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INSTRUCTION BOOK

and

PARTS LIST

for

CHRIS-CRAFT MARINE ENGINES

6 Cylinder, 145 Horsepower—Model ML

6 Cylinder, 115 Horsepower—Model MBL

421' Capri - CP21-038

3/28/55



MBL 86370

BOOK NO. ONE

Revised No. 4

EFFECTIVE

ML—Engine 145HP

MBL—Engine 115HP

Chris-Craft Corporation

Algonac, Michigan

U. S. A.

Chris-Crafts, Chris-Craft, 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.

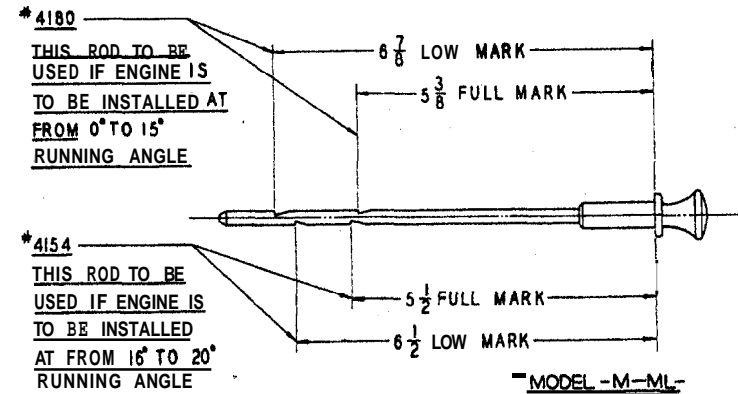
This Warranty shall not apply to any Chris-Craft boat or part manufactured by Company, which shall have been altered or repaired outside of the factories of Company.

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.



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 the oil to use. This quantity will vary from 6 quarts to 12 quarts.

The proper oil test rod can be determined from the above 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

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 three 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.

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. On reduction gear models there will remain from 1 to 1-1/2 quarts in that unit that cannot be removed.

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 is 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 used 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 clear 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 name plate. 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 which is equipped with the proper tools and information to correctly repair these units.

Starting Motor --

The starting motor required 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 oilers 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 be 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 an 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 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 carries the pinion gears. The reverse motion is obtained by driving through the gears. Unless the band is clamp-

ed 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 28)

If the gear slips in the forward drive, back out the lock screw No. 76 until the end of it is clear of the hole in the pressure disc No. 11. Then turn the adjusting finger collar No. 28 to the right until the lock screw No. 76 is opposite one of the holes in the pressure disc No. 11.

Then tighten up the lock screw No. 76 and be sure that end of the screw enters the hole in the pressure disc No. 11. Repeat this procedure until the reverse gear holds on the forward drive. An adjustment of one or two holes is usually sufficient.

Adjustment for Reverse Drive --

In the reverse position the brake band is supposed to grip and hold the gear cage or drum from turning. If this drum slips, it is necessary to tighten the adjustment of the brake band, which adjustment is made as follows:

Loosen the locknut No. 429 on the inside of the upright lug at the top of the brake band to the amount you think the brake band needs adjusting. Then tighten the adjusting nut No. 431 on the outside of this lug until it is again tight against this lug. Repeat until the brake band gripe the gear cage and keeps it from revolving.

The adjustment should be tight enough so that a decided snap is felt when the lever is thrown into the 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 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 re-face 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 13.

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 (ML - 500 RPM and MBL - 700 RPM) set the distributor so that the timing light shows the flywheel timing mark directly in line with the ignition indicator.

To set the ignition timing on engines which do not have timing marks, run the boat at its maximum speed and advance the spark until it starts to rattle. At this point speed will drop off, indicating detonation. Then retard it just enough to make the engine run smoothly without any rattle or spark knock. Do not attempt to set the spark with the reverse gear in neutral.

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

For marking engines not previously provided with timing marks see your Chris-Craft Dealer or write direct to the factory for a quotation on the distributor and instructions necessary.

ADJUSTMENT OF CARBURETOR

Carburetors which have a fixed **main** jet require no adjustment.

Carburetors with adjustable main jets should be adjusted as follows. Screw the needle valve all the way in, then back it out about two and one-quarter turns. This should make it just a trifle too rich. Run the boat at full throttle and screw the needle valve in until the speed starts to drop off. (Watch the tachometer closely). Then unscrew it until the engine runs at highest speed. The approximate setting is about two full turns. A too lean mixture will cause pre-ignition and burned valves. It is better to run a little on the rich side.

The idling jet should be set to run the engine at its smoothest. The minimum idling speed for these engines is 500 RPM for ML and 700 RPM for MBL.

Carburetors with adjustable main jets can be changed over to fixed main jets quite easily. For further information see your Chris-Craft Dealer or write Chris-Craft Service Department at Algonac, Michigan.

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 a 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 RPM. 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 to 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 13 for clearances. 5--Breaker points out of adjustments; 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.

IMPORTANCE 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 broken--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 in the bottom of the exhaust manifold near the water inlet connection. Remove plug at bottom of water pump. Also remove plug in the oil cooler bracket.

USEFUL INFORMATION

Engine

Type - L Head, vertical

Cylinders - 6

Bore - 4"

Stroke - 4-1/2"

Brake Horsepower - ML - 145

MBL - 158

Piston Displacement - 339.2 Cu. in.

Compression Ratio - 6.86 - 1

Weight - ML & MBL - 850 lbs.

