



JLO Engines

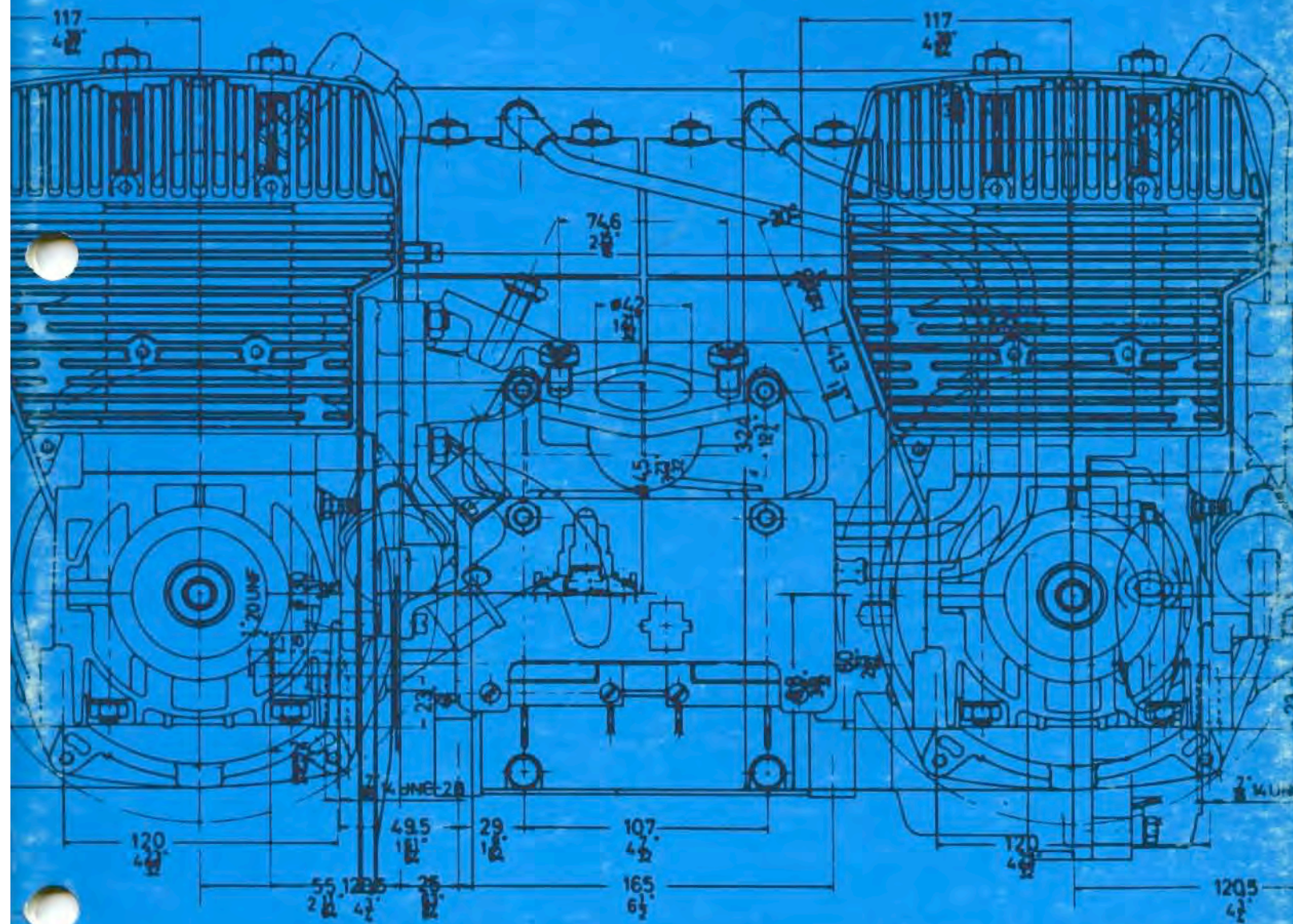
# SERVICE MANUAL

## SINGLE CYLINDER ENGINES

- L-99 (IF-100-1)
- L-230 (IF-250-1), L-227
- L-295 (IF-295-1), R-295 (IF-295-2)
- L-297, L-300
- L-340 (IF-340-1), R-340 (IF-340-2)

