KOHLER ENGINE

OWNER'S MANUAL

MODELS: K295-1, K309-1, K335-1

TWO-CYCLE ENGINES

- OPERATING INSTRUCTIONS
- MAINTENANCE SCHEDULE
- MAINTENANCE PROCEDURE
- PARTS IDENTIFICATION
- PARTS ORDERING

KOHLER CO., KOHLER, WIS. 53044

Congratulations!

You have just purchased equipment powered by the finest two-cycle engine available. Please take a few moments to review this manual to familiarize yourself with the engine and its operation. To obtain maximum performance and life, carefully follow fuel, oil and maintenance recommendations. The manual serves this purpose with illustrations, charts, and easy-to-follow instructions.

Your engine is covered by a 1-year warranty against defects in material and workmanship. This cannot, of course, cover failures due to improper operation or maintenance. When service is required or if there may be questions in this regard, please contact the nearest Kohler Dealer or Distributor.

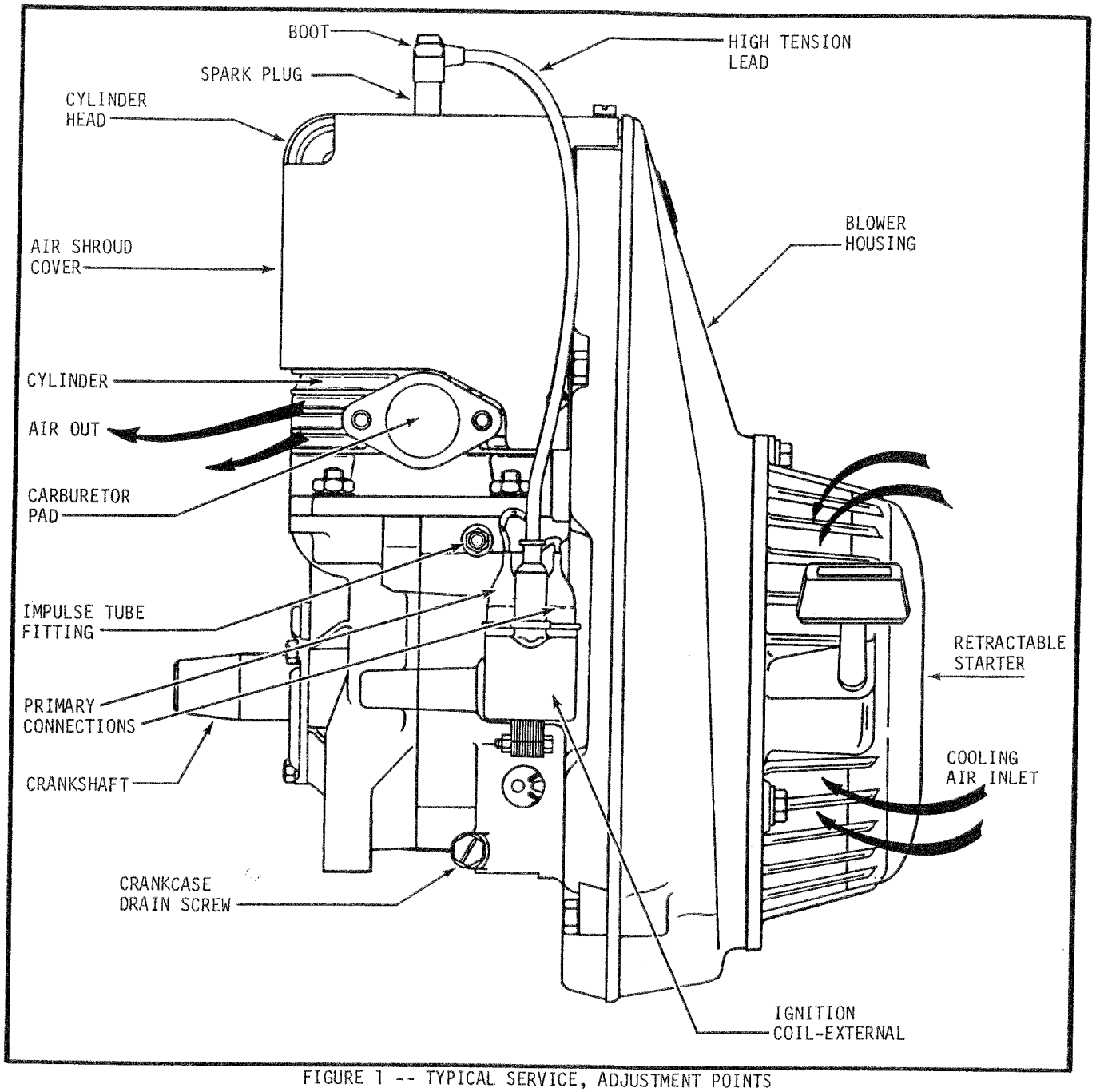

FIGURE 1 -- TYPICAL SERVICE, ADJUSTMENT POINTS

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.
- Make sure ignition switch is in "OFF" position and spark plug disconnected before working on 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 operate engine in closed building unless exhaust is piped safely outside.

OPERATING INSTRUCTIONS

PRE-START INSTRUCTIONS

FUEL MIXTURE: Mix REGULAR grade gasoline (92 octane minimum) with SAE 30 two-cycle (air-cooled type) engine oil. Gasoline to oil mixture 20 to 1. Pre-mix fuel thoroughly in separate container before filling fuel tanks on vehicle. Add about 1 gallon of fuel first then add oil and mix thoroughly before pouring in the rest of the gasoline. The ratio chart below is for mixing with some common size containers.

