INSTRUCTION BOOK

and

PARTS LIST

for

CHRIS-CRAFT MARINE ENGINES

4 CYLINDER, 60 HORSEPOWER—MODEL A

BOOK NO. 1

Chris-Craft Corporation

Algonac, Michigan

U. S. A.

Cable Address: Chriscraft, Algonac

Printed in U. S. A.

WARRANTY

Chris-Craft boats and Chris-Craft parts manufactured by company are warranted to be free from defects in material or workmanship under normal use and service and the company will replace or repair any part thereof, which shall disclose defects within SIX MONTHS after date of delivery of such boat or part to the original purchaser, and which examination by company shall determine to be defective; providing that Dealer shall make claim thereon and return said part or parts to Company, transportation prepaid, within 30 days after defect is discovered. The Company does not authorize Dealer to assume for Company any liability in connection with this warranty. Paints, varnishes and chromium plate finishes are believed by the Company to be the best obtainable, however, cannot be guaranteed because of the varying effects which different climates and use conditions have on the same.

This Warranty shall not apply to any Chris-Craft boat or part manufactured by Company which shall have been altered or repaired outside of the factories of Company.

This Warranty will not apply to any engines, engine accessories or trade accessories not of Company's manufacture which Company may use as these are generally warranted by their respective manufacturers.

This warranty does not cover race boats or racing engines.

Catalogue speeds are estimated or are attained over a certified course at Algonac, Michigan under favorable conditions and are not guaranteed.

Chris-Craft Corp.

BREAKING IN A NEW ENGINE

The first few hours of operation have a great deal to do with the successful performance of an engine. Engines properly broken in will give much longer satisfactory service.

Before leaving the Chris-Craft factory, your engine has had several hours of "run-in" on the block test and is satisfactory for speeds up to 1500 R. P. M. It should be run for at least 5 hours at not over 1500 R. P. M. and then not over 2000 R. P. M. for the next 5 hours. The engine should not be run at maximum throttle for more than three or five minutes at a time until after the engine has had at least 20 hours.

A good way to tell how the break-in period is progressing, is to idle the engine at 1000 R. P. M., turn off the ignition and note how quickly the engine comes to a stop. You will note that the new engine will stop at once but as the break-in progresses, you will note that it does not stop with such a sudden jerk.

An abnormal rise in temperature on the temperature gauge will indicate that you are running a little too fast.

It is recommended that a pint of oil be added to each 5 gallons of gasoline for the first few hours of running. Be sure that it is mixed thoroughly in the tank.

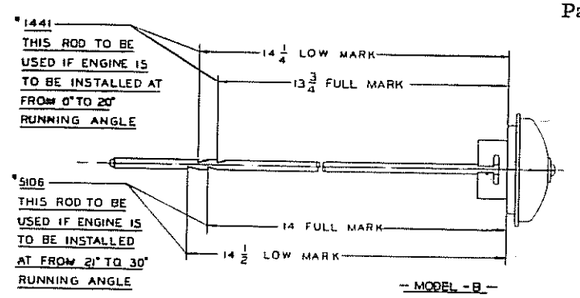
During the entire life of the engine, always run the engine at medium speeds for a few minutes to allow the oil to warm up before running at sustained high speeds.

When coming to the dock, after a run, always allow the engine to run at moderate speed for at least 3 minutes before turning off the ignition. This can be done by slowing down several hundred yards before you get to the dock and coming in slow or letting the engine idle after you have come into the dock. This is to allow the valves to cool down while the water is still circulating in the engine. This will prevent warped valves.

ENGINE LUBRICATION

For engines installed in Chris-Craft boats at the factory, the capacity of the engine lubricating system should usually, be governed by the markings on the oil test rod---as the angle of the engine determines the amount of oil to use. This quantity will vary from 4 quarts to 6 quarts.

The proper oil test rod can be determined from the below illustration after measuring the engine angle in the boat while running.



TO CHANGE OIL

The oil should be changed after the first ten or fifteen hours running of the motor and then after every forty or fifty hours.

To drain the oil use a piece of copper tubing. Unscrew the oil pressure gauge line from the fitting where it goes into the engine on the side of the cylinder block below the ignition coil. Put the end of this tube in a pail and idle the engine slowly which will pump the oil out of the crankcase. Do not speed up the engine and watch it closely and stop the engine as soon as the oil stops running out of the tube.