MLS - 920 lbs.

MLR - 940 lbs.

Electrical System

Battery - 6 volt

Generator Charging Rate - 14 to 19 Amps. Max.

Generator Cuts in at 800 Engine RPM

Oiling System

5 pounds (minimum) - idling speed

20 to 35 pounds - maximum speed - hot

Part No.	No. Reqd.	Name
MAIN BEARINGS (Cont'd)		
		2--43601 B Rear Main Bearing Upper and Lower
		8--43600 B Inter. Main Bearing Upper and Lower
42540A	4	Front Main Bearing Thrust Washer
40554A	4	Front Main Bearing Thrust Washer Pin
Note: Main Bearing Thrust Washers are not included in the 3612 set. They must be ordered as a separate item.		
40070A	10	Main Bearing Cap Screw - Front and Intermediate 1/2" x 2"
40071A	8	Main Bearing Cap Screw - Center and Rear 7/16" x 2"
4731A	10	Main Bearing Cap Screw Lockwasher 1/2"
4732A	8	Main Bearing Cap Screw Lockwasher 7/16"
40549A	When Reqd	Main Bearing Shim-Center and Rear .002
40551A	"	Main Bearing Shim-Center and Rear .003
40550A	"	Main Bearing Shim-Front and Inter. .002
40552A	"	Main Bearing Shim-Front and Inter. .003

GASKET SET

3260 1 Complete Set of Gaskets

CONNECTING ROD

43087AS	6	Conn Rod Assembly (with Bearing)
43081B	12	Conn Rod Bearings
22059A	12	Conn Rod Bolt
21056A	12	Conn Rod Bolt Nut
301A	12	Conn Rod Bolt Nut Cotter Pin (3/32"x3/4")
40556A	When Reqd	Conn Rod Shim .003
40553A	"	Conn Rod Shim .002
43096A	6	Conn Rod Piston Pin Bushing

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
PISTONS AND RINGS		
ML and MLO Engines		
43150C	6	Piston - 3 Ring ML - Std. Rot.
441756	6	Piston - 3 Ring MLO - Opp. Rot.
3588	1	Set Piston Rings (Order by Set or Multiples)
43118A	6	Piston Pin
43125A	12	Piston Pin Retainer
MBL Engines After Engine 13566		
43150C	6	Piston - 3 Ring MBL
3588	1	Set Piston Rings (Order by Set or Multiples)
43118A	6	Piston Pin
43125A	12	Piston Pin Retainer
MBL Engines Before Engine 13567		
43127C	6	Piston - 4 Ring MBL
3586	1	Set Piston Rings (Order by Set or Multiples)
43118A	6	Piston Pin
43125A	12	Piston Pin Retainer

CRANKSHAFT

435293	1	Crankshaft
44026B	1	Crankshaft Gear - Std. Rot.
44028B	1	Crankshaft Gear - Opp. Rot.
4265A	1	Crankshaft Gear Key

VALVES

BEFORE ML-82400		
MLO-82198		
MBL-82139		
43016A	6	Exhaust Valves
43017A	6	Exhaust Valve Spring Seats
20023A	6	Exhaust Valve Rotor Cap

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
VALVES (Cont'd)		
To Change over to the new exhaust valves order the three items listed below plus (6) 40715A Valve Springs and (6) 43076A Valve Guides.		
EFFECTIVE ML-82400		
MLO-82198		
MBL-82139		
43072A	6	Exhaust Valves
43074A	6	Exhaust Valve Spring Seats
43073A	6	Exhaust Valve Rotor Cap
USED FOR ALL ENGINES		
43018A	6	Intake Valves
40715A	12	Valve Springs
43076A	12	Valve Guides
43021A	6	Intake Valve Spring Seats
76011A	12	Intake Valve Spring Seat Locks
20022A	12	Exhaust Valve Rotor Cap Key
40006B	1	Valve Cover - Aft
2415	1	Valve Cover - Fwd. - With Baffle
4068A	4	Valve Cover Screw 1/2"-13x2-1/2"
41005B	2	Valve Cover Gasket - Cork
2421	1	Fume Tube and Fitting Assembly
2416	1	Fume Tube Screw
2422	1	Fume Tube Gasket
VALVETAPPET		
43024AS	12	Valve Tappet Assembly
2185A	12	Valve Tappet Screw (Hardened)
2186A	12	Valve Tappet Screw Nut
22089A	12	Valve Tappet Guide
CYLINDER HEAD		
5164	1	Cylinder Head - Cast Iron ML-MBL
Note: Replace #3660 Head with above.		

Part No.	No. Reqd.	Name
CYLINDER HEAD (Cont'd)		
43221C	1	Cylinder Head Gasket
1738	24	Cylinder Head Stud-For Cast Iron Heads
3574	2	Cylinder Head Capscrews
3622	24	Cylinder Head Stud Not- 1/2" 20 Std.
3374	26	Cylinder Head Stud Plain Washer (Hardened)
3688	3	Cylinder Head Expansion Plug (1- 1/8" Brass)
3198	1	Cylinder Head Temperature Gauge Plug 1/2"
LIFTING EYE		
1784	1	Engine Lifting Eye
	1	Engine Lifting Eye Lockwasher-5/8"
SUPPORT BRACKETS		
1732	1	Engine Front Support Bracket
1779	1	Engine Front Support to Cyl. Gasket
5122	2	Dowel Capscrew
2244	1	Engine Rear Support Bracket
1776	1	Engine Rear Support Gasket
1777	2	Engine Rear Support Dowel Bushing
1803	4	Engine Support Bracket (On Keelson) Direct
1560	4	Engine Rubber Mounting (On Keelson) Direct
2363	2	Engine Support Bracket (On Keelson) Front MLR-MLS
2201	2	Engine Support Bracket (On Keelson) Rear MLR-MLS
1430	4	Engine Rubber Mounting - Small MLR - MLS