FUEL RATIO CHART

20 to 1 Ratio	GASOLINE CONTAINER CAPACITY					
(GAS to OIL)	1 GALLON	2 GALLONS	3 GALLONS	4 GALLONS	5 GALLONS	6 GALLONS
OIL AMOUNT	6.5 ounces	13 ounces	19 ounces	26 ounces	32 ounces	38 ounces

EQUIVALENT VALUES (APPROX.)

OUNCES	4	5	6	7	8	9	10	11	12	13	14	15	16 OUNCES
PINT %	1/4	1/3	3/8	7/16	1/2	9/16	5/8	11/16	3/4	13/16	7/8	15/16	1 PINT

2 pints = 1 quart 1 quart = 32 ounces (U.S. STANDARD MEASUREMENTS)

COOLING: Make sure baffles and cooling shrouds are in place and tight. Air intake openings must be kept clean and unrestricted at all times.

RUN-IN (NEW ENGINE): During the first hour, run for short periods of time at varying speeds up to 3/4 throttle. Avoid operation at low and continuous speeds as this causes buildup of heat especially during warm weather or heavy load conditions. After first hour, operate normally up to full throttle--no further "babying" of the engine is necessary.

BATTERY: On new vehicle or after battery has been removed for servicing, make sure battery negative (-) terminal is grounded.

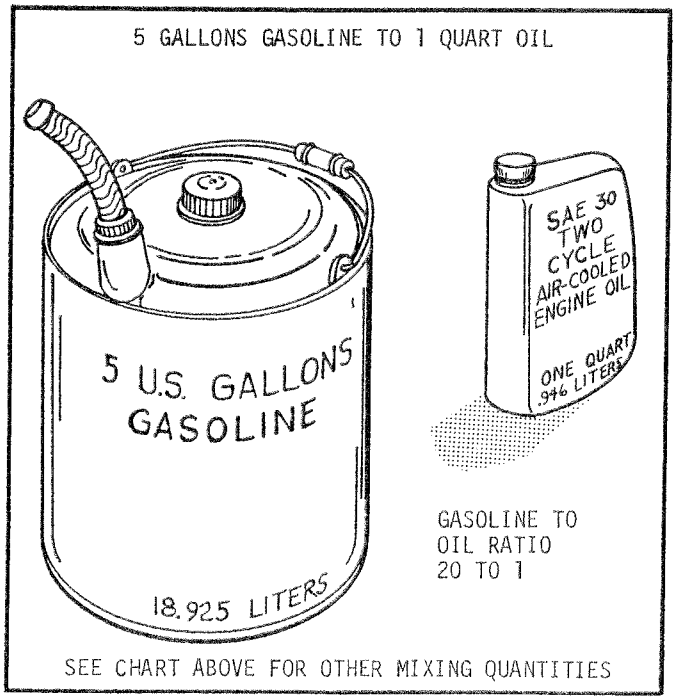

FIGURE 2 -- FUEL MIXTURE

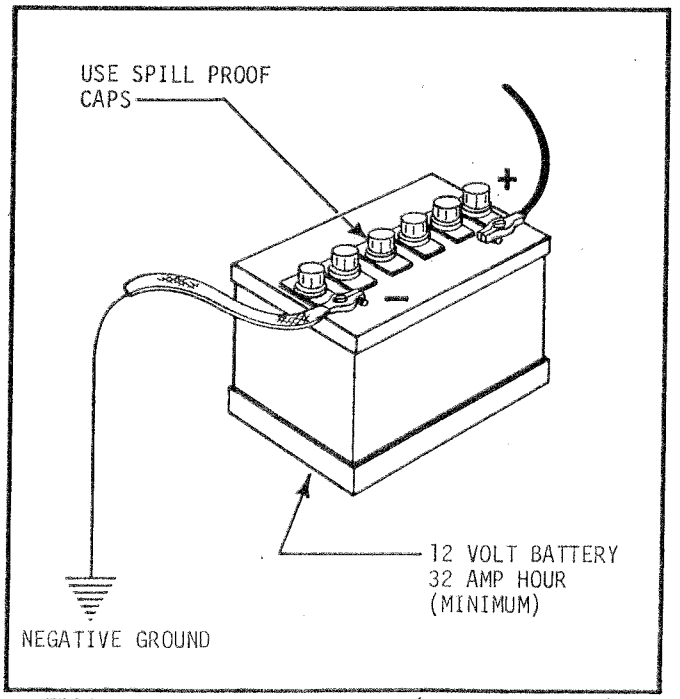

FIGURE 3 -- BATTERY POLARITY (ELECTRIC START)

