

Spec No 35113b - Serial 3223389 - Model K4825



KOHLER

MODEL K482

SPEC. 35113 ENGINE

OWNER'S MANUAL

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NOTE: Since this manual must cover several different engine versions, your engine may not have all of the items covered or you may find certain variations in type and/or location of some items. You may, therefore, have to alter some of the recommendations to fit your particular engine application. Refer to pages 14-15 for items that actually come with your engine.

WARRANTY

We warrant each new engine sold by us to be free from manufacturing defects in normal service for a period of one (1) year commencing with delivery of the engine to the original user.

OUR OBLIGATION UNDER THIS WARRANTY IS EXPRESSLY LIMITED TO THE REPLACEMENT OR REPAIR AT KOHLER CO., KOHLER, WISCONSIN, OR AT A POINT DESIGNATED BY US, OF SUCH PART OR PARTS AS SHALL APPEAR TO US TO HAVE BEEN DEFECTIVE.

WE SHALL NOT BE LIABLE FOR CONSEQUENTIAL LABOR COSTS OR TRANSPORTATION CHARGES IN CONNECTION WITH THE REPLACEMENT OR REPAIR OF DEFECTIVE PARTS.

THIS WARRANTY DOES NOT APPLY TO AN ENGINE UPON WHICH REPAIRS OR ALTERATIONS HAVE BEEN MADE BY OTHERS EXCEPT WITH OUR PRIOR WRITTEN APPROVAL.

WE MAKE NO WARRANTY WITH RESPECT TO TRADE ACCESSORIES. THEY ARE SUBJECT TO THE WARRANTIES OF THEIR MANUFACTURERS.

WE SHALL NOT BE LIABLE FOR CONSEQUENTIAL DAMAGES OR CONTINGENT LIABILITIES NOR FOR THE FITNESS OF ANY ENGINE FOR ANY PARTICULAR PURPOSE.

WE MAKE NO OTHER EXPRESS, IMPLIED OR STATUTORY WARRANTY, NOR IS ANYONE AUTHORIZED TO MAKE ANY IN OUR BEHALF.

KOHLER CO.
Kohler, Wis. 53044

676-7809 Webb

GENERAL

This manual covers the standard rope start and electric start versions of the Kohler Model K482 air-cooled engine series. The K482 is a two cylinder-opposed, 4 stroke-cycle L head design gasoline engine. The engine features a pressure type lube system with full-flow oil filter. Please take a few moments to familiarize yourself with the engine through the material in this manual. Carefully follow all service recommendations to keep your engine in top condition and also to attain longest engine life. Some of the general specifications are listed below--refer to the appropriate service section for specific details, especially when an adjustment is involved.

K482 GENERAL SPECIFICATIONS

BORE X STROKE	3-1/4 x 2-7/8"
DISPLACEMENT	47.7 cu. in.
WEIGHT (APPROXIMATE)	180 lbs.
OIL CAPACITY (U.S. STANDARD MEASUREMENT)	3 quarts
SPARK PLUG SIZE	14mm
SPARK PLUG TIGHTENING TORQUE	22 ft. lbs.
SPARK PLUG GAP (GASOLINE)025"
BREAKER POINT GAP020"
BATTERY (ELECTRIC START)	12 volt
CHARGING SYSTEM (ELECTRIC START)	30 amp alternator

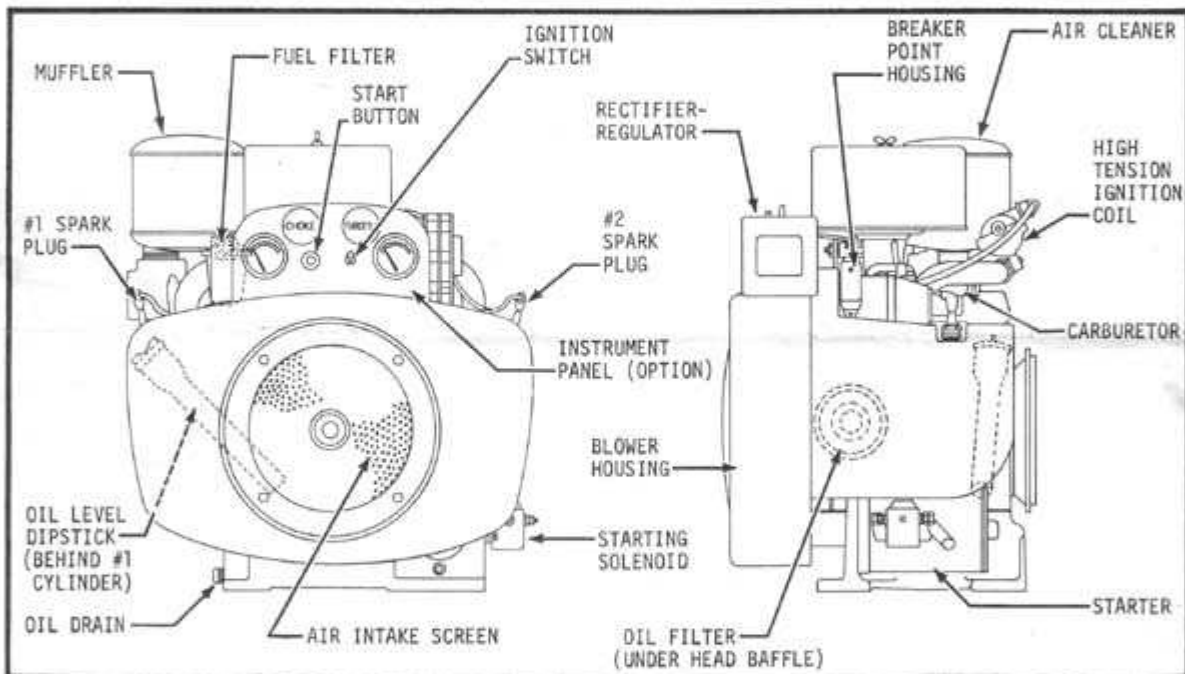


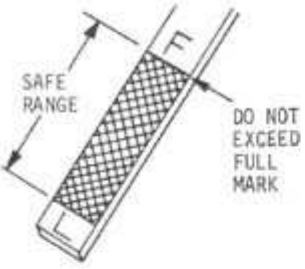
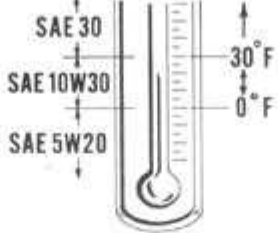
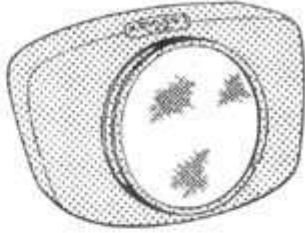
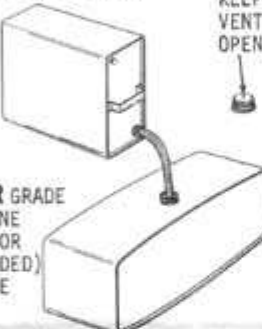
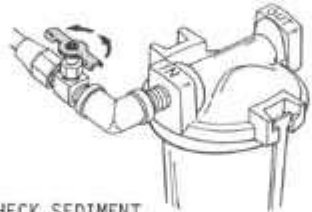
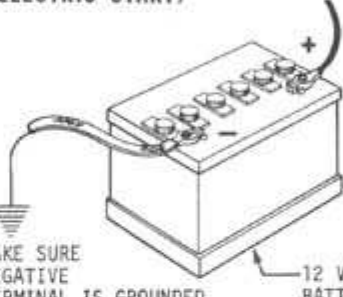
FIGURE 1 -- SERVICE, ADJUSTMENT POINTS

SAFETY PRECAUTIONS

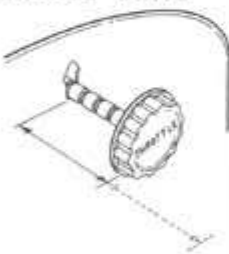
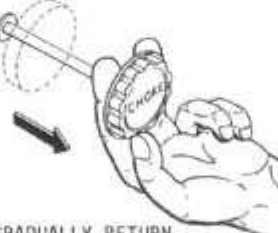
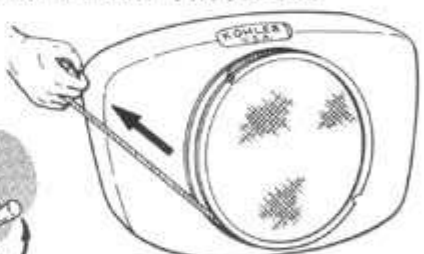

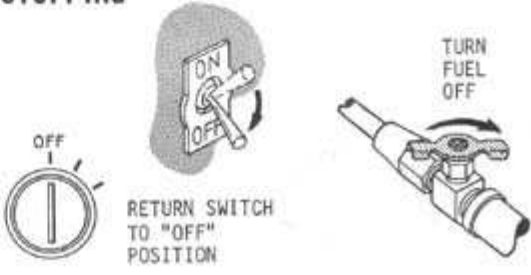
- Do not add fuel while engine is running. Stop engine and, if possible, allow cooling period to prevent spilled fuel from igniting on contact with hot engine parts.
- Always disconnect spark plug cable to prevent unintentional starting before making any adjustments on equipment powered by engine.
- Make sure all safety guards on engine and driven equipment are in proper position and secure.
- Make sure hands, feet, and clothing are at a safe distance from any movable parts prior to starting.
- Do not tamper with governor settings. The governor establishes safe operating limits. These limits must not be exceeded.

