

Robin Industrial Engines®

SERVICE MANUAL

Model

EC01

1193S116



ROBIN AMERICA, INC.
ROBIN TO WISCONSIN ROBIN
ENGINE MODEL CROSS REFERENCE LIST

ROBIN

WISCONSIN ROBIN

SIDE VALVE

EY08	W1-080
EY15	W1-145
EY15V	W1-145V
EY20	W1-185
EY20V	W1-185V
EY23	W1-230
EY28	W1-280
EY35	W1-340
EY40	W1-390
EY45V	W1-450V
EY21	EY21W
EY44	EY44W
EY18-3	EY18-3W
EY25	EY25W
EY27	EY27W

OVERHEAD VALVE

EH11	WO1-115
EH12	WO1-120
EH15	WO1-150
EH17	WO1-170
EH21	WO1-210
EH25	WO1-250
EH30	WO1-300
EH30V	WO1-300V
EH34	WO1-340
EH34V	WO1-340V
EH43V	WO1-430V

TWO CYCLE

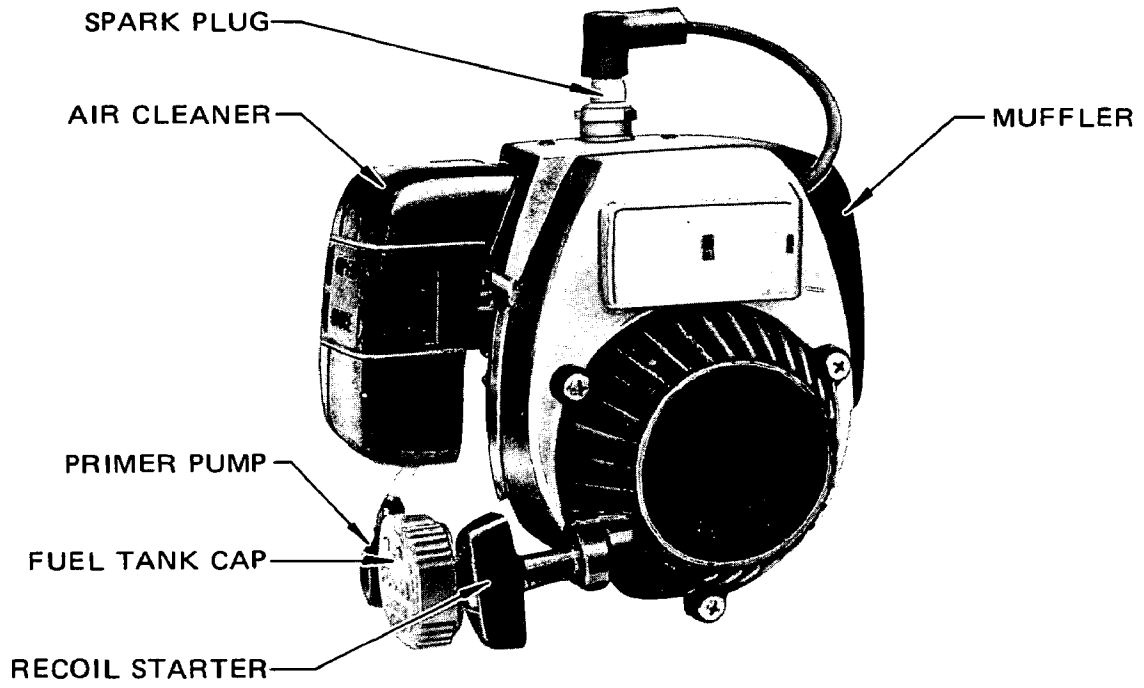
EC13V	WT1-125V
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DIESEL