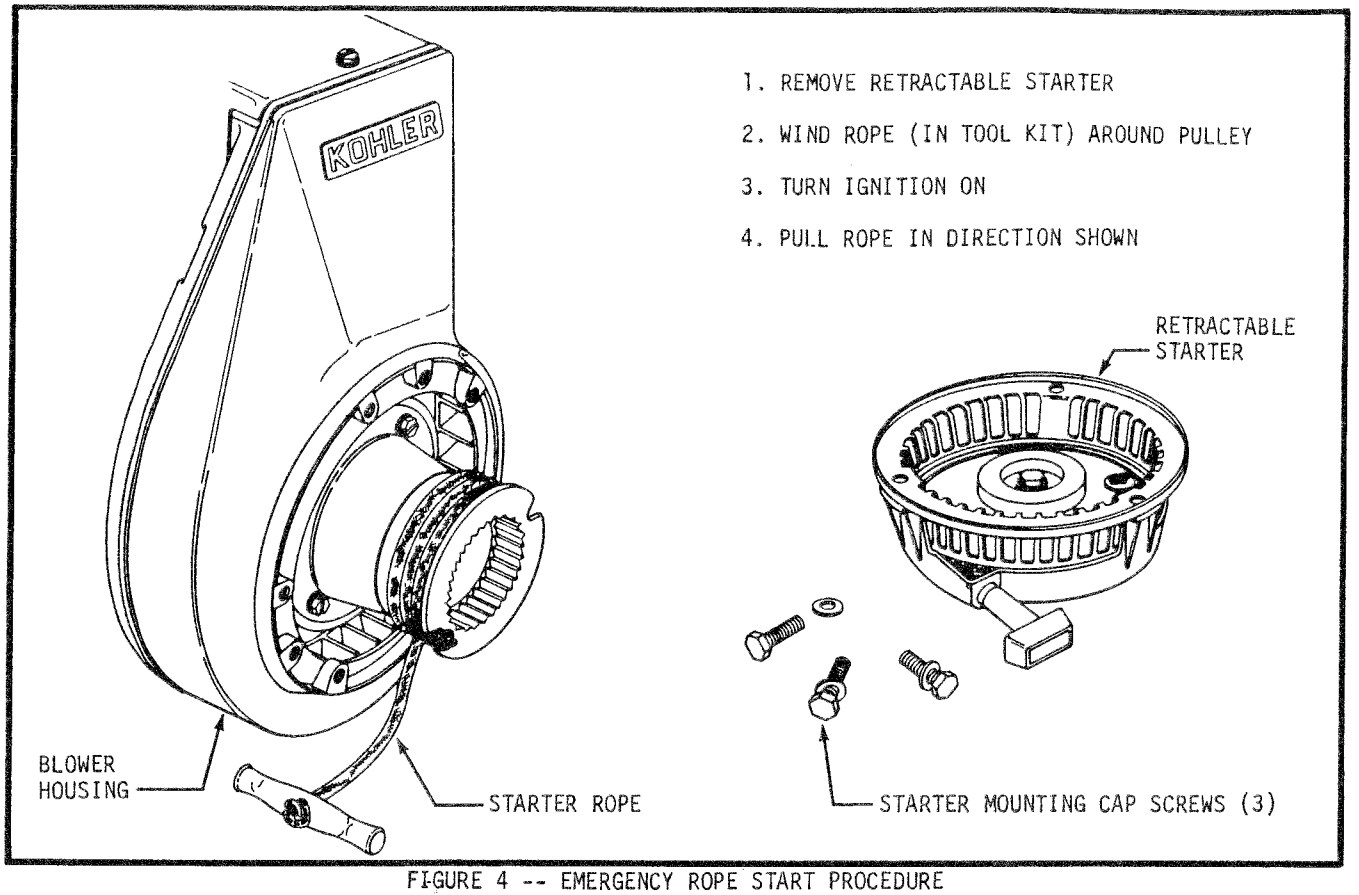

FIGURE 4 -- EMERGENCY ROPE START PROCEDURE

STARTING PROCEDURE

If engine has been out in snow, make sure air intake or baffle is cleared before attempting to start.

CAUTION: Throttle must move freely to prevent accidental sticking in running position during start-up. Check for freedom of movement.

1. CHOKE: Pull choke full on in cold weather. Little or no choking required with warm engine. After engine starts, open choke.

2. PRIME: If vehicle has primer button, press button several times before attempting to start (when cold). Choking not normally required with primer.

3. COMPRESSION RELEASE (K335-1 ONLY): Pull compression release knob out and after engine starts push knob in. Caution: Do not leave knob in out position--use only when starting!

4. THROTTLE: Hold throttle slightly off idle while cranking engine.

5. CRANK ENGINE: (A) RETRACTABLE START MODELS: Turn ignition switch ON, pull starting rope in quick, steady motion. Do not allow handle to snap back.

   (B) ELECTRIC START MODELS: Move switch to START position--release as soon as engine starts (switch will remain in "ON" position). Do not continue cranking if engine fails to start after 20 seconds. Allow starter to cool off before making another attempt. Use retractable starter if battery is low or dead.

   (C) EMERGENCY START: If battery won't start engine or retractable starter fails, the engine can still be started with rope provided in the tool kit. Remove retractable starter then wind rope clockwise around pulley - drive cup (see illustration). Turn ignition switch ON and pull rope to start. Refer to installation instructions on page 7 when reinstalling recoil starter.

   (D) STARTING AIDS: If aid such as ether is sprayed into intake for starting in extreme cold, do this only once as ether provides no lubrication.

OPERATION

WARM-UP: Allow gradual warm-up by operating at moderate speed and load for the first few minutes after starting. DO NOT attempt to race or place engine under heavy load immediately--performance is best after engine is thoroughly warmed.

IDLING: Avoid idling or slow speed operation for prolonged periods as this can result in crankcase flooding, carbon accumulation in head, and spark plug fouling.