OPERATING INSTRUCTIONS

PRE-START CHECKS

<p>CHECK OIL</p>  <p>SAFE RANGE</p> <p>DO NOT EXCEED FULL MARK</p>	<p>USE API SERVICE MS OIL</p>  <p>SAE 30</p> <p>SAE 10W30</p> <p>SAE 5W20</p> <p>30°F</p> <p>0°F</p> <p>VISCOSITY-TEMPERATURE INDEX</p>	<p>KEEP AIR INTAKE SCREENS CLEAN</p> 
<p>FILL FUEL TANK</p>  <p>KEEP VENT OPEN</p> <p>REGULAR GRADE 90 OCTANE (LEADED OR NON-LEADED) GASOLINE</p>	<p>TURN FUEL VALVE ON</p>  <p>CHECK SEDIMENT BOWL - CLEAN AS NEEDED</p>	<p>CHECK BATTERY CONNECTIONS (ELECTRIC START)</p>  <p>MAKE SURE NEGATIVE TERMINAL IS GROUNDED</p> <p>12 VOLT BATTERY</p>

START - STOP PROCEDURE

<p>DISENGAGE DRIVE</p>  <p>THEN OPEN THROTTLE ABOUT HALF WAY FOR STARTING</p>	<p>PULL CHOKE VALVE CLOSED (COLD START)</p>  <p>GRADUALLY RETURN CHOKE TO OPEN POSITION AFTER ENGINE STARTS</p>	<p>MANUAL (ROPE) START PROCEDURE</p>  <p>1 IGNITION ON</p> <p>2 PULL ROPE IN QUICK STEADY MOTION</p>
<p>ELECTRIC START PROCEDURE</p>  <p>KEYSTART - MOVE KEY TO START POSITION, *RELEASE WHEN ENGINE STARTS (SWITCH AUTOMATICALLY RETURNS TO RUN)</p>		<p>STOPPING</p>  <p>RETURN SWITCH TO "OFF" POSITION</p> <p>TURN FUEL OFF</p>

GENERAL SERVICES

SERVICE SCHEDULE

SERVICE AT INTERVALS INDICATED	DAILY (PRE-START)	EVERY 50 HOURS	EVERY 100 HOURS	EVERY* 500 HOURS
CLEAN AIR INTAKE SCREEN -----	X			
CHECK OIL LEVEL -----	X			
REPLENISH FUEL SUPPLY -----	X			
SERVICE AIR CLEANER -----		X		
CLEAN EXTERNAL SURFACES OF UNIT -----		X		
CHANGE LUBE OIL -----		X		
CHANGE LUBE OIL FILTER -----			X	
SERVICE FUEL FILTER -----			X	
SERVICE OR REPLACE SPARK PLUGS -----			X	
REPLACE ELEMENT - DRY AIR CLEANER -----			X	
CHECK AND SERVICE BREAKER POINTS* -----				X
CHECK IGNITION TIMING* -----				X
CHECK VALVE - TAPPET CLEARANCE* -----				X
SERVICE CYLINDER HEADS* (See Page 18) -----				X

*Have these services (500 hour) done only by qualified engine specialist.

NOTE: Intervals stated are for good, clean operating conditions only--service items more frequently (even daily) if extremely dusty or dirty conditions prevail.

COOLING SYSTEM SERVICE

On engines with the standard forced air cooling system, rotation of the blades or fins on the fly-wheel causes cooling air to be drawn in through the rotating air screen where it is forced through the blower housing and baffles past the cooling fins on cylinder block and heads where it is finally ejected as heated air toward the rear of the engine. In all applications, recirculation of the heated air must be avoided--make sure air heated by the engine cannot be drawn back into the air intake.

The rotating air screen and cooling fins must be kept clean and unobstructed at all times. **DO NOT** operate engine with blower housing, baffles or any other cooling shrouds removed as this will result in improper circulation past the cooling fins and overheating.

Other external surfaces of an engine should also be kept free of oil and dirt accumulation. This should be done not only for safety and appearance but because poor cooling efficiency results from dirty external surfaces on engine and components.

AIR CLEANER SERVICE

Under normal operating conditions, disassemble and service air cleaner components every 50 hours of operation. Do this more frequently (even daily) if extremely dusty or dirty conditions prevail. The dry type element is cleaned by gently tapping on a flat surface--when doing this, be careful not to damage gasket surfaces on element. **Do not** attempt to clean dry type elements in any liquid or with compressed air as this will damage paper filter material. Wipe dirt or dust accumulation from cover including base plate where used.

Dry type elements should be replaced after each 100 to 200 hours--replace at 100 hours if engine operated under dirty conditions--replace every 200 hours under good clean air conditions. Replace element sooner if engine loses power due to clogged filter.

The importance of maintaining an air cleaner in proper condition cannot be overemphasized! Dirt induced through improperly installed, improperly serviced or inadequate elements, wears out more engines than does long hours of operation. Even a small amount of dirt will wear out a set of piston rings in just a few hours. Furthermore, operating with a clogged element causes the fuel mixture to be richer which can lead to formation of harmful sludge deposits in the engine. Always cover carburetor or air intake horn when air cleaner is removed for servicing. Do not neglect servicing air cleaner at recommended intervals and use only genuine Kohler parts for replacement. Keep other air intake components such as adapters, hoses, clamps, etc. secure and in good condition to prevent entrance of unfiltered air.

CARBURETOR

Carburetors are adjusted in the factory and should not have to be reset. If, however, one of the following conditions is noted, readjust carburetor immediately as continued operation with incorrect setting can lead to fouled spark plugs, overheating, excessive valve wear or other problems. If black exhaust smoke is noted, check the air cleaner first--an "overrich" mixture is usually caused by a poorly serviced, clogged air cleaner element, not an improperly adjusted carburetor.

CONDITION	POSSIBLE CAUSE/PROBABLE REMEDY
A. Black, sooty exhaust smoke, engine sluggish.	A. Mixture too rich - readjust main fuel needle.
B. Engine misses and backfires at high speed.	B. Mixture too lean - readjust main fuel needle.
C. Engine starts, sputters and dies under cold weather starting.	C. Mixture too lean - turn main fuel adjustment 1/4 turn counterclockwise.
D. Engine runs rough or stalls at idle speed.	D. Idle speed too low or improper idle adjustment - readjust speed then idle fuel needle if needed.

CONDITIONS CAUSED BY AN IMPROPERLY ADJUSTED OR MALFUNCTIONING CARBURETOR

If readjustment becomes necessary, stop the engine, then turn the MAIN and IDLE fuel adjusting screws all the way in until they bottom lightly--don't force them closed as this will damage the needle valves. For preliminary setting, turn MAIN fuel screw out (counterclockwise) 2 full turns and the IDLE 1-1/4 turns. For final adjustments, start engine and allow it to warm up then operate at full throttle and under load, if possible. Turn MAIN fuel in until engine slows down (lean side) then out until it slows down again from overrich setting--note positions of screw at both settings, then set it about halfway between the two. The IDLE fuel setting can then be adjusted in the same manner for smoothest idle. Rough idle is often due to the idle speed being set too low--check this also.

FUEL FILTER

A sediment bowl type fuel filter is usually used to trap any solid impurities in the gasoline. Before servicing, turn fuel off at valve located on top of filter assembly, then loosen retaining bail at bottom of fuel bowl, remove and clean bowl. If filter element is used, swish element in clean solvent. After re-installing and opening fuel valve, use primer (if so equipped) on fuel pump to pump fuel back into bowl.