This is usually sufficient for a normal or average oil change. It does not take out sludge below the screen or remove the oil in the Reduction or Reverse Gear. For a more complete oil change, the oil may be pumped out of the crankcase by using a hand sump pump having a 1/4-inch copper tube 18 inches long fitted to it. Then by removing inspection cover on top of the Reverse Gear housing, the oil may be pumped out of this unit also.

RECOMMENDED LUBRICANT

We are primarily interested in seeing that every Chris-Craft is serviced with oil of good character and quality, because the use of such oil means not only dollars in the owner's pocket but smooth engine operation, freedom from trouble, and maximum engine performance. A marine engine works at maximum capacity 90% of its lifetime, whereas in an automobile, the engine rarely, if ever, works at its maximum more than 10% or 15% of its lifetime. Hence, the demands on the oil are far greater in a marine engine.

We recommend the use of a detergent oil with additives. A straight mineral oil of high quality may be used but we caution that

the two types should never be mixed. To do so might cause the formation of sludge. Always replenish with the same make and type of oil that is in the crankcase. If it is necessary to change the make of oil, always drain the crankcase and make a complete change.

The oil in new engines shipped from the Chris-Craft factories in Texaco. SAE 20, light break-in oil. It should not be used for more than the first 10 hours running, after which time it should be changed to the grade recommended on the engine name plate.

AUTO-LITE ELECTRICAL INSTRUCTIONS

Auto-Lite equipment is guaranteed and serviced by the Electric Auto-Lite Company of Toledo, Ohio. This service is handled through their many Official Service Stations located in all of the more important cities throughout the world. A directory of these Official Service Stations will be furnished any Auto-Lite user by request addressed to the Part and Service Division, the Electric Auto-Lite Company, Toledo, Ohio.

General Care of the Electrical Equipment————

Most important in the care of the electrical equipment is the keeping of all connections not only clean and tight mechanically, but free from all corrosion. Brass and copper connections in a boat operated around salt water are especially subject to corrosion and they should be taken apart two or three times a year, cleaned with fine sandpaper, given a light coating of vaseline and reconnected, being sure they are tight.

Battery terminals should be given special attention and much trouble and annoyance can be avoided if they are periodically taken apart and washed in a strong ammonia or soda solution, given a light coating of vaseline and reassembled, being sure they are tight.

When replacing worn parts only genuine Auto-Lite service parts should be used. While the market affords numerous imitation parts there is no assurance that these are built of the same carefully selected material or are subject to the same exacting inspection as the genuine parts. Therefore, in order to insure yourself the longest possible life of the electrical equipment only genuine Auto-Lite parts should be used.

Generator————

The generator output should never be set above the maximum output as noted on the nameplate. All wiring and connections should be tight and the proper size as high resistance in the charging circuit will cause an over voltage that materially shortens the life of lamps

or other electrical equipment. The owner should not attempt to repair or adjust the circuit breaker or regulator as these operations should only be handled by an Official Service Station who is equipped with the proper tools and information to correctly repair these units

Starting Motor————

The starting motor requires no special attention except to see that it is mounted securely and that the Bendix is free from dirt. There should be no voltage loss in the starting circuit and switch as a reduced voltage reduces the cranking power of the motor.

Distributor————

The distributor should be kept free from dirt and properly lubricated. The drain hole in the bottom of the housing should be kept open. Breaker point rubbing blocks are run in at the factory and can be set for proper maximum gap of .022 inch without any run in period. If the points in use show a grayish color, are only slightly pitted and are within .002 inch of the proper maximum gap they need not be replaced or adjusted. However, before adjusting the points they should first be refaced so as to have a smooth flat contact with each other.

The ignition coil is sealed against moisture and needs no attention except to see that the connections are tight.

Lubrication————

Every 40 hours of engine use, the following points should be lubricated with a medium engine oil:

1. The oiler in each end of the generator should be given 3 to 5 drops.
2. The intermediate oiler, if provided, and the commutator end oiler in the starting motor should be given 3 drops.
3. The oiler on the outside of the distributor housing should be given 3 to 5 drops.

Every season the distributor cap and rotor should be removed and one drop of light oil put on the breaker arm hinge pin, a light wipe of grease on the cam and a few drops of light oil added to the hole in the top of the distributor drive shaft.

