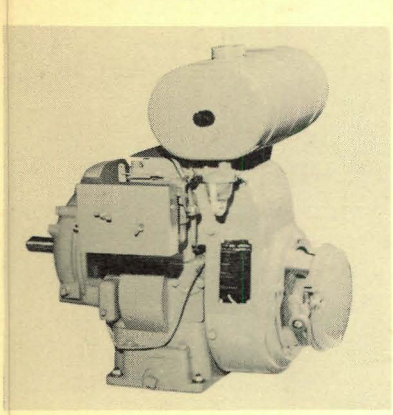
KOHLER ENGINES

4-CYCLE • SHORT-STROKE • AIR-COOLED



MODEL K91RT

SPEC. NO. 31600-A

AS MANUFACTURED FOR

THE ESKA COMPANY

1.8 H.P. at 1800 R.P.M.
2.6 H.P. at 2400 R.P.M.
3.5 H.P. at 3200 R.P.M.
3.8 H.P. at 3600 R.P.M.
4.0 H.P. at 4000 R.P.M.

Kohler engines are manufactured under the close supervision of skilled technicians. The engines are precision units, machined and assembled to deliver many hours of reliable service. All components are produced under rigid inspection, tested under load conditions, and adjusted to meet exact specifications before shipment is made.

Kohler engines are solidly constructed with a heavy duty cast iron block, employing modern short stroke design, and built-in mechanical governor.

This folder will assist you by offering the correct procedures for care of Kohler engines. For a K91 engine service manual with complete operation, maintenance, overhaul, and parts identification information, send $1.50 to:

Engine Service Department
Kohler Co., Kohler, Wisconsin

OPERATING INSTRUCTIONS

1. Before Starting

a. Remove oil filler cap and check oil level. Add clean oil to mark indicated on dipstick (SAE 5W-20). Oil should not be over full mark.

b. Keep fuel tank filled with clean, fresh gasoline of regular grade to prevent condensation in cold weather. *DO NOT MIX OIL WITH GASOLINE.* Be sure fuel tank cap vent hole is open. Vent hole can freeze over while plowing.

c. Remove both plugs of reduction gear unit and add oil, (same grade as used in crankcase) to oil level hole. Be sure that vent hole of oil fill plug is open. If oil bubbles out of vent hole of oil fill plug, there is too much oil.

d. Break rotor blade free before starting.

2. To Start

a. Open valve on sediment bowl.

b. Close choke lever. Choking may be necessary due to variations in temperature, grade of fuel, etc. Little or no choking will be necessary when engine is warm. Experience will teach you the degree necessary under varying conditions. Open remote throttle about half way until engine starts, then set at desired speed.

Extreme Cold

Idle screw is set at factory for fast idle. Close throttle and set at full choke. When engine has started, open choke slowly, making adjustments as engine warms up. Use Autolite AR8 spark plug or equivalent.

Below −25° F.

Apply heat to engine cylinder head, spark plug, and oil pan. Engine will start at −40° F. with heat application.

c. Give starter pulley quick, steady pull. Do not jerk or pull retractable starter to end of cable —return handle slowly. *DO NOT ALLOW HANDLE TO SNAP BACK.*

d. Slowly return choke to open position as engine warms up.

3. To Stop

Whenever possible, allow engine to idle, with no load, before stopping.

a. Press red breaker point "STOP" button and *hold until engine is completely stopped.*

b. See Instructions for Storing if engine is to be taken out of service for a considerable length of time.

4. Precautions

Stop engine before filling fuel tank. Avoid spilling gasoline on a hot engine. Always use fresh, clean gasoline.

a. Avoid injuries. Always disconnect spark plug cable before making any adjustment to machine powered by engine.