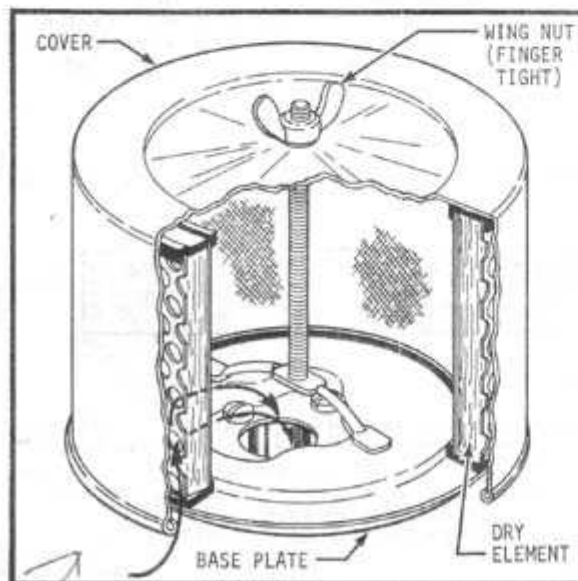


FIGURE 2 -- CUTAWAY VIEW--DRY AIR CLEANER

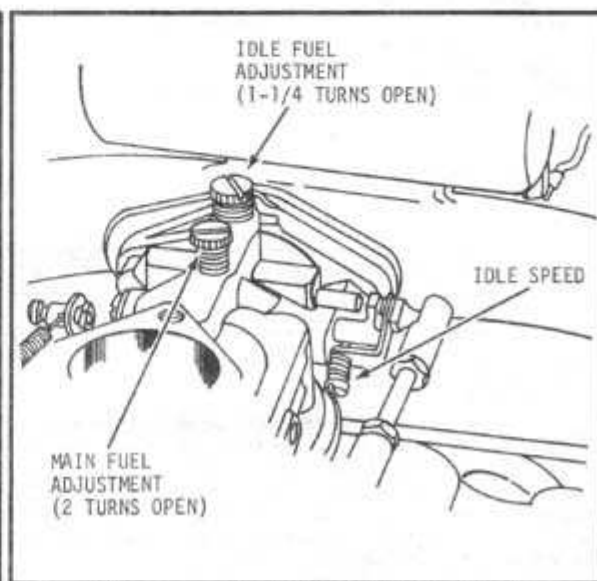


FIGURE 3 -- CARBURETOR ADJUSTMENT POINTS

Part no. 297138 ELEMENT 5
code 546

LUBRICATION

CAUTION: New engines are usually shipped from factory with dry sump--check to make sure proper amount of oil is in the engine or added before engine is started for the first time. (Also add oil as needed to driven equipment such as wet type clutch.)

The lubricating oil level must be maintained in the "safe" operating range at all times. Oil level must be between the L (low) and F (full) marks on the dipstick. Always clean area around dipstick so that dirt does not fall into engine when dipstick is removed. Check daily and add oil as necessary to maintain proper level--**DO NOT OVERFILL**--oil level must not exceed the F mark.

OIL CHANGE: The oil must be changed every 50 hours when operating under normal conditions or more frequently under dirty, dusty conditions. On a new engine, change oil after the first 5 hours and thereafter at 50 hour intervals. Drain oil while it is hot for it will then flow more freely and thus carry away more impurities. Change the oil filter at every other oil change (every 100 hours).

After completely draining old oil, reinstall drain plug then remove oil filler cap and add 3 quarts of oil to begin with--check the oil level on the dipstick before adding more--bring the level up in the safe range but do not exceed the full mark. If the oil filter has been changed, add one more pint (half quart) of oil to start with. Select oil weight and type according to outside temperature from the chart below.

OIL TEMPERATURE - VISCOSITY CHART

AIR TEMPERATURE	OIL VISCOSITY	OIL TYPE
ABOVE 30° F.	SAE 30	API SERVICE MS
30° F. TO 0° F.	SAE 10W-30	API SERVICE MS
BELOW 0° F.	SAE 5W-20	API SERVICE MS

Change oil every 50 hours--Filter every 100 hours

A special "break-in" oil is used in the factory during the test and run-in period. After factory "run-in", the special oil is drained and the engine is fogged with a special preservative oil. Further use of "break-in" oil is not required nor recommended for new Kohler Engines. Engines should be run-in on the detergent type oil listed in the foregoing chart. Engines should be placed under load from the very first as this promotes final seating of the rings.

OIL PRESSURE: When operating at normal temperature and with the proper weight of oil in the engine, pressure should be within the following range:

1200 RPM (IDLE)	1800 RPM	2200 RPM	3200 RPM
25 psi (MINIMUM)	30 - 50 psi	35 - 55 psi	45 - 65 psi

If pressure is lower than the minimum stated, this could indicate worn bearings or a faulty oil pump. If pressure builds up too high, this may indicate dirty restricted oil lines or filter or an improperly adjusted oil pressure relief valve. If readjustment is called for, the adjustment is located on the crankcase just forward of the #1 cylinder. To adjust, loosen the jam nut and lock nut then turn the adjusting screw in or out as needed to get the pressure within limits--make sure engine temperature is up to normal and that it has the proper weight of oil when making this adjustment. Retighten jam nut to lock the screw in the new position.

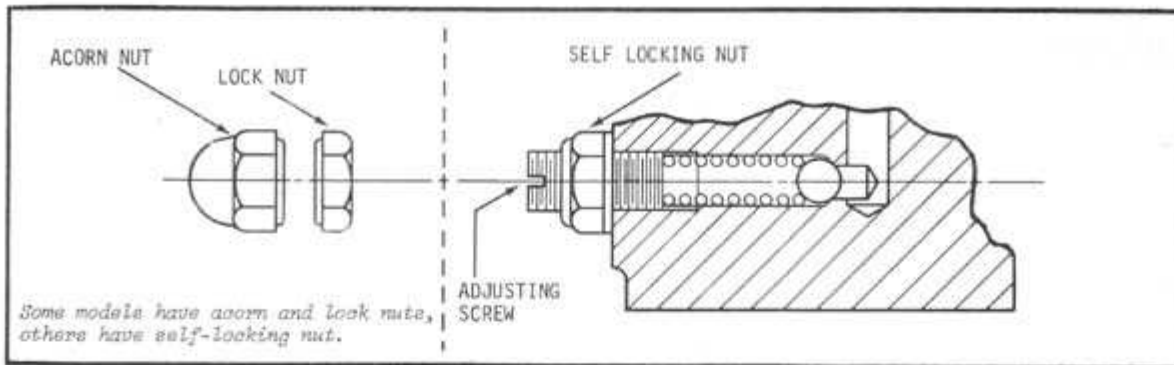


FIGURE 4 -- OIL PRESSURE RELIEF VALVE AND ADJUSTMENT

OIL FILTER: On some applications, the oil filter is mounted outside the engine while on others, the filter is mounted on the crankcase of the engine--on these, it is necessary to remove the air baffle on the number 2 cylinder to gain access to the filter. These are "throw away" cartridge type filter elements. If the cartridge has been overtightened during installation, a strap wrench may have to be used to remove it but usually it can be turned off by hand. Use the following procedure to replace the crankcase mounted units.

1. Remove #2 air baffle.
2. Place rags or a pan below the cartridge to catch spilled oil, then unscrew and discard the cartridge.
3. Wipe up any spilled oil then wipe the adapter clean.
4. Apply grease on gasket then turn new cartridge (with gasket in place) on the adapter in clockwise direction--hand tighten only.
5. After replenishing oil and restarting engine, check air around cartridge for signs of oil leakage--make sure baffle is in place when running engine. Correct leakage if need be by turning cartridge tighter.

CAUTION: Failure to change oil and oil filter elements at the recommended intervals can lead to serious damage to the engine. This is especially true when using detergent oils which have the ability to hold a specific amount of unfilterable impurities in suspension; however, when a saturation point is reached, the oil may suddenly break down to form a gelatin-like substance which seriously impairs and can even stop flow of lube oil. An oil filter does a very effective job; however, it must be replaced each 100 hours of operation (every other oil change) under normal conditions or more often if the engine is subject to extremely dirty conditions.

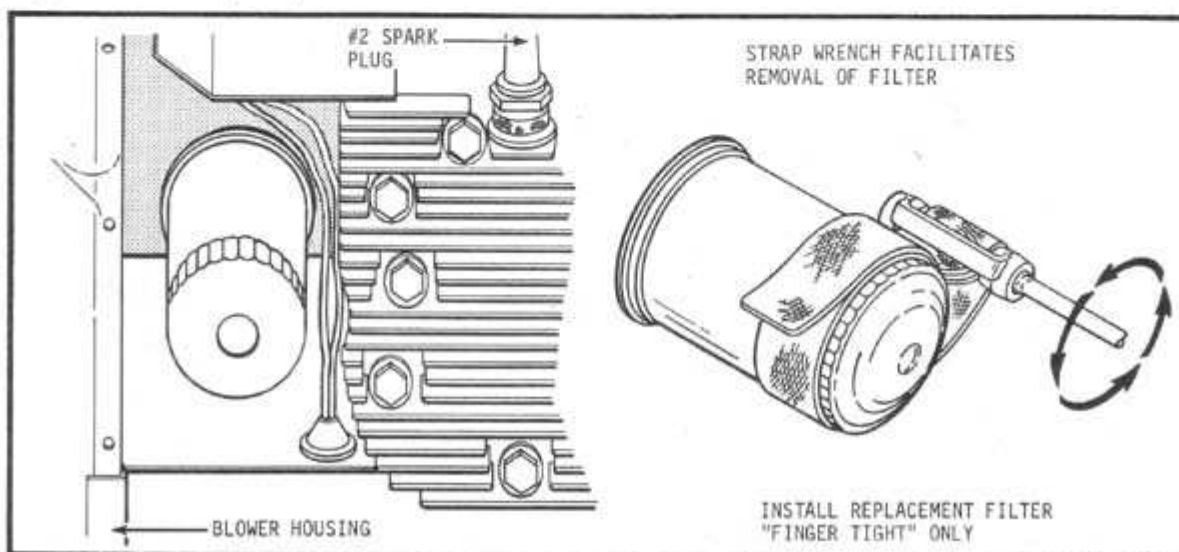


FIGURE 5 -- CRANKCASE MOUNTED OIL FILTER (CARTRIDGE TYPE)

IGNITION SYSTEMS

Engine misfire or generally poor operation is often caused by spark plugs in poor condition or with incorrect spark gap setting. Always clean area around spark plugs before removing to prevent dirt from getting into engine. Carefully note spark plug condition as this is often a good indicator of the ignition trouble. Plugs fail for various reasons. The porcelain insulator may crack or become coated with oil, carbon or other deposits. This can cause the high voltage ignition impulse to pass from the center electrode to ground without jumping the spark gap. As an engine operates, the electrodes are gradually burned or worn away. In time, the gap becomes so wide that the available ignition voltage cannot jump the gap and the engine misses.