## TWIN CYLINDER ENGINES

- LR-340/2 (2F-340-1)
- LR-399/2 (2F-400-1)
- LR-440/2 (2F-440-2)
- LB-600/2 (2F-600-1)



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# JLO Single Cylinder Engines

## Disassembly and Assembly Procedure - Model L-99 (IF-100-1)

### Assembly

#### 1. Crankshaft

Heat crankshaft bearings in oil preheated to 215°F. After reaching temperature, quickly slip bearing over end of crankshaft; it should fall freely on the counterweight. Using a hollow pipe with a diameter approximately that of the inner bearing race, hit pipe with a rubber hammer and seat the bearing on the shaft. The bearing should now rest securely and turn freely. Repeat procedure for bearing on other end of crankshaft.

#### 2. Crankcase

Check both halves of crankcase and clean, carefully removing any left-over gasket material or burrs; 2) with the ignition side of the crankcase facing up, heat bearing seat area while protecting oil seal with a hollow pipe; 3) guide crankshaft through the oil seal until the bearing fits easily into its seat; 4) let casting cool, then install crankcase gasket; 5) to install the other half of the crankcase, repeat items 2, 3 and 4, as applicable; 6) insert the 6 Allen Head screws and tighten slightly; 7) check alignment of crankcase halves with a straight edge and 8) firmly tighten Allen Head screws, crosswise.

#### 3. Piston and Cylinder

Clean carbon deposits from the piston. Check to see that rings move freely in their grooves. Install piston with the arrow pointing toward the exhaust port. Gently guide the piston over the connecting rod and insert the wrist pin. Snap circlips into each side of the piston using needle-nose pliers. Install cylinder-base gasket. Place a V-shaped wood block under the piston, resting it on the crankcase. After lining up the rings with the locating pins on the piston, compress them with a ring compressor. Rest piston on wood block and carefully slide cylinder over the piston until the rings disappear into the cylinder. Remove ring compressor and wood block. Install four cylinder base nuts and torque-down crosswise. (6/7 ft. lbs.).

#### 4. Contact Breaker

##### A. Fixed cam models:

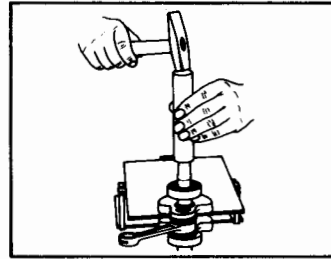
*Insert backing plate into crankcase housing and attach breaker points using lockwasher and slotted screw.*

##### B. Independent cam models:

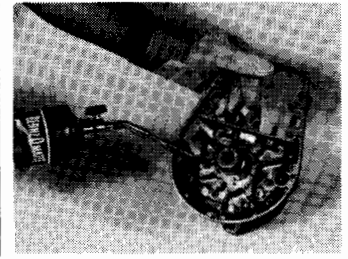
Install backing plate. Slide spring washers over crankshaft, insert Woodruff key and slide cam into position. Install breaker points using slotted screw and washer.

#### 5. Ignition Coil

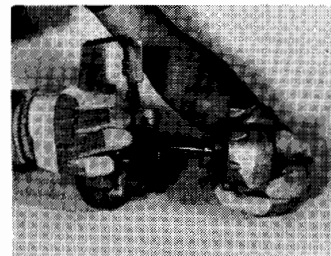
Attach ignition coil to crankcase with two 6 mm. bolts (use 10 mm. wrench). Connect wires to condenser and contact breaker terminals.