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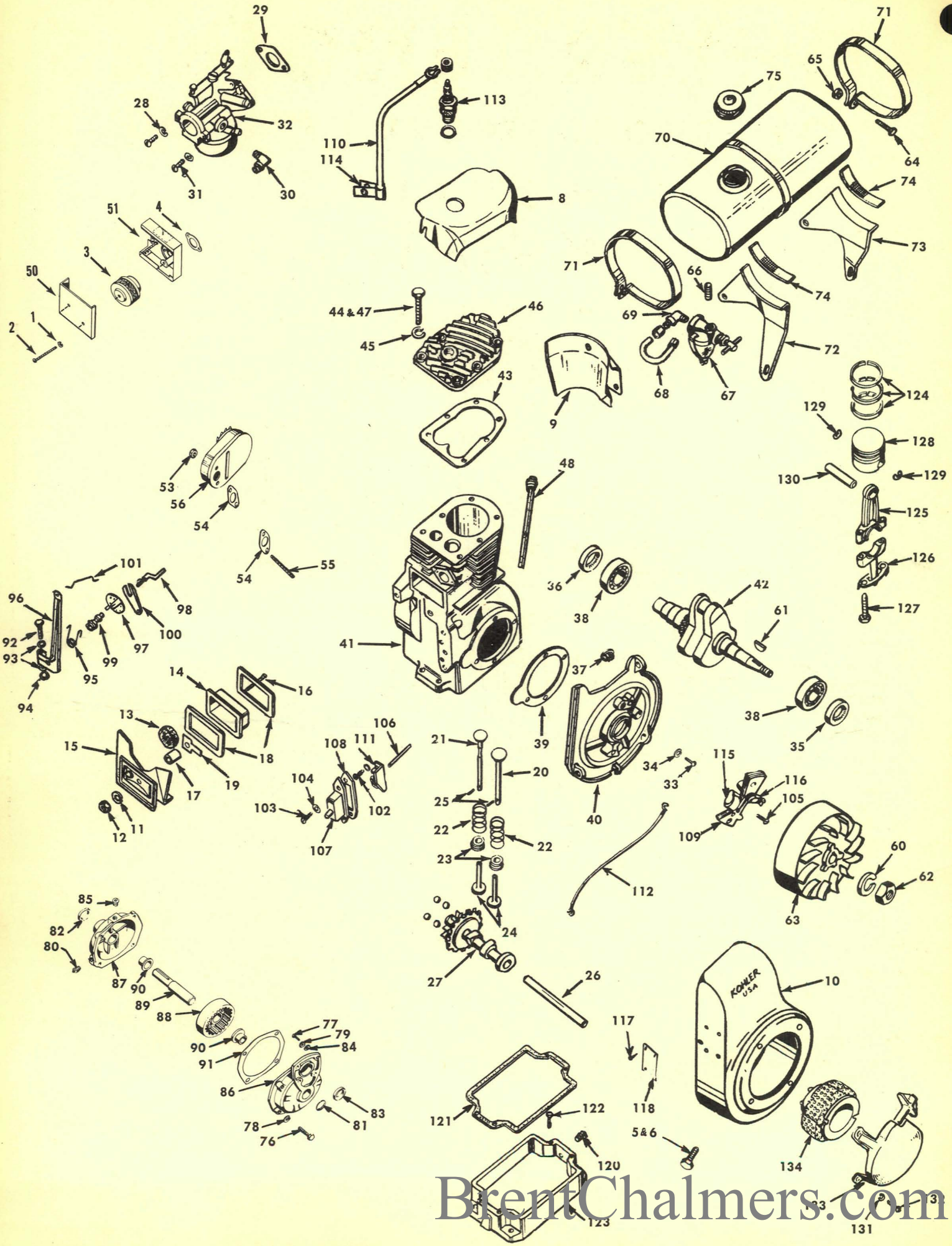