DY23	WRD1-230
DY27	WRD1-270
DY30	WRD1-300
DY35	WRD1-350
DY41	WRD1-410

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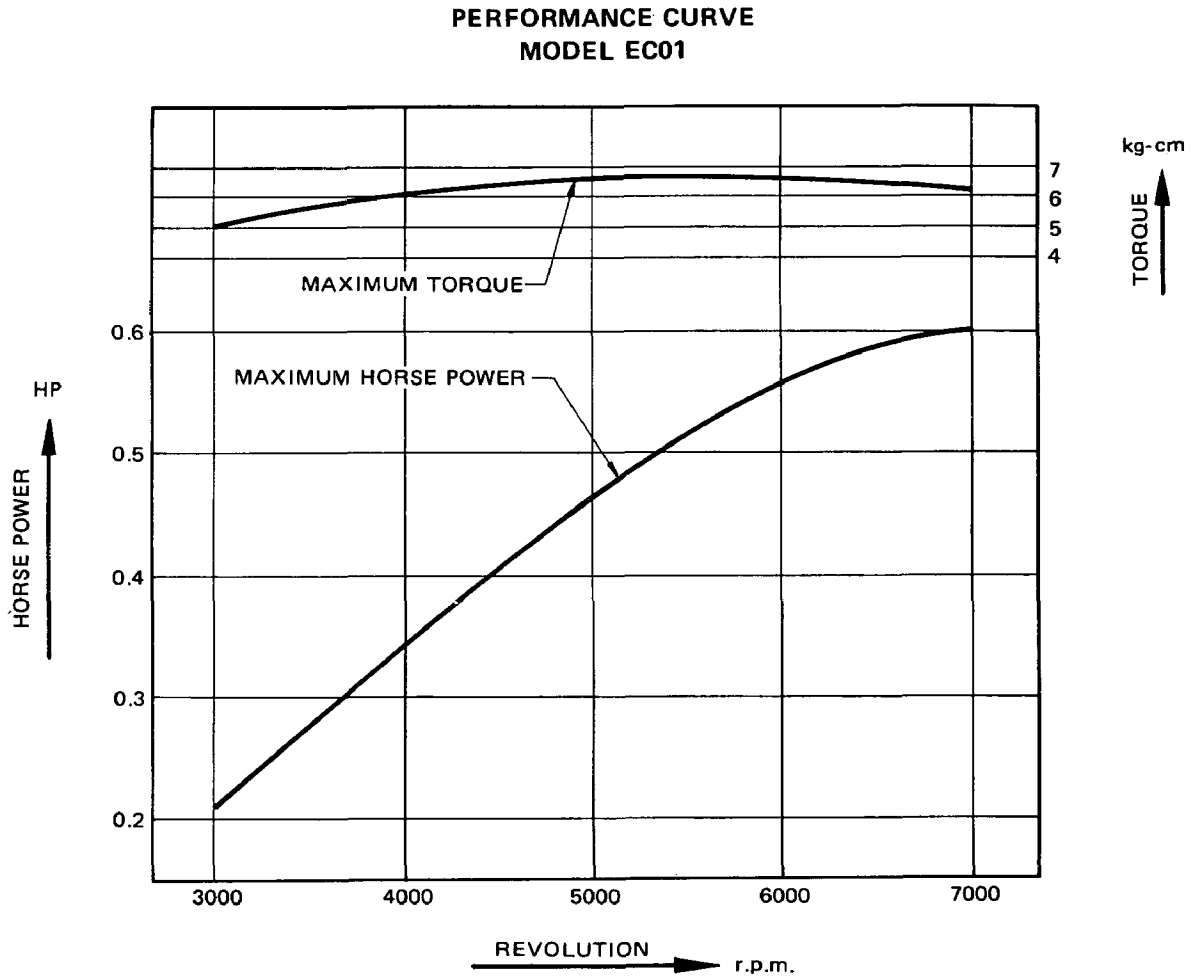
1. SPECIFICATIONS

Model	EC01R
Type	Air-Cooled, 2-Cycle, Single Cylinder, Horizontal P.T.O. Shaft
Bore x Stroke (in)	28 mm x 25 mm (1.10 x 1.0)
Piston Displacement (cu. in)	15.4 cc (0.94)
Output Max.	0.6 HP/7,000 rpm
Direction of Rotation	Counter-clockwise, viewed from driving shaft (P. T. O. shaft) side
Cooling System	Forced Air Cooling
Lubrication	Gasoline-Oil Mixing Type
Lubricant	2-Cycle engine Oil only
Carburetor	Horizontal Draft Diaphragm Type
Fuel	Gasoline-Oil Mixture (20 ~ 25:1)
Fuel Feed System	Diaphragm Pump Type
Fuel Tank Capacity	Approx. 0.4 liter (0.11 U.S. gal.)
Ignition System	Solid State Ignition
Spark Plug	NGK BM-7A
Starting Method	Recoil Starter
Dry Weight (lbs.)	1.8 kg (4.0)
Dimensions (in)	138 mm (5.4) length x 170 mm (6.7) width x 225 mm (8.9) height

2. PERFORMANCE

2-1 MAXIMUM OUTPUT

The maximum output of the EC01R is such standard power as developed by the engine, after its run-in period with all the moving parts properly break-in, when operating with the fully open throttle valve. Therefore, it follows that a new engine may not develop this maximum output in the beginning, because moving parts are not in a properly break-in condition.



3. FEATURES

1. COMPACT, LIGHT WEIGHT, HIGH PERFORMANCE and LOW FUEL CONSUMPTION
2. TROUBLE FREE because of simple design and easy to handle
3. HIGH DURABILITY engine withstand long severe operation
4. TILTED OPERATION AVAILALBE
Be able to operate at any position due to diaphragm cuarburetor.
5. EASY STARTING with recoil starter
6. Ball main bearings at both ends
7. Forged steel connecting rod.
8. With CHROME PLATED CYLINDER, HEAT CONDUCTIVITY and WEAR PROOF are quite excellent.