CARBURETOR

The carburetor is guaranteed and serviced by the Zenith-Detroit Corporation, Foot of Hart Avenue, Detroit, Michigan.

Any service problem may be taken up with them or with the Chris-Craft Service Department.

FUEL PUMP

Service on the A C Fuel Pump is available through United Motors Service Branches and authorized A C Service Stations which are prepared with parts and fixtures for repairing all types of pumps.

Any service problem may be taken up with them or with the Chris-Craft Service Department.

REVERSE GEAR

Important Recommendation———

It is not recommended that the boat run at the dock with the reverse gear in the neutral position. Space here will not permit a detailed diagram on the construction and operation of a reverse gear but let it suffice to say that when the reverse gear is in the neutral position it compares to any automobile when the clutch pedal is pushed to the floor.

If you wish to warm up the engine at the dock put the nose of the boat against the dock and put the lever in the go-ahead position and run the engine slowly.

If you are familiar with the operation of reverse operation of the gear you will know that in reversing, the reverse band is clamped firmly to the clutch drum. Therefore, it is important that the reverse lever be pulled back firmly so that the band will not slip on the drum. Pull the lever back and hold it there as long as you want to reverse and control the speed by the throttle and not by allowing the band to slip. It is not intended that the Reverse Gear be used as a brake.

Adjustments———

It is necessary that your reverse gear be properly adjusted before you operate it. The forward drive is obtained by means of a multiple disc clutch. The locking or clamping of these discs is brought about by the pressure produced by the outward movement of the fingers when the operating lever is thrown into the forward position. On the forward drive the whole reverse gear is locked together as a solid coupling. Unless the pressure on these discs is great enough to lock the whole gear together under full load, the clutch will slip and heat.

The reverse drive is obtained by clamping the brake band around the outside drum or case which carriers the pinion gears. The reverse motion is obtained by driving through the gears. Unless the band is clamped tight enough to keep this gear cage from revolving, it will slip in the reverse position.

In neutral position, both disc and the brake band are free and the gears run idle.

Adjustment for the Forward Drive____(See Page 16)

If the gear slips in the forward drive, back out the lock screw No. 76 until the end of it is clear. Then turn the adjusting finger

collar No. 28 to the right tightening the discs. Now tighten lock screw No. 76 to set the adjustment. Repeat this procedure until the reverse gear holds on the forward drive. An adjustment of one or two notches is usually sufficient.

Adjustment for Reverse Drive———

Tighten the adjusting nut No. 53 on the outside of the brake band lug until the brake band grips the gear cage and keeps it from revolving when in reverse position.

ADJUSTMENT OF VALVES

It is not possible to put a final adjustment on the valves at the factory that will last the entire season. After a few hours running the boat should be taken back to the dealer and the valves readjusted. Loss of engine speed and increase in gasoline consumption is the first indication for the need for grinding valves. An engine that is driven at sustained high speeds will need valve grinding much oftener than one that is used at normal speeds.

CARE OF THE WATER PUMP

The Water Pump is equipped with a water seal that is automatic in its action. When leaks occur, this seal may be replaced. No lubrication is required.

IGNITION

The surfaces of the contact points should be clean and free from rough pittings and grease. After 500 hours running of the boat it may be necessary to reface these contacts, or to install a new set. The same applies to spark plugs, and when the points become worn and corroded new plugs should be installed. It is important that only the correct type of plug be used in this motor. See page 9

To set the ignition timing use a timing light. The flywheel is provided with a timing mark on its rim and an ignition timing indicator is positioned over the flywheel ring gear. With the timing light connected to the battery and No. 1 spark plug (flywheel end) and the engine run at idle (500 RPM) set the distributor so that the timing light shows the flywheel timing mark directly in line with the ignition timing indicator.

Recheck ignition timing after tightening the distributor to be sure that the ignition timing is properly set.

ADJUSTMENT OF CARBURETOR

These carburetors have a fixed main jet which requires no adjustment.

The idling jet is adjustable and should be set to run the engine at it smoothest. The recommended idling speed for this motor is approximately 500 RPM.

ENGINE ALIGNMENT

Many cases of excessive vibration, reverse or reduction gear noise, and loss of revolutions, are caused by engine misalignment. This alignment is checked by disconnecting the two halves of the shaft coupling just aft of the reverse or reduction gear. The faces of these flanges must be within .003 parallel in all directions. The engine is mounted on taper shims to facilitate this adjustment. For further information refer to the paragraph on this subject in the Boat Owner's Manual.

