

COMMAND PRO CS SERIES 4-12 HP
HORIZONTAL CRANKSHAFT



KOHLER.
engines

**BORN
TO RUN™**

Safety Precautions

To insure safe operations please read the following statements and understand their meaning. Also refer to your equipment owner's manual for other important safety information. This manual contains safety precautions which are explained below. Please read carefully.



WARNING

Warning is used to indicate the presence of a hazard that *can* cause severe personal injury, death, or substantial property damage if the warning is ignored.



CAUTION

Caution is used to indicate the presence of a hazard that *will* or *can* cause *minor* personal injury or property damage if the warning is ignored.

NOTE

Note is used to notify people of installation, operation, or maintenance information that is important but not hazard-related.

For Your Safety!

These precautions should be followed at all times. Failure to follow these precautions could result in injury to yourself and others.

WARNING
<p>Explosive Fuel can cause fires and severe burns.</p> <p>Stop engine before filling fuel tank.</p>

Explosive Fuel!

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Do not fill the fuel tank while the engine is hot or running, since spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Do not start the engine near spilled fuel. Never use gasoline as a cleaning agent.

WARNING
<p>Rotating Parts can cause severe injury.</p> <p>Stay away while engine is in operation.</p>

Rotating Parts!

Keep hands, feet, hair, and clothing away from all moving parts to prevent injury. Never operate the engine with covers, shrouds, or guards removed.

WARNING
<p>Hot Parts can cause severe burns.</p> <p>Do not touch engine while operating or just after stopping.</p>

Hot Parts!

Engine components can get extremely hot from operation. To prevent severe burns, do not touch these areas while the engine is running—or immediately after it is turned off. Never operate the engine with heat shields or guards removed.

CAUTION
<p>Electrical Shock can cause injury.</p> <p>Do not touch wires while engine is running.</p>

Electrical Shock!

Never touch electrical wires or components while the engine is running. They can be sources of electrical shock.

California Proposition 65 Warning
<p><i>Engine exhaust from this product contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.</i></p>



Safety Precautions (Cont.)

 WARNING

Accidental Starts can cause severe injury or death. Disconnect and ground spark plug lead before servicing.



Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

 WARNING

Carbon Monoxide can cause severe nausea, fainting or death. Do not operate engine in closed or confined area.

Lethal Exhaust Gases!

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled. Avoid inhaling exhaust fumes, and never run the engine in a closed building or confined area.

 WARNING

Explosive Gas can cause fires and severe acid burns. Charge battery only in a well ventilated area. Keep sources of ignition away.

Explosive Gas!

Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.

Before disconnecting the negative (-) ground cable, make sure all switches are OFF. If ON, a spark will occur at the ground cable terminal which could cause an explosion if hydrogen gas or gasoline vapors are present.

Congratulations – You have selected a fine four-cycle, single cylinder, air-cooled engine. Kohler designs long life strength and on-the-job durability into each engine...making a Kohler engine dependable...dependability you can count on. Here are some reasons why:

- Efficient overhead valve design and splash lubrication provide maximum power, torque, and reliability under all operating conditions.
- Dependable, maintenance free electronic ignition ensures fast, easy starts time after time.
- Kohler engines are easy to service. All routine service areas (like the oil fill/check plug, air cleaner, spark plug, and carburetor) are easily and quickly accessible.
- Parts subject to the most wear and tear (like the cylinder liner, crankshaft, and camshaft) are made from precision formulated cast iron. Because the cylinder liner can be rebored, these engines can last even longer.
- Every Kohler engine is backed by a worldwide network of over 10,000 distributors and dealers. Service support is just a phone call away. Call 1-800-544-2444 (U.S. & Canada) for Sales & Service assistance.

To keep your engine in top operating condition, follow the maintenance procedures in this manual.

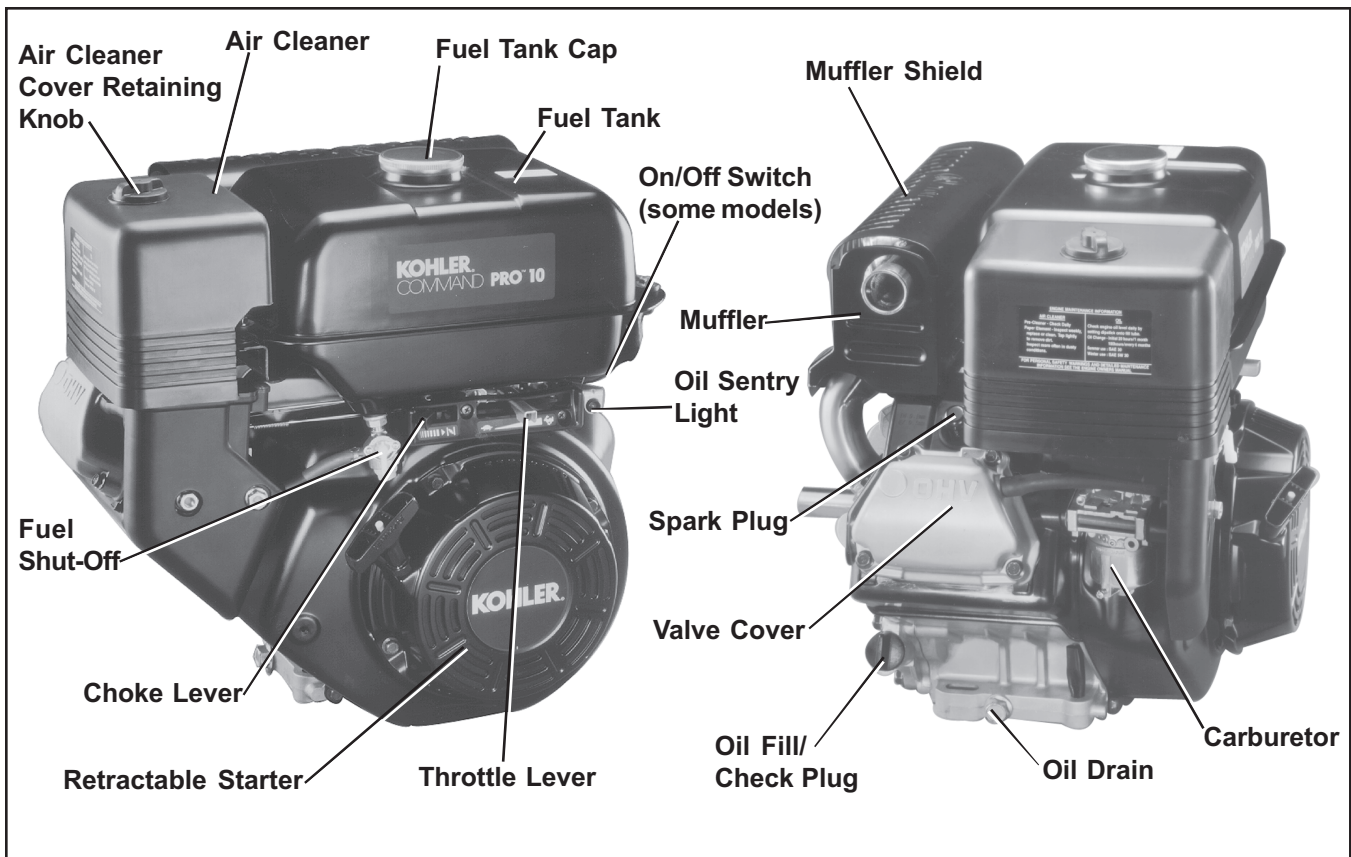


Figure 1. Location of Controls and Service Points on CS Engines.

Oil Recommendations

Using the proper type and weight of oil in the crankcase is extremely important. So is checking oil daily and changing oil regularly. Failure to use the correct oil, or using dirty oil, causes premature engine wear and failure.

NOTE: Using other than service class SG, SH, SJ or higher oil or extending oil change intervals longer than recommended can cause engine damage.

Oil Type

Use high quality detergent oil of **API (American Petroleum Institute) service class SG, SH, SJ or higher**. Select the viscosity based on the air temperature at the time of operation as shown in the following table.