STOPPING PROCEDURE

1. THROTTLE: Release throttle and allow engine to idle for a few moments under no load.

2. IGNITION SWITCH: Move switch to OFF position.

EMERGENCY STOPPING: After operating under heavy load in warmer weather, engine may be hot enough to Dieselize and continue running after ignition is turned off. To stop the engine under these conditions, pull full choke and open throttle to shut off air and stall engine.

TROUBLE ANALYSIS

The pre-requisites for easy starting and top performance are: proper fuel, good ignition and good compression. Problems which may occur during normal usage are listed below along with probable causes. The remedy is, in most cases, obvious. If the problem is major or if it persists after simple corrective steps are taken, return engine to the nearest Kohler service center for repair.

HARD STARTING OR WONT START

LACK OF FUEL

1. Tank empty.
2. Line pinched or disconnected.
3. Plugged vent hole in filler cap.
4. Fuel filter plugged.
5. Impulse tube loose or pinched.

POOR OR NO IGNITION SPARK

1. Ignition not turned on.
2. Spark plug wet or carbon fouled.
3. Spark electrodes broken or improperly gapped.
4. High tension lead loose or broken.
5. Breaker points damp, pitted or improperly gapped.
6. Ignition switch faulty.
7. Ignition coil faulty.
8. Condenser faulty.

INCORRECT FUEL - AIR MIXTURE

1. Engine flooded, overchoking.
2. Fuel stale, doesn't vaporize properly.
3. Water in fuel.
4. Dirt or gum forming to restrict fuel supply.
5. Carburetor loose -- too much air.

POOR COMPRESSION

1. Spark plug loose.
2. Cylinder head loose.
3. Cylinder head gasket "blown".
4. Piston rings broken.
5. Piston and cylinder badly worn.

CRANKS TOO SLOW (ELECTRIC START)

1. Loose or corroded battery connections.
2. Weak battery.
3. Starting solenoid faulty.
4. Moisture in starter.

RUNNING TROUBLES

LACKS POWER

1. Poor quality or improperly mixed fuel.
2. Water in fuel.
3. Air inlet restricted.
4. Exhaust port and/or muffler plugged.
5. Loose or improperly adjusted carburetor.
6. Ignition timing wrong.
7. Poor compression.

RUNS UNEVENLY

1. Spark plug in poor condition.
2. Wrong spark plug.
3. High tension lead loose.
4. Breaker points pitted.
5. Fuel bubbles in carburetor from overheating.

POOR ACCELERATION (ENGINE "FOURSTROKES")

1. Choke closed.
2. Carburetor improperly adjusted or malfunctioning.
3. Dirt on carburetor inlet needle.
4. Exhaust port heavily coated with carbon.

WILL NOT ACCELERATE

1. Carburetor idle mixture too lean.
2. Carburetor diaphragm coverplate loose.
3. Carburetor diaphragm gasket leaking.
4. Carburetor and/or manifold loose and leaking.
5. Carburetor malfunctioning.

BACK FIRES THRU CARBURETOR

1. Insufficient fuel.
2. Spark plug "too hot".
3. Water in carburetor.
4. Air leakage from faulty gaskets or oil seals.

PINGS UNDER HEAVY LOAD, FULL THROTTLE

1. Ignition timing too early.
2. Spark plug wrong heat range.
3. Carburetor main fuel set too lean.
4. Combustion chamber coated with carbon.

ENGINE STOPS

1. Fuel tank empty.
2. Vapor locks.
3. Ignition inadvertently turned off.
4. Exhaust pipe plugged.
5. Stalls from overload.
6. Clogged, restricted cooling system.
7. Cooling shrouds not in place or fan damaged.
8. Insufficient oil content in fuel.
9. Fuel line between tank and pump plugged or leaking.
10. Impulse tube plugged, kinked or loose.
11. Carburetor inlet screen or passages clogged.

TROUBLE SHOOTING CHART

SERVICE

IGNITION

With the exception of spark plugs, repair or replacement of ignition system components should be done only by qualified Kohler Engine Specialist as this usually involves retiming of the engine.

SPARK PLUG: Remove spark plug and check condition--replace if carbon fouled or if porcelain is cracked. The color of the spark plug is a good indicator of operating condition. Take corrective action if other than normal operation is indicated. Refer to accompanying spark condition chart.

BLACK	TAN	WHITE
CARBON FOULING	NORMAL	OVERHEATING

Do not sandblast, scrape or otherwise attempt to service plug that is in poor condition--best results are obtained with a new plug. Spark plugs should be selected according to the type of operating conditions. Select plug from accompanying plug chart. Standard plugs are suitable for average operating conditions including occasional runs at full throttle, heavy load. Heavy duty plugs are for pulling thru heavy, wet snow and/or warm weather. Use plugs from chart only--do not use booster gap types. Set plug gap at .020" and make sure plug is tightened to 25 foot lbs.--a loose plug is a definite and often overlooked cause of overheating.