ENGINE KNOCKS AND LOSS OF REVOLUTION

A sudden and otherwise inexplicable drop in revolutions, a new and disturbing period of vibration, and sudden loss of speed without other apparent cause, are usually definite symptoms of propeller wheel disorders even though the propeller wheel itself looks to be undamaged.

Never attempt to judge the condition of a propeller from its appearance. Though undamaged to the naked eye it may show startling pitch discrepancies when subjected to careful measurements with proper instruments, It is not necessary to run aground or become entangled with drift in order to throw a propeller out of pitch. Especially in the case of high-speed, high-power runabouts, loss of pitch will occur in the course of normal operation. A sudden turn at high speed, or bucking a heavy sea is often sufficient to submit one or more of the blades to a sudden shock or load beyond their normal ability to withstand, resulting in a propeller which, though not perceptibly damaged, is sufficiently "out of pitch" to account for several hundred lost R.P.M. on the tachometer or set up a serious vibration period.

Engine knocks are usually caused by faulty lubrication, and if you take proper care of the oiling of your motor you will probably never hear a knock.

Knocks which start suddenly and rapidly get louder are dangerous. Stop motor and investigate oil supply and water circulation, including water intake. Do not run motor with a loose bearing.

Knocks which begin faintly and increase slowly if at all are not immediately dangerous, but should be investigated by a mechanic or your Chris-Craft dealer as soon as possible.

If you are caught off shore with a burned out rod bearing due to lack of oil in the crankcase and must run the motor in order to get land, removing the spark plug in the bad cylinder is your best chance. Run slowly.

EXTRA GALLON OF OIL

The extra gallon of oil usually furnished with the engine is supplied with the compliments of the Texaco Company. If used for replenishment, be sure to replace it, for it is advisable to have an extra gallon of oil aboard the boat for emergency purposes.

MISFIRING

The most frequent causes of misfiring are as follows: (It is entirely unlikely that you will be troubled with any of these things, but it is well to know what to do in case of emergency) 1——Dirty or cracked plugs; remedy——install new ones or clean them. 2——Intermittent electric leak somewhere in the wiring, remedy——trace and insulate. 3——Stuck valve, or broken valve spring. Remove valve cover plate and inspect valve mechanism; remedy——new spring or grinding valves, or both. 4——Valve tappets too close. At high speed close-set tappets will ride the cams, prevent the valves from closing, and thus cause misfiring; remedy——adjust tappets. See page 9 for clearances. 5—Breaker points out of adjustment; when a motor misses at low speeds only, inspect breaker points first. 6——Water in one or more cylinders due to blown gaskets or crack in water jacket. 7——Blown or leaky gaskets either in manifold or cylinder head. 8——Loose spark plugs. 9——Too high oil level, causing sooty plugs.

IMPORTANT NOTICE

Form the habit of watching the oil pressure gauge. This gauge is sometimes called the "watch dog" of the engine. Advance notice of serious trouble is nearly always given by the oil gauge. If the pressure suddenly drops off, stop the engine immediately and do not run it until the trouble is located and remedied. See if there is plenty of oil in the crankcase. An oil line may be broken or the gauge broke——Try a new gauge first. If the oil pressure suddenly goes too high look for a plugged oil line or the relief valve may be stuck. If the oil pressure falls off gradually, the oil may be worn out or diluted with gasoline. If you have plenty of pressure when the engine is cold and drops off when hot, and you are not using a high grade marine oil change to the correct grade of a better oil. Do not change the oil pressure regulating valve to compensate for sudden changes in oil pressure or to compensate for the incorrect grade of oil.

TO DRAIN THE WATER SYSTEM

Open drain cock on side of cylinder block behind the water pump. Remove plug at bottom of water pump. Remove plug in water line at bottom of exhaust manifold. This should drain the engine of all water.

USEFUL INFORMATION

Engine
- Type——L-Head, vertical
- Cylinders——4
- Bore——3-1/4
- Stroke——4"
- Brake Horsepower——60
- Piston Displacement——133 cu. in.