4. DISASSEMBLY and REASSEMBLY

4-1 PREPARATION and SUGGESTIONS

- 1) When disassembling the engine, memorize the locations of individual parts so as to be able to reassemble them correctly. Tag parts if there is a possibility of confusion.
- 2) Prepare several boxes to keep parts belonging to certain groups together.
- 3) Group those parts related each other, tentatively assembling where they belong, immediately after removing, in order to prevent missing and misplacing.
- 4) Handle the disassembled parts carefully and wash them in kerosene.
- 5) Use the correct tools in the correct way.
- 6) Standard tools required for disassembling and reassembling:
 - a. Work table
 - b. Washing pan
 - c. Disassembling tools
 - d. Washing oil (kerosene or gasoline), 2 cycle-oil
 - e. Emery paper, cloth
- 7) Before starting to disassemble the engine, drain fuel.
- 8) Tighten the screws of the cylinder, crankcase, connecting rod, spark plug, and flywheel to the specified torque values.
- 9) Use new packings and gaskets in reassembly.
- 10) Immediately before assembling parts, wash them in fresh gasoline or kerosene and blow them dry.
- 11) Apply 2 cycle-oil on rotating and sliding parts.
- 12) Take care not to contaminate the parts by dust during assembling.
- 13) Tighten bolts, nuts and screws with proper torque according to their sizes. If small screws are tightened too tight, they may get broken.
- 14) After completely assembling the engine, turn it by hand and check if there is any abnormality or loose members.

4-2 DISASSEMBLY PROCEDURES

4-2-1 FUEL DRAIN

Drain fuel from the fuel tank.

4-2-2 THROTTLE WIRE (See Fig. 1.)

Remove throttle wire from carburetor.

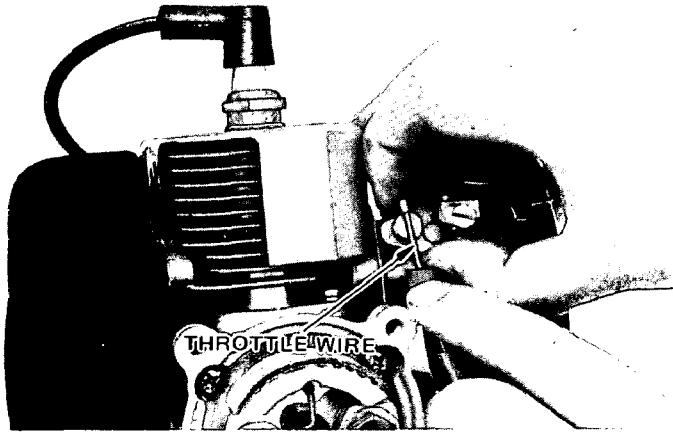


Fig. 1

4-2-3 RECOIL STARTER and FUN COVER

Remove recoil starter and fun cover by unscrewing bolts.

4-2-4 FUEL TANK and RUBBER TUBE

- 1) Disconnect fuel pipe between fuel tank and carburetor at carburetor side and remove fuel tank.
- 2) After removing fuel pump, push the head of rubber tube toward arrow mark in Fig. 2 with a screwdriver of minus top (preferably not sharpened) and remove rubber tube.

CAUTION:

Never remove rubber tube except at replacement.

Be sure to replace with new one when removed.

Be careful not to damage the hole in which rubber tube will be inserted.

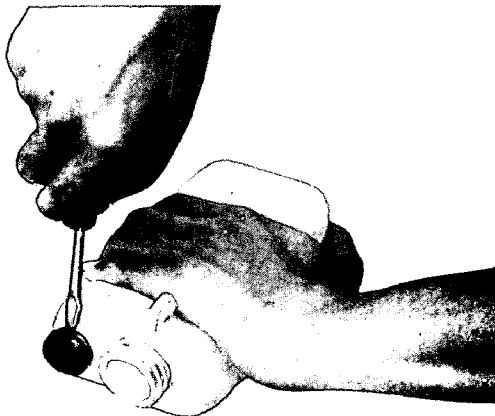


Fig. 2

4-2-5 KILL SWITCH WIRE

Disconnect stop switch wire terminal.

4-2-6 MAGNETO FLYWHEEL (See Fig. 3.)

After loosening the nut, lightly tap the center bolt and pull out the flywheel from the crankshaft.

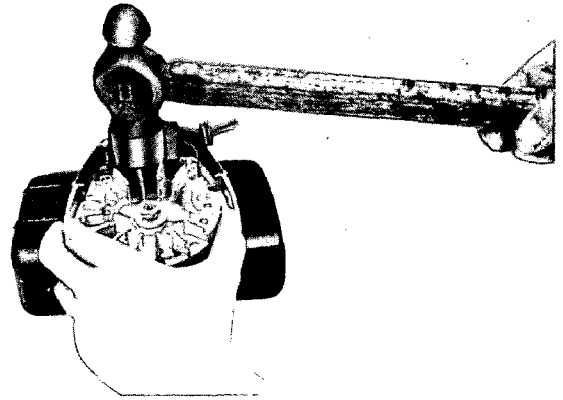


Fig. 3

4-2-7 CARBURETOR and HEAT BLOCK (See Fig. 4.)

Remove the cleaner cover first and then the cleaner body, carburetor, and heat block by loosening the screws.