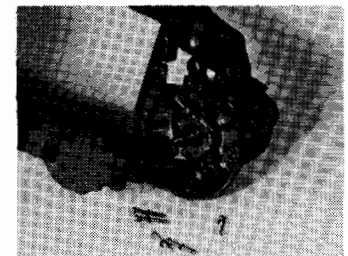
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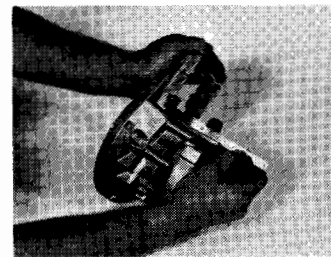
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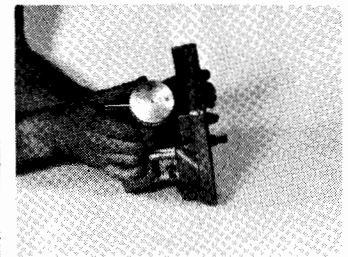
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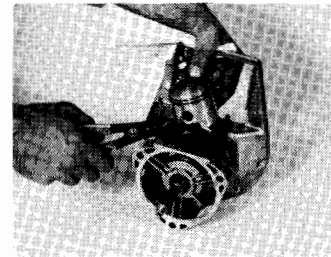
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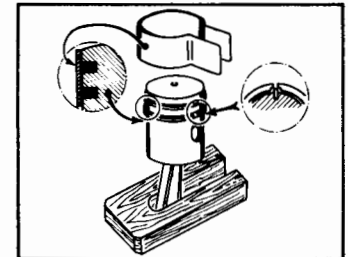
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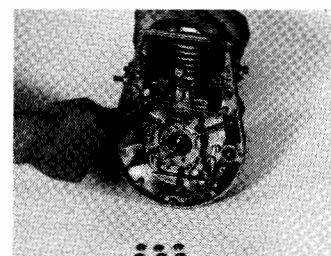
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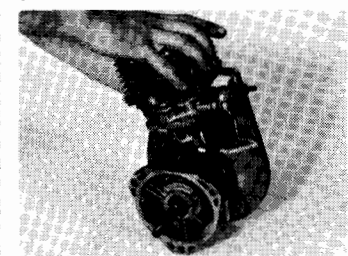
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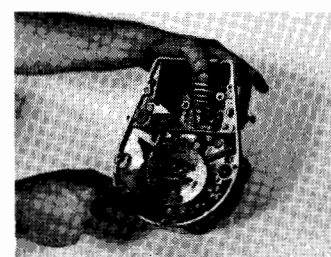
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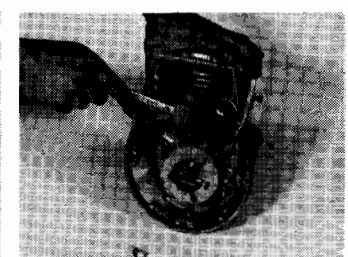
3D



3E



4



5

**F. Spark Plug**

Remove spark plug.

**G. Cylinder Head**

With 13 mm. socket wrench, remove cylinder head nuts; take off spacers and washers and lift-off cylinder head and gasket.

**H. Cylinder**

Remove the cylinder base nuts with 17 mm. wrench. Gently lift up cylinder until piston clears the sleeve.

**I. Piston**

With needle nose pliers remove the wrist pin circlips—one on each side of pin. Gently drive out the wrist pin and lift off the piston. Remove spacers and connecting rod bearing.

**J. Armature Plate**

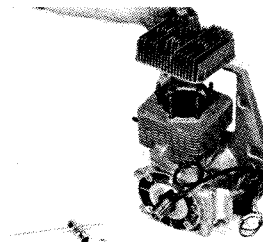
Important: before pulling the armature plate make an alignment mark on it and on the crankcase to facilitate ignition timing. Remove the 3 slotted-head screws holding armature plate in place. Disconnect wire terminals from the external coil and clip them off. Put a drop of oil on the wires so they will slip easily through the protecting rubber grommet. Lift out the armature plate and pull wires through the grommet. Remove grommet.