Engine (con't)
Compression Ratio——7.5:1
Weight——Motor and Reverse Gear——450 lbs. (Direct Drive)

Electrical System
Battery——6 - volts
Generator Chargine rate——14 to 19 amperes max.
Generator cuts in at——800 R. P. M.

Oiling System
5 pounds (minimum) idling speed
20 to 35 pounds——maximum speed——hot

SPECIFICATIONS AND ADJUSTMENTS
Valve Clearance - Engine Cold
Exhaust Valve - .010
Intake Valve - .010
Valve Seat -
Exhaust - Diam. 1.359 - Face -5/64"
Intake - Diam. 1-1/2" - Face -5/64"

Valve Guide Clearance -
Exhaust - .0025 to .003
Intake - .001 to .0015
Tappet Guide Clearance - .00075 to .001
Idler Shaft Clearance - .001 to .0015
Idler Gear back lash to Crankshaft - .001 to .002
Camshaft Bearing Clearance - .0015 to .0025
Camshaft Gear back lash to Crankshaft. - .000 to .002
Crankshaft Main Brgn. Clearance - .002 to .0025
Crankshaft Thrust Clearance - .002 to .004
Conn. Rod Brng. Clearance - .001 to .0015
Conn. Rod Side Clearance - .005 to .010
Accessory Shaft Clearance - .0025 to .003
Accessory Gear back lash to Idler Gear - .002 to .004
Accessory Shaft End Thrust - .002 to .003
Oil Pump Gear back lash to Camshaft - .008 to .010
Dist . Drive Gear back lash to Dist. Driven Gear - .003 to .008
Piston Clearance (at skirt) - .003 to .0035
Piston Pin Clearance in Piston - Hand Push Fit
Piston Ring Gap - .015 to .020
Piston Ring Side Clearance -
Top Groove - .0015 to .003
2nd & 3rd Groove - .0015 to .003
Distributor Point Gap - .022
Spark Plug - J8J - F Gap - .028
Firing Order -
Standard Rotation - 1-2-4-3

PARTS LIST
CHRIS-CRAFT MARINE MOTOR
MODEL - A

See Your Chris-Craft Dealer or Write Direct To Factory for Prices

Part No.	No. Reqd.	Name
		CYLINDER AND CRANKCASE AND STRIPPED ENGINE ASSEMBLY
39345AS	1	Cylinder and Crankcase——only
3494	1	Stripped Engine Assy.——with valves, pistons, camshaft, crankshaft, connecting rods and main bearings.
8A	1	Drain Cock
60A	2	Oil Tube Pipe Plug——1/4" Steel
59A	1	Oil Tube Pipe Plug——1/8"
3585A	5	Cup Plugs——1-1/4" Brass
11051A	1	Cup Plugs——7/8" Brass
3586A	3	Cup Plugs——1" Brass
11052A	1	Cup Plugs——1-3/4" Brass
		MAIN BEARINGS
4250	1	Set of Main Bearings (Shell Insert) 4——38692B Upper and lower front and center main bearings. 2——38699B Upper and lower rear main bearings
13796A	6	Main Bearing Cap Screw——9/16"——12x9/16"
4859A	6	Main bearing cap screw lockwashers——9/16"——SAE
		GASKET SET
3272	1	Complete Set of Gaskets
		CONNECTING ROD
39070AS	4	Connecting rod assembly (with bearings)
38102B	8	Connecting rod bearings
28096A	8	Connecting rod bolts
27056A	8	Connecting rod bolt nut
301A	8	Connecting rod bolt cotter pin——3/32" x 3/4"
11841A	4	Connecting rod piston pin lockscrew
14842A	4	Connecting rod piston pin lockwasher

BE SURE TO GIVE ENGINE NUMBER WHEN ORDERING PARTS

Part No.	No. Reqd.	Name
		PISTONS AND RINGS
27017C	4	Piston
27129B	4	Piston pin
3520	1	Complete set of piston rings consisting of: 4——28020A piston ring—top 4——28021A piston ring—center 4——38106A piston ring—oil (Order in full sets or 1/4 sets only)
		CRANKSHAFT
39572D	1	Crankshaft
38538B	1	Crankshaft gear
4413A	1	Crankshaft gear key
		VALVES
27140A	4	Intake valve
28212A	4	Exhaust valve
29288A	8	Valve guides
4302	8	Valve springs (38033A)
27013A	8	Valve springs seat
27018A	8	Valve springs seat pin
1424	1	Valve cover and fume tube assy. consisting of: 1——27006B valve cover 1—— 1536 fume tube
1865A	2	Valve cover screw—3/8" x 1-1/4"
28009B	1	Valve cover gasket
3402	2	Copper asbestos ring gasket—3/8" I.D. (McCord 500E)
		VALVE TAPPET
38021AS	4	Valve tappet assy.
38017	4	Valve tappet guide
		CYLINDER HEAD
2013	1	Cylinder head
39213C	1	Cylinder head gasket
1407	16	Cylinder head stud
1408	16	Cylinder head stud nut—3/8" - 24 (long nut)