A logo or symbol on oil containers identifies the API service class and SAE viscosity grade. See Figure 3.

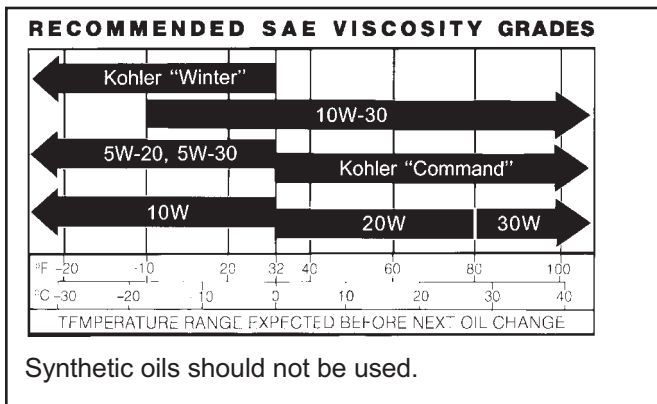


Figure 2. Viscosity Grades Table.



Figure 3. Oil Container Logo.

Refer to "Maintenance Instructions" beginning on page 8 for detailed oil check and oil change procedures.

Fuel Recommendations



WARNING: Explosive Fuel!

Gasoline is extremely flammable and its vapors can explode if ignited. Store gasoline only in approved containers, in well ventilated, unoccupied buildings, away from sparks or flames. Do not fill the fuel tank while the engine is hot or running, since spilled fuel could ignite if it comes in contact with hot parts or sparks from ignition. Do not start the engine near spilled fuel. Never use gasoline as a cleaning agent.

General Recommendations

Purchase gasoline in small quantities and store in clean, approved containers. A container with a capacity of 2 gallons or less with a pouring spout is recommended. Such a container is easier to handle and helps eliminate spillage during refueling.

Do not use gasoline left over from the previous season, to minimize gum deposits in your fuel system and to insure easy starting.

Do not add oil to the gasoline.

Do not overfill the fuel tank. Leave room for the fuel to expand.

Fuel Type

For best results use only clean, fresh, **unleaded** gasoline with a pump sticker octane rating of 87 or higher. In countries using the Research method, it should be 90 octane minimum.

Unleaded gasoline is recommended as it leaves less combustion chamber deposits. Leaded gasoline may be used in areas where unleaded is not available and exhaust emissions are not regulated. Be aware however, that the cylinder head will require more frequent service.

Gasoline/Alcohol blends

Gasohol (up to 10% ethyl alcohol, 90% unleaded gasoline by volume) is approved as a fuel for Kohler engines. Other gasoline/alcohol blends are not approved.

Gasoline/Ether blends

Methyl Tertiary Butyl Ether (MTBE) and unleaded gasoline blends (up to a maximum of 15% MTBE by volume) are approved as a fuel for Kohler engines. Other gasoline/ether blends are not approved.

Engine Identification Numbers

When ordering parts, or in any communication involving an engine, always give the **Model, Specification, and Serial Numbers** of the engine.

The engine identification numbers appear on decal (or decals) affixed to the engine shrouding. Include letter suffixes, if there are any.

Record your engine identification numbers on the identification label below (Figure 4) for future reference.

IMPORTANT ENGINE INFORMATION
THIS ENGINE CONFORMS TO U.S.
EPA PHASE 1 & 1995-2001
CALIFORNIA EMISSION CONTROL
REGULATIONS FOR SORE*

FAMILY
MODEL NO.
SPEC. NO.
DISPL (CC)
SERIAL NO.

REFER TO OWNER'S MANUAL FOR
SAFETY, MAINTENANCE SPECS, AND
ADJUSTMENTS. FOR SALES AND
SERVICE IN US/CANADA CALL:
1-800-544-2444

KOHLERengines

KOHLER CO. KOHLER, WI USA
(Ref.***-*****)

If your engine has this identification label, it is certified to meet EPA/CARB standards.
***Small Off-Road Engines.**

Figure 4. Engine Identification Label.

Operating Instructions

Also read the operating instructions of the equipment this engine powers.

Pre-Start Checklist

NOTE: This engine has been shipped without engine oil. Fill with oil, otherwise it will not start.

- Check oil level. Add oil if low. Do not overfill.
- Check fuel level. Add fuel if low.
- Check cooling air intake areas and external surfaces of engine. Make sure they are clean and unobstructed.
- Check that the air cleaner components and all shrouds, equipment covers, and guards are in place and securely fastened.
- Check that any clutches or transmissions are disengaged or placed in neutral.



WARNING: Lethal Exhaust Gases!

Engine exhaust gases contain poisonous carbon monoxide. Carbon monoxide is odorless, colorless, and can cause death if inhaled. Avoid inhaling exhaust fumes, and never run the engine in a closed building or confined area.

Cold Weather Starting Hints

1. Be sure to use the proper oil for the temperature expected. See Figure 2 on page 4.
2. Declutch all possible external loads.
3. Set speed control at part throttle position.
4. A warm battery has much more starting capacity than a cold battery.
5. Use fresh winter grade fuel. NOTE: Winter grade gasoline has a higher volatility to improve starting. Do not use gasoline left over from summer.

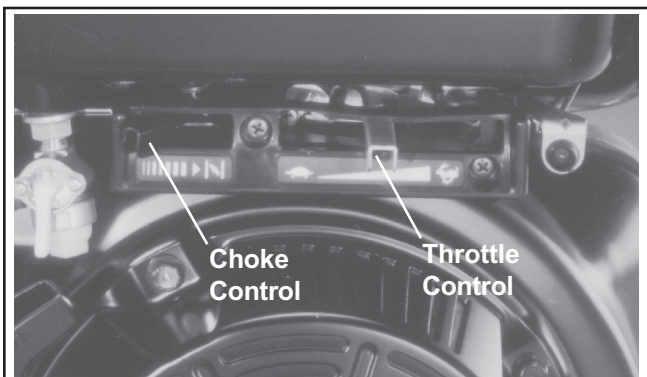


Figure 5. Control Panel.

Starting

1. Turn fuel shut-off valve to “on” position. See Figure 6.

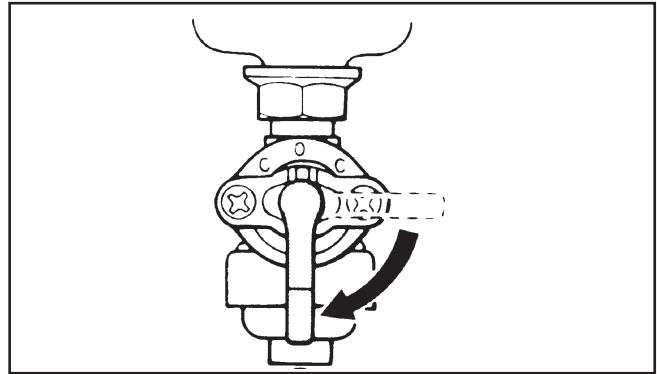


Figure 6. “On” Position of Fuel Shut-Off Valve.

2. **For a Cold Engine** – Place the throttle control midway between the “slow” and “fast” positions. See Figure 5. Place the choke control into the “on” position.

For a Warm Engine (normal operating temperatures) – Place the throttle control midway between the “slow” and “fast” positions. The choke is not required to start a warm engine.

3. Start the engine as follows:

For Retractable Start Engine – Turn engine On/Off switch to “on” (see Figure 7) and SLOWLY pull the starter handle until just past compression – STOP! Return starter handle, pull firmly with a smooth, steady motion to start. Pull the handle straight out to avoid excessive rope wear from the starter rope guide.

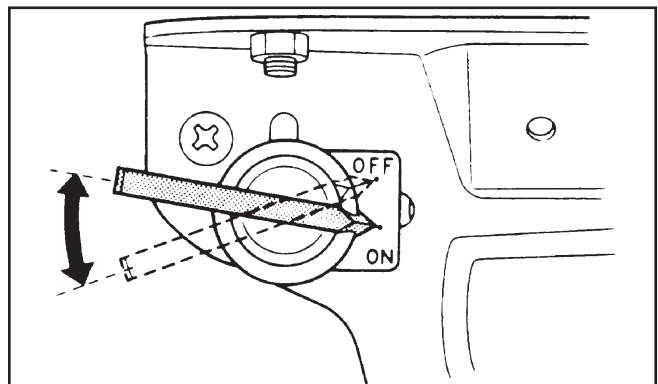


Figure 7. Retractable Start Engine On/Off Switch.