Be Sure To Give Engine Number When Ordering Parts

Be Sure To Give Engine Number When Ordering Parts

Part NO.	No. Reqd.	Name
SUPPORT BRACKETS (Cont'd)		
1560	2	Engine Rubber Mounting - Large MLR - MLS
2277	3	Gear Train Thrust Screw (on front support bracket)
2048A	3	Gear Train Thrust Screw Locknut
5166	1	Ignition Timing Indicator
CAMSHAFT		
45686DS	1	Camshaft - with Plunger Std. Rot. (ML Motor)
45685DS	1	Camshaft - with Plunger Opp Rot. (MLO Motor)
1912	1	Camshaft - with Plunger (MBL Motor)
40063B	2	Camshaft bearing - Front and Rear
40065B	2	Camshaft bearing - Center
42914B	1	Camshaft Gear - Std. Rot.
43061B	1	Camshaft Gear - Opp. Rot.
11023A	1	Camshaft Gear Nut
4265A	1	Camshaft Gear Key
2045A	1	Camshaft Thrust Washer
40068A	1	Camshaft Thrust Plunger
IDLER GEAR		
42915B	1	Idler Gear - Std. Rot.
42918B	1	Idler Gear - Opp. Rot.
40136AS	1	Idler Gear Shaft - With Plunger
22107A	1	Idler Gear Thrust Washer
40137B	1	Idler Gear Shaft Bearing
40068A	1	Idler Gear Thrust Plunger
59A	1	Idler Gear Shaft Pipe Plug
ACCESSORY DRIVE		
40852BS	1	Acc. Drive Assembly - Std. Rot.
40718BS	1	Acc. Drive Assembly - Opp. Rot.

Part No.	No. Reqd.	Name
ACCESSORY DRIVE (Cont'd)		
22195B	1	Acc. Drive Gear - Std. Rot.
22782A	1	Acc. Drive Gear - Opp. Rot.
4265A	1	Acc. Drive Gear Key
40833B	1	Acc. Drive Shaft
22168A	1	Acc. Drive Shaft Snap Ring
22174A	1	Acc. Drive Bushing
22149A	1	Acc. Drive Attaching Gasket
4266A	1	Acc. Drive Attaching Screw
1864A	2	Acc. Drive Attaching Screw-3/8"x1"
342A	3	Acc. Drive Attaching Screw Lockwasher - 3/8"
40068A	1	Acc. Drive Thrust Plunger
4024A	1	Acc. Drive Thrust Washer
408506	1	Acc. Drive Housing
22336A	1	Acc. Drive Dist. Driving Gear - Std. Rot.
27073A	1	Acc. Drive Dist. Driving Gear - Opp. Rot.
1179A	1	Acc. Drive Dist. Driving Gear Key
FLYWHEEL		
1837	1	Flywheel with Ring Gear - Std. Rot. (ML Motor)
1843	1	Flywheel with Ring Gear - Opp. Rot. (MLO Motor)
1700	1	Flywheel with Ring Gear (MBL Motor)
22104A	4	Flywheel Bolt
5116	2	Flywheel Dowel
4642A	1	Flywheel Positioning Dowel
1609	4	Flywheel Bolt Nut
1562	1	Flywheel Ring Gear - Std. Rot.
1563	1	Flywheel Ring Gear - Opp. Rot.
1434	1	Starting Crank - Cruiser (Long)
1488	1	Starting Crank - Runabout (Short)

Part No.	No. Reqd.	Name
OIL PAN		
1733	1	Oil Pan
4865A	1	Steel Drive Plug (for extra test rod hole)
1780	2	Oil Pan Gasket
2011	1	Oil Strainer Body and Screen
1801	1	Oil Strainer to Pump Flexible Tube Assembly
3570	1	1/2" Tube Elbow Fitting - 3/8" FPT
3198	1	Oil Drain Plug - 1/2" Square Head
1737	1	Oil Pan Insp. Plate (Before Eng. 75841)
4178	1	Oil Pan Insp. Plate (S/S or opp T/S) After Engine 75840
1737	1	Oil Pan Insp. Plate (Std. T/S only) After Engine 75840
1610	1	Oil Pan Insp. Plate Gasket
OIL FILLER		
1764	1	Oil Filler Body
5136	1	Oil Filler Body Cap
1792	1	Oil Level Test Rod (Used all Engines Before #75841 except Twin Screw Std. Rot.)
5158	1	Oil Level Test Rod (Used all Engines After #75840 and Twin Screw Std, Rot. Before #75841
Note:		This assembly becomes #4180 when marked for an engine with a running angle of 0° to 15° and #4154 for 16° to 20° -- (See Page 2)
OIL PUMP		
43366CS	1	Oil Pump Assembly Std. Rot.
43367CS	1	Oil Pump Assembly Opp. Rot.
22119A	1	Oil Pump Attaching Gasket