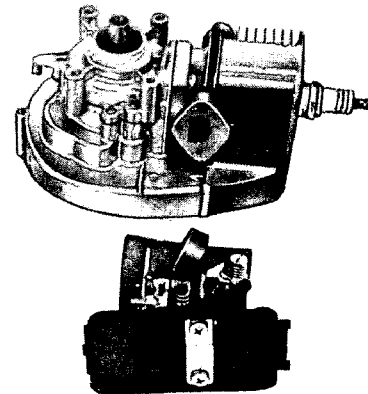


Fig. 4

NOTE: When reassembling, pay attention to the choke lever facing. (See Fig. 5.)

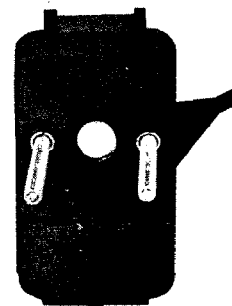


Fig. 5

4-2-8 MUFFLER

Remove muffler from cylinder by loosening screws.

4-2-9 CYLINDER (See Fig. 6.)

Remove cylinder carefully so as not to damage sliding surfaces of cylinder and piston.

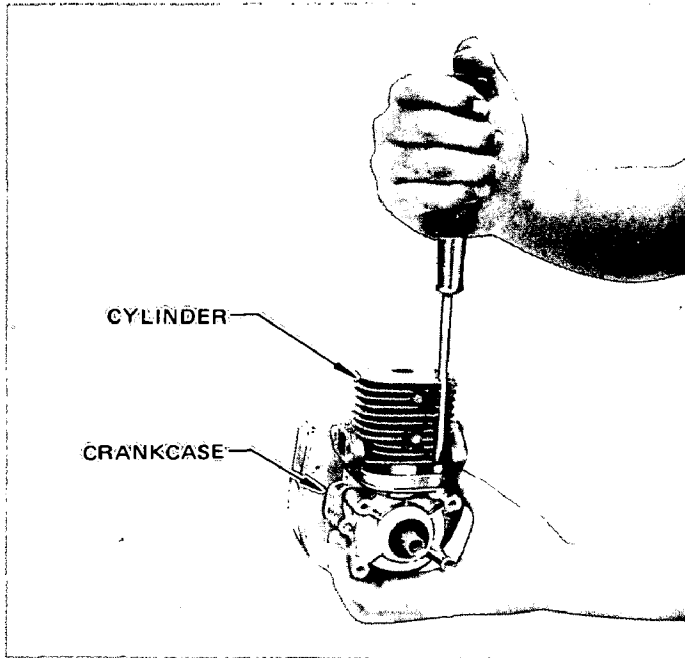


Fig. 6

4-2-10 DIVISION of CRANKCASE (See Fig. 7)

After loosening bolts, disassemble front and rear crankcase. Also, crankshaft by tapping with a soft hammer. Washing crankcase with gasoline, apply the film of oil to crankcase ball bearing bore and grease to oil seal bore.

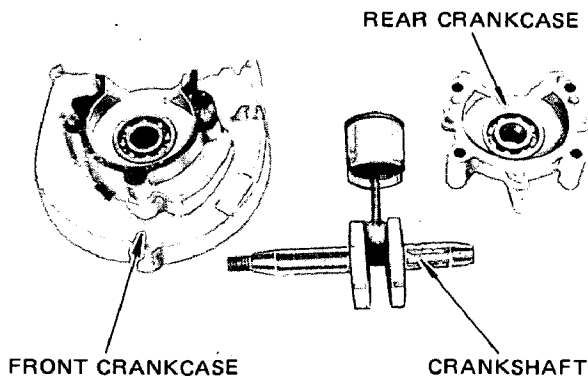


Fig. 7

4-3 REASSEMBLY PROCEDURES

4-3-1 CRANKCASE (See Fig. 8.)

- 1) Insert crankshaft into front crankcase bearing.
- 2) Assemble crankcases.
- 3) Use new gasket.
- 4) Tighten bolts to 40~50 kg-cm (2.9~3.6 ft-lb) torque.
- 5) Cut off crankcase gaskets stuck out to the mating surface of cylinder.

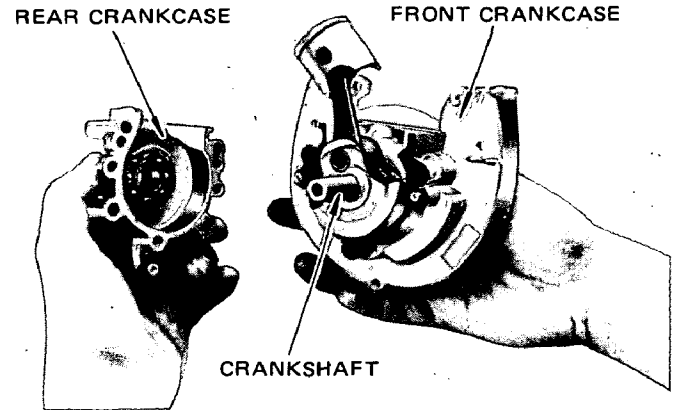


Fig. 8

4-3-2 CYLINDER (See Fig. 9.)