Extend the starting rope periodically and check its condition. If the rope is frayed, have it replaced immediately by your Kohler Engine Service Dealer.



WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

For an Electric Start Engine – Activate the starter switch. Release the switch as soon as the engine starts.

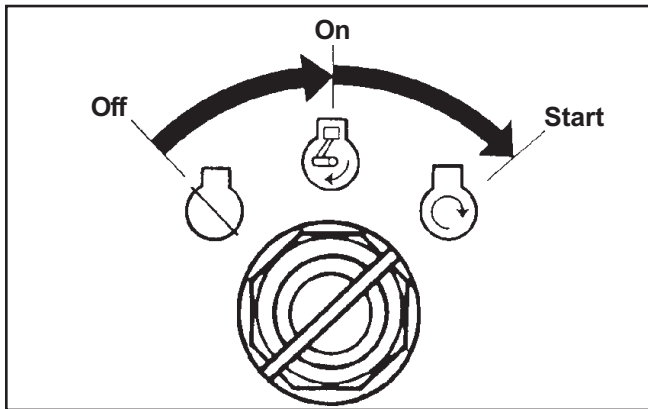


Figure 8. Electric Start Engine Starter Switch.

NOTE: Do not crank the engine continuously for more than 10 seconds at a time. If the engine does not start, allow a 60 second cool down period between starting attempts. Failure to follow these guidelines can burn out the starter motor.

NOTE: If the engine develops sufficient speed to disengage the starter but does not keep running (a false start), the engine rotation must be allowed to come to a complete stop before attempting to restart the engine. If the start is engaged while the flywheel is rotating, the starter pinion and flywheel ring gear may clash, resulting in damage to the starter.

If the starter does not turn the engine over, shut off starter immediately. Do not make further attempts to start the engine until the condition is corrected. Do not jump start using another battery (refer to "Battery"). See your Kohler Engine Service Dealer for trouble analysis.

4. **For a Cold Engine** – Gradually return the choke control to the “off” position after the engine starts and warms up.

The engine/equipment may be operated during the warm up period, but it may be necessary to leave the choke partially on until the engine warms up.

Stopping

1. If possible, remove the load.
2. Move the throttle control to the “slow” or “low” idle position. Allow the engine to run at idle for 30-60 seconds.
3. Move the throttle control to the “slow” position. Turn key switch or on/off switch to “off” position.
4. Close fuel shut-off valve.

Battery

A 12 volt battery is normally used. Refer to the operating instructions of the equipment this engine powers for specific battery requirements.

If the battery charge is not sufficient to crank the engine, recharge the battery (see page 12).

Operating

Angle of Operation

This engine will operate continuously at angles up to 20°. Check oil level to assure crankcase oil is up to the point of overfilling the filler neck.

Refer to the operating instructions of the equipment this engine powers. Because of equipment design or application, there may be more stringent restrictions regarding the angle of operation.

NOTE: Do not operate this engine continuously at angles exceeding 20° in any direction. Engine damage could result from insufficient lubrication.

Cooling

NOTE: If debris builds up on the grass screen or other cooling air intake areas, stop the engine immediately and clean. Operating the engine with blocked or dirty air intake and cooling areas can cause extensive damage due to overheating.



WARNING: Hot Parts!

Engine components can get extremely hot from operation. To prevent severe burns, do not touch these areas while the engine is running—or immediately after it is turned off. Never operate the engine with heat shields or guards removed.

Engine Speed

NOTE: Do not tamper with the governor setting to increase the maximum engine speed. Overspeed is hazardous and will void the engine warranty.

Maintenance Instructions

Maintenance, repair, or replacement of the emission control devices and systems, which are being done at the customer's expense, may be performed by any non-road engine repair establishment or individual. Warranty repairs must be performed by an authorized Kohler service outlet.



WARNING: Accidental Starts!

Disabling engine. Accidental starting can cause severe injury or death. Before working on the engine or equipment, disable the engine as follows: 1) Disconnect the spark plug lead(s). 2) Disconnect negative (-) battery cable from battery.

Maintenance Schedule

These required maintenance procedures should be performed at the frequency stated in the table. They should also be included as part of any seasonal tune-up.

Frequency	Maintenance Required
Daily or Before Starting Engine	<ul style="list-style-type: none"> • Fill fuel tank. • Check oil level. • Check air cleaner for dirty, loose, or damaged parts.¹ • Check air intake and cooling areas, clean as necessary.¹ • Check fuel hose for cracks or damage. Replace if necessary. • Check exhaust system for leakage. Retighten or replace gasket if necessary.² • Check choke operation. • Check retractable starter operation.
Every 25 Hours	<ul style="list-style-type: none"> • Service precleaner element. Replace if necessary.¹
Every 100 Hours	<ul style="list-style-type: none"> • Change oil. • Replace air cleaner element.¹ • Remove cooling shrouds and clean cooling areas.¹ • Check all fittings and fasteners. • Clean fuel valve shut-off filter. Replace if necessary. • Check muffler screen/spark arrestor. Clean/replace if necessary. • Check spark plug condition, adjust gap, and clean. Replace if necessary.
Annually or Every 300 Hours	<ul style="list-style-type: none"> • Check and adjust valve clearance when engine is cold.² • Check and adjust idle speed. • Service starter motor drive, if so equipped.² • Check cooling fan for damage. • Have combustion chamber decarbonized.²

¹Perform these maintenance procedures more frequently under extremely dusty, dirty conditions.

²Have a Kohler Engine Service Dealer perform this service.

Check Oil Level

The importance of checking and maintaining the proper oil level in the crankcase cannot be overemphasized.

Check oil **BEFORE EACH USE** as follows:

1. Make sure the engine is stopped, level, and is cool so the oil has had time to drain into the sump.
2. To keep dirt, debris, etc., out of the engine, clean the area around the oil fill/check plug before removing it.
3. Unthread and remove the oil fill/check plug.
4. The level should be up to but not over, the point of overflowing the filler neck.

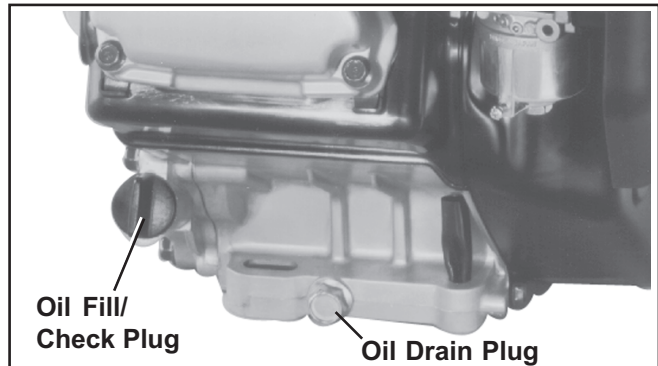


Figure 9. Location of Oil Drain and Check Plugs.

NOTE: Just because you can see oil in the crankcase doesn't mean the level is in the safe range. Bring the level up to the point of overflowing the filler neck.

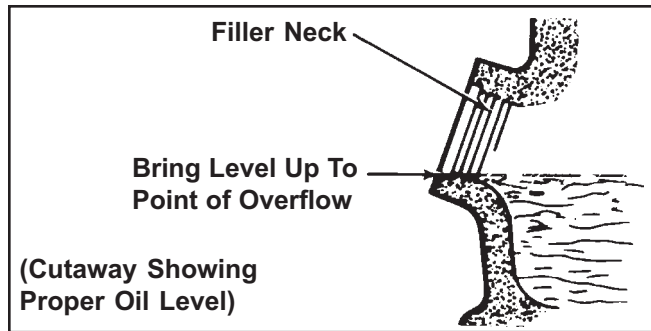


Figure 10. Proper Oil Level.

