equipment on which this engine is mounted is equipped with an automatic safety gas "fuel lock-off" valve. DO NOT operate the equipment if the "fuel lock-off" valve is missing or inoperative, explosion or fire could occur.

STARTING

CAUTION: This engine is shipped from Briggs & Stratton WITHOUT oil. Check oil level. If you start the engine without oil, the engine will be damaged beyond repair and will not be covered under warranty. See Oil section for recommendations, capacity and filling details.

BEFORE STARTING LPG / NG ENGINES – SEE FIGURE 3

The LPG / NG mixer is equipped with solenoid ❶, fuel inlet ❷, 12 volt connector ❸, and equipped for a fuel lock-off valve ❹. (Read the operating instructions supplied by the equipment manufacturer to determine how your engine is equipped.)

BEFORE STARTING ALL ENGINES – SEE FIGURE 4

Note: LPG / NG engines skip steps 1 and 2.

Note: If equipment manufacturer has supplied battery, charge it as manufacturer recommends before trying to start engine.

1. Open fuel shut-off valve ❶ (if equipped).
2. Move choke control ❷ to CHOKE or START.
3. Move throttle (if equipped) ❸ to FAST position. (Operate engine with throttle in FAST position and choke in RUN or OFF position.)
4. Push rocker switch ❹ to I position, if equipped.

REWIND STARTER – SEE FIGURE 5

1. Grasp rope handle and pull slowly until resistance is felt.
2. Then, pull cord rapidly to overcome compression, prevent kickback and start engine.
3. Repeat if necessary with choke in RUN position throttle in FAST.
4. When engine starts, operate in FAST.

ELECTRIC STARTER – SEE FIGURE 5

CAUTION: If equipment manufacturer has supplied battery, charge it before trying to start engine. DO NOT operate engine with battery disconnected. To prolong starter life, use short starting cycles (5 seconds maximum, then wait one minute). Extended cranking can damage starter motor.

1. Turn key to START position ❶ or press button ❷.
2. Repeat if necessary with choke off and throttle control in FAST position.
3. Allow engine to warm up.
4. **If choke equipped:** Slowly adjust toward RUN or OFF position. Wait until engine runs smoothly before each choke adjustment.
5. Operate engine with choke off and throttle in FAST position.

STOPPING – SEE FIGURE 6

1. **Rewind (Manual) Starter:** Move throttle control (if equipped) to SLOW and then STOP ❶ position.
2. **Electric (Key) Starter:** Move throttle lever (if equipped) to SLOW. Turn key to OFF ❷. Remove key and store out of reach of children.
3. Push rocker switch (if equipped) to O ❸.
4. Close fuel shut-off valve (if equipped).



WARNING

DO NOT move choke control to CHOKE position to stop engine. Backfire or engine damage may occur.

MAINTENANCE



WARNING

To prevent accidental starting, disconnect spark plug wire and keep it away from spark plug before servicing.
Do not strike flywheel with hammer or hard object. If done, flywheel may shatter during operation.
Do not tamper with links or other parts to increase engine speed.

Regular maintenance improves performance and extends engine life.

Need assistance? Go to www.briggsandstratton.com.

Follow the hourly or calendar intervals, whichever occur first. More frequent service is required when operating in adverse conditions noted below.

First 8 Hours

- Change oil

Every 8 Hours or Daily

- Check oil level
- Clean around muffler, linkage and springs

Every 25 Hours or Every Season

- Service air cleaner pre-cleaner *

Every 50 Hours or Every Season

- Clean and inspect spark arrester, if equipped
- Change oil if operating under heavy load or high ambient temperature

Every 100 Hours or Every Season

- Service air cleaner cartridge*
- Change oil
- Replace oil filter, if equipped
- Clean oil cooler, if equipped*
- Clean cooling system*
- Check valve clearance – LPG / NG engines

Every Season

- Replace spark plugs**
- Replace in-line fuel filter
- Check valve clearance

* Clean more often under dusty conditions or when airborne debris is present.

** In some areas, local law requires using a resistor spark plug to suppress ignition signals. If this engine was originally equipped with resistor spark plug, use same type of spark plug for replacement.

CHANGING ENGINE OIL – SEE FIGURE (7)

Change oil after first 8 hours of operation.

1. Change oil while engine is warm.
2. Remove oil drain plug to drain oil. ①
3. Refill with new oil of recommended SAE viscosity grade.
4. Fill to FULL mark on dipstick.

OIL FILTER ②, IF EQUIPPED.