- 1) Replace cylinder gasket with new one. At the same time, try to mate the tappet hole with the groove on the contact surface of crankcase.

CAUTION:

Take care that gasket is placed in right position and on right side.

- 2) In assembling cylinder, take care of the position of piston ring and cylinder.
- 3) Tighten bolts to 40~50 kg-cm (2.9~3.6 ft-lb).

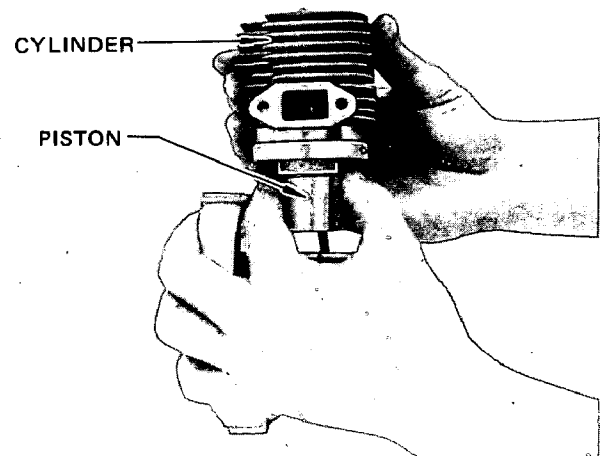


Fig. 9

4-3-3 CARBURETOR and HEAT BLOCK

- 1) Use new gasket.
- 2) Tighten bolts to 40~50 kg-cm (2.9~3.6 ft-lb).

4-3-4 IGNITION COIL

Tighten ignition coil tentatively, putting high tension wire on the right side.

4-3-5 FLYWHEEL

Mount flywheel on crankshaft and tighten flywheel nut.

Flywheel tightening torque is 120~140 kg-cm (8.6~10.1 ft-lb).

4-3-6 IGNITION COIL (See Fig. 10.)

Tighten ignition coil, keeping a clearance of 0.4~0.6 mm from flywheel.

Tightening torque: 40~50 kg-cm (2.9~3.6 ft-lb).

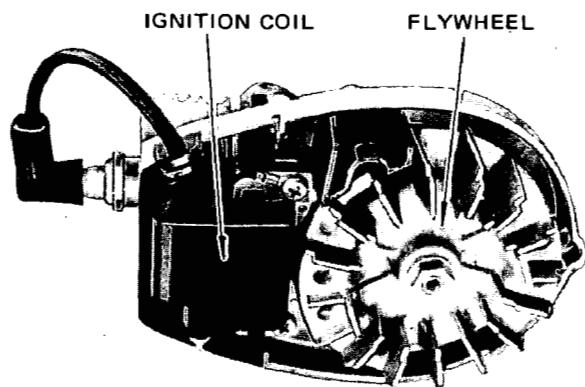


Fig. 10

4-3-7 MUFFLER

Tighten muffler 40~50 kg-cm (2.9~3.6 ft-lb).

Use new gasket.

4-3-8 RUBBER TUBE in FUEL TANK

Insert the rubber tube from the end of felt side into the hole of fuel tank. Put the spacer or backing plate between vice and fuel tank as shown in the figures.

Completely put in the ridge of rubber tube. After inserting, pinch the outer side of rubber tube and turn it to assure that the ridge has been completely inserted.

CAUTION:

After inserting, confirm the insertion of the ridge of rubber tube.

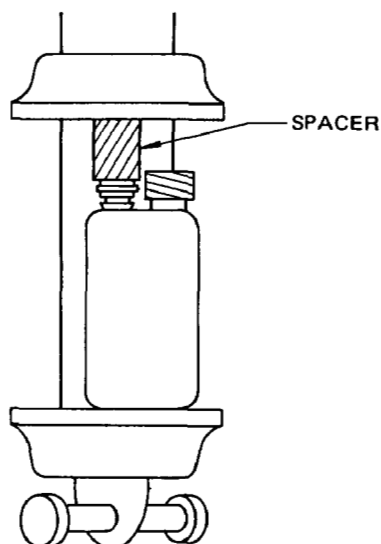


Fig. 11

4-3-9 RECOIL STARTER, FAN COVER, FUEL TANK, and GROMMET

Run high tension cord through the grommet and assemble plug cap spring and plug cap. Put the fuel tank in the crankcase. Run the grommet through the groove of fan cover and tighten recoil starter and fan cover to crankcase with three screws. Connect fuel line to carburetor.

Tightening torque: Recoil starter 22 ±4 kg-cm

Tool: Plus driver, Torque wrench

4-3-10 SPARK PLUG and CYLINDER COVER

Tighten the cylinder cover with spark plug.

Tightening torque: 150~200 kg-cm (10.8~14.4 ft-lb)

5. CARBURETOR ADJUSTMENT

Carburetor has carefully been adjusted at shop before shipment. Do not adjust it unless absolutely necessary.