- If the level is low, add oil of the proper type, up to the point of overflowing the filler neck. (Refer to "Oil Type" on page 4.) Always check the level before adding more oil.

NOTE: To prevent extensive engine wear or damage, always maintain the proper oil level in the crankcase. Never operate the engine with the oil level below the point of overflowing the filler neck.

Oil Sentry™

Engines are equipped with an Oil Sentry™ oil monitor. When the oil level falls below the safe level, the engine stops automatically. Unless you refill with oil, the engine will not start again. See Figure 11.

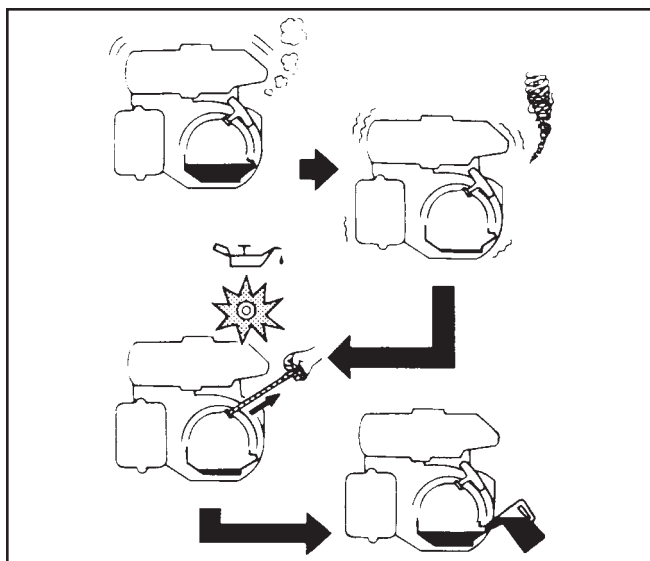


Figure 11.

NOTE: If the engine stalls or does not start, turn the engine switch to "on" position and then pull the recoil starter or attempt to start engine. If the oil warning light flickers for a few seconds, the engine oil is insufficient. Add oil and restart.

NOTE: Make sure the oil level is checked BEFORE EACH USE and is maintained up to the point of overflowing the filler neck.

Change Oil

For a new engine, change oil after the first **20 hours** of operation. Thereafter, change oil after every **100 hours** of operation.

For an overhauled engine, use *10W-30 – weight* service class SG, SH, SJ or higher oil for the first **20 hours** of operation. Change the oil after this initial run-in period. Refill with service class SG, SH, SJ or higher oil as specified in the "Viscosity Grades" table (Figure 2) on page 4.

Change the oil while the engine is still warm. The oil will flow freely and carry away more impurities. Make sure the engine is level when filling, checking, or changing the oil.

Change the oil as follows (see Figure 9):

- To keep dirt, debris, etc., out of the engine, clean the area around the oil fill cap/dipstick before removing it.
- Remove the oil drain plug and oil fill/check plug. Be sure to allow ample time for complete drainage.
- Reinstall the drain plug. Make sure it is tightened to **17.6 N·m (13 ft. lb.)** torque.
- Fill the crankcase, with new oil of the proper type, up to the point of overflowing the filler neck. Refer to "Oil Type" on page 4. Always check the level before adding more oil.
- Reinstall the oil fill/check plug and tighten securely.

NOTE: To prevent extensive engine wear or damage, always maintain the proper oil level in the crankcase. Never operate the engine with the oil level below the point of overflowing the filler neck.

Reduction Systems

2:1 Reduction Systems

All 2:1 reduction systems are lubricated by the crankcase oil of the engine through special openings in the closure plate. No special maintenance or service is necessary. Check and maintain the oil level as outlined on pages 8 and 9.

6:1 Reduction Systems

CS4 and CS6: Use an internal pinion and ring gear system, independent of, and separated from the main crankcase lubrication. See Figure 12. Use the same weight oil in the reduction system that is being used in the crankcase. **Reduction System Capacity=.15 liters (5.07 fl. oz.).** Change the reduction system oil every 300 hours as follows:

1. Drain old oil out through the oil level/drain plug, tip engine as required.
2. Engine must be level. Fill with new oil through the oil fill plug hole on top until the oil level is up to the bottom of the oil level/drain plug hole. Reinstall both plugs securely.

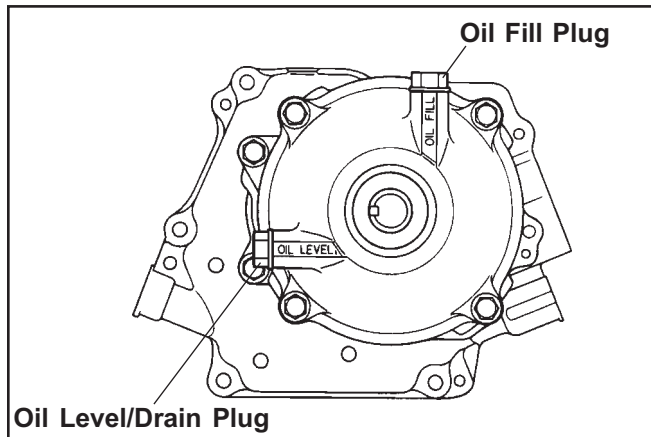


Figure 12. CS4 and CS6 6:1 Reduction System.

CS8.5, CS10, and CS12: Use a gear reduction system which is lubricated by the crankcase oil of the engine through holes in the closure plate. No special maintenance or service is necessary.

Service Precleaner and Air Cleaner Element

This engine is equipped with a replaceable, high density paper air cleaner element. All engines are also equipped with an oiled, foam precleaner which covers the paper element. See Figure 13 on page 11.

Check the air cleaner **daily or before starting the engine.** Check for a buildup of dirt and debris around the air cleaner system. Keep this area clean. Also check for loose or damaged components. Replace all bent or damaged air cleaner components.

NOTE: Operating the engine with loose or damaged air cleaner components could allow unfiltered air into the engine causing premature wear and failure.

Service Precleaner

Wash and reoil the precleaner every **25 hours** of operation (more often under extremely dusty or dirty conditions).

1. Remove the outer cover of the air cleaner assembly and access the element.
2. Remove the precleaner from the paper element.
3. Wash the precleaner in warm water with detergent. Rinse the precleaner thoroughly until all traces of detergent are eliminated. Squeeze out excess water (do not wring). Allow the precleaner to air dry.
4. Saturate the precleaner with new engine oil and squeeze out all excess oil.
5. Reinstall the precleaner over the paper element.
6. Reinstall and secure the air cleaner cover.

Service Paper Element

Every **100 hours** of operation (more often under extremely dusty or dirty conditions), replace the paper element.

1. Remove the outer cover of the air cleaner assembly and access the element/precleaner assembly. Remove the wing nut securing the element assembly, or pull the complete assembly out of the cover/housing (some Heavy Duty Air Cleaners). Separate the precleaner from the element and service as outlined above.
2. Do not wash the paper element or **use pressurized air**, as this will damage the element. Replace a dirty, bent, or damaged element with a genuine Kohler element. Handle new elements carefully; do not use if the sealing surfaces are bent or damaged.
3. When servicing the air cleaner, check the air cleaner base. Make sure it is secured and not bent or damaged. Check the air cleaner cover/housing for damage or improper fit. Replace all bent or damaged air cleaner components.

On Standard Air Cleaner Systems:

Before air cleaner is reassembled make sure rubber seal is in position around stud. Inspect seal and replace if its condition is questionable in any way.

On Heavy Duty Air Cleaner Systems:

Remove and clean the lower dirt/swirl chamber. Make sure the openings near the base of chamber and in the air cleaner cover/housing, are not blocked or restricted. See Figure 13.

- 4. Position the paper element on base and secure with wing nut, then install the precleaner over the element. If element is not secured with a wing nut (some Heavy Duty Cleaners), place the precleaner over the element and install it as an assembly into the cover/housing. Narrow end must be installed first and face away from base.
- 5. Reinstall and secure the outer cover/housing.