Replace oil filter after every 100 hours of operation or every season, whichever occurs first.

1. Before installing new filter, lightly oil filter gasket with fresh, clean engine oil.
2. Screw filter on by hand until gasket contacts oil filter adapter. Tighten 1/2 to 3/4 turn more.
3. Refill engine with new oil of recommended SAE viscosity grade. See *Adding Oil* under **OIL RECOMMENDATIONS** for procedure.
4. Start and run engine at IDLE to check for oil leaks.
5. Stop engine. Recheck oil level and add oil if required.

OIL PRESSURE

If oil pressure drops below 1-4 psi (.1-.2 kg/cm²), an oil pressure switch (if engine is equipped) will either activate a warning device or stop the engine. Check oil level with dipstick. If oil level is between **ADD** and **FULL** mark on dipstick, do not try to restart engine. Contact an Authorized Briggs & Stratton Service Dealer. Do not operate engine until oil pressure is corrected.

If oil level is below **ADD** mark on dipstick, add oil to bring level to **FULL** mark. Restart engine and check oil pressure. If pressure is normal, continue to operate engine.

Note: Oil pressure gauge, if engine is equipped, is supplied by manufacturer of equipment.

AIR CLEANER, DUAL ELEMENT – SEE FIGURE (8)

1. Unhook clips or unscrew knobs and remove cover.
2. Carefully slide pre-cleaner ① off cartridge ②.
3. Remove knob and plate. Carefully remove cartridge to prevent debris from entering carburetor.

To service cartridge, clean by tapping gently on a flat surface. Replace pre-cleaner, if equipped, or cartridge if very dirty or damaged.

CAUTION: Do not use petroleum solvents, e.g., kerosene, which will cause cartridge to deteriorate. Do not use pressurized air, which can damage cartridge. Do not oil cartridge.

4. Reinstall cartridge, plate and knob.

Note: Top of air cleaner plate ③ is marked "UP" (only on engines equipped with fuel tank).

5. Install pre-cleaner on cartridge and replace cover.

SPARK PLUG SERVICE – SEE FIGURE (9)

WARNING

DO NOT check for spark with spark plug removed.

Use only Briggs & Stratton Spark Tester, to check for spark.

- If engine is flooded, place throttle in FAST and crank until engine starts.
- The electrodes on the spark plug must be clean and sharp to produce the powerful spark required for ignition. If the spark plug is worn or dirty the engine will be hard to start.
- Ensure spark plug gap ① is 0.76 mm or 0.030 in.

Note: In some areas, local law requires using a resistor spark plug to suppress ignition signals. If this engine was originally equipped with resistor spark plug, use same type of spark plug for replacement.

MUFFLER – SEE FIGURE (10)



WARNING



Accumulation of debris around muffler ① could cause a fire. Inspect and clean before every use.

If muffler is equipped with spark arrester screen ②, remove spark arrester screen for cleaning and inspection every 50 hours or every season. Replace if damaged.

FUEL FILTER

Replace in-line fuel filter ③ every season. Drain fuel tank or close fuel shut-off valve before replacing fuel filter.

KEEP ENGINE CLEAN – SEE FIGURE (11)

Periodically, after engine cools, remove debris from engine to reduce risk of overheating and ignition. Clean finger guard. Keep linkage, springs and controls ① free of debris.

CAUTION: Clean with a brush or compressed air. DO NOT use water to clean engine parts. Water could contaminate fuel system. Use a brush or dry cloth.

OIL COOLER

Clean oil cooler ④ every 100 hours or every season, if equipped.

COOLING SYSTEM

Debris may clog engine's air cooling system, especially after prolonged service. Every 100 hours or every season, clean internal cooling fins ⑤ and surfaces to prevent overheating and engine damage. Remove blower housing to clean areas shown.

VALVE CLEARANCE

Gasoline Engines –

Check valve clearance yearly (intake and exhaust .10-.15 mm).

LPG / NG Engines –

Valve clearance must be checked after every 100 hours of operation. Adjust if necessary.

SPECIFICATIONS

Model 290000 & 300000

Bore	68 mm (2.68 in.)
Stroke	66 mm (2.60 in.)
Displacement	480 cc (29.3 cu. in.)

Model 350000

Bore	72 mm (2.83 in.)
Stroke	70 mm (2.76 in.)
Displacement	570 cc (34.7 cu. in.)

Model 380000

Bore	76 mm (2.97 in.)
Stroke	70 mm (2.76 in.)
Displacement	627 cc (38.2 cu. in.)