Part NO.	No. Reqd.	Name
OIL PRESSURE REGULATING PARTS		
22129A	1	Oil Pressure Regulating Plunger
1347A	1	Oil Pressure Regulating Spring
1385A	1	Oil Pressure Regulating Spring Cap
2058A	1	Oil Pressure Regulating Adj. Screw
1660A	1	Oil Pressure Regulating Adj. Screw Lock Nut
28A	1	Oil Pressure Regulating Adj. Screw Lock Nut
MANIFOLDS		
5056	1	Exhaust Manifold
5058	1	End Cover (for 5056 Manifold)
5060	1	End Cover Gasket
Note:		#2353 Manifold used before Eng. 82212 is replaced by above three items.
2368	1	Exhaust Manifold Gasket
2370	6	Manifold Stud - Short
2369	4	Manifold Stud - Long
2371	2	Manifold Stud - End
3276	12	Manifold Stud Nut 7/16" -- 20 Hex,
4732A	12	Manifold Stud Lockwasher - 7/16"
2354	1	Intake Manifold
2367	2	Intake Manifold Gasket - End
2366	1	Intake Manifold Gasket - Center
3194	1	Manifold Drain Plug 1/4" MPT
3688	7	Expansion Plugs 1-1/8" Brass
2400	1	Water Inlet Fitting
2399	1	Water Inlet Fitting Gasket
3752	1	Molded Hose - Oil Cooler to Manifold
Below Parts used only with 2353 Exhaust Manifold before Engine No. 82212		
2140	1	End Cover (for 2353 manifold used before engine No. 82212)
2181	1	End Cover Gasket

Be Sure To Give Engine Number When Ordering Parts

Re Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
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EXHAUST ELBOWS

Caution: When ordering an exhaust elbow assembly **be sure** to check the outside diameter of the exhaust tube, "ML" Series engines have used two sizes.

3-1/2" Exhaust Elbow Assemblies		
4028	1	Exhaust Elbow Assy, - Vertical
3904	1	Exhaust Elbow Asey. - Horiz. to Port
4024	1	Exhaust Elbow Assy, - Horiz. to Stbd.
3334	4	Exhaust Elbow Capscrew 3/8"-16x1-1/8"
342A	4	Exhaust Elbow Lockwasher 3/8"
2-3/4" Exhaust Elbow Assemblies		
2208	1	Exhaust Elbow Assy. - Vertical
2157	1	Exhaust Elbow Assy. - Horiz. to Port
2158	1	Exhaust Elbow Assy. - Horiz. to Stbd.
3802	1	Exhaust Elbow Assy, - Straight Aft (Special for Single Screw Engine in Post War 30' and 31' Sedan)
2139	1	Exhaust Pipe Fitting-For 2-1/2" Std. Iron Pipe
	2	Pipe Fitting Capscrew 3/8"-16x2"
H-682	2	Pipe Fitting Capscrew 3/8"-16x2-3/4"
342A	4	Pipe Fitting Lockwasher 3/8"
2181	1	Exhaust Elbow Gasket

Note: Exhaust elbow assemblies may be ordered in either **brass** or cast iron.

CARBURETOR

(Order detail parts direct from manufacturer)

3212	1	Carburetor Assembly - (Zenith Outline 9776)
2241	1	Carburetor Gasket
1406	2	Carburetor Stud
1557	1	Carburetor Flame Arrester (Zenith B-175-13)
12696	1	Carburetor Repair Kit-(For 3212 Carb)

Be Sure To Give Engine Number When Ordering Parts

Part NO.	No. Reqd.	Name
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FUEL PUMP

1559	1	Fuel Pump Aesy. AC 1539683
1462	1	Fuel Pump Gasket
1561	1	Fuel Pump To Carb. Fuel Line
105-1/8	1	Fuel Line Fitting 5/16" T x 1/8" MPT
105-114	1	Fuel Line Fitting 5/16" T x 1/4" MPT
12689	1	Fuel Pump Repair Kit AC 1538579

ELECTRICAL EQUIPMENT

1540	1	Generator Auto-Lite GEO-4807 Std. Rot
1552	1	Generator Auto-Lite GEO-4809 Opp. Ro (Order detail parts direct from manufacturer)
1802	1	Generator Shaft Spacer Washer
2003	1	Generator Pulley 4" Dia.
1570	1	Generator Belt - 2MO-37
4234	1	Starting Motor Auto-Lite MCL 6004 Std. Rot.
4236	1	Starting Motor Auto-Lite MCL 6005 Opp. Rot.
4342	1	Distributor Assy. -Std. Rot , Auto-Lite IAY-4009
4344	1	Distributor Assy. -Opp. Rot. Auto-Lite IAY-4009 (Order detail parts direct from manufacturer)
4343A	1	Distributor Spark Control Bracket
4266A	1	Bracket Screw 3/8" - 16 x 1-3/4"
22335A	1	Distributor Driven Gear-Std. Rot.
27335A	1	Distributor Driven Gear-Opp. Rot.
3416	1	Distributor Driven Gear Pin
1530	1	Tachometer Fitting
3142	1	Set Screw-1/4"-20 x 5/8" Cup Point
1410	1	Distributor Shaft Packing Gland
3474	As Req.	Distributor Shaft Packing Gland Waeher