Spark Plug Service: Every 100 hours remove plug, check condition and reset gap or replace plug if needed. Good operating conditions are indicated if plug has light coating of gray or tan deposit. A dead white, blistered coating could indicate overheating. A black (carbon) coating may indicate an "overrich" fuel mixture caused by clogged air cleaner or improper carburetor adjustment. Do not sandblast, wire brush, scrape or otherwise service plug in poor condition--best results are obtained with new plug.

SPARK PLUG	SIZE	STANDARD	SPARK GAP*	TIGHTEN TORQUE
	14 mm	H 10	.025"	22 ft. lbs.

* Gasoline, set at .018" for gaseous fuels.

Breaker Points: Operation is greatly affected by breaker point condition and adjustment of point gap. If points are burned or badly oxidized, little or no current will pass and as a result the engine may not operate at all, or if it does run, it is likely to miss particularly at full throttle. Adjusting breaker point gap affects the time that the contacts are opened and closed. If the points are adjusted to a wider gap, they will open earlier and close later in terms of cam movement. A definite time is required for the magnetic field within the ignition coil to build up to sufficient value. If the points are closed for too short a time, a weak spark will be produced by the coil or if set too wide, they will open before the primary current reaches the maximum value.

Points are located under cover on top of the governor. Use the following procedure to adjust breaker point gap:

1. Remove breaker point cover.
2. Turn engine over until breaker points are full open--measure gap with feeler gauge. Maximum opening should be .020". Adjust by loosening gap adjusting screw then insert screwdriver blade in adjusting notch to shift movable plate until .020" maximum opening is attained. Retighten gap adjusting screw and replace breaker point cover after initial adjustment.
3. Follow up with the final or precision adjustment using a timing light.

Always replace badly burned or pitted breaker points. A certain amount of build up or metal transfer occurs under normal operating conditions; however, if this occurs too frequently and becomes excessive, the condenser may be at fault. Slightly pitted points can be dressed down with a point file, although this should be done only as a temporary field fix since points may tend to arc more readily after filing. Replace points at first opportunity after filing. If the points are oxidized, rub a piece of coarse cloth between the surfaces. Dirty or oily points can be cleaned with cloth but make sure no particles of lint are left between surfaces.

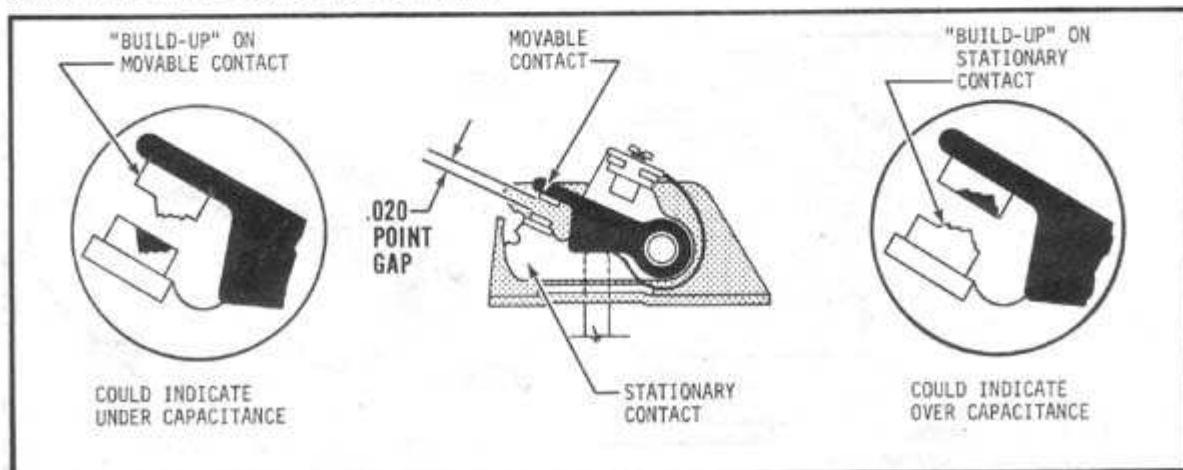


FIGURE 6 -- BREAKER POINT GAP - POINT CONDITION INDICATORS

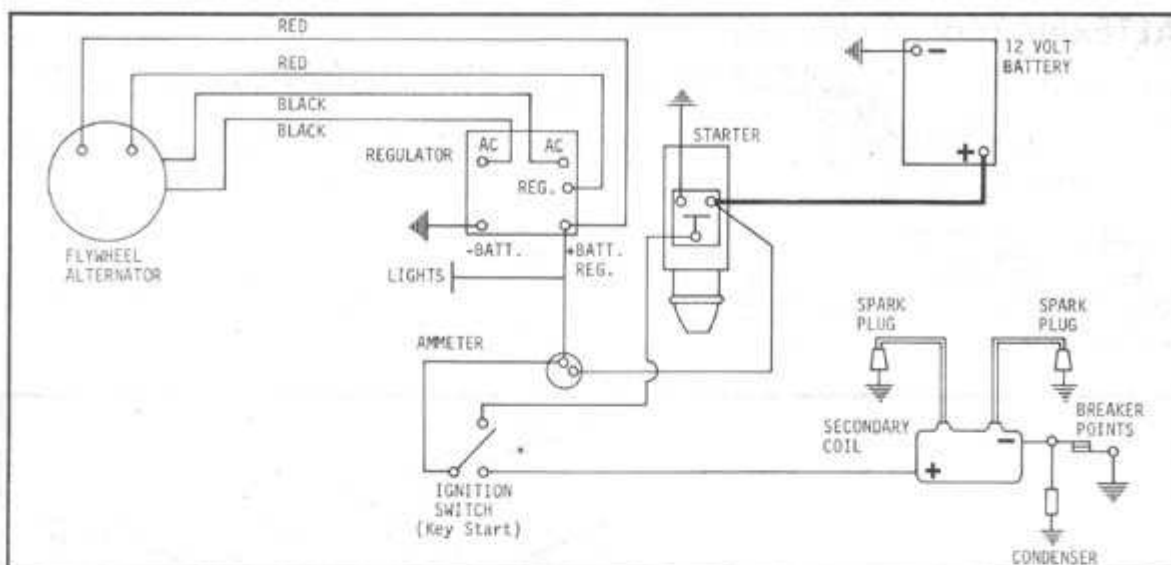


FIGURE 7 -- WIRING DIAGRAM OF A TYPICAL 30 AMP ALTERNATOR - IGNITION SYSTEM

Condenser: If the condenser shorts out, the coil will be unable to produce output voltage. On the other hand, if it opens or decreases in capacitance, the output voltage will be greatly reduced and the ignition points will burn excessively. If badly burned breaker points occur too frequently, the condition of the condenser should be suspected. If condenser has too small capacitance, metal will transfer from the stationary contact to the movable contact. If capacitance is too large, the metal will build up on the stationary contact.

Ignition Coil: Ignition coils as used on the 30 amp alternator ignition systems do not require servicing on a regular basis, however, the coil should be kept in clean condition and the terminals and connections must be tight to provide good electrical contact. The rubber nipple on the high tension terminal must be in good condition to prevent leakage of current across exposed surfaces.

Timing: The breaker point assembly is mounted externally on the governor. The breaker rod rides on a cam on the governor drive shaft. The governor is therefore timed to the engine and must be retimed if it has been removed for any reason (see K482 Governor Instructions on page 11). The governor also incorporates an automatic spark advance-retard mechanism. Retard is 8° BTDC while the advance point is 27° BTDC. The advance spark point is marked "SP" on the flywheel of the engine.

Several different types of timing lights are available--follow the manufacturer's instructions for the particular type of timing light used. The following procedure can be used with most timing lights. Rotating the governor advances or retards the timing depending on which way the unit is turned.