Clean Air Intake/Cooling Areas

To ensure proper cooling, make sure the grass screen, cooling fins, and other external surfaces of the engine are kept clean **at all times**.

Every **100 hours** of operation (more often under extremely dusty, dirty conditions), remove the blower housing and other cooling shrouds. Clean the cooling fins and external surfaces as necessary. Make sure the cooling shrouds are reinstalled.

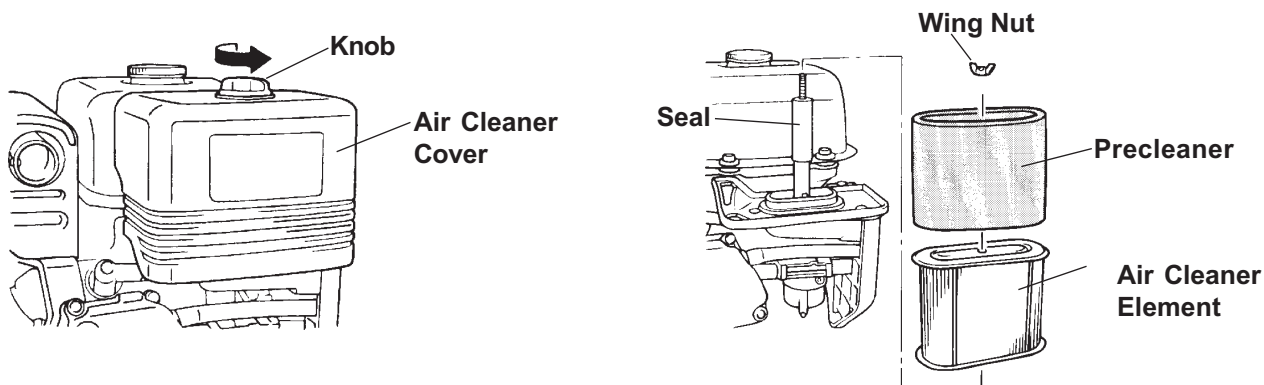
NOTE: Operating the engine with a blocked grass screen, dirty or plugged cooling fins, and/or cooling shrouds removed, will cause engine damage due to overheating.

Ignition System

This engine is equipped with a dependable electronic magneto ignition system. Other than periodically checking/replacing the spark plug, no maintenance, timing, or adjustments are necessary or possible with this system.

In the event starting problems should occur which are not corrected by replacing the spark plug, see your Kohler Engine Service Dealer for trouble analysis.

Standard Dual Air Cleaner System



Heavy Duty Air Cleaner System

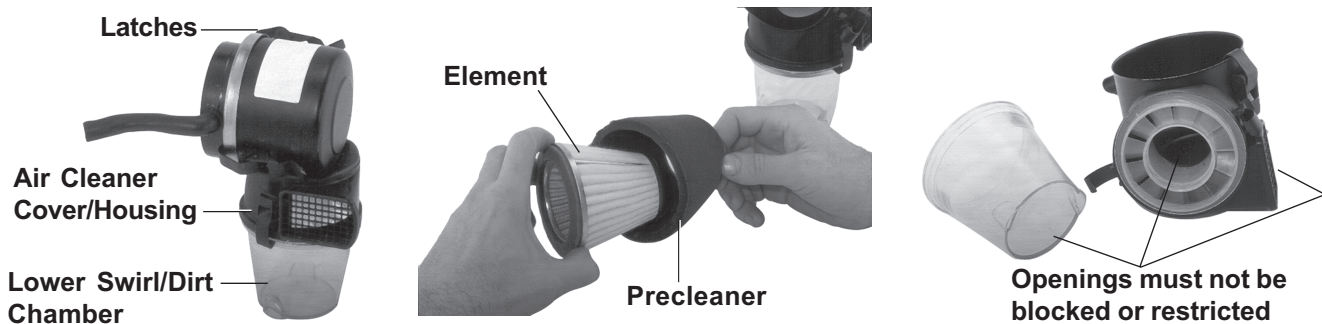


Figure 13. Air Cleaner System Components.

Check Spark Plug

Annually or every **100 hours** of operation, remove the spark plug, check condition, and reset the gap or replace with new plug as necessary. Use a NGK BPR4ES/Champion® RN14YC (or equivalent) spark plug.

1. Before removing the spark plug, clean the area around the base of the plug to keep dirt and debris out of the engine.
2. Remove the plug and check its condition. Replace the plug if worn or reuse is questionable.

NOTE: Do not clean the spark plug in a machine using abrasive grit. Some grit could remain in the spark plug and enter the engine causing extensive wear and damage.

3. Check the gap using a wire feeler gauge. Adjust the gap to **0.7/0.8 mm (0.028/0.031 in.)** by carefully bending the ground electrode. See Figure 14.
4. Reinstall the spark plug into the cylinder head. Torque the spark plug to **20 N·m (14 ft. lb.)**.

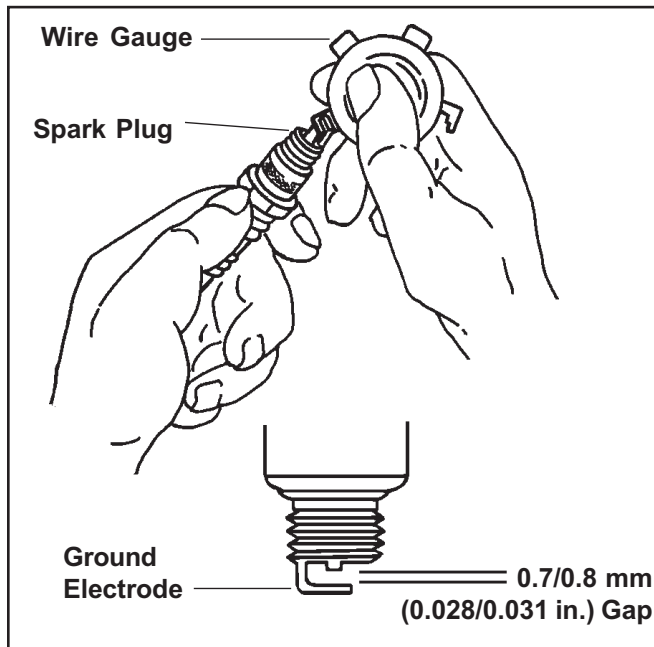


Figure 14. Servicing Spark Plug.

Battery Charging



WARNING: Explosive Gas!

Batteries produce explosive hydrogen gas while being charged. To prevent a fire or explosion, charge batteries only in well ventilated areas. Keep sparks, open flames, and other sources of ignition away from the battery at all times. Keep batteries out of the reach of children. Remove all jewelry when servicing batteries.

Before disconnecting the negative (-) ground cable, make sure all switches are OFF. If ON, a spark will occur at the ground cable terminal which could cause an explosion if hydrogen gas or gasoline vapors are present.

NOTE: Do not apply 12 volt DC to kill terminal of ignition module.

Fuel Valve

Engines are equipped with a fuel valve and integral screen filter located at the outlet of the fuel tank. See Figure 15. It controls and filters fuel flow from the tank to the carburetor.

Every 100 hours of operation clean filter screen and cup of any accumulated debris as follows:



CAUTION!

Never use or be near fuel or solvent while smoking or in the vicinity of an open flame.

1. Stop the engine.
2. Turn the fuel valve lever to “off.”
3. Remove the fuel valve cup and gasket.
4. Clean the cup with solvent and wipe it off.
5. Check the gasket, replace if damaged.
6. Reinstall the gasket and fuel valve cup.



CAUTION!

Be sure the fuel valve cup is tightened securely.