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
ELECTRICAL EQUIPMENT Cont.		
1469	1	Ignition Coil-Auto-Lite CR-6001
1861	1	Ignition Cable--Dist. to Coil--High Tension
1650	3	Ignition Cable--Dist. to Spark Plugs- (Cyl. #4, 5, 6)
1651	1	Ignition Cable--Dist. to Spark Plugs- (Cyl. #1)
2183	1	Ignition Cable-Dist. To Spark Plugs- (Cyl. #2)
1655	1	Ignition Cable-Dist. to Spark Plugs- (Cyl. #3)
1665	1	Ignition Cable-Dist. to Coil-Low Tension
1470	6	Spark Plugs-Champion-J-8-J
5126	1	Ignition Cable Bracket (Small)
5128	1	Ignition Cable Bracket (Large)
1869	6	Ignition Wire Grommet
1746	1	Coil Bracket
1765	1	Coil Bracket Gasket
1751	1	Coil Bracket Stud
3134	2	Coil Bracket Cap Screw
11000	1	Solenoid Starter Switch

WATER PUMP

4276	1	Water Pump Assembly
4408	1	Water Pump Gasket (When ordering detailed pump parts furnish the number found stamped on the machined face of the pump attaching flange. We do not recommend new gears being installed in housings that are old and worn.)

WATER PUMP FITTINGS

1	Water Pump to Oil Cooler Hose 1"ID - 3 ply x 3-3/4"
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Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
WATER PUMP FITTINGS Cont.		
12593	2	Hose Clamps
	2	Water Pump Elbows 3/4" - 90°
	2	Close Nipples 3/4"
1800	2	Hose Nipples 3/4" x 1-1/2"
OIL COOLER-RV-20		
1548	1	Oil Cooler-Without Base
1742	1	Oil Cooler Bracket and Base--Std Rot.
1743	1	Oil Cooler Bracket and Base--Opp. Rot..
1770	1	Oil Cooler Stud
1816	1	Oil Cooler to Crankcase Tube (Closest to Block)
1772	1	Special Tee (for 1816)
1817	1	Cylinder Block to Oil Cooler Tube
3136	1	1/4" x 1-1/2" Brass Pipe Nipple (for 1817)
3566	2	Connector 7/16" T x 1/4" MPT
3254	2	Oil Cooler Gaskets
3364	1	3/8"--24 Acorn Nut
4288	1	Elbow Connector 7/16" T x 1/4" FPT

REVERSE GEAR ASSEMBLY 3XE-90

For All Direct Drive Models
For All Reduction Drive Models Before Engine No. 82248

3XE-1	1	Gear Cage or Drum
3XE-3B	1	Propeller Gear
3XE-4AD	1	Engine Gear
3XE-5H	2	Pinion Gear-Short-(With Bushing)
3XE-5G	2	Pinion Gear-Long-(With Bushing)
3XE-7A	8	Pinion Bushing
3XE-8A	4	Pinion Stud
3XE-10E	3	Friction Disc-Teeth Inside
3XE-37E	4	Friction Disc-Teeth Outside (It is recommended that only complete sets of Friction Discs be Ordered)

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
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REVERSE GEAR ASSEMBLY 3XE-90 Cont.

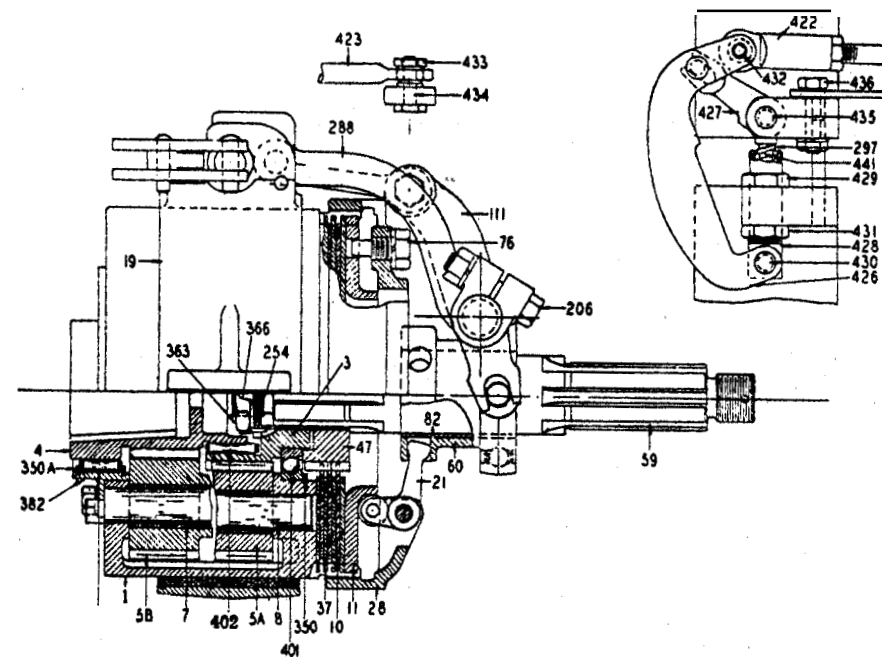
3XE-11D	1	Pressure Plate
3XE-19A	1	Brake Band-With Lining
2XE-24	1	Clutch Operating Hand Lever
1635	1	Engine Gear Retaining Screw
3XE-370	1	Brake Band Lining--Only
3XE-28	1	Adjusting Finger Collar
3XE-47A	1	Disc Driver
3XE-60B	1	Operating Sleeve-With Ball Bearing Throwout Collar
3XE-254	1	Propeller Gear Plain Washer
3XE-366	1	Propeller Gear Lock Washer
2XE-363	1	Propeller Gear Lock Nut
3XE-288A	1	Brake Band Support
3XE-382B	1	Roller Bearing Race
3XE-422	1	Brake Band Toggle Link-End
3XE-423	1	Brake Band Toggle Link
3XE-426	2	Brake Band Toggle Lever-Long
3XE-427A	1	Brake Band Toggle Lever-Short
3XE-428A	1	Brake Band Toggle Adj. Bolt
3XE-429	2	Brake Band Toggle Adj. Bolt Lock Nut
3XE-430	2	Brake Band Toggle Pin-Long
3XE-432	1	Toggle Lever Ball Joint--Long
3XE-433	1	Reverse Yoke Ball Joint
3XE-434	1	Reverse Yoke Ball Joint Screw
3XE-435	1	Brake Band Toggle Pin-Short
3XE-436	1	Brake Band Brace Screw
2XE-21	3	Clutch Throwout Finger Assembly
2XE-76	1	Clutch Adjusting Lock Screw
3XA-111	1	Clutch Throwout Yoke
3XA-401A	1	Gear Cage Ball Bearing-(Key No. 110-3)
3XE-350	1	Gear Cage Ball Bearing Retaining Ring
3XE-402	1	Pilot Roller Bearing
35X-369A	1	Gear Cage Roller Bearing-(Key No. 210)
3XE-350A	2	Gear Cage Roller Bearing Retaining Ring