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ESKA

MODEL K91RT - SPEC. NO. 31600-A

PARTS LIST

Item No.	Quantity	Part No.	Description
			AIR INTAKE GROUP
1	2	X-18-2	Washer, lock
2	2	X-51-43	Screw, R.H.M. 8–32x3/8
50	1	220854	Cover, duct
51	1	220855	Body, duct
3	1	235308	Element
4	1	220537	Gasket
			BAFFLES & SHROUD GROUP
5	2	X-132-1	Screw, H.C. 1/4—20x3/8
6	4	X-132-5	Screw, H.C. 1/4—20x5/8
8	1	220049	Baffle, head
9	1	220054	Baffle, cylinder
10	1	220220	Housing, blower
			BREATHER & VENT GROUP
11	1	X-20-1	Washer, lock 1/4
12	1	X-81-1	Nut, hex. 1/4—20
13	1	210256	Filter
14	1	220357	Plate, breather
15	1	220358	Cover, valve
16	1	220368	Stud, cover
17	1	220369	Seal, breather
18	2	220370	Gasket, cover
19	1	220379	Reed, breather
			CAMSHAFT & VALVES GROUP
20	1	220008	Valve, intake
21	1	220009	Valve, exhaust
22	2	220010	Spring, valve
23	2	220011	Retainer, spring
24	2	220013	Tappet, valve
25	2	220052	Pin, valve lock
26	1	220053	Pin, camshaft
27	1	A-220140	Camshaft—assembly
			CARBURETOR GROUP
31	2	X-140-1	Screw, sltd. hd. 1/4—20x3/4
29	1	210223	Gasket, carburetor
32	1	E-220517	Carburetor—assembly
	1	231324	Decal, choke
30	1	231510	Elbow, compression
28	1	220547	Sleeve
	1	220786	Nut
			CRANKCASE GROUP
33	4	X-5-1	Screw, H.C. 1/4—20x5/8
34	4	X-25-55	Washer, copper 1/4
35	1	X-271-15	Seal, front oil
36	1	X-271-16	Seal, rear oil
37	1	X-301-6	Button, plug
38	2	200110	Bearing, ball
39	1	220071	Gasket, bearing plate
40	1	220385	Plate, bearing
41	1	A-220459	Block, cylinder—assy.
			CRANKSHAFT GROUP
42	1	220433	Crankshaft
			CYLINDER HEAD GROUP
43	1	220124	Gasket, head
44	6	220257	Screw, H.C. 5/16x18x1–1/4
45	6	220534	Washer 5/16
46	1	220541	Head, cylinder
			DIPSTICK GROUP
48	1	A-220092	Dipstick—assembly
			EXHAUST GROUP
	2	X-81-1	Nut, hex. 1/4—20
54	1	220122	Gasket, muffler
55	2	220133	Stud, muffler
56	1	A-220145	Muffler—assembly
			FLYWHEEL GROUP
60	1	X-23-1	Washer, lock 7/16
61	1	X-43-3	Key, woodruff 5
62	1	X-88-2	Nut, hex. 7/16—20
63	1	A-220636	Flywheel—assembly
			FUEL TANK & FITTINGS GROUP
64	2	X-5-7	Screw, H.C. 1/4—20x1
65	2	X-101-8	Nut, stop 1/4—20
66	1	X-217-6	Nipple
67	1	210101-A	Filter, fuel—assenbly
68	1	220097	Line, fuel
71	2	220154	Strap, tank
72	1	220158	Bracket, tank - L.H.
74	2	220166	Webbing
73	1	220514	Bracket, tank - R.H.
	1	220547	Sleeve
	1	220786	Nut
70	1	A-220852	Tank, fuel—assembly
	1	220853	Cap, tank
69	1	231510	Elbow, compression
			GEAR REDUCTION GROUP
76	2	X-5-4	Screw, H.C. 1/4—20x1 1/4
77	4	X-6-23	Screw, H.C. 5/16—24x3/4
78	4	X-20-1	Washer, lock 1/4
79	2	X-21-1	Washer, lock 5/16
80	1	X-75-2	Plug, pipe 1/4
	2	X-81-1	Nut, hex. 1/4—20
81	1	X-230-11	Plug, expansion
82	1	X-271-11	Seal, gear cover
83	1	X-271-15	Seal, gear housing
84	2	D-997	Washer, copper
85	1	205013	Plug, pipe
86	1	220211	Housing, gear
87	1	220212	Cover, gear
88	1	220213	Gear, drive
90	2	220216	Bushing, drive shaft
91	1	220218	Gasket, cover
	2	220790	Stud
89	1	220858	Shaft, gear

Pour engine oil into gear housing at filler hole until oil runs from oil level hole at lower end.