1. If boot type lead is used, remove boot at #1 cylinder (nearest flywheel) then wrap one end of a short piece of fine wire around spark plug terminal. Reconnect boot to terminal so that free end of the wire can protrude under the boot. (Step 1 applies to timing lights having alligator clips.)
2. Connect one of the timing light leads to the wire protruding from under the boot.
3. Connect second timing light lead to hot (ungrounded) side of battery--see timing light instructions for proper battery size, wire connections, etc.
4. Connect third timing light lead to common ground.
5. Before starting, rotate engine until "SP" mark is observed in timing sight hole--chalk mark the line for easy reading.
6. Start engine and operate at 1200 RPM or above. Aim timing light into sight hole--light should flash just as "SP" mark is centered in sight hole. If light flashes before mark is centered, timing is overadvanced. If light flashes after mark is centered, timing is retarded.
7. To adjust, loosen (do not remove) governor flange mounting capscrews and shift or rotate until timing mark is exactly centered as light flashes. Retighten flange mounting screws after exact timing is achieved.

ALTERNATOR SYSTEMS

The Alternator system provides electrical energy to charge a 12 volt battery and also for lighting or accessory circuits. Engines having the 30 amp Alternator system can be identified by the Rectifier-Regulator Assembly which is externally mounted on the engine or on equipment powered by the engine. The Rectifier-Regulator Assembly is shown in figure below. In addition to the Rectifier-Regulator, the Alternator system has two other basic components which are: The permanent field magnet ring and the alternator-stator. The flywheel must be removed to gain access to these two components.

OPERATION: A brief explanation of how this charging system functions is as follows: As the permanent magnet ring is rotated around the stator (which is mounted on the gear cover), an alternating current (AC) is induced in the primary or load winding of the stator. AC thus produced is carried thru the 2 black leads to the full wave bridge rectifier portion of the Rectifier-Regulator where it is changed to Direct Current. The two red stator leads serve to complete the electrical circuit from the regulator to the secondary or regulator winding in the stator.

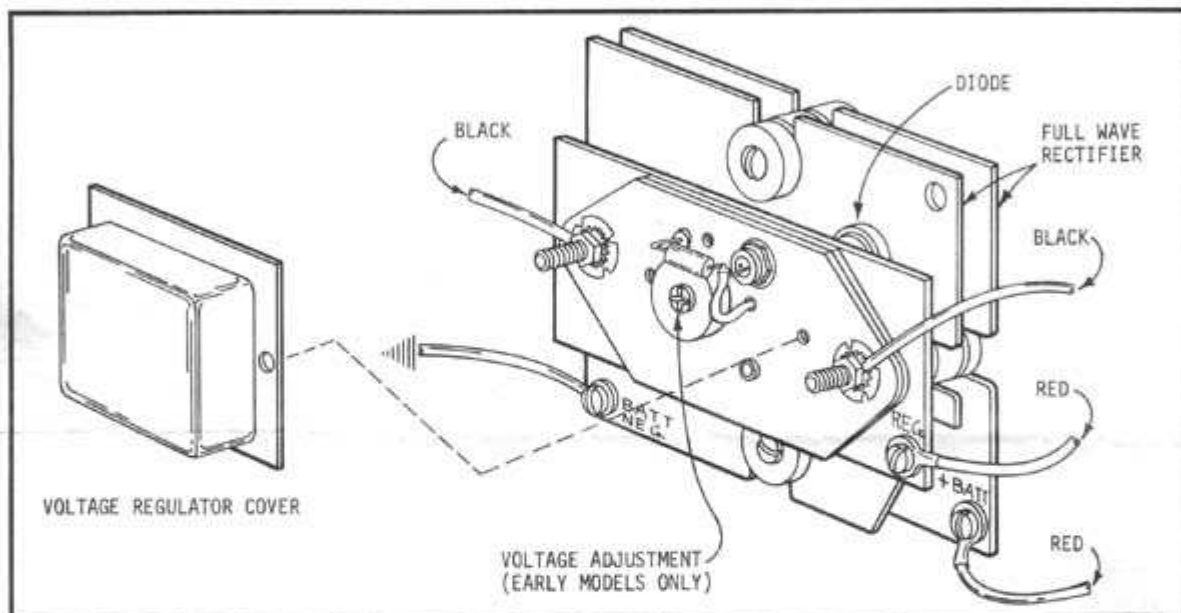


FIGURE 8 -- SOLID STATE RECTIFIER-REGULATOR ON 30 AMP ALTERNATOR SYSTEM

Regulation is provided by solid state (no moving parts) electronic devices which are located under the cover on the front face of the rectifier-regulator. A zener diode is used to "sense" battery voltage and it electronically controls a Silicon Controlled Rectifier (SCR) which functions as a switch to allow current to flow in the regulator winding in the stator when battery voltage gets above a specific level. An increase in battery voltage also brings about an increase in current flow in the regulator winding. Any increase in regulator current in this winding brings about a corresponding decrease in AC current in the primary winding in the stator. In effect, the current in the regulator winding "bucks" the flow of AC current in the primary winding thus controlling output.

Precautions: To avoid damage to the Alternator System, make sure the following precautions are taken.

1. Battery polarity must be correct--negative (-) battery terminal is connected to ground.
2. Rectifier-Regulator must be in common ground with engine and battery.
3. Make sure that no fuses, resistors or wires smaller than #10 AWG are in connection from battery to rectifier.
4. Disconnect wire at terminal marked "BATT. NEG." if arc welding is done on equipment in common ground with engine.
5. Disconnect battery to regulator lead when battery is being recharged.
6. DO NOT operate engine with battery disconnected from Alternator System.
7. Make sure AC leads are prevented from being grounded at all times.

Service: With the exception of the permanent magnet ring which is affixed to the flywheel, the 30 amp Alternator system has no moving or mechanically operated parts and is therefore virtually service free. The only service required is an occasional check to make sure all electrical connections are tight and that wires are not frayed or cracked.

GOVERNOR

These 2 cylinder engines are equipped with centrifugal flyweight type mechanical governors which are externally mounted at the rear of the gear cover and driven off the camshaft gear. The governors are self-contained units except that lubrication is provided through an external oil line which connects the engine lubrication system to the governor. Always make sure linkage between governor and carburetor moves freely. If governor is out of adjustment, engine speed will surge or hunt with changing load or speed will drop considerably when a normal load is applied. Governors also function to establish safe operating speed limits--these must not be exceeded.

The breaker points are mounted on the governor and are activated by the breaker rod which rides on a cam on the governor drive shaft on this engine. For this reason, it is necessary to retime this governor to the engine if removed. This is initially done during assembly of the engine and it will not have to be done again unless governor has been removed from the engine. Timing should be done only at an authorized service center.

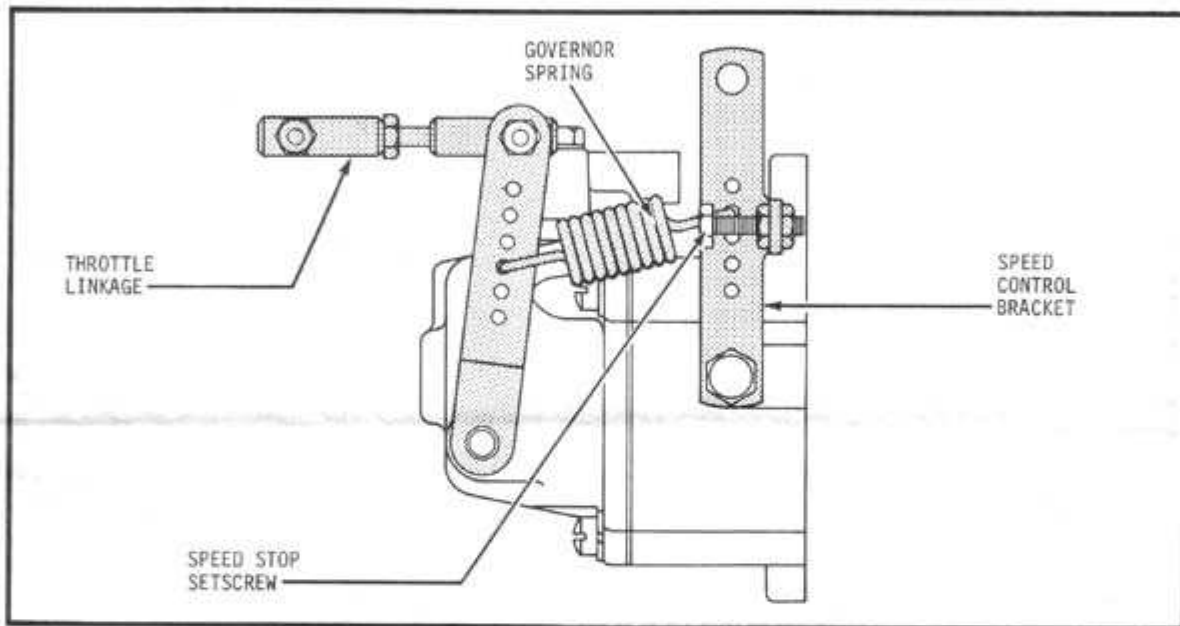


FIGURE 9 -- VARIABLE SPEED TYPE GOVERNOR - K482 ENGINES

Speed Adjustment: On most K482 engines with the variable speed type governor (See the illustration above), maximum speed is set at 3600 RPM no load. On some applications, a lower maximum speed is specified--make sure that the allowable speed for the particular application is not exceeded. Use the following procedure to readjust speed limit on K482 engines with the variable speed governor:

1. Start engine and operate at full throttle (no load).
2. Check engine speed with hand tachometer--if within 50 RPM of specified limit, readjustment is not absolutely necessary.
3. Loosen locking nuts on speed stop setscrew--turn screw out or in as necessary to attain specified top speed. Retighten locking nuts to secure stop at new setting.