If adjustment is required;

1) Idle adjustment (See Fig. 12)

Adjust throttle stop screw. If turn throttle stop screw toward clockwise, revolution will increase. If turn it toward counterclockwise, revolution will reduce.

CAUTION:

Do not idle under 2,800 r.p.m.

2) Fuel flow adjustment (See Fig. 12)

a. At low speed (at the small opening of the throttle):
When fuel is too RICH, turn the low speed fuel adjusting screw to the RIGHT. When it is too LEAN, turn low speed fuel adjusting screw to the LEFT.

b. At high speed (at the large opening of the throttle):
When fuel is too RICH, turn high fuel adjusting screw to the RIGHT. When it is too LEAN, turn high speed fuel adjusting screw to the LEFT.

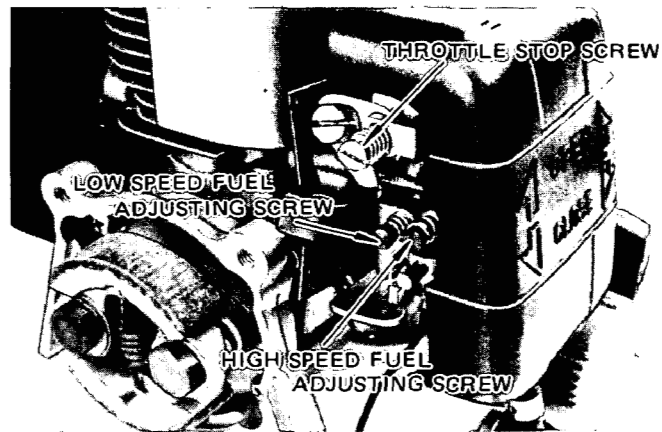


Fig. 12

6. OPERATION OF DIAPHRAGM CARBURETOR

- 1) When the engine runs, positive pressure and negative pressure will alternately occur in the crankcase. This alternation in pressure is led to the reverse side of fuel pump diaphragm so that the top side will work as fuel pump.
- 2) The fuel drawn up by fuel pump enters pressure compensating diaphragm chamber through the felt, rubber tube in fuel tank, fuel pipe and needle valve.
- 3) The fuel in pressure compensating diaphragm chamber is sent by pressure, so that the fuel pressure becomes higher than atmospheric pressure and pushes down the pressure compensating diaphragm.
- 4) When the pressure compensating diaphragm is pushed downwards, the arm connected to needle valve turns by the strength of spring and pushes up the needle valve, which shuts out the supply of fuel.
- 5) The fuel in pressure compensating diaphragm chamber is measured by high speed fuel adjusting screw and low speed fuel adjusting screw, entering the engine through the carb venturi. Then, the pressure is present compensating diaphragm chamber becomes lower than atmospheric pressure and the diaphragm is pushed up against the strength of spring.
- 6) When the pressure compensating diaphragm is pushed up, the arm turns against the spring and lowers needle valve, which admits fuel to enter. After this, the same operation 1) ~ 6) are repeated.

NOTE: OPERATION OF TICKLER LEVER

- 1) *When tickler lever is pushed down, the lever connected to needle valve turns against the strength of spring, lowering needle valve, which allows fuel to enter.*
- 2) *In a condition of 1), if primer pump is repeatedly pushed, fuel is pumped up from the tank and air in pressure compensating diaphragm chamber is exhausted through the overflow valve, so that the pressure compensating diaphragm chamber is filled with fuel.*
- 3) *Further, when primer pump is operated continuously, fuel is forced to flow into the overflow pipe through the overflow valve and, at the same time, a little amount of fuel is sent to carb venturi through the high speed fuel adjusting screw and the low speed fuel adjusting screw.*
- 4) *A little amount of fuel sent to carb venturi by the operation of 3), if recoil starter is pulled, it is taken into the engine, and becomes somewhat rich and suitable fuel for easy starting of the engine.*

7. TROUBLE-SHOOTING

For a gasoline engine to start and run satisfactorily, the following three requirements must be met:

- 1) The cylinder filled with a proper fuel-air mixture.
- 2) An appropriate compression in the cylinder.
- 3) Good spark at correct time to ignite the mixture.

If all the three requirements are not met simultaneously, an engine can not be started. There are also other factors such as heavy load at starting and too long an exhaust pipe causing a high back pressure, which contribute to hard starting. The most common causes of engine troubles are given below.