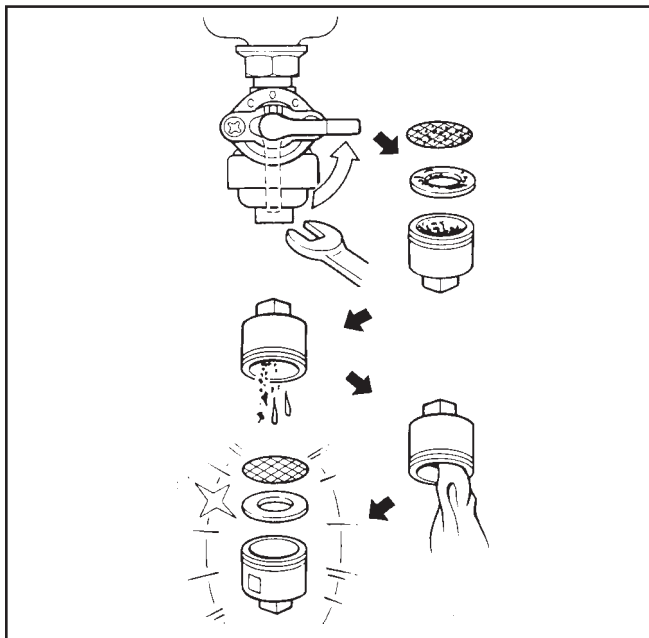


Figure 15.

Fuel Tank Filter

A serviceable fuel tank filter is located under the fuel tank cap within the tank inlet to filter incoming fuel.

Daily or as required clean filter of any accumulation as follows:

1. Remove the fuel tank cap and filter.
2. Clean the filter with solvent, replace if damaged.
3. Wipe the filter and insert it.

⚠ CAUTION!

Be sure the tank cap is tightened securely.

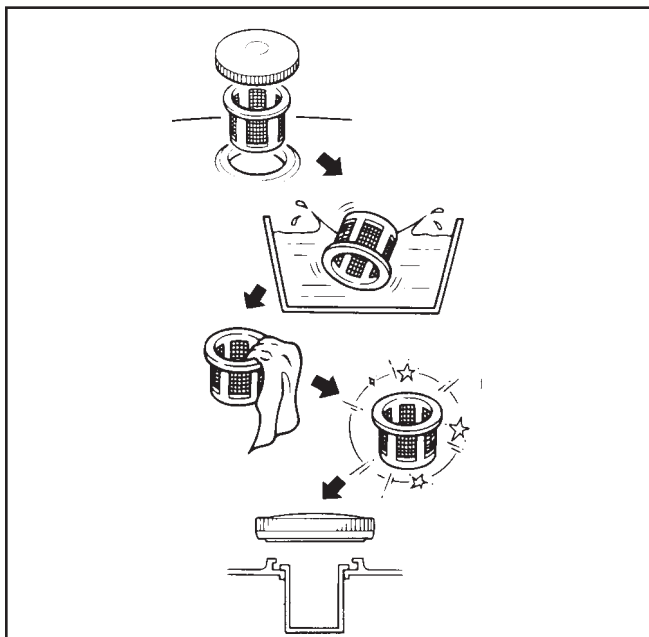


Figure 16.

Muffler Screen and Spark Arrestor

Engines are equipped with a muffler screen and spark arrestor for operational and environmental safety. One of two configurations will be used, determined by the engine model involved.

Every **100 hours** of operation, remove and clean or replace the muffler screen and/or spark arrestor following the instructions below.

Muffler Screen CS4,CS6

⚠ CAUTION!

The engine and muffler will be very hot after the engine has been run.

Avoid touching the engine and muffler while they are still hot with any part of your body or clothing during inspection or repair.

1. Remove the muffler screen.
2. Clean the carbon deposits out of the muffler screen using a wire brush.
3. Check the muffler screen, replace if damaged.
4. Install the muffler screen.

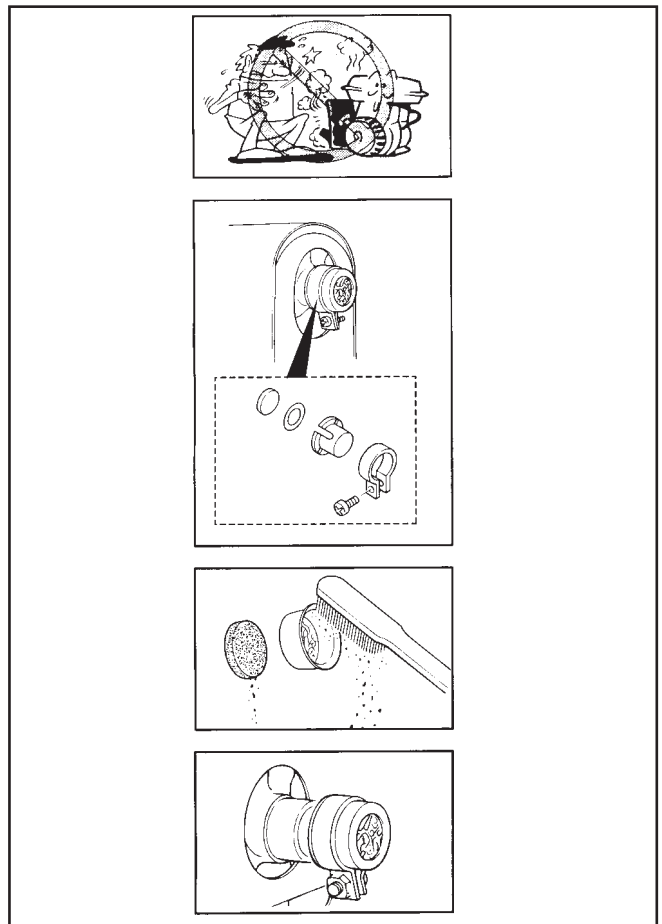


Figure 17. Muffler Screen.

Muffler Screen and Spark Arrestor CS8.5,CS10,CS12

CAUTION!

The engine and muffler will be very hot after the engine has been run.

Avoid touching the engine and muffler while they are still hot with any part of your body or clothing during inspection or repair.

1. Remove the muffler screen.
2. Remove the spark arrestor using a flathead screwdriver.
3. Clean the carbon deposits out of the muffler screen and spark arrestor using a wire brush.

CAUTION!

When cleaning, use the wire brush lightly to avoid damaging or scratching of the muffler screen and spark arrestor.

4. Check the muffler screen and spark arrestor, replace if damaged.
5. Install the spark arrestor and muffler screen.

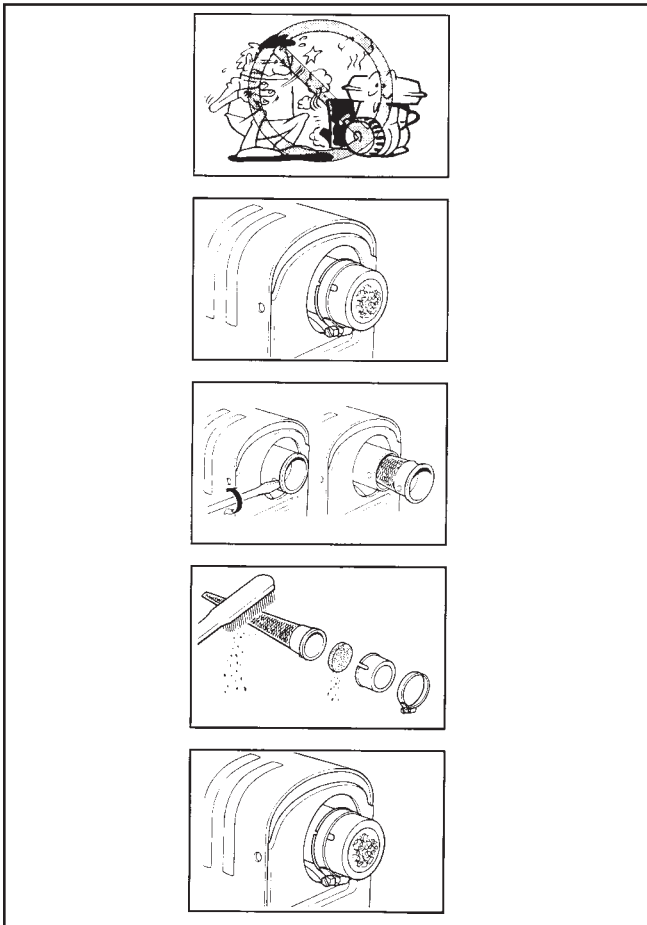


Figure 18. Muffler Screen and Spark Arrestor.