Governor Sensitivity Adjustment: If the governor is too sensitive, speed surging will occur with change in load. If a big drop in speed occurs when normal load is applied, the governor should be set for greater sensitivity.

On the K482 with variable speed governor, sensitivity is adjusted by repositioning the governor spring in the holes on the governor arm and speed control bracket. Normally the spring is placed in the 4th hole from top on the arm and in the 2nd hole from top on the speed bracket. To make governor control more sensitive, increase tension on spring by moving spring hooks into holes spaced further apart. Conversely, decreasing spring tension allows broader governor control but less sensitivity. Move spring one hole at a time and recheck control after each move.

CRANKCASE BREATHER

The breather functions as a one-way valve to allow pressure to be expelled from the crankcase and also to block or prevent air from being drawn back into the crankcase. A proper functioning breather system thus helps maintain a slight vacuum within the crankcase.

Most K482 models use a closed or positive type breather system. On these, a nonserviceable breather valve is pressed into the breather housing which is assembled to the governor. If the valve is faulty, replace breather-housing as a unit. A tube connects the breather to air inlet side of the carburetor. The flow of air to the carburetor thus creates a vacuum on the tube which pulls air (and fumes) from the crankcase to maintain vacuum. Keep tube connections tight.

CYLINDER HEAD SERVICE

After each 500 hours* of operation, the cylinder heads should be taken off the engine and serviced. Remove carbon deposits from combustion chamber in head. Scrape and remove carbon with a sharp piece of wood--wood or similar material is suggested to avoid scratching aluminum surfaces of head. Always use new cylinder head gaskets, make sure head bolts are tightened in the proper sequence and to the torque value stated in the opposite specifications.

*NOTE: Under certain operating conditions, such as continued light load or relatively constant speed, carbon may build up much more rapidly. If there are early indications of this, such as heavy deposits of carbon on spark plug electrodes, service the heads much more frequently. 250-hour intervals are suggested under these conditions.

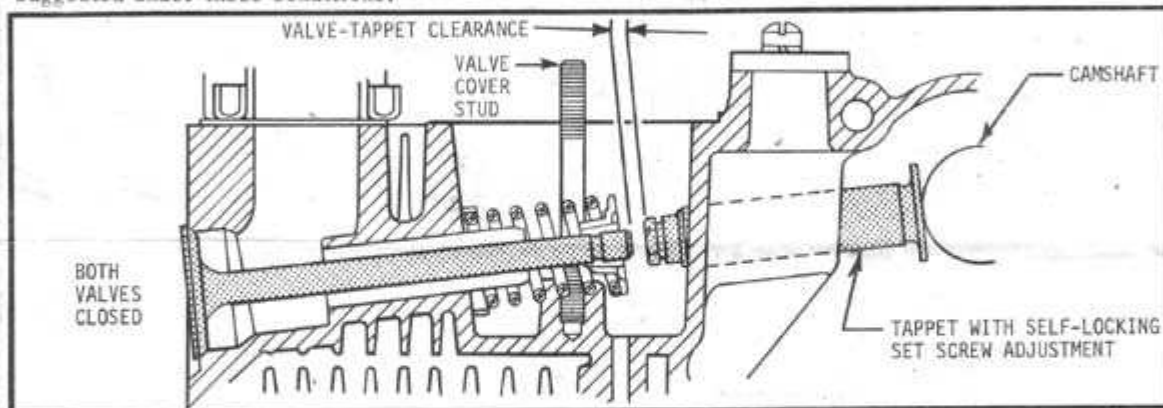


FIGURE 10 -- CUTAWAY VIEW SHOWING VALVE - TAPPET CLEARANCE

VALVE SERVICE

After each 500 hours (or sooner if a loose valve is detected), check clearance between the valve stems and tappets. The engine must be stopped and cooled to normal ambient temperatures to accurately gauge and adjust valve clearances. Use the following procedure to adjust:

1. Turn engine over until piston in #1 cylinder (closest to flywheel) is at Top Dead Center on compression--in this position, both valves will be closed and cam will have no effect on tappet.
2. Measure clearance between valve stem and tappet with a feeler gauge. To adjust, turn adjusting screw on tappet in or out until proper clearance is attained.

COLD CLEARANCE

INTAKE .008-.010" EXHAUST .017-.020"

3. After adjusting valve-tappet clearance on #1 cylinder, turn engine over until #2 cylinder is at TDC on compression and repeat adjustment on this cylinder.
4. After valves are in proper adjustment, position new head gaskets and reinstall cylinder heads. Make sure head bolts are tightened in the proper sequence and to the torque value specified in Figure 11 on page 13.

TROUBLE SHOOTING GUIDE

HARD STARTING OR LOSS OF POWER	OPERATING ERRATICALLY	OVERHEATING
a. Faulty ignition. 1. Leads grounded or loose. 2. Breaker points faulty or improperly gapped. 3. Spark plug faulty or improperly gapped. 4. Coil or condenser defective. b. Faulty carburetion. 1. Fuel line clogged (dirt-gum) 2. Fuel pump faulty. 3. Carburetor dirty or improperly adjusted. c. Poor compression. 1. Head loose or gasket leaking. 2. Valves sticking or leaking. 3. Piston rings worn.	a. Clogged fuel line. b. Water in fuel. c. Vent in gas cap plugged. d. Faulty fuel pump. e. Gasket leaking (carb.-manifold) f. Governor improperly set. g. Carburetor improperly adjusted. KNOCKING a. Fuel octane too low. b. Ignition timing wrong c. Carbon build-up in combustion chamber. d. Engine overheated. OCCASIONAL "SKIP" AT HIGH SPEED a. Spark plug fouled, faulty or gap too wide. b. Ignition timing wrong c. Carburetor improperly adjusted.	a. Air intake screen or fins clogged. b. Oil level too high (or low). c. Fuel mixture too lean d. Ignition timing wrong e. Engine overloaded. f. Tappet clearance too close. IDLES POORLY a. Idle Speed too low. b. Idle Fuel improperly adjusted. c. Gasket leaking (carb.-manifold) d. Spark plug gap too close. BACKFIRING a. Carburetor set too lean (Main Fuel). b. Breaker points improperly gapped (timing). c. Valve sticking.

ENGINE STORAGE PROCEDURE

If engine is to be out of service for a considerable length of time during an off season period, for example, the following procedure is recommended to prepare the engine for storage:

1. Drain oil from crankcase while engine is still hot and flush with clean, light oil. Refill crankcase.
2. Drain fuel tank and carburetor. (Don't use stale fuel)
3. Remove, clean and replace sediment bowl.
4. Clean exterior surfaces of engine.
5. Spread a light film of oil over any exposed metal surfaces of engine that are subject to corrosion.
6. Pour tablespoon of oil into each spark plug hole, crank engine slowly by hand and replace spark plugs.
7. Store in clean, dry place.

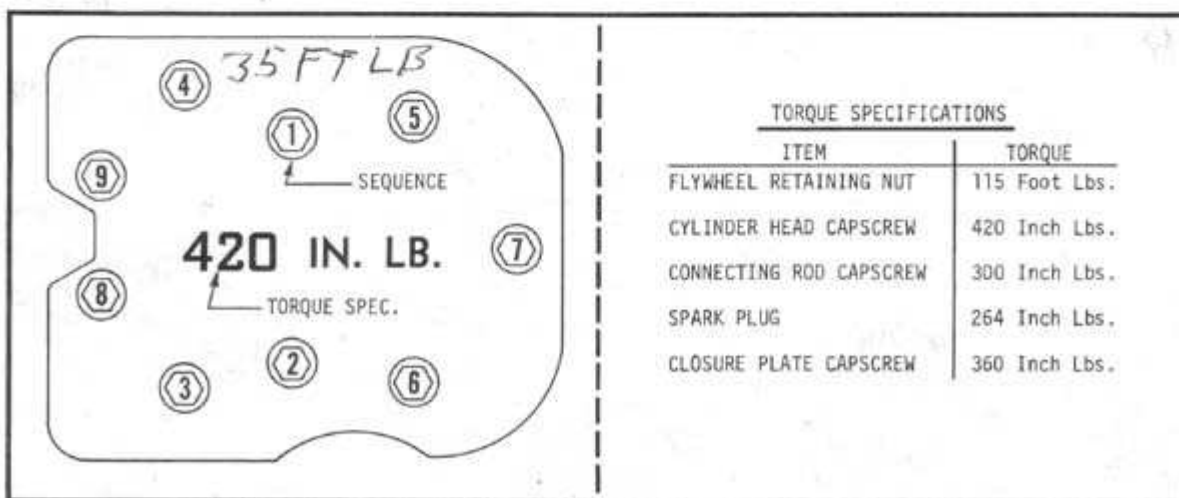


FIGURE 11 -- CYLINDER HEAD TIGHTENING SEQUENCE & TORQUE SPECIFICATION

(Divide 12 into inches to get ft lbs.)