PLUG	STANDARD DUTY	HEAVY DUTY
BOSCH	M 240 T1	M 280 T1
CHAMPION	K9 OR K8G	K7

CARBURETOR

Changing carburetor settings on two-cycle engines alters the amount of lubrication the engine receives. If adjustment is necessary, stop engine then turn IDLE FUEL and MAIN FUEL adjustments all the way in until they bottom lightly (do not force closed). Set IDLE FUEL adjustment at 3/4 turn open on Tillotson carburetor and 5/8 turn open on Kohler carburetor. For initial MAIN FUEL adjustment, set Tillotson at 1-1/4 turns open and Kohler at 3/4 turn open. Final adjustment is made with engine running at normal operating temperatures. MAIN FUEL adjustment may be "leaned" slightly for better performance; however, this setting must never be less than 1 turn open on Tillotson or 5/8 turn open on the Kohler carburetor.

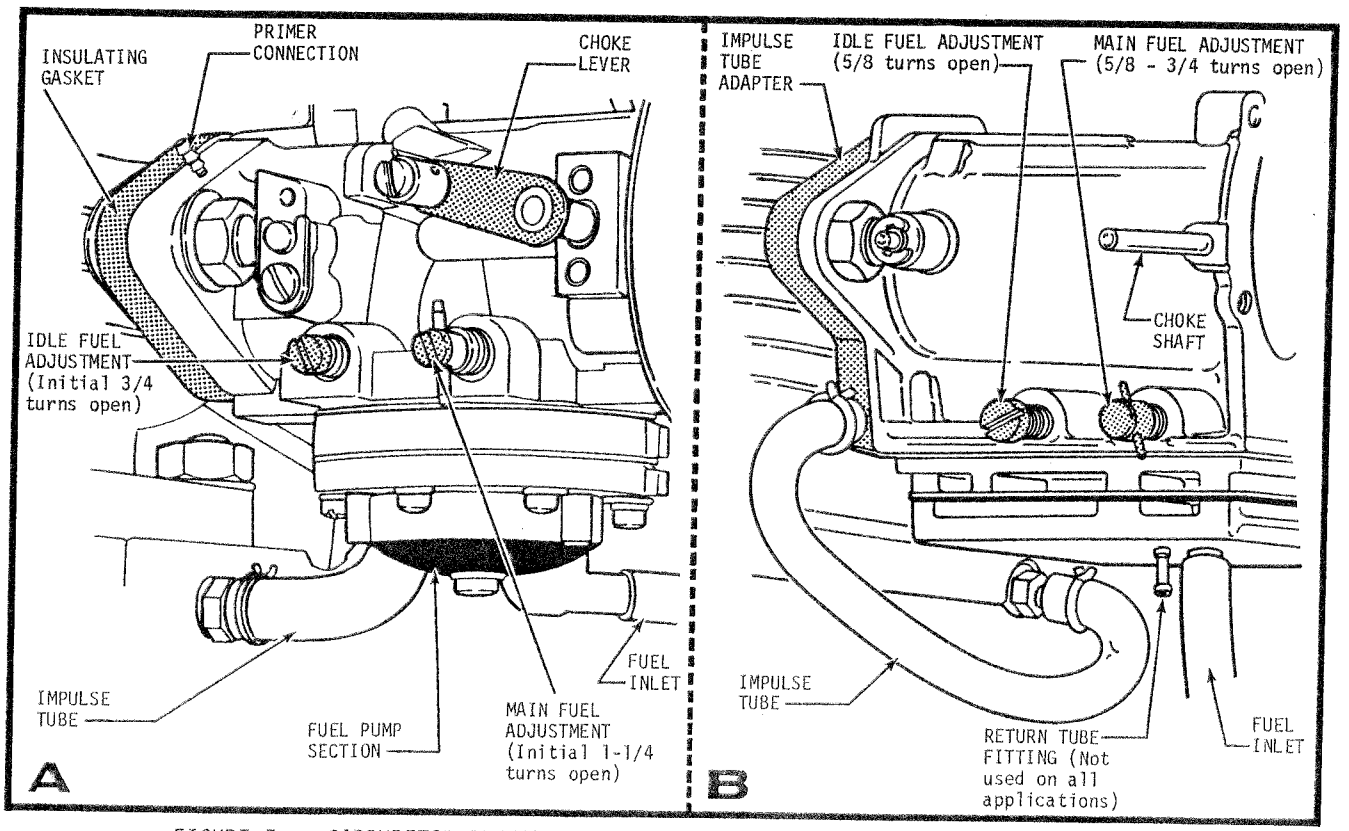

FIGURE 5 -- CARBURETOR ADJUSTMENTS & CONNECTIONS, (A) TILLOTSON (B) KOHLER

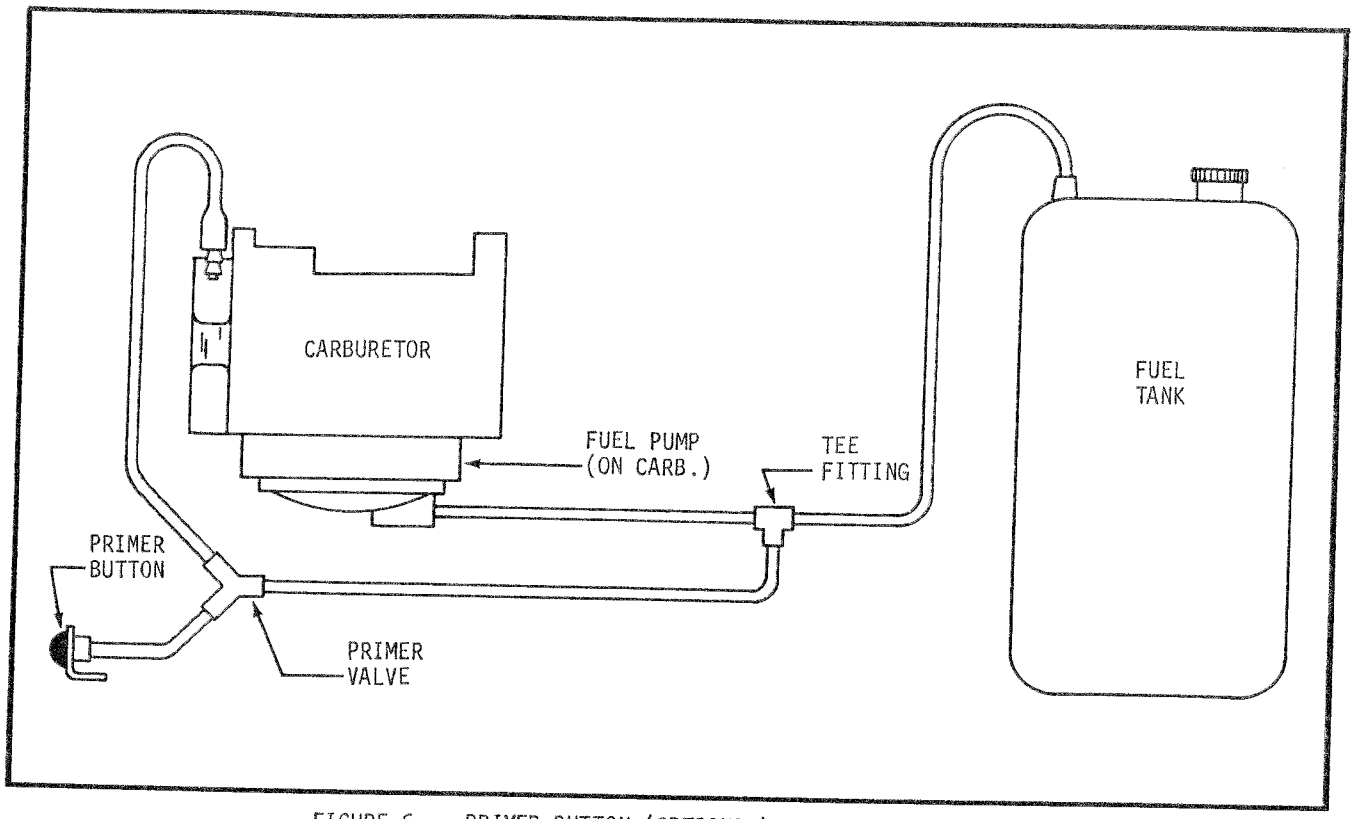

FIGURE 6 -- PRIMER BUTTON (OPTIONAL) CONNECTION DIAGRAM

ENGINE - GENERAL SERVICES

COOLING SYSTEM: On single cylinder models, cooling air is drawn into the blower housing by fan in flywheel, circulated past cooling fins on the block and cylinder head and is then ejected toward the clutch or power take-off end of engine. DO NOT operate engine with missing or loose air shroud cover or broken fins on flywheel. Keep cooling fins, air intake screens and compartment cooling inlets clean and unobstructed at all times. Fins on cylinder head must be parallel to crankshaft on single cylinder models.

CYLINDER HEAD: Poor performance may be caused by carbon buildup inside cylinder head. If spark plug is badly fouled, have head removed and cleaned at the first opportunity. This service should be performed only at an authorized service center for serious damage can result if done improperly.

DRAIN CRANKCASE: Crankcase should be drained occasionally since accumulation of fuel and oil in crankcase may throw the fuel-air ratio off and cause erratic operation. Remove hex.-head screw driver slot screw at low point on crankcase just below the carburetor. After draining fuel, reinstall and tighten screw.

RETRACTABLE STARTER

The retractable starter does not require service; however, if it is removed or works loose on engine, it must be realigned. If this is not done, teeth in pulley - drive cup will be damaged. Use the following procedure to align starter.

1. Install starter on engine but do not tighten capscrews.

2. Pull starter handle out about 8" so that starter centers as dogs engage in pulley - drive cup.

3. Hold rope in this position while tightening starter mounting capscrews to complete installation.

CAUTION: Do not attempt to disassemble starter as rewind spring can unwind violently if improperly handled and cause injury or damage. Have repairs done at authorized Kohler Service center.