			GOVERNOR GROUP
92	1	X-5-7	Screw, H.C. 1/4—20x1
93	2	X-25-63	Washer 1/4
	1	X-67-5	Screw, drive
94	1	X-81-1	Nut, hex. 1/4—20
	1	X-269-13	Ring, snap
95	1	220119	Spring, governor
96	1	220126	Lever, governor
98	1	220131	Shaft, governor
99	1	220132	Bushing, governor
100	1	220156	Bracket, speed control
101	1	220380	Linkage, governor
97	1	220873	Disc,regulating
			IGNITION GROUP
	1	X-5-1	Screw, H.C. 1/4—20x5/8
104	1	X-20-1	Washer, lock 1/4
	1	X-22-18	Washer, lock 8 I.E.T.
	1	X-25-48	Washer 8
	1	X-25-63	Washer 1/4
105	2	X-67-22	Screw, self tapping 10
102	1	X-67-37	Screw, self tapping 8—32x5/8
103	4	X-131-1	Screw, F.H.M. 10–24x3/8 (w/washer)
106	1	X-489-1	Rod, breaker
107	1	A-220136	Cover, breaker—assy.
108	1	220174	Gasket
109	1	A-220409	Stator—assembly
115	1	220435	Coil
116	1	220434	Condenser
110	1	A-220443	Cable, hi-tension
111	1	A-220474	Breaker—assembly
112	1	A-220512	Lead, breaker
	1	220856	Spring, stop control
	1	220857	Bracket, stop control
113	1	240667	Plug, spark
114	1	275183	Clip, cable
			NAMEPLATE GROUP
117	4	X-513-1	Screw, sheet metal —7x3/8
118	1	220630	Nameplate
	1	220673	Decal, 4 H.P.
			OIL PAN GROUP
120	1	X-75-2	Plug, pipe 1/4
122	4	X-154-1	Screw, H.C. 5/16—18x7/8
113	1	220167	Pan, oil
121	1	220775	Gasket, pan
			PISTON & ROD GROUP
124	1	220467	Ring set—std.
	1	B-220070	Rod, connecting—assy.
125	1	B220111	Connecting rod
126	1	220492	Lock, connecting rod
127	2	220491	Screw, connecting rod
128	1	A-220103	Piston—assy., std.
129	2	220004	Retainer, pin
130	1	220003	Pin, piston
			RETRACTABLE STARTER GROUP
131	4	X-19-1	Washer, lock 10
	4	X-25-7	Washer 10
132	4	X-50-2	Screw, R.H.M. 10-32x3/8
133	1	C-220589	Starter, recoil—assy.
134	1	A-220594	Cup, drive w/screen

220151	Gasket set

Indented part numbers and descriptions are components of preceding assembly.
Order parts from your nearest Kohler dealer giving part number and description of part and model number, specification number and serial number of engine.

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GEAR REDUCTION

The reduction unit is a gear type running in oil. The drive gear is machined on the crankshaft and the driven gear is keyed and pressed onto the power-take-off shaft. The shaft is supported by two bronze bearings located in the gear housing and in the gear cover.

1. Before Operating

a. Remove oil fill plug and oil level plug and fill gear unit to oil level hole. Use same grade of oil recommended for engine.

b. The reduction gear is vented through the oil fill plug. This vent should be checked daily to see that it is open.

c. Change reduction gear oil every 100 operating hours.

2. To Service

a. Remove four cap screws from gear housing, slide off cover and remove power-take-off with driven gear.

b. Remove four cap screws that hold gear housing to engine block. Use socket wrench.

c. Wash all parts and inspect shaft, bushing, and gears for wear. Replace all worn parts.

d. Remove old oil seals and install new seals (flat side out) in gear housing and reduction gear cover.