7-1 STARTING DIFFICULTIES

	Cause	Remedy	Preventive measure
Little or No Spark	Defects in spark plug	<ol style="list-style-type: none"> 1) If contaminated, wash in gasoline, remove foreign material and dry. 2) If spark plug is broken and lost insulation, replace plug. 3) Adjust spark gap to 0.6~0.7 mm (.024~0.27"). 	<ol style="list-style-type: none"> 1) Use spark plugs of specified heat range. Do not use poor grade oil. Clean air cleaner and avoid dust entry. 2) When spark gap is adjusted, if center electrode is hit or bent, insulator may get damaged.
	Defects in contact cable	If cable is burnt, replace cable along with coil.	
	Defects in magneto	<ol style="list-style-type: none"> 1) If wire or insulation is broken, replace magneto. 2) If magnetism is weak, re-magnetize (at the magneto maker) or replace. 	
	Other defects in electric system	<ol style="list-style-type: none"> 1) If kill switch is faulty, (short circuiting) replace or repair. 2) If primary wire is grounded to the engine body, insulate it with insulating adhesive tape. 	
Little or No Compression	Gas leak from combustion chamber	<ol style="list-style-type: none"> 1) If spark plugs are loose, tighten. 2) If spark plugs are defective, replace. 	
	Defects in piston assembly	<ol style="list-style-type: none"> 1) If piston is worn, replace. 2) If piston rings are worn, replace. 3) If piston rings are stuck, clean or replace rings. 	<ol style="list-style-type: none"> 1) Keep air cleaner always clean. 2) Do not use poor grade oil. Change oil regularly.
No Fuel Supply	Defects in fuel tank system	<ol style="list-style-type: none"> 1) Clean clogged tank outlet. 2) If incorrect fuel is poured into tank or water is mixed, drain tank completely and fill it with correct fuel. 3) When fuel pipe is locked with air, expell air. 4) If there is any crack or damage in the rubber components of fuel line system, due to their deterioration, replace. 	<ol style="list-style-type: none"> 1) Be sure to use a filter when adding fuel. 2) Use mixture (gasoline 20~25:oil 1) as fuel.
	Defects in carburetor	<ol style="list-style-type: none"> 1) If clogged with dust, clean. 2) If defective, replace. Clean orifices, if they are clogged. 	

	Cause	Remedy	Preventive measure
Excessive Fuel		1) Start engine with fully open choke valve and fully open throttle valve. 2) Remove spark plug and disconnect fuel pipe, repeat starting operation several times to evacuate excess fuel.	1) Never close choke valve when engine is warm. 2) When stopping the engine, run it at slow speed for a while. This practice not only favourably affects next starting, but also improves engine life. 3) Clogged air-cleaner results in too rich air-fuel mixture. Clean it thoroughly.
	Defects in carburetor	If fuel overflows, check needle valve seat for wear. Replace, if necessary.	Be careful clogged carburetor.
Too much resistance in starting	Piston or Connecting Rod seized	1) If piston seizes, correct or replace. 2) If connecting rod large end or small end seize, replace.	1) Do not use poor grade oil. 2) Use fuel of proper mixing ratio.

7-2 OVERHEATING

- 1) If too much carbon deposits in the combustion chamber, remove it.
- 2) If the heat range of the spark plug is too cool, replace it with correct one (NGK BM7A).
- 3) If the air-fuel mixture is too lean, clean the air cleaner.
- 4) If the load is in excess, reduce it below the specified continuous load.

7-3 POWER DROP

- 1) If the cylinder, piston or piston rings are worn, replace them.
- 2) If the carburetor is out of order, re-adjust or clean it.
- 3) If the spark plugs is faulty (contamination, gas leakage or faulty insulation), clean it or replace it.
- 4) If the magneto is faulty, replace it.
- 5) If the air cleaner is clogged, clean it.
- 6) If the fuel system is clogged, clean it.
- 7) If the oil seals at the crankshaft are worn and let the compressed gas through, replace them.

7-4 EXCESSIVE FUEL CONSUMPTION

- 1) If fuel leakage, re-tighten screws or replace.
- 2) If beside these causes, also caused by power drop, perform remedies for power drop, according to 7-3. POWER DROP.

7-5 ENGINE HUNTING

If the fuel-air mixture is too lean. Clean the carburetor.

7-6 OTHER COMPLAINTS

- 1) Fuel overflow from carburetor
If the fuel flows towards the air cleaner or much fuel flows into the crankcase while the engine is standing still (overflowing), the needle valve is faulty. Correct or replace it.
- 2) If the engine suddenly stops with abnormal noise, the piston or the cranksahft and connecting rod assembly is seized. Correct them or replace them.
- 3) If the engine produces abnormal noise during operation, be sure to stop the engine and do not start it again before the cause is found.

If the cause for the trouble is not found, contact our distributor and entrust the engine in the hand of our service engineer.

8. CHECKS and CORRECTIONS

After disassembling and cleaning the engine parts, check them, and if necessary, correct them according to the correction table. The correction table applies whenever engine are repaired. Its contents should be thoroughly understood by those who undertake the repairing. Its specifications must be abided by to effect correct maintenance.

Below, terms employed in the correction table as explained.

1) CORRECTION

All operations performed on the engine parts for the purpose of improving or recovering the engine performance, consisting of repairs, readjustments, and replacements.

2) STANDARD SIZE

The design dimensions of the part without the tolerance.

3) CORRECTION TOLERANCE

The tolerance on the re-finished part dimension or on the readjusted dimension.

4) CORRECTION LIMIT

The limit on the part and adjustment, beyond which any dimensional and functional changes, due to wear, burn, and other causes will adversely affect the normal engine performance.

5) USE LIMIT

The limit, beyond which the part is no longer usable, due to defects in function or strength.