**K. Crankcase**

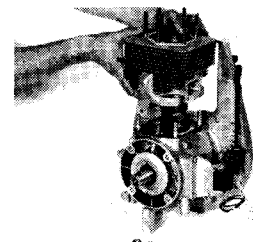
To separate the crankcase: 1) remove the 6 Allen Head 8 mm. screws on the crankcase housing; 2) turn crankcase on its side (ignition side facing up); 3) slide hollow protective pipe over oil seal (pipe should have I.D. slightly larger than oil seal); 4) using protective gloves, apply heat around bearing seat (do not overheat); 5) lift off, separating casting; 6) turn crankcase so P.T.O. end is up and proceed as per points 3, 4 and 5. Important: do not cut oil seal on sharp edges of crankshaft keyway. Should crankcase separate without application of heat, it is an indication that both crankcase castings are worn out and should be replaced.

**L. Crankshaft**

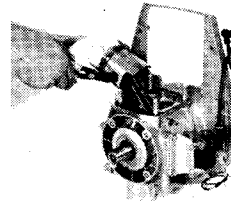
Place crankshaft on work surface and use special puller to remove bearings: 1. slide puller over crankshaft and align bolt with crankshaft end; 2. slip half shells around the bearing and engage them with puller grooves; 3. slide retaining ring over half shells to keep them on bearing; 4. use two 27 mm. wrenches and turn puller center bolt with one wrench while holding puller body with the other; 5. keep turning bolt clockwise until bearing comes to the end of crankshaft. Note: On engines with internal threaded shafts use pressure piece (Part No. 444-31-690-00) to prevent damage to threads.



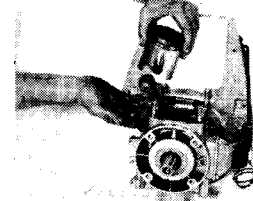
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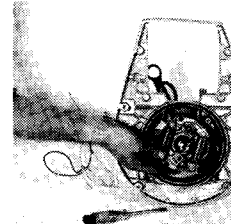
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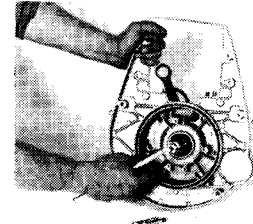
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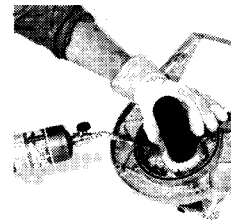
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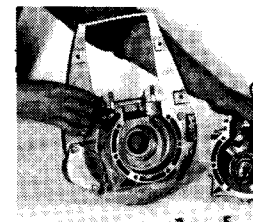
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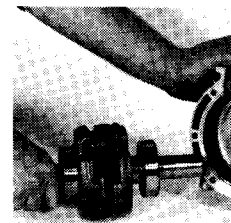
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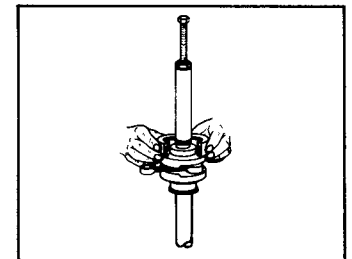
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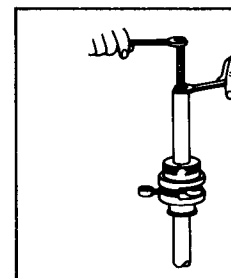
K3



K4



L1



L2



# JLO Twin Cylinder Engines

## Electric Starter Mounting Instructions

Models LR-340/2 (2F-340-1), LR-399/2 (2F-400-1) and LR-440/2 (2F-440-2).

### Electric Starter Kit Installation

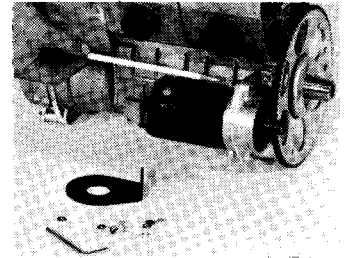
1. Install front mounting bracket on crankcase using the two socket cap screws provided.
2. Loosely install rear support bracket to crankcase housing.
3. Insert starter unit between front and rear brackets and fasten securely to front bracket.
4. Tighten rear bracket to crankcase housing and then fasten rear bracket to motor.