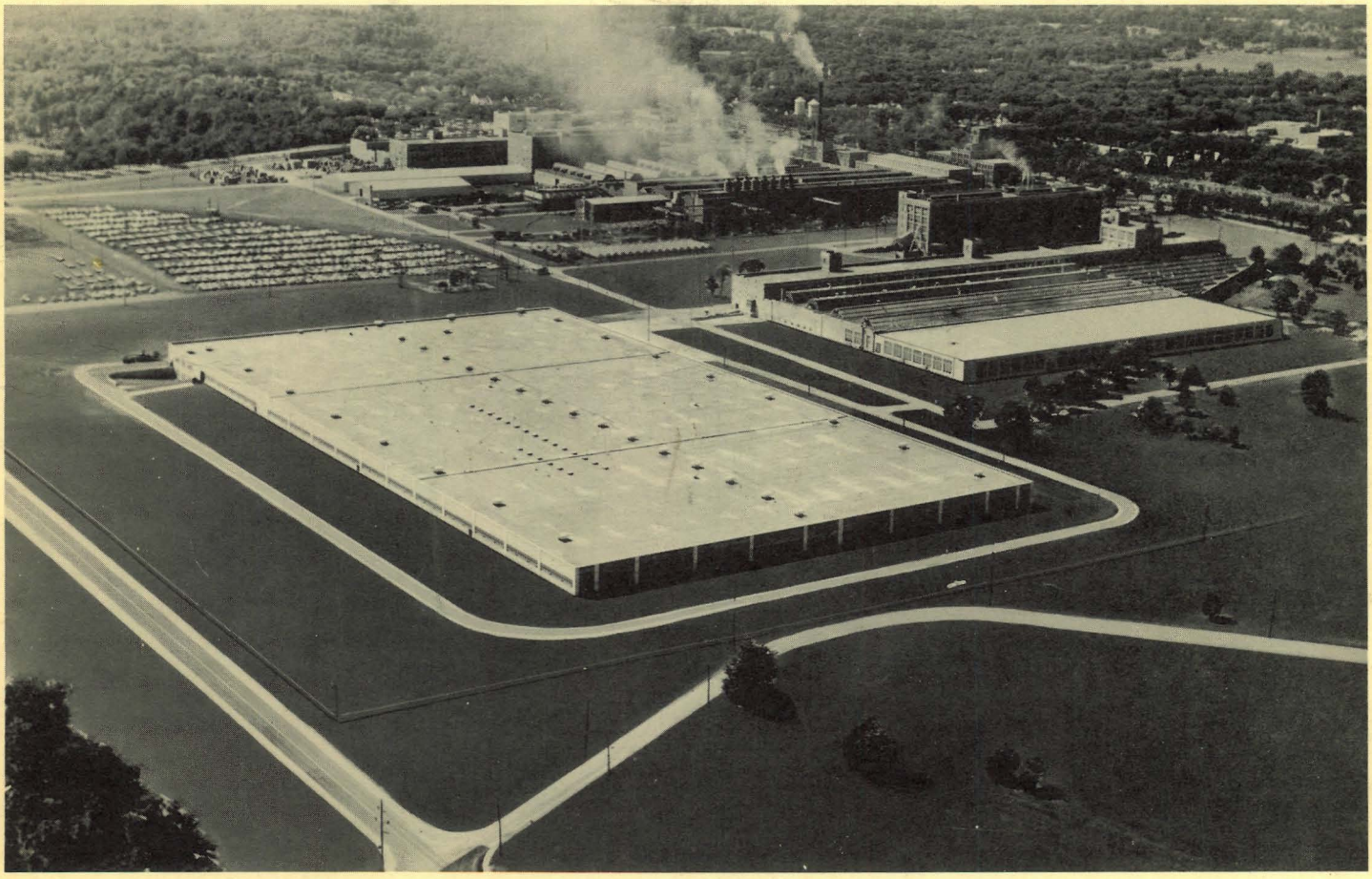
3. Assembly

a. Wrap tape around crankshaft gear to protect oil seal, slide gear reduction housing over shaft and attach to block. Two lock washers are used on outside and copper washers inside.

b. Place thrust washers on shaft, one on each side of reduction gear.

c. Tape should be wrapped around shaft to prevent keyway from damaging oil seal while cover is installed on power-take-off shaft.

d. Install gaskets on cover and place assembly in position on gear housing.



CONTACT YOUR NEAREST KOHLER DEALER FOR REPAIR PARTS

KOHLER CO. *Established 1873* **KOHLER, WIS.**

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b. Crankcase and air cleaner must be properly serviced at all times. Dirt drawn through improperly serviced air cleaner can ruin an engine in a few operating hours.

c. Allow engine to warm up before applying work load.

d. Keep cylinder block, flywheel, cylinder head cooling fins, and rotating air screen free of ice and snow.

e. Do not operate at speeds greater than governor setting or run continuously under maximum load.

MAINTENANCE

1. Each Day

a. Check fuel supply and oil level in crankcase. Add oil only as needed to keep level between marks on oil gauge.

b. Clean oil, dirt, and snow from external surface of power unit.

c. Check air intake and cooling fins for obstructions and ice.

2. Every 25 Operating Hours

a. Change oil in crankcase.

b. Check gasket joints between air cleaner, carburetor, and air intake manifold.

3. Every 100 Operating Hours

Perform 25 hour service and in addition:

a. File electrode areas and regap spark plug to .025. Use Autolite AR-8 plugs, or equivalent, for cold weather operation.

b. Remove, clean, and replace sediment bowl.

c. Check breaker points and regap to .020.

d. Oil recoil starter through hole indicated on starter housing. Use lube equivalent to #5 grade oil.

4. Instructions for Storing

If engine is to be out of service for a considerable length of time, the following procedure is recommended:

a. Drain fuel tank.

b. Drain carburetor by pressing bowl drain button on bottom of carburetor bowl.

c. Remove, clean, and replace sediment bowl.

d. Clean exterior surfaces of engine.

e. Spread a light film of oil over any exposed surfaces of engine subject to corrosion.

f. Pour tablespoon of oil into spark plug hole and crank engine slowly by hand. Replace plug.

g. Do not expose to elements—store in dry place.