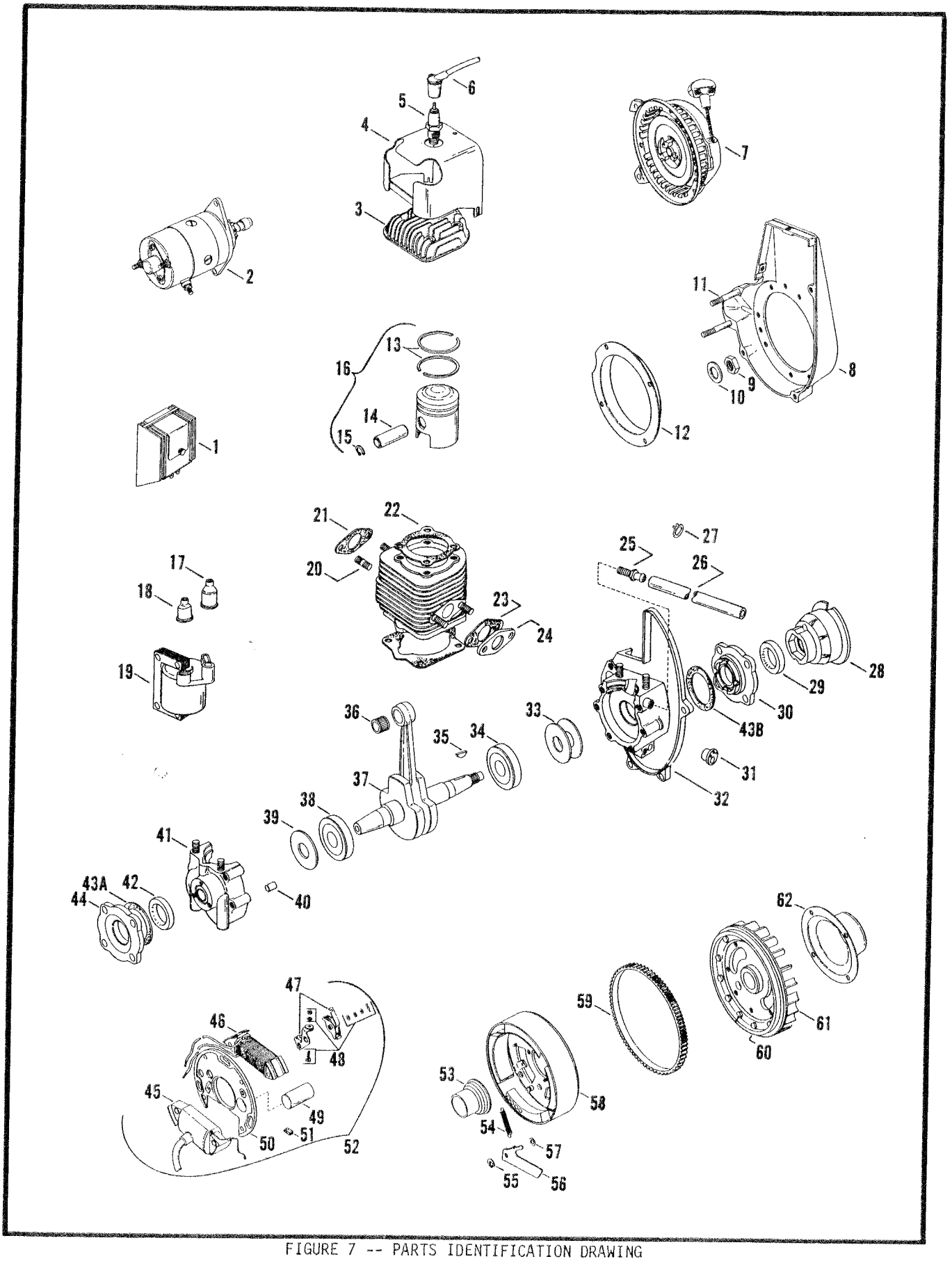

FIGURE 7 -- PARTS IDENTIFICATION DRAWING

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 numbers are not shown in this manual. The information requested above will enable the Dealer to quickly locate the Kohler number and supply the correct part for your particular engine version.

PARTS LIST

ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION	ITEM NO.	DESCRIPTION
1	Rectifier	23	Gasket, carburetor	44	Plate, bearing support
2	Starter - assembly	24	Gasket, insulating	45	Coil, ignition
3	Head, cylinder	25	Connector, impulse tube	46	Coil, lighting
4	Cover, air shroud	26	Tube, impulse	47	Breaker - assembly
5	Spark plug	27	Clamp, impulse tube	48	Screw - set
6	Boot, spark plug	28	Pulley, rope starting	49	Condenser
7	Starter, retractable-assem:	29	Seal, oil	50	Plate, stator
8	Housing, blower	30	Plate, bearing support	51	Felt, lubricating
9	Nut, flywheel	31	Nipple, rubber	52	Stator - assembly
10	Washer, flywheel	32	Crankcase, front half	53	Cam
11	Stud, blower housing	33	Washer, thrust	54	Spring
12	Cover, dust	34	Bearing, ball	55	Retainer
13	Ring set	35	Key, flywheel	56	Flyweight
14	Pin, piston	36	Bearing, needle	57	Shim
15	Retainer, piston pin	37	Crankshaft - assembly	58	Ring, magnet
16	Piston - assembly	38	Bearing, ball	59	Gear, ring
17	Cover, terminal	39	Washer, thrust	60	Flywheel
18	Cover, terminal	40	Pin, roll	61	Fan
19	Coil, high voltage	41	Crankcase, back half	62	Cover, breaker
20	Stud, muffler	42	Seal, oil		
21	Gasket, muffler	43A	Gasket plate		
22	Gasket, cylinder head	43B	Gasket plate		Carburetor (See your Kohler dealer)

ELECTRIC START (OPTIONAL)

A Bendix Drive type starting motor is used on Electric Start models. A 12 volt, 32 amp hour (minimum) battery is required as energy source for cranking. The negative (-) terminal of the battery must be grounded. Spill-proof caps must be used for battery. Energy for battery charging is furnished by lighting coils mounted on the stator under the flywheel. The 75 watt alternating current produced is converted to Direct Current in a rectifier for battery charging and operating lights on the vehicle. Two 5 amp fuses are provided inside the rectifier to protect diodes and windings against possible damage from overcurrent. Use Kohler replacement fuses only.