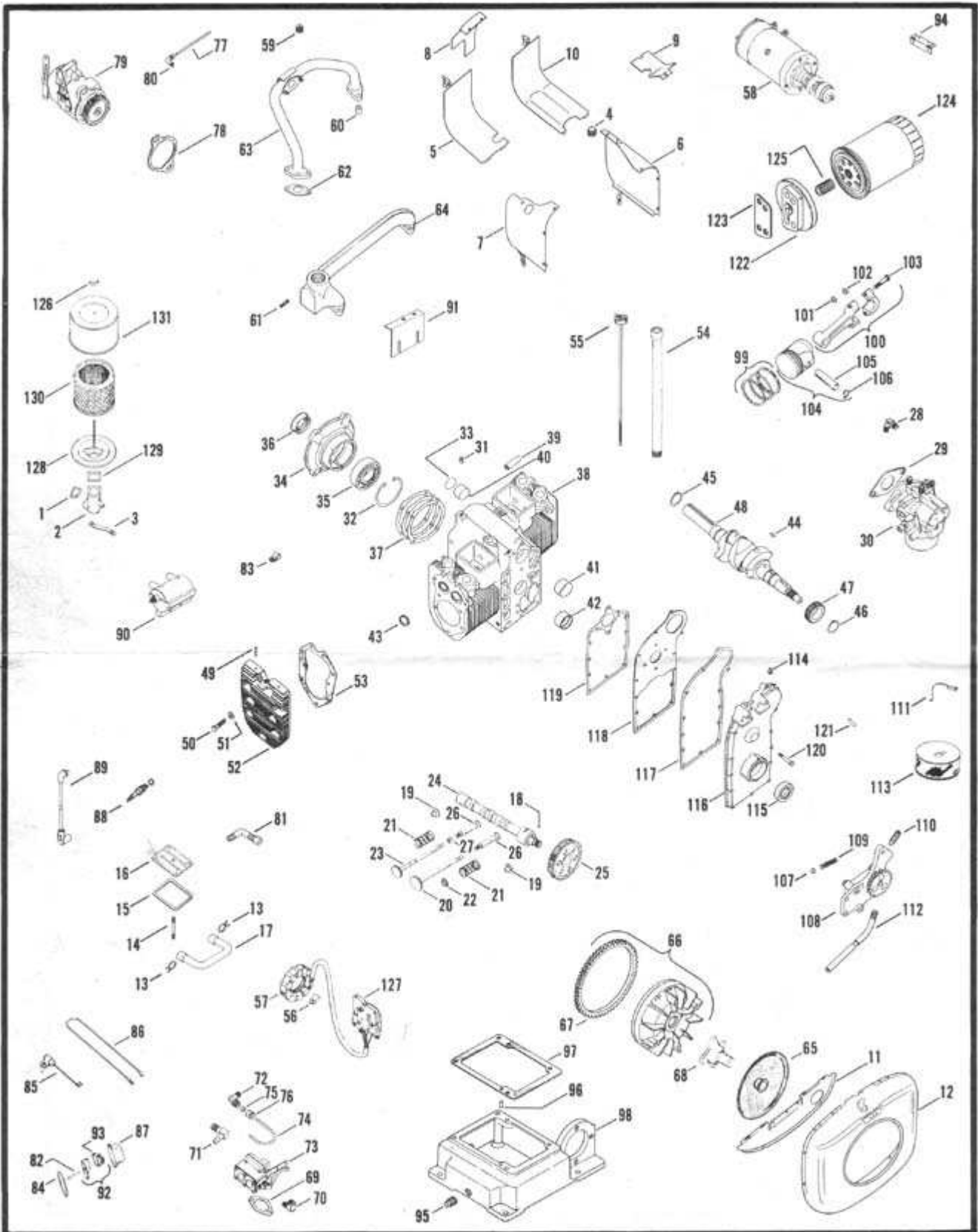


FIGURE 12 -- PARTS IDENTIFICATION - EXPLODED VIEW K482 ENGINE

SERIAL NO. 322385

PARTS ORDERING INSTRUCTIONS

When ordering replacement parts from your Kohler Dealer, always state Model, Serial and Specification numbers as found on the nameplate of your engine. If a letter follows the specification number, make sure this is also stated. Use the view on opposite page to correctly identify the part(s) required then order by quantity and complete description shown for that item in the Parts List below. Do not order by item number--this number is for locating purposes only. Kohler part number are not shown in this manual. The information requested will enable the Dealer to quickly locate the Kohler number and supply the correct part for your particular engine.