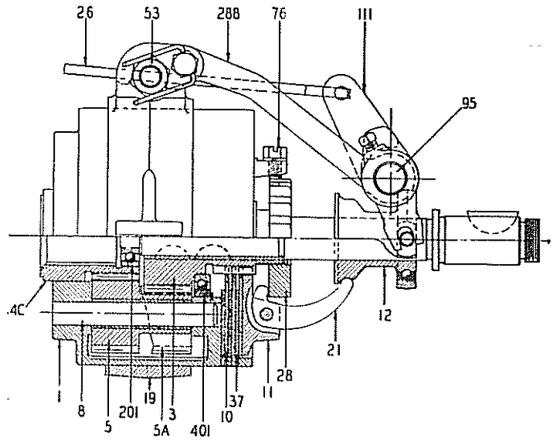
Part No.	No. Reqd.	Name
		CYLINDER HEAD (CON'T)
4877A	2	Cap screw,——3/8" - 16 x 2-1/2"
3310	18	Cylinder head stud plain washer
3688A	2	Cylinder head expansion plug—1-1/8" brass
		LIFTING EYE
1447	1	Engine lifting eye
312A	1	Engine lifting eye lockwasher 1/2"
		SUPPORT BRACKETS
2435	1	Engine front support bracket
2439	1	Engine front support to cylinder gasket
1380	1	Engine rear support bracket
1419	1	Engine rear support bracket gasket
5124	2	Engine front support bracket dowel capscrew
5130	4	Engine support bracket (on keelson)
2277	3	Gear train thrust screw (on front support bracket)
2048A	3	Gear train thrust screw locknut
		CAMSHAFT
38083AS	1	Camshaft——with oil pump drive gear
38071A	1	Camshaft front bearing
38070A	1	Camshaft rear bearing
27050A	2	Camshaft inter. bearing
27306B	1	Camshaft gear
4413A	1	Camshaft gear key
4853A	1	Camshaft thrust washer
40068A	1	Camshaft thrust plunger
		IDLER GEAR
27105B	1	Idler gear
27106-AS	1	Idler gear shaft with 40068-A plunger
27107A	1	Idler gear thrust washer
27316B	1	Idler shaft bearing
40068A	1	Idler thrust plunger
		ACCESSORY DRIVE
27074-BS	1	Acc. drive assy.
27195-B	1	Acc. drive gear

Part No.	No. Reqd.	Name
		ACCESSORY DRIVE (CON'T)
4413A	1	Acc. drive gear key
27072A	1	Acc. drive shaft
27257A	1	Acc. drive bushing
27264A	1	Acc. drive attaching gasket
315A	1	Acc. drive attaching screw
682A	2	Acc. drive attaching screw
342A	3	Acc. drive attaching lockwasher
40068A	1	Acc. drive thrust plunger
4024A	1	Acc. drive thrust washer
27073A	1	Acc. drive dist. driving gear
1179A	1	Acc. drive dist. driving gear key
		FLYWHEEL
2441	1	Flywheel and ring gear assy.
2456	1	Flywheel ring gear
1403	4	Flywheel bolt
5116	2	Crankshaft flywheel dowel
1488	1	Starting crank——runabout
		OIL PAN AND OIL STRAINER
2434	1	Oil pan
2438	2	Oil pan gasket
1437	1	Oil strainer body assy.
1438	1	Oil strainer support arm
3196	1	Oil drain plug——3/8" pipe
1439	1	Oil strainer to oil pump tube
507-1/4	2	Oil line fittings for 1439 tube——90° male elbow 7/16" T x 1/4" MPT
		OIL FILLER
1388	1	Oil filler (cast iron)
5154	1	Oil filler cap and test rod assy. (unmarked)
		Note: This assembly becomes #1441 when marked for an engine with a running angle of 0° to 20° and # 5106 for 21° to 30° - (See page 2)
1411	1	Oil filler gasket