NOTE: All dimensions in the "CORRECTION TABLE" are given in millimeter, except where otherwise specified.

	ITEM	kg-cm	ft-lb	TOOL
Specified Tightening Torque	Ignition coil	40 ~ 50	2.9 ~ 3.6	Torque Wrench
	Carburetor & heat block	40 ~ 50	2.9 ~ 3.6	
	Crankcase	40 ~ 50	2.9 ~ 3.6	
	Cylinder	40 ~ 50	2.9 ~ 3.6	
	Flywheel	120 ~ 140	8.6 ~ 10.1	
	Spark plug	150 ~ 200	10.8 ~ 14.4	
	Muffler	40 ~ 50	2.9 ~ 3.6	

9. TABLE OF CORRECTION STANDARDS

ITEM		STANDARD SIZE	CORRECTION LIMIT	REMARKS	TOOL	CORRECTION METHOD
Piston & Cylinder	Clearance between cylinder & piston	0.015L – 0.046L	0.08L			Replace
	Cylinder bore	28.0 dia	28.0 dia +0.02	at middle portion	Cylinder gauge	Replace
	Piston O.D.	27.99 dia	27.99 dia –0.04	at middle portion	Micrometer	Replace
	Side clearance of piston ring	0.04L – 0.11L	0.15L		Feeler gauge	Replace
	Width of ring groove	1.6	1.6 +0.08	Max. width of ring groove	Block gauge	Replace
	Ring width	1.6	1.6 –0.05	Min. ring width	Micrometer	Replace
	Ring gap	0.1 – 0.3	0.4		Feeler gauge	Replace
	Clearance between piston & piston pin	0.004T – 0.011L	0.03L			Replace
	Piston pin hole	8 dia	8 dia +0.02	Max. inner dia	Cylinder gauge	Replace
	Piston pin O.D.	8 dia	8 dia –0.01	Min. outer dia	Micrometer	Replace
Crankshaft & Connecting Rod	Side clearance of Connecting rod large end	0.1L – 0.5L	0.7L		Feeler gauge	Replace
	Run-out of crankshaft	0.05	0.1	Supporting assembled crankshaft between centers, measure journal where is 5 mm from crankcase	Dial gauge	Correct
	Axial clearance of crankshaft journal	0.05 – 0.6	0.8		Dial gauge	Replace
	Tightness of main bearing outer dia	0.014T – 0.036T	0			Replace
	Housing inner dia	28 dia	28 dia –0.004		Cylinder gauge	Replace
	Bearing O.D.	28 dia	28 dia –0.01		Micrometer	Replace
	Clearance of main bearing I.D.	0.002T – 0.014L	0.02L			Replace
	Bearing inner dia	12 dia	12 dia +0.003		Cylinder gauge	Replace
	Crankshaft O.D. dia	12 dia	12 dia –0.017		Dial gauge	Replace
	Connecting rod small end I.D.	8 dia	8 dia +0.018			
Electric Equipment	Air gap	0.5	±0.1		Feeler gauge Thickness gauge	Adjust
	Spark plug gap	0.6 – 0.7	±0.1		Feeler gauge	Adjust

10. MAINTENANCE and STORING

The following maintenance jobs apply when the engine is operated correctly under normal conditions. The indicated maintenance intervals are by no means guarantees for maintenance free operations during these intervals. For example, if the engine is operated in extremely dusty conditions, the air cleaner should be cleaned every day, instead of every 50 hours.

10-1 DAILY CHECKS and MAINTENANCE

- 1) Remove dust from whatever which accumulated dust.
- 2) Check external fuel leakage. If any, retighten or replace.
- 3) Check screw tightening. If any loose one is found, retighten.

10-2 EVERY 50 HOURS CHECKS and MAINTENANCE

- 1) Check spark plug. If contaminated, wash in gasoline or polish with emery paper.
- 2) Clean air cleaner.

10-3 EVERY 150 HOURS CHECKS and MAINTENANCE

- 1) Clean fuel strainer and fuel tank.
- 2) Clean contact breaker point.
- 3) Clean exhaust port of cylinder and both inlet and outlet of muffler.

10-4 YEARLY CHECK and MAINTENANCE

- 1) Remove carbon from cylinder head and piston head.
- 2) Clean fuel tank inside.
- 3) Clean carburetor diaphragm chamber inside.
- 4) Replace fuel line once a year.

10-5 PREPARATION for LONG ABEYANCE

- 1) Perform the above 10-1 and 10-2 maintenance jobs.
- 2) Drain fuel from the fuel tank and carburetor float chamber. (In case type R with diaphragm carburetor, run the engine until it stops from lack of fuel.)
- 3) Remove spark plug, and apply 5 to 10 cc of lubricating oil through the spark plug hole. Perform idle operation several times by pulling the recoil starter handle slowly. Reinstall the spark plug.
- 4) Clean the engine outside with oiled cloth.
- 5) Put a vinyl or other cover over the engine and store the engine in dry place.



Robin Engine





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