### Removal

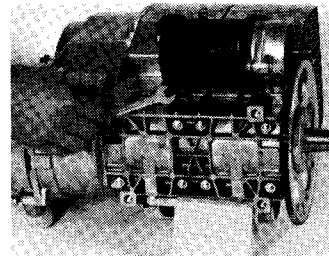
1. To remove, reverse the above procedure.



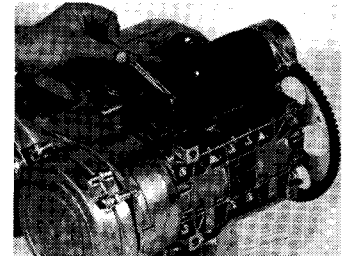
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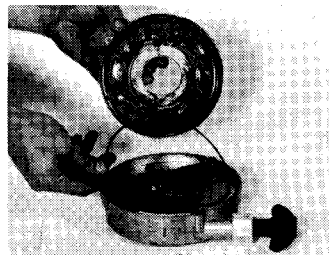


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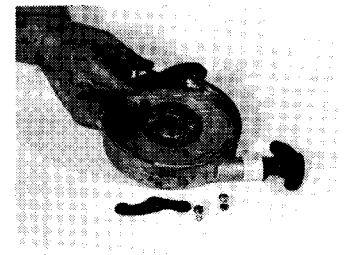
## Disassembly and Assembly Procedure - Recoil Starter for Models LR-340/2 (2F-340-1), LR-399/2 (2F-400-1) and LR-440/2 (2F-440-2)

### Disassembly

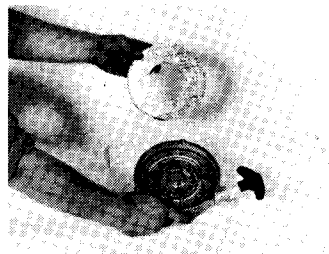
- A. Take off cover plate and gasket ring by removing slotted or Phillips head screws.
- B. Lift out pawl assembly, including spring caps and pressure springs.
- C. Remove intermediate plate.
- D. Remove handle assembly. To provide needed slack for removal of handle, pull rope part way out and tie a knot.
- E. After removing handle, untie knot in rope carefully holding recoil pulley with one hand and let the rope feed back slowly to gradually release spring tension.
- F. Remove nylon rope bushing.
- G. Lift out rope pulley with pliers. Keep coil spring in position using a screwdriver.
- H. Turn recoil housing upside down in your hand and smack down sharply against workbench. This will release spring tension within the housing enabling you to grasp the spring and gradually and safely uncoil it.



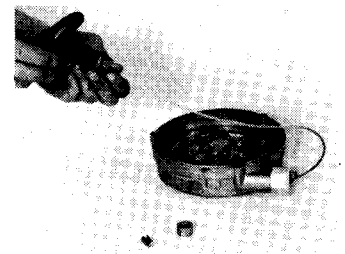
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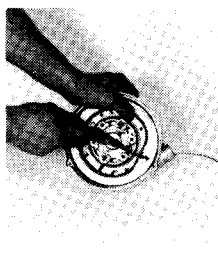
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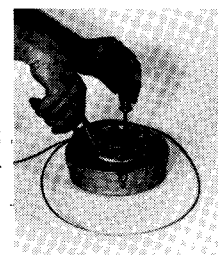
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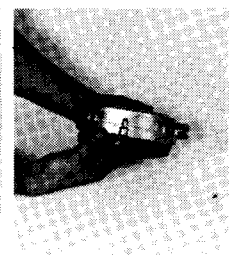
D



E



G



H



# JLO Engines

## General Trouble Shooting . . .

A thorough check should be made before any overhaul procedures are taken. Following this practice will help eliminate unnecessary repairs.