Be Sure To Give Engine Number When Ordering Parts

Part NO.	No. Reqd.	Name
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REVERSE GEAR ASSEMBLY 3XE-90 (Cont'd)

3XA-65	2	Clutch throwout Poke Shaft
	2	Woodruff Key #11 {Small end Cross- Shaft}
	1	Woodruff Key # 127 (Cross-Shaft to reverse lever)
1452	2	Housing Operating Shaft Oil Seal- Rawhide
2249	2	Reverse Gear Housing Stud



REVERSE GEAR

1619	1	Reverse Gear Housing Top Cover
1620	1	Reverse Gear Housing Top Cover Gasket
2251	2	Reverse Gear Brake Band Support Pin
2252	2	Reverse Gear Brake Band Support Block

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
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FOLLOWING PARTS USED WITH ALL DIRECT DRIVE ENGINES

3XE-90	1	Reverse Gear Assy. Spec. Z-5650
3XE-59S	1	Stub Shaft
2XE-208C	1	Propeller Shaft Coupling-Engine Half
*1749	1	Propeller Shaft Coupling-Shaft Half
3XE-235	1	Propeller Shaft Coupling Thrust Washer
3X-363	1	Propeller Shaft Coupling Nut
2XE-366	1	Propeller Shaft Coupling Nut Lock-Washer
2245	1	Reverse Gear Housing
2256	1	Reverse Gear Housing Gasket
3488	1	Housing Rear Oil Seal (Key No, 33528)
3174	1	Housing Rear Ball Bearing (6309)
1744	1	Housing Rear Oil Seal Retainer
1782	1	Housing Rear Oil Seal Retainer Gasket
2039	6	Housing Rear Oil Seal Retainer Screw

THE FOLLOWING PARTS USED WITH REDUCTION DRIVE ENGINES BEFORE ENGINE NO, - 82248

3XE-90	1	Reverse Gear Assy, Spec. Z-5461
3XE-59X	1	Stub Shaft
2246	1	Reverse Gear Housing - 1-1/2:1 only
2247	1	Reverse Gear Housing-2:1 only
2256	1	Reverse Gear Housing Gasket

Be Sure To Give Engine Number When Ordering Parts

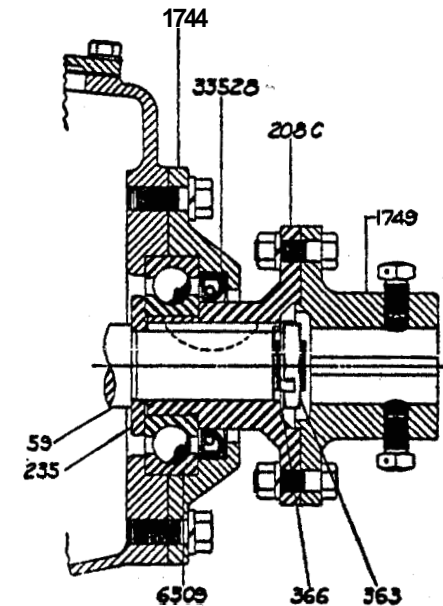
Part No.	No. Reqd.	Name
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* Note: When ordering shaft half couplings the following "Key Letters" denoting required bore, should be used in conjunction with the basic shaft half coupling number:

A-3/4"	E-1-1/4"	I-1-3/4"
B-7/8"	F-1-3/8"	J-1-7/8"
C-1"	G-1-1/2"	K-2"
D-1-1/8"	H-1-5/8"	