Carburetor Troubleshooting and Adjustments

NOTE: Carburetor adjustments should be made only after the engine has warmed up.

The carburetor is designed to deliver the correct fuel-to-air mixture to the engine under all operating conditions. The high idle is set at the factory and cannot be adjusted. The low idle fuel adjusting needle is also set at the factory and has a limiting cap. It normally does not need adjustment.

If the engine is hard to start, runs roughly, or stalls at low idle speed, it may be necessary to adjust or service the carburetor.

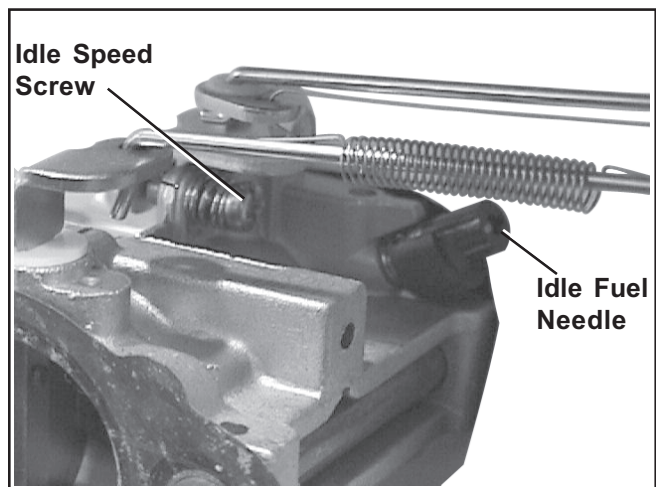


Figure 19. Carburetor.

Troubleshooting

If engine troubles are experienced that appear to be fuel system related, check the following areas before adjusting the carburetor.

- Make sure the fuel tank is filled with clean, fresh gasoline.
- Make sure the fuel tank cap vent is not blocked and that it is operating properly.
- Make sure the fuel shut-off valve is fully open.
- Make sure fuel shut-off valve strainer, and in-line fuel filter (if used) are clean and unobstructed. Clean or replace as necessary.

-
- Make sure fuel is reaching the carburetor. This includes checking the fuel lines and components for restrictions or problems. Replace as necessary.
 - Make sure On-Off switch is functioning properly.
 - Make sure the air cleaner element is clean and all air cleaner components are fastened securely.

If, after checking the items listed above, the engine is hard to start, runs roughly, or stalls at low idle speed, it may be necessary to adjust or service the carburetor.

Adjust Carburetor

NOTE: Certified engines have a limiter cap on the idle fuel adjusting needle. Adjustment can only be performed within the limits allowed by the cap.

1. Start the engine and run at half throttle for 5 to 10 minutes to warm up. The engine must be warm before making final settings.

2. **Low Idle Fuel Needle Setting:** Place the throttle into the “idle” or “slow” position. Turn the low idle fuel adjusting needle/cap in or out within adjustment range, to obtain the best low speed performance.
3. **Low Idle Speed Setting:** Place the throttle control into the “idle” or “slow” position. Set the low idle speed to **2000 RPM*** (\pm 150 RPM) by turning the low idle speed adjusting screw **in or out**. Check the speed using a tachometer.

*NOTE: The actual low idle speed depends on the application – refer to equipment manufacturer's recommendations. The recommended low idle speed for basic engines is 2000 RPM. To ensure best results when setting the low idle fuel needle, the low idle speed must not exceed 2000 RPM (\pm 150 RPM).

Troubleshooting

When troubles occur, be sure to check the simple causes which, at first, may seem too obvious to be considered. For example, a starting problem could be caused by an empty fuel tank. Some common causes of engine troubles are listed in the following table.

Do not attempt to service or replace major engine components, or any items that require special timing or adjustment procedures. Have your Kohler Engine Service Dealer do this work.

Possible Cause Problem	No Fuel	Improper Fuel	Dirt In Fuel Line	Dirty Grass Screen	Incorrect Oil Level	Engine Overloaded	Dirty Air Cleaner	Faulty Spark Plug
Will Not Start	•		•		•	•	•	•
Hard Starting	•	•	•			•	•	•
Stops Suddenly	•		•	•	•	•	•	
Lacks Power		•	•	•	•	•	•	•
Operates Erratically		•	•	•		•	•	•
Knocks or Pings		•		•		•		•
Skips or Misfires		•	•	•			•	•
Backfires			•			•	•	•
Overheats			•	•	•	•	•	
High Fuel Consumption							•	•

Storage

If the engine will be out of service for two months or more, use the following storage procedure:

1. Clean the exterior surfaces of the engine.
2. Change the oil while the engine is still warm from operation. See "Change Oil" on page 9.
3. The fuel system must be completely emptied, or the gasoline must be treated with a stabilizer to prevent deterioration. If you choose to use a stabilizer, follow the manufacturers recommendations, and add the correct amount for the capacity of the fuel system. Fill the fuel tank with clean, fresh gasoline. Run the engine for 2-3 minutes to get stabilized fuel into the carburetor.

To empty the system, run the engine until the tank and system are empty.
4. Remove the spark plug. Add one tablespoon of engine oil into the spark plug hole. Install the plug, but do not connect the plug lead. Crank the engine two or three revolutions.
5. Remove the spark plug. Cover the spark plug hole with your thumb, and turn the engine over until the piston is at the top of its stroke. (Pressure against the thumb is greatest.) Reinstall the plug, but do not connect the plug lead.
6. Store the engine in a clean, dry place.

Parts Ordering

The engine Specification, Model, and Serial Numbers are required when ordering replacement parts from your Kohler Engine Service Dealer. These numbers are found on the identification plate which is affixed to the engine shrouding. Include letter suffixes if there are any. See "Engine Identification Numbers" on page 5.

Always insist on genuine Kohler parts. All genuine Kohler parts meet strict standards for fit, reliability, and performance.

Major Repair

Major repair information is available in Kohler Engine Service Manuals. However, major repair generally requires the attention of a trained mechanic and the use of special tools and equipment. Your Kohler Engine Service Dealer has the facilities, training, and genuine Kohler replacement parts necessary to perform this service. For Sales & Service assistance call 1-800-544-2444 (U.S. & Canada) or contact your Kohler Engine Dealer or Service Distributor, they're in the Yellow Pages under Engines-Gasoline.

Model Designation

Model CS4T for example: C designates Command engine, S designates slanted cylinder configuration, and 4 designates horsepower. A suffix letter designates a specific version as follows:

Suffix	Designates
T	Retractable Start
S	Electric Start
G	Tapered Crankshaft
P	Threaded Crankshaft
R	Gear Reduction (2:1 or 6:1)

Specifications

Model:	.....	CS4	.....	CS6	.....	CS8.5	.....	CS10	.....	CS12		
Bore:	.....	in. (mm)	.....	2.20(56)	.....	2.60(66)	.....	3.07(78)	.....	3.07(78)	.....	3.35(85)
Stroke:	.....	in. (mm)	.....	1.97(50)	.....	1.97(50)	.....	2.48(63)	.....	2.48(63)	.....	2.48(63)
Displacement:	.....	in. ³ (cm ³)	.....	7.51(123)	.....	10.44(171)	.....	18.37(301)	.....	18.37(301)	.....	21.79(357)
Power (@ 3600 RPM):	.....	HP (kW)	.....	4(2.98)	.....	6*(4.47)	.....	8.5*(6.33)	.....	10*(7.45)	.....	12*(8.95)
Max. Torque:	.....	ft. lbs. (N·m)	.....	5.1(6.9)	.....	7.2(9.8)	.....	14.5(19.6)	.....	14.5(19.6)	.....	16.7(22.6)
Compression Ratio:	.....		.....	8.3:1	.....	8.5:1	.....	8.1:1	.....	8.1:1	.....	8.1:1
Weight (Approx.):	.....	lbs. (kg.)	.....	38.6(17.5)	.....	38.6(17.5)	.....	70.5(31.9)	.....	70.5(31.9)	.....	70.5(31.9)
Oil Capacity (Approx.):	.....	U.S. quarts (liters)	.....	0.6(0.6)	.....	0.6(0.60)	.....	1.2(1.1)	.....	1.2(1.1)	.....	1.2(1.1)
Fuel Tank Capacity (Approx.):	.....	U.S. quarts (liters)	.....	4.1(3.9)	.....	4.1(3.9)	.....	7.3(6.9)	.....	7.3(6.9)	.....	7.3(6.9)

*Horsepower ratings are established in accordance with Society of Automotive Engineers – Small Engine Test Code – J1349 GROSS. Kohler Co. reserves the right to change product specifications, design, and standard equipment without notice and without incurring obligation.