K482S PARTS LIST - - SPEC. 35113

Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description	Item No.	Quantity	Part No.	Description
INTAKE GROUP											
3	1	3-22-9	Washer	52	2	277083	Head, cylinder	92	1	A-220474	Breaker - assembly
1	1	3-55-17	Screw, R.H.M. #10 - 32 x 2-1/4	53	2	277088	Gasket, cylinder head	93	1	220479	Points, breaker
2	1	3-50-57	Screw, R.H.M. #10 - 32 x 1-1/2	DIPSTICK GROUP							
1	1	277069	Gasket	54	1	271829	Tube, dipstick	2	1	3-5-12	Screw, H.C. 5/16 - 18 x 5/8
2	1	277070	Elbow, air cleaner	55	1	A-277157	Dipstick	2	1	3-21-3	Washer, lock 5/16
1	1	277078	Bracket, hose	ELECTRIC START GROUP							
2	1	3-132-5	Screw, H.C. 1/4 - 20 x 5/8	4	1	3-22-9	Washer, I.T. #10	94	1	277128	Bracket, cable
2	1	3-25-53	Washer	4	1	3-116-4	Screw, R.H.M. #10 - 24 x 1	OIL PAN GROUP			
BAFFLES AND SHROUD GROUP											
6	1	3-132-1	Screw, Sets 1/4 - 20 x 3/8	4	1	3-132-6	Screw, H.C. 1/4 - 20 x 1/2	4	1	3-129-11	Screw, H.C. 3/8 - 16 x 4
3	1	3-132-8	Screw, H.C. 1/4 - 20 x 1/2	2	1	3-154-2	Screw, H.C. 5/16 - 18 x 1	4	1	3-22-1	Washer, lock 3/8
4	1	243035	Bracket, hose	3	1	3-185-1	Screw, R.H.M. #10 - 24 x 1-1/2	95	1	3-25-24	Plug, pipe
5	1	277048	Baffle, #1 barrel	56	1	3-675-3	Clip, cable	96	2	230129	Pin, dowel
6	1	277050	Baffle, #2 cylinder head	56	1	3-672-7	Clip, cable	97	1	277034	Gasket, oil pan
7	1	277051	Baffle, #1 cylinder head	57	1	277063	Stator, alternator	98	1	277215	Pin, oil
8	1	277054	Baffle, #1 upper cylinder	58	1	A-277214	Stator - assembly	PISTON AND ROD GROUP			
9	1	277057	Baffle	INTAKE & EXHAUST MANIFOLDS GROUP							
10	1	277105	Baffle, #2 barrel	1	1	3-4-2	Screw, H.C. 5/16 - 18 x 1-1/8	99	2	235467	Ring set - std.
11	1	277206	Baffle, blower housing support	3	1	3-6-11	Screw, H.C. 5/16 - 18 x 3/4	2	1	235468	Ring set - .010
12	1	277056	Housing, blower - assembly	4	1	3-25-20	Washer	2	1	235469	Ring set - .020
VENT AND VALVE COVERS GROUP											
2	1	3-25-8	Washer 1/4	8	1	3-21-1	Washer, lock 5/16	2	1	235287	Ring set - std. (Service)
2	1	3-81-1	Nut, hex. 1/4 - 20	59	1	3-25-37	Plug, pipe 1-1/2	2	1	235288	Ring set - .010 (Service)
13	2	3-358-11	Clamp, hose	3	1	3-125-4	Screw, H.C. 5/16 - 18 x 1-1/8	2	1	235289	Ring set - .020 (Service)
14	2	220043	Stud, valve cover	60	1	3-125-11	Screw, H.C. 5/16 - 18 x 2-1/2	2	1	235290	Ring set - .030 (Service)
15	2	277034	Gasket, valve cover	61	4	235899	Stud	100	2	A-277130	Rod, connecting
16	2	277036	Cover, valve	62	4	277091	Gasket, manifold	101	4	236002	Rod, connecting - .010 U.S.
17	1	277392	Hose, breather	63	1	277127	Manifold, intake - assembly	102	4	3-22-1	Washer
CRANKSHAFT AND VALVES GROUP											
18	1	3-43-1	Key, woodruff #2	64	1	277482	Manifold, exhaust	103	4	236631	Screw
19	1	3-119-17	Nut, jam 3/8 - 16	FLYWHEEL GROUP							
19	4	230011	Retainer, valve spring	4	1	3-7-1	Screw, H.C. 3/8 - 16 x 1	104	2	A-235631	Piston - assembly
20	2	235008	Valve, intake	4	1	3-29-1	Washer, lock 1/4	105	2	A-235571	Piston - assembly -- .010
21	4	235010	Spring, valve	1	1	3-25-53	Washer, plain 1/4	106	4	A-235616	Piston - assembly -- .030
22	4	235011	Retainer, valve spring	1	1	3-45-1	Key, woodruff #15	107	1	235572	Pin, piston
23	1	235826	Valve, exhaust	1	1	3-119-21	Nut, jam 1 - 16	108	1	235604	Retainer
24	1	277030	Camshaft	1	1	3-166-2	Screw, nuts 1/4 - 20 x 5/8	OIL PUMP GROUP			
25	1	277032	Gear, camshaft	65	1	277017	Screw, grass	1	1	3-8-7	Screw, H.C. 5/16 - 18 x 1
26	4	A-277031	Tapout - assembly	66	1	A-277328	FlYWheel - assembly	1	1	3-6-11	Screw, H.C. 5/16 - 18 x 3/4
27	8	240013	Key, retainer	67	1	277122	Gear, ring	1	1	3-21-1	Washer, lock 5/16
CARBURETOR GROUP											
28	1	3-22-5	Washer, lock 5/16	68	1	277484	Shaft, front drive	1	1	3-25-34	Washer, copper
29	1	231510	Elbow	FUEL PUMP GROUP							
29	1	275167	Gasket, carburetor	69	2	3-161-1	Screw, fill 1/4 - 20 x 5/8	109	1	A-277029	Pump - assembly
30	1	C-277061	Carburetor - assembly	70	1	240281	Gasket, fuel pump	109	1	277082	Spring, relief valve
30	1	275778	Kit, carburetor repair	71	1	3-211-10	Elbow, street	110	1	A-277514	Screw, adjusting - assembly
31	1	200443	Needle and seat	72	1	3-391-1	Elbow, hose	111	1	277085	Clip, oil tube
CRANKCASE GROUP											
4	1	3-22-1	Washer, lock 3/8	72	1	231510	Elbow, compression	112	1	277201	Tube, oil inlet
21	6	3-75-23	Plug, pipe 1/8 N. pocket	73	1	277067	Pump, fuel	113	1	277202	Strainer, oil - assembly
21	4	3-129-7	Ring, retaining	74	1	220697	Line, fuel	CLARE COVER GROUP			
32	1	3-268-31	Ring, retaining	75	2	220547	Sleeve	2	1	3-6-11	Screw, H.C. 5/16 - 18 x 3/4
33	1	160037	Plug, Welch 1-1/2	76	2	220786	Nut	4	1	3-6-12	Screw, H.C. 5/16 - 18 x 5/8
34	1	277060	Plate, rear closure	GOVERNOR GROUP							
35	1	277062	Bearing, ball	2	1	3-6-2	Screw, H.C. 5/16 - 18 x 1-1/4	114	1	3-21-1	Washer, lock 5/16
36	1	277065	Seal, rear oil	2	1	3-18-1	Washer, lock #10	115	1	3-25-0	Plug, pipe
37	1	277087	Gasket, closure plate	2	1	3-21-3	Washer, lock 5/16	116	1	3-378-4	Seal, front oil
37	A.R.	277183	Gasket, closure plate .005	2	1	3-25-20	Washer	117	1	277039	Cover, gear
37	A.R.	A-277118	Gasket, closure plate .010	2	1	3-70-3	Nut, hex. #10 - 32	117	1	277020	Gasket, gear cover
38	1	235007-5	Guide, valve	77	1	3-302-9	Line, oil	118	1	277021	Plate, gear cover
40	1	277039	Bushing, rear camshaft	78	1	277078	Gasket, governor housing	119	1	277022	Gasket, gear cover plate
41	1	277038	Bushing, front camshaft	79	1	A-277078	Governor - assembly	120	2	277086	Screw, H.C. 5/16 - 18 x 1-3/4
42	1	277206	Bushing	80	1	277137	Elbow	121	2	3-280-13	Pin
43	1	235170-5	Seat, exhaust valve	81	1	3-324-7	Elbow	OIL FILTER GROUP			
CRANKSHAFT GROUP											
44	1	3-42-15	Key, woodruff	IGNITION GROUP							
45	1	3-269-30	Ring, retaining	1	1	3-5-12	Screw, H.C. 1/4 - 20 x 1/2	2	1	3-25-20	Washer, copper
47	1	277029	Gear, crankshaft	1	1	3-20-1	Washer	2	1	3-55-6	Screw, socket hd.
48	1	277521	Crankshaft	1	1	3-22-9	Washer, lock #10	122	1	277194	Adapter, filter
CYLINDER HEAD											
49	2	3-280-13	Pin, roll 3/16 x 1-1/8	1	1	3-50-14	Screw, R.H.M. #10 - 24 x 1-1/8	123	1	277195	Gasket, filter
50	18	270156	Screw, H.C. 3/8 - 16 x 1-1/2	1	1	3-70-2	Nut, hex. #10 - 24	124	1	277233	Filter, oil - assembly
51	18	270869	Washer 3/8	1	1	3-81-1	Nut, hex.	125	1	277234	Stud, filter
1	1	3-131-1	Screw, F.H.M. #10 - 24 x 3/8	2	1	3-131-1	Screw, F.H.M. #10 - 24 x 3/8	ACCESSORIES			
2	1	3-149-4	Screw, H.C. 1/4 - 20 x 1	4	1	210081	Rod, breaker push	4	1	3-15-2	Screw, F.H.M.
3	1	210071	Rod, breaker push	4	1	3-19-1	Washer #10	4	1	3-19-1	Washer #10
4	1	220124	Clip, cable	126	1	3-275-6	Nut, wing	127	1	277064	Regulator, voltage
5	1	220124	Gasket, breaker cover	128	1	277031	Wash	128	1	277031	Wash
6	1	A-231839	Lead	128	1	277093	Gasket	129	1	277093	Gasket
7	1	232525	Cover, breather	130	1	277138	Element	130	1	277138	Element
8	2	235040	Plug, spark	131	1	277142	Cover	131	1	277142	Cover
9	2	277374	Lead, high tension	GASKET SET							
10	1	277375	Coil								
11	1	277459	Plate, coil mounting								

STARTING MOTOR

Electric start Model K482 engines use starting motors with overrunning clutch drives. When the switch is in the start position, current from the battery goes thru field windings and also thru armature windings to set up magnetic fields which buck each other and start the armature turning. As the armature turns, the drive pinion works out on a splined shaft into mesh with the ring gear on the engine flywheel. A spring loaded pin "locks" the drive in engaged position until after the engine "starts" and attains the speed where the flywheel begins overrunning the armature speed. The overrunning clutch then allows the pinion to spin faster than the armature and this spinning action forces the locking pin out of position and allows the pinion to retract. A small anti-drift spring holds the pinion in retracted position as the armature coasts to a stop after start switch is released.

Precautions: In the event of a "false start" (engine gets up sufficient speed to disengage starter but fails to continue running), the engine must be completely stopped before another starting attempt is made. If the flywheel is still rotating, the drive pinion and ring gear will clash and be damaged. Limit cranking (continuous) to a period of 30 seconds to prevent overheating of the starter. If cranked for 30 seconds, starter should not be operated again for 60 seconds to allow time for cooling.

Trouble Analysis: If starter fails to energize, first check wiring, starting switch or solenoid and condition of battery. Clean or replace badly corroded or dirty contacts--replace wires if frayed or cracked. Bypass start switch or solenoid with jumper wire--if starter cranks normally, replace defective switch or solenoid. If starter turns too slowly and battery is in good condition, check for dirty brushes or commutator. Further trouble analysis will require special test equipment available only at authorized repair stations.

Alignment: Alignment of starter pinion to ring gear is established by the machined surface of starter mounting flange on the oil pan and thru special (Allen head) mounting bolts. To prevent misalignment and gear damage, make sure the right bolts are used and that they are securely tightened at all times.

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