### 1. Engine does not start or starts with difficulty

POSSIBLE CAUSE	REMEDY
No fuel in tank	Fill tank with clean, fresh fuel and oil mixture.
Obstructed fuel line or filter	Clean fuel filter and line. If necessary remove and clean carburetor.
Fuel tank cap vent hole obstructed	Open vent hole.
Water in fuel	Drain tank. Clean carburetor and fuel lines. Dry spark plug electrodes. Fill tank with clean, fresh fuel and oil mixture.
Engine over-choked ("flooded")	Turn engine over several times with choke "IN". Refer to symptoms No. 8 through 15.
Improper carburetor adjustment	Adjust carburetor.
Loose or defective magneto and/or wiring	Check magneto wiring for shorts or grounds. Check timing, point gap, and adjust or repair as necessary. See "Trouble-Shooting Ignition System".
Spark plug fouled	Clean and regap spark plug.
Spark plug porcelain cracked	Replace spark plug.
Poor compression	Check compression and make necessary repairs. See "Checking Engine Compression".

### 2. Engine Knocks

POSSIBLE CAUSE	REMEDY
Carbon in combustion chamber	Remove cylinder head and clean carbon from head and piston.
Loose or worn connecting rod (or rod bearing)	Replace crankshaft assembly.
Loose flywheel	Check flywheel key and keyway; replace parts if necessary.
Worn cylinder	Replace cylinder.
Incorrect magneto timing	Time ignition. See "Trouble-Shooting Ignition System".

### 3. Engine Misses Under Load

POSSIBLE CAUSE	REMEDY
Spark plug fouled or improper gap	Clean and regap spark plug.
Spark plug porcelain cracked	Replace spark plug.
Loose or defective magneto and/or wiring	Check timing, point gap and wiring for defects. See "Trouble-Shooting Ignition System".
Improper carburetor adjustment	Adjust carburetor. See symptoms No. 8 through 15.



## Gasket Sets, Spark Plug Recommendations

### Gasket Sets

Model	Description	Part No.
(1) L-227/L-230	Gasket set with Seals	227-61-801-00
(2) L-295/L-297/L-300/R-340 a) L-297 b) L-297 c) L-295/L-300/R-340 d) L-295/L-300	Gasket set with Seals: 30 mm. dia. shaft 24 mm. dia. shaft 30 mm. dia. shaft 24 mm. dia. shaft	297-61-805-00 297-61-801-00 297-61-811-00 297-61-806-00
(3) L-340 L-340 L-340	Gasket set with Seals 24 mm. shaft 30 mm. shaft	339-61-801-00 339-61-802-00
(4) LR-340/2 (2F-340-1), LR-399/2 (2F-400-1), LR-440/2 (2F-440-2) a) LR-340/2 (2F-340-1) b) LR-340/2 (2F-340-1) c) LR-399/2 (2F-400-1) d) LR-440/2 (2F-440-2)	Gasket set with Seals  Recoil Start Electric Start Recoil Start Electric Start	338-61-801-00 338-61-802-00 399-61-801-00 399-61-802-00
(5) LB-600/2 (2F-600-1)	Gasket set with Seals	600-61-802-00

### Spark Plug Recommendations

Engine Model	Medium Load		Full Load		Racing	
	Bosch	Champion	Bosch	Champion	Bosch	Champion
L-99	W-175-T1	L-97Y	W-225-T1	L-87Y	---	---
L-227	M-225-T1	K-9	M-260-T1	K-7	M-280-T31	K-57R
L-230	M-240-T1	K-8	M-260-T1	K-7	M-280-T31	K-57R
L-295	M-240-T1	K-8	M-240-T1	K-8	M-280-T31	K-57R
R-295	---	---	W-280-T20S	N-60Y	W-310-T17	N-57R
L-297	M-240-T1	K-8	M-240-T1	K-8	M-280-T31	K-57R
L-300	M-240-T1	K-8	M-280-T31	K-7	M-310-T31S	K-54R
L-340	M-240-T1	K-8	M-280-T31	K-7	M-310-T31S	K-54R
R-340	---	---	W-280-T20S	N-60Y	W-310-T17	N-57R
LR-340-2	W-240-T2	N-4	W-260-T2	N-3	W-310-T17	N-57R
LR-399/2	W-240-T2	N-4	W-260-T2	N-3	W-310-T17	N-57R
LR-440/2	W-260-T2	N-4	W-260-T2	N-3	W-310-T17	K-57R
LB-600/2	M-225-T1	K-9	M-240-T1	K-8	---	---

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