Armature air gap 0.20-0.30 mm (0.008-0.012 in.)

Spark plug gap 0.76 mm (0.030 in.)

Valve clearance with valve springs installed and piston 6 mm past top dead center (check when engine is cold). See Repair Manual P/N 272144.

Intake 0.10-0.15 mm (0.004-0.006 in.)

Exhaust 0.10-0.15 mm (0.004-0.006 in.)

Note: Engine power will decrease 3-1/2% for each 1,000 feet (300 meters) above sea level and 1% for each 10° F (5.6° C) above 77° F (25° C). It will operate satisfactorily at an angle up to 15°. Refer to the equipment operator manual for safe allowable operating limits on slopes.

Technical Information

Engine Power Rating Information

The gross power rating for individual gas engine models is labeled in accordance with SAE (Society of Automotive Engineers) code J1940 (Small Engine Power & Torque Rating Procedure), and rating performance has been obtained and corrected in accordance with SAE J1995 (Revision 2002-05). Torque values are derived at 3060 RPM; horsepower values are derived at 3600 RPM. Actual gross engine power will be lower and is affected by, among other things, ambient operating conditions and engine-to-engine variability. Given both the wide array of products on which engines are placed and the variety of environmental issues applicable to operating the equipment, the gas engine will not develop the rated gross power when used in a given piece of power equipment (actual "on-site" or net power). This difference is due to a variety of factors including, but not limited to, accessories (air cleaner, exhaust, charging, cooling, carburetor, fuel pump, etc.), application limitations, ambient operating conditions (temperature, humidity, altitude), and engine-to-engine variability. Due to manufacturing and capacity limitations, Briggs & Stratton may substitute an engine of higher rated power for this Series engine.

STORAGE

Engines stored over 30 days need to be protected or drained of fuel to prevent gum from forming in fuel system or on essential carburetor parts.

For engine protection, we recommend use of Briggs & Stratton Fuel Stabilizer available from an Authorized Briggs & Stratton Service Dealer. Mix stabilizer with fuel in fuel tank or storage container. Run engine for a short time to circulate stabilizer through carburetor. Engine and fuel can be stored up to 24 months.

Note: If stabilizer is not used or if engine is operating on gasoline containing alcohol, e.g. gasohol, remove all fuel from tank and run engine until it stops from lack of fuel.

1. Change oil. See **Oil service**.
2. Remove spark plug and pour about 30 ml (1 oz) of engine oil into cylinder. Replace spark plug and crank slowly to distribute oil.
3. Clean chaff and debris from cylinder and cylinder head fins, under finger guard and behind muffler.
4. When removing the unit from storage, only use fresh gasoline. Perform operation checks, see maintenance schedule, before starting engine.

SERVICE

See an Authorized Briggs & Stratton Service Dealer. Each one carries a stock of Genuine Briggs & Stratton Parts and is equipped with special service tools. Trained mechanics assure expert repair service on all Briggs & Stratton engines. Only dealers advertising as "Authorized Briggs & Stratton" are required to meet Briggs & Stratton standards.

When you purchase equipment powered by a Briggs & Stratton engine, you are assured of highly skilled, reliable service at more than 30,000 Authorized Service Dealers worldwide, including more than 6,000 Master Service Technicians. Look for these signs wherever Briggs & Stratton service is offered.



Partial List of Genuine Briggs & Stratton Parts

<u>Part</u>	<u>Part No.</u>
Oil (48 oz.)	100028
Oil filter (6 cm long)	492932
Oil filter (9 cm long)	491056
Oil pump kit (uses electric drill to remove oil from engine)	5056
Fuel stabilizer (4.2 oz., 125 ml bottle)	5041
Fuel filter (without fuel pump)	298090
Fuel filter (with fuel pump)	691035
Fuel filter (with 9 qt. fuel tank on engine)	808116
Air cleaner cartridge (with 9 qt. fuel tank on engine)	393957
Air cleaner pre-cleaner (with 9 qt. fuel tank on engine)	271794
Air cleaner cartridge (all other models except model 380000)	394018
Air cleaner pre-cleaner (all other models except model 380000)	272490
Air cleaner cartridge (model 380000)	692519
Air cleaner pre-cleaner (model 380000)	692520
Resistor spark plug	491055 or 496018
Long life platinum spark plug (used on most OHV engines)	5066
Spark tester	19368

You may find the nearest Authorized Service Dealer in our dealer locator map at www.briggsandstratton.com or by calling 1-800-233-3723.