TROUBLE SHOOTING

Following is a list of troubles which may occur through average use and normal wear:

1. Hard Starting

a. Faulty Ignition

(1) Loose or grounded high tension on breaker point leads.

(2) Improper breaker point gap.

(3) Defective breaker points.

(4) Faulty spark plugs.

(5) Faulty condenser or coil.

(6) Incorrect spark timing.

(7) Check ignition system for moisture.

b. Faulty Carburetion

(1) Gasoline not getting to carburetor.

(a) Ice, dirt or gum deposits in fuel line.

(2) Dirt in carburetor.

(3) Carburetor improperly adjusted.

c. Compression Loss

(1) Valves leaking or sticking.

(2) Rings worn.

(3) Head gasket leaking.

2. Overheating

a. Insufficient cooling air available.

b. Dirty or clogged intake screen, shroud or cooling fins.

c. Improper fuel.

d. Fuel mixture too lean.

e. Improper ignition timing.

3. Backfiring

a. Fuel mixture too lean.

b. Sticky intake valve.

c. Improper ignition timing.

d. Point gap open too far.

4. Occasional Missing at High Speed

a. Spark plug gap too wide.

b. Improper carburetor adjustment or lack of fuel.

c. Wrong type spark plug.

d. Improper ignition timing.

5. Missing Under Slow, Hard Pull

a. Spark plug gap too wide.

b. Pitted breaker points.

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c. Partially fouled spark plug.

d. Defective ignition timing.

6. Knocking

a. Fuel octane rating too low. Use a good grade of regular gasoline.

b. Improper ignition timing.

c. Overheated engine.

d. Loose connecting rod.

e. Excessive carbon in combustion chamber.

f. Lack of lubrication.

7. Operating Erratically

a. Clogged fuel line.

b. Water in fuel.

c. Faulty choke control.

d. Improper fuel mixture.

e. Loose ignition system connection.

f. Air leaks in manifold or carburetor connections.

8. Engine Will Not Idle

a. Improper carburetor idling adjustment.

b. Carburetor jets clogged.

c. Spark plug gap too small. .025.

d. Leaking carburetor or manifold gaskets.

e. Sticking or leaking valves.

f. Weak coil or condenser.

9. Engine Stops While In Operation

a. Check fuel tank cap vent hole.

b. Air cleaner can be clogged with fine snow.

CARBURETOR ADJUSTMENTS

The carburetor is adjusted at the factory and under normal operating conditions will not require readjustment. If adjustment is necessary because of fuel values and/or air conditions, the following procedure is recommended:

a. Turn high speed adjustment screw (center vertical screw on top of carburetor) counter-clockwise two full turns from closed position and start engine.

b. After engine has reached normal operating temperature, accelerate and check response. Operate engine under full load and adjust high speed needle for a slightly richer mixture for improved cooling and greater power.

c. If engine misses and backfires, high speed mixture is too lean. To correct—high speed adjustment screw should be turned counter-clockwise, ¼ turn at a time, until condition is corrected.

d. If engine shows sooty exhaust and is sluggish, mixture is too rich. To correct—high speed adjustment screw should be turned clockwise until engine runs smoothly.

e. To make final check of high speed adjustment, operate under full load and make corrections to achieve smooth operation.

f. Idle speed is controlled by stop screw on carburetor throttle shaft and should be set at a speed not less than 1000 RPM.

g. Adjustments to idle mixture screw (angled screw on side of carburetor) and idle stop screw should be made at the same time as each affects the other. Adjust until engine idles smoothly.

WARNING: *Do not use force on high speed needle or idle screw—they will be damaged.*

RECOIL STARTER

The starter has a die cast aluminum housing. A friction shoe assembly, under spring tension, is used to engage in the drive cup when starter handle is pulled. The drive cup is held in place on engine by the flywheel nut. A pin on the cup is engaged in the crankshaft keyway to prevent slippage of the drive cup.

1. To Align Starter

a. Place in desired position on blower housing with centering pin engaged in center hole of crankshaft. If centering pin is too short to reach crankshaft, pull pin out to correct length with a pair of pliers.

2. Operating Tips

a. Be sure starter screen is kept clean when engine is operating. Severe damage may result from overheating.

b. After starting engine, return cable slowly. Releasing handle when cable is extended will shorten life of starter.

c. Use a steady pull to start engine. Jerking cable to the end will result in wear.

d. Pull handle so that cable will remain centered in guides.

If for any reason recoil starter should not operate, starter assembly can be removed and engine cranked with a rope. The starter cup will serve as a rope pulley.

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