Part No.	No. Reqd.	Name
		OIL PUMP
38141CS	1	Oil pump assy.
27127A	1	Oil pump body attaching gasket
		OIL PRESSURE REGULATOR
15243A	1	Oil pressure regulating plunger
27417A	1	Oil pressure regulating spring
8572A	1	Oil pressure regulating adjusting screw
8574A	1	Oil pressure regulating by pass nut
8575A	2	Oil pressure regulating by pass nut gasket
8573A	1	Oil pressure regulating adjusting nut
		MANIFOLD
3700	1	Exhaust and intake manifold
1395	1	Manifold gasket
3702	2	Manifold stud long
1406	2	Manifold stud short
1391	1	Manifold end cover
1412	1	Manifold end cover gasket
1864A	4	Capscrew 3/8" - 16 x 1"
342A	4	Lockwasher 3/8"
3196	1	Manifold drain plug——3/8" hex. hd. brass
3688A	6	Expansion plug——1-1/8" brass
3202	2	Expansion plug——5/8" brass
		EXHAUST ELBOWS
1494	1	Exhaust elbow assy. 45 degree
1495	1	Exhaust elbow assy. vertical
1864A	4	Capscrew 3/8" - 16 x 1"
342A	4	Lockwasher 3/8"
1747	1	Manifold exhaust pipe fitting 2" iron pipe thread
4877A	4	Capscrew 3/8" - 16 x 2-1/2"
342A	4	Lockwasher 3/8"
1412	1	Exhaust elbow gasket
		Note: Exhaust elbow assemblies may be ordered in either brass or cast iron.

Part No.	No. Reqd.	Name
		CYLINDER HEAD TO ELBOW WATER TUBE
2030	1	Cylinder head to elbow water tube—for 1494 elbow
2036	1	Cylinder head to elbow water tube—for 1495 elbow
510-1/2	1	Cylinder head outlet water tube ell- 1/2" M.P. x 5/8" tube
1493	1	Cylinder head outlet water tube elbow gland 5/8"
		CARBURETOR
3204	1	Carb. assy.——Zenith Outline 8963
1458	1	Carburetor gasket
1821	2	Carburetor stud
1539	1	Carb. flame arrester—Zenith B-175-12
12692	1	Carb. Repair Kit——Zenith K-8963
		FUEL PUMP
1461	1	Fuel pump assy.——AC-1539673
1462	1	Fuel pump gasket
1463	1	Fuel pump to carb. fuel line
104-1/8	1	Fuel line fitting 1/4" Tx 1/8 P. straight
504-1/8	1	Fuel line fitting 1/4" Tx 1/8 P. elbow
13232	1	Fuel pump repair kit AC-5593006
	1	Fuel pump bowl AC-854004
	1	Fuel pump bowl gasket AC-854003
		ELECTRICAL EQUIPMENT
1540	1	Generator——Autolite GEO-4807
5138	1	Generator pulley——3-1/2" dia.
2453	1	Generator belt
1598	1	Starting motor——Autolite MZ-4106A
11000	1	Solenoid starting switch
3228	1	Distributor assy.——with 27335A gear Autolite IGW-4152
27335A	1	Distributor driven gear
1530	1	Tachometer fitting
3142	1	Tachometer fitting setscrew——1/4" - 20x5/8" cup point
1410	1	Distributor shaft packing gland
3474	3	Distributor shaft packing gland washer
1469	1	Ignition coil - Autolite CR-6001
1650	4	Spark plug cable——short