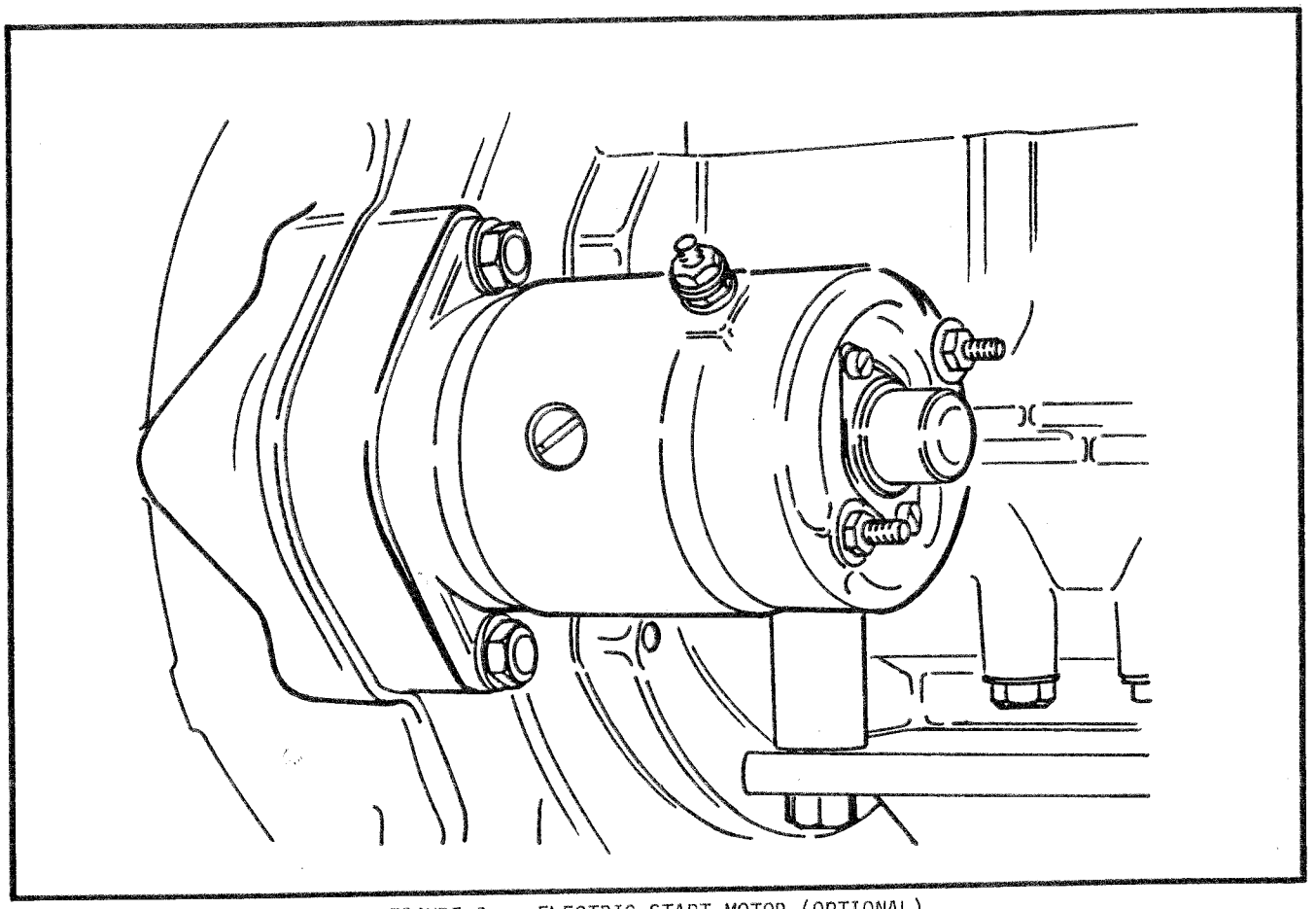

FIGURE 8 -- ELECTRIC START MOTOR (OPTIONAL)

PREPARATION FOR STORAGE

Use the following procedure to prepare engine for off-season storage.

1. Remove fuel line at carburetor, start and run engine at idle until it stops. This uses up fuel in carburetor.
2. Drain fuel from tank to prevent gumming and use of stale fuel at the start of the next season.
3. Remove spark plug, add 1 tablespoon of SAE 30 weight oil to cylinder.
4. Turn engine over several times by hand to coat cylinder with oil then replace spark plug.
5. Clean up spark plug boot, cable and outside of engine.
6. Close choke and cover air intake to prevent dust and dirt from entering.
7. Plug or cover exhaust pipe.

GENERAL SPECIFICATIONS

ENGINE SPECIFICATION	K295-1	K309-1	K335-1
BORE	2.953	2.953	2.953
STROKE	2.618	2.756	2.992
DISPLACEMENT (CUBIC CENTIMETERS)	295	309	335
BRAKE HORSEPOWER @ 5500 RPM	18	20	23
OPERATING SPEED - MINIMUM RPM	2000	2000	2000
OPERATING SPEED - MAXIMUM RPM	6000	6000	6000
WEIGHT (APPROXIMATE) LBS.	53	53	54.5

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 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.

WARRANTY IS VOIDED BY UNAUTHORIZED REPAIRS OR MODIFICATIONS OR USE OF ENGINES IN ANY FORM OF COMPETITION.

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, WISCONSIN

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