REVERSE GEAR ASSEMBLY 35XE-90

For Reduction Drive Models After Engine No, 82247



REVERSE GEAR REAR END

35XE-90	1	Reverse Gear Assy. Spec Z-5850
35XE-1	1	Gear Cage or Drum

Be Sure To Give Engine Number When Ordering Parts

Part NO.	NO Reqd.	Name
REVERSE GEAR ASSEMBLY 35XE-90 Cont.		
3XE-3B	1	Propeller Gear
3XE-4AD	1	Engine Gear
	1	Woodruff Key #128 (Engine Gear to Crankehaft)
3XE-5H	3	Pinion Gear-Short-(With Bushing)
3XE-5G	3	Pinion Gear -Long-(With Bushing)
3XE-7A	12	Pinion Bushing
3XE-8A	6	Pinion Stud
3XE-10E	5	Friction Disc-(Teeth Inside)
3XE-37E	6	Friction Disc-(Teeth Outside) (It is recommended that only complete sets of Friction Discs be ordered.)
3XE-11D	1	Pressure Plate
3XE-19A	1	Brake Band-With Lining
2XE-24	1	Clutch Operating Hand Lever
1635	1	Engine Gear Retaining Screw
3XE-370	1	Brake Band Lining-Only
3XE-28	1	Adjusting Finger Collar
35XE-47	1	Disc Driver
3XE-60B	1	Operating Sleeve-With Ball Bearing Throwout Collar
3XE-254	1	Propeller Gear Plain Washer
3XE-366	1	Propeller Gear Lock Washer
ZXE-363	1	Propeller Gear Lock Nut
35XE-288	1	Brake Band Support
35XE-382	1	Roller Bearing Race
3XE-422	1	Brake Band Toggle Link-end
3XE-423C	1	Brake Band Toggle Link
3XE-426	2	Brake Band Toggle Lever-Long
3XE-427A	1	Brake Band Toggle Lever-Short
3XE-428A	1	Brake Band Toggle Adj. Bolt
3XE-429	2	Brake Band Toggle Adj. Bolt Lock Nut
3XE-430	2	Brake Band Toggle Pin--Long
3XE-435	1	Brake Band Toggle, Pin--Short
3XE-432	1	Toggle Lever Ball Joint--Long
3XE-433	1	Reverse Yoke Ball Joint

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reyd.	Name
REVERSE GEAR ASSEMBLY 35XE-90 Cont.		
3XE-434	1	Reverse Yoke Ball Joint Screw
3XE-436	1	Brake Band Brace Screw
2XE-21	3	Clutch Throwout Finger Assembly
2XE-76	1	Clutch Adjusting Lock Screw
3XA-111	1	Clutch Throwout Yoke
3XA-401A	1	Gear Cage Ball Bearing--(Key No. 110-3)
3XE-350	1	Gear Cage Ball Bearing Retaining Ring
3XE-402	1	Pilot Roller Bearing
35X-369A	1	Gear Cage Roller Bearing--(Key No. 210)
3XE-350A	2	Gear Cage Roller Bearing Retaining Ring
3XA-65	2	Clutch Throwout Yoke Shaft
	2	Woodruff Key #11 (Small end Cross-Shaft)
	1	Woodruff Key #127 (Cross-Shaft to Reverse Lever)
35XE-59A	1	Reverse Gear Stub Shaft-Reduction Drive-2:1 1-1/2:1
1452	2	Housing Operating Shaft Oil Seal-Rawhide
5068	1	Reverse Gear Housing--Reduction Drive-2:1 1-1/2:1
5088	1	Reverse Gear Housing Gasket
2249	2	Reverse Gear Housing Stud
1619	1	Reverse Gear Housing Top Cover
1620	1	Reverse Gear Housing Top Cover Gasket
2251	2	Reverse Gear Brake Band Support Pin
2252	2	Reverse Gear Brake Band Support Block
RDB-20	1	Retaining Nut for Reduction Gear Drive Pinion
RDC-235B	1	Thrust Washer for Reduction Gear Drive Pinion

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
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REDUCTION GEAR RB20(2:1)MLR
(Spec. Z5462)-Before Engine No. 82248

RB20-3	1	Reduction Gear Housing
BR20-15	1	Reduction Gear Housing Gasket
RB20-6	1	Main Drive Pinion Std. Rot.
RB20-0-6	1	Main Drive Pinion Opp. Rot.
RB20-28	1	Internal Ring Gear Std. Rot.
RB20-0-28	1	Internal Ring Gear Opp. Rot.
RB20-29	1	Internal Ring Gear Flange
RB20-31	8	Internal Ring Gear Flange Screw
RDC235-B	1	Ball Bearing Thrust Washer
3156	1	Ball Bearing-Front-408-W(Key No. A)
3158	1	Ball Bearing-Center-3121W (Key No. B)
3160	1	Ball Bearing-Rear-5212 (Key No. C)
RDD-350	1	Front Ball Bearing Retaining Ring
RDB-20	1	Driving Pinion Nut
RB20-30	1	Ball Bearing Spacer
RB20-225	1	Rear Ball Bearing Oil Seal Retainer
RB20-14	1	Rear Ball Bearing Oil Seal Retainer Gasket
3162	1	Rear Ball Bearing Oil Seal-Garlock (VI-2124)
RB20-208	1	Propeller Shaft Coupling--Gear Half-5-1/2" Face
*2313	1	Propeller Shaft Coupling--Shaft Half (Give Shaft size Key-Letter)
RB-NO9	1	Propeller Shaft Coupling Nut
RB20-36	1	Oil Seal Washer(Used ahead of coupling)
RB-W09	1	Propeller Shaft Coupling Washer

REDUCTION GEAR RB20(2:1)MLR (Spec. Z5867)-After Engine No. 82247 and Before 83838

Same parts as RB20-Spec Z-5462 but with the following adapter plate.