Part No.	No. Reqd.	Name
		ELECTRICAL EQUIPMENT (CON'T)
5126	2	Ignition Cable Bracket
1869	4	Grommet for Bracket
2184	1	Coil cable——high tension
1665	1	Coil wire——low tension
1470	4	Spark plugs——Champion J-8-J
	1	Distributor setscrew——3/8" - 16 x 1-1/4" Cup point
300A	1	Locknut for setscrew - 3/8" - 16
		WATER PUMP
4338	1	Water pump assy.
3362	1	Water pump drain plug - 1/8" hex. head brass.
4408	1	Water pump to accessory drive gasket (Detail pump parts may be ordered, but each order must be accompanied by the stamped number found on the machined face of the pump attaching flange. To obtain this number, it is necessary to remove the pump from the engine.)
		WATER PUMP FITTINGS
	1	Water pump to manifold hose——5/8" - 2 braid x 17
12551	2	Water pump to manifold hose clamp
1682	2	Water pump outlet street ell—3/8" - 90°
1681	1	Water pump inlet street ell—1/2" female, 3/8" male - 90°
1671	1	Water pump inlet hose nipple—1/2" x 2"
1679	1	Manifold inlet tee——Galv.
2324	2	Hose Nipple——3/8" x 1-1/4"
		REVERSE GEAR OXKB Spec. Z-5928
OXKA-1	1	Gear cage or drum
OXKB-3	1	Propeller gear
	2	Propeller gear key (Woodruff # 9)
OXKB-4F	1	Engine gear
3482	1	Engine gear key
2372	1	Reverse gear oil metering plug
OXK-5	2	Pinion gear - short with bushing
OXK-5A	2	Pinion gear - long with bushing
OXK-7A	8	Pinion gear bushing



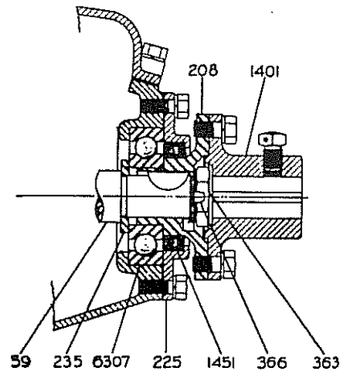
REVERSE GEAR

Numbers shown are key numbers only
Refer to parts list for complete part number

REVERSE GEAR OXKB Spec. Z-5928 (CON'T)

OXKA-8A	4	Pinion Stud
OXK-10B	3	Friction disc - inside steel
OXK-37B	3	Friction disc - outside bi-metal
OXK-11A	1	Finger pressure disc
OXK-12	1	Operating sleeve - with ball bearing throwout collar
OXK-19L	1	Reverse brake band
OXK-370	1	Brake band lining only
OXK-21A	3	Clutch throwout finger
OXK-16A	3	Finger Pin
OXKA-26	1	Reverse brake band locking bar
OXK-28	1	Adjusting finger collar
OXKA-53A	1	Reverse brake band adjusting nut
1XE-331A	1	Lockspring
OXKB-59D	1	Reverse gear stub shaft
XS-24C	1	Clutch reverse lever
OXK-76	1	Clutch adjusting lockscrew
1XKA-95A	1	Clutch throwout yoke shaft
3492	2	Yoke shaft to yoke key (Woodruff # 7)
	1	Yoke shaft to reverse lever key (Woodruff # 11)

OXK-111	1	Clutch throwout yoke
1XE-208	1	Propeller shaft coupling - engine half
	1	Stub shaft to gear half coupling key (Woodruff #13)
RDA-363	1	Propeller shaft coupling nut
RDA-366	1	Propeller shaft coupling lockwasher
1XE-235	1	Stub shaft thrust washer
OXKA-288	1	Rev. brake band support
OXK-330	1	Adjusting bolt and spring (complete)
OXK-297	1	Spring only
OXK-401	1	Gear cage rear bearing
OXK-350A	1	Pinion stud retaining ring
RDA-350A	1	Gear cage bearing retaining ring
3188	1	Pilot bearing 201-K
2364	1	Rev. gear housing
1420	1	Rev. gear housing to engine gasket
1386	1	Rev. gear housing top cover
1413	1	Rev. gear housing top cover gasket
*1401	1	Propeller shaft coupling - shaft half
RDA-225	1	Housing rear oil seal retainer
1416	1	Housing rear oil seal retainer gasket
1451	1	Housing rear oil seal Rawhide No. 262128L
2039	6	Oil seal retainer capscrew
1450	1	Thrust bearing BCA No. 307
3190	2	Housing operating shaft oil seal Rawhide No. 13722



REVERSE GEAR REAR END
Direct Drive

Numbers shown are key numbers only
Refer to parts list for complete part number

* Note: When ordering shaft half couplings, the following key letters should be used in conjunction with the basic number to denote propeller shaft diameter being used.

A—3/4"	D—1-1/8"
B—7/8"	E—1-1/4"
C—1"	F—1-3/8"