LIMITED 2 YEAR COMMAND ENGINE WARRANTY

We warrant to the original consumer that each new COMMAND engine sold by us will be free from manufacturing defects in materials or workmanship in normal service for a period of two (2) years from date of purchase, provided it is operated and maintained in accordance with Kohler Co.'s instructions and manuals.

Our obligation under this warranty is expressly limited, at our option, to the replacement or repair at Kohler Co., Kohler, Wisconsin 53044, or at a service facility designated by us of such parts as inspection shall disclose to have been defective.

EXCLUSIONS:

This warranty does not apply to defects caused by casualty or unreasonable use, including faulty repairs by others and failure to provide reasonable and necessary maintenance.

The following items are not covered by this warranty:

Engine accessories such as fuel tanks, clutches, transmissions, power-drive assemblies, and batteries, unless supplied or installed by Kohler Co. These are subject to the warranties, if any, of their manufacturers.

WE SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT, INCIDENTAL, OR CONSEQUENTIAL DAMAGES OF ANY KIND, including but not limited to labor costs or transportation charges in connection with the repair or replacement of defective parts.

ANY IMPLIED OR STATUTORY WARRANTIES, INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, ARE EXPRESSLY LIMITED TO THE DURATION OF THIS WRITTEN WARRANTY. We make no other express warranty, nor is any one authorized to make any in our behalf.

Some states do not allow limitations on how long an implied warranty lasts, or the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

TO OBTAIN WARRANTY SERVICE:

Purchaser must bring the engine to an authorized Kohler service facility. For the facility nearest you, consult your Yellow Pages or write Kohler Co., Attn: Engine Warranty Service Dept., Kohler, Wisconsin, 53044.

ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

**KOHLER CO.
FEDERAL AND CALIFORNIA EMISSION CONTROL SYSTEMS
LIMITED WARRANTY
UTILITY AND LAWN AND GARDEN ENGINES**

The U.S. Environmental Protection Agency (EPA), the California Air Resources Board (CARB), and Kohler Co. are pleased to explain the Federal and California Emission Control Systems Warranty on your utility/lawn/garden equipment engine (herein engine). For California, engines produced in 1995 and later must be designed, built and equipped to meet the state's stringent anti-smog standards. In other states, new 1997 and later model year engines must be designed, built and equipped, at the time of sale, to meet the U.S. EPA regulations for small non-road engines. The engine must be free from defects in materials and workmanship which cause it to fail to conform with U.S. EPA standards for the first two years of engine use from the date of sale to the ultimate purchaser. Kohler Co. must warrant the emission control system on the engine for the period of time listed above, provided there has been no abuse, neglect or improper maintenance.

The emission control system may include parts such as the carburetor or fuel injection system, the ignition system, and catalytic converter. Also included are the hoses, belts and connectors and other emission related assemblies.

Where a warrantable condition exists, Kohler Co. will repair the engine at no cost, including diagnosis (if the diagnostic work is performed at an authorized dealer), parts and labor.

MANUFACTURER'S WARRANTY COVERAGE

Engines produced in 1995 or later are warranted for two years in California. In other states, 1997 and later model year engines are warranted for two years. If any emission related part on the engine is defective, the part will be repaired or replaced by Kohler Co. free of charge.

OWNER'S WARRANTY RESPONSIBILITIES

- (a) The engine owner is responsible for the performance of the required maintenance listed in the owner's manual. Kohler Co. recommends that you retain all receipts covering maintenance on the engine, But Kohler Co. cannot deny warranty solely for the lack of receipts or for your failure to assure that all scheduled maintenance was performed.
- (b) Be aware, however, that Kohler Co. may deny warranty coverage if the engine or a part has failed due to abuse, neglect, improper maintenance or unapproved modifications.
- (c) For warranty repairs, the engine must be presented to a Kohler Co. service center as soon as a problem exists. Call 1-800-544-2444 for the names of the nearest service centers. The warranty repairs should be completed in a reasonable amount of time, not to exceed 30 days.

If you have any questions regarding warranty rights and responsibilities, you should contact Kohler Co. Engine Service at 1-920-457-4441.

COVERAGE

Kohler Co. warrants to the ultimate purchaser and each subsequent purchaser that the engine will be designed, built and equipped, at the time of sale, to meet all applicable regulations. Kohler Co. also warrants to the initial purchaser and each subsequent purchaser, that the engine is free from defects in materials and workmanship which cause the engine to fail to conform with applicable regulations for a period of two years.

Engines produced in 1995 or later are warranted for two years in California. For 1997 and later model years, EPA requires manufacturers to warrant engines for two years in all other states. These warranty periods will begin on the date the engine is purchased by the initial purchaser. If any emission related part on the engine is defective, the part will be replaced by Kohler Co. at no cost to the owner. Kohler Co. is liable for damages to other engine components caused by the failure of a warranted part still under warranty.

Kohler Co. shall remedy warranty defects at any authorized Kohler Co. engine dealer or warranty station. Warranty repair work done at an authorized dealer or warranty station shall be free of charge to the owner if such work determines that a warranted part is defective.

Listed below are the parts covered by the Federal and California Emission Control Systems Warranty. Some parts listed below may require scheduled maintenance and are warranted up to the first scheduled replacement point for that part. The warranted parts are:

- Oxygen sensor (if equipped)
- Intake manifold (if equipped)
- Exhaust manifold (if equipped)
- Catalytic muffler (if equipped)
- Fuel metering valve (if equipped)
- Spark advance module (if equipped)
- Crankcase breather
- Ignition module(s) with high tension lead
- Gaseous fuel regulator (if equipped)
- Electronic control unit (if equipped)
- Carburetor or fuel injection system
- Fuel lines (if equipped)
- Air filter, fuel filter, and spark plugs (only to first scheduled replacement point)

Continued on next page.

LIMITATIONS

This Emission Control Systems Warranty shall not cover any of the following:

- (a) repair or replacement required because of misuse or neglect, improper maintenance, repairs improperly performed or replacements not conforming to Kohler Co. specifications that adversely affect performance and/or durability and alterations or modifications not recommended or approved in writing by Kohler Co.,
- (b) replacement of parts and other services and adjustments necessary for required maintenance at and after the first scheduled replacement point,
- (c) consequential damages such as loss of time, inconvenience, loss of use of the engine or equipment, etc.,
- (d) diagnosis and inspection fees that do not result in eligible warranty service being performed, and
- (e) any add-on or modified part, or malfunction of authorized parts due to the use of add-on or modified parts.

MAINTENANCE AND REPAIR REQUIREMENTS

The owner is responsible for the proper use and maintenance of the engine. Kohler Co. recommends that all receipts and records covering the performance of regular maintenance be retained in case questions arise. If the engine is resold during the warranty period, the maintenance records should be transferred to each subsequent owner. Kohler Co. reserves the right to deny warranty coverage if the engine has not been properly maintained; however, Kohler Co. may not deny warranty repairs solely because of the lack of repair maintenance or failure to keep maintenance records.

Normal maintenance, replacement or repair of emission control devices and systems may be performed by any repair establishment or individual; however, **warranty repairs must be performed by a Kohler authorized service center.** Any replacement part or service that is equivalent in performance and durability may be used in non-warranty maintenance or repairs, and shall not reduce the warranty obligations of the engine manufacturer.

FOR SALES AND SERVICE INFORMATION
IN U.S. AND CANADA, CALL
1-800-544-2444

KOHLER engines
BORN TO RUN™

ENGINE DIVISION, KOHLER CO., KOHLER, WISCONSIN 53044

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ISSUED:	8/98
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