RB20-1B	1	Adapter Plate
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Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
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REDUCTION GEAR RB-20 (2:1) MLR
(Spec. 25955) - After Engine No. 83837

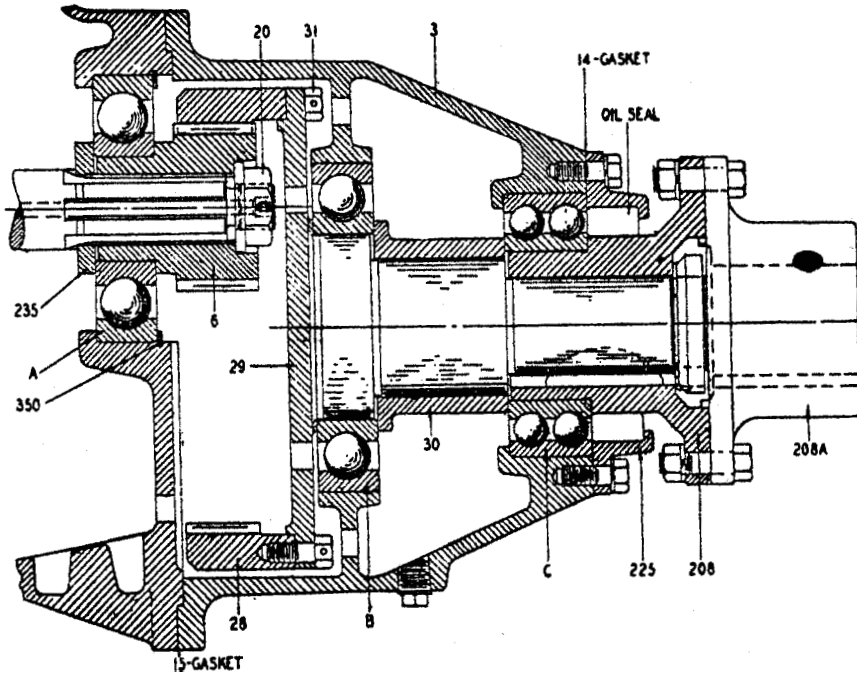
RB20-1B	1	Adapter Plate
RB20-3J	1	Reduction Gear Housing
RB20-15	1	Reduction Gear Housing Gasket
RB20-6	1	Main Drive Pinion-Std. Rot
RB20-0-6	1	Main Drive Pinion-Opp. Rot.
RB20-28	1	Internal Ring Gear-Std. Rot.
RB20-0-28	1	Internal Ring Gear-Opp. Rot.
RB20-29	1	Internal Ring Gear Flange
RB20-31	8	Internal Ring Gear Flange Screw
3156	1	Ball Bearing-Front-408W (Key No. A)
3158	1	Ball Bearing-Center-312 W(Key No. B)
3160	1	Ball Bearing-Rear-5212 (Key No. C)
RDD-350	2	Ball Bearing Retaining Ring
RB20-30	1	Ball Bearing Spacer
3162	1	Rear Oil Seal
RB20-208	1	Propeller Shaft Coupling-Gear Half
	1	Coupling Key (Woodruff #T)
*2313	1	Propeller Shaft Coupling-Shaft Half (Give shaft size Key Letter)
RB-NO9	1	Propeller Shaft Coupling Nut
RB-W09	1	Propeller Shaft Coupling Nut Washer
RB20-36	1	Oil Seal Washer (Used ahead of Coupling)

REDUCTION GEAR RA-15 (1-1/2: 1)MLS
(Spec. Y5277)-Before Engine No. 82248

RA20-3	1	Reduction Gear Housing
RA20-15	1	Reduction Gear Housing Gasket
RA15-6B	1	Main Drive Pinion-34 Teeth-Std. Rot.
RA15-0-6B	1	Main Drive Pinion-34 Teeth-Opp. Rot.
RA20-28	1	Internal Ring Gear-Std. Rot.
RA20-0-28	1	Internal Ring Gear-Opp. Rot.
RA20-29	1	Internal Ring Gear Flange

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
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REDUCTION GEAR

REDUCTION GEAR - **MLS** Cont.

RA20-31	8	Internal Ring Gear Flange Screw
RDC-235B	1	Ball Bearing Thrust Washer
3168	1	Ball Bearing - Front-310-W (Key No. A)
3168	1	Ball Bearing-Center-310-W (Key No. B)
3170	1	Ball Bearing-Rear-5211 (Key No. C)
RDD-350	1	Front Ball Bearing Retaining Ring
RDB-20	1	Driving Pinion Nut
RA20-30	1	Ball Bearing Spacer
RA20-225	1	Rear Ball Bearing Oil. Seal Retainer
RA20-36	1	Oil Seal Washer (Used ahead of Coupling)

Be Sure To Give Engine Number When Ordering Parts

Part No.	No. Reqd.	Name
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REDUCTION GEAR - **MLS** Cont.

RA20-14	1	Rear Ball Bearing Oil Seal Retainer Gasket
3186	1	Rear Ball Bearing Oil Seal--Garlock
*2317	1	Propeller Shaft Coupling-Shaft Half- (Give Shaft Size Key-Letter)
RA-NO7	1	Propeller Shaft Coupling Nut
RA-W07	1	Propeller Shaft Coupling Washer
RA20-208	1	Propeller Shaft Coupling-Gear Half
REDUCTION GEAR RA15 (1-1/2:1)		
MLS (Spec. Y5345) After Engine No 82247		

Same parts as RA-15 Spec. Y5277 but with the following adapter plate.

RA15-1M	1	Adapter Plate
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Be Sure To Give Engine Number When Ordering Parts