

# ENYA

## 90-4C (Ring) 4 stroke cycle engine

### OPERATING

### INSTRUCTION

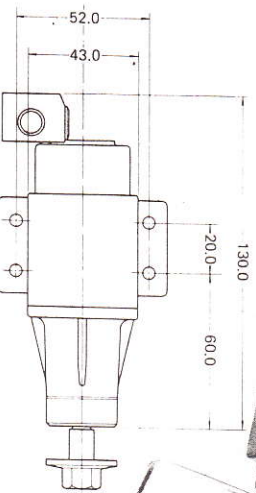
#### \*DISTINCTIVE FEATURES

1. Suitable for model R/C scale, sport and aerobatic planes
2. High torque and power, nice speed controlling
3. Sturdy and dependable construction
4. Easy handling

#### \*TECHNICAL DATA

\*Type: 4 stroke cycle, glow plug ignition, with overhead valves driven by push rods and twin camshafts.

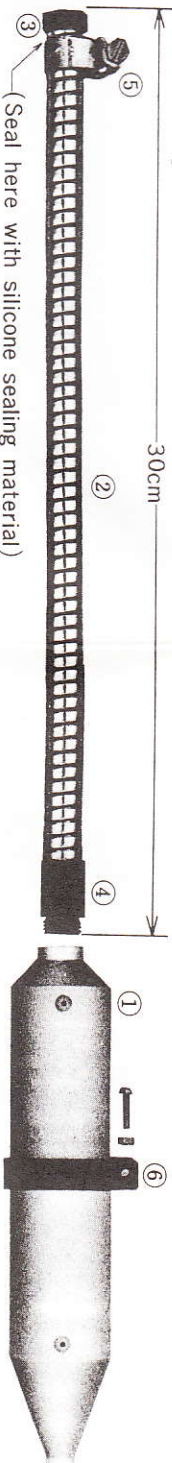
	ENYA 90-4C
Cylinder bore x stroke	mm 29.0 x 22.6
Cylinder displacement	cc 14.93
Weight	g 795 (815 with muffler)
Max. power	HP 1.3/11,500 r.p.m.
Practical speed range	r.p.m. 7,000 ~ 11,500
Idling speed	r.p.m. 2,500 ~ 3,000
Critical speed	r.p.m. 12,500
Carburetor	ENYA G type 8.0mm with detachable 7.0mm venturi
Cylinder liner and piston	steel liner, ringed Al. piston
Size of propeller	in. 16~14x6, 13~11.5x7~9
Glow plug	ENYA No. 3, No.4
Suitable weight of plane	kg 3.5 ~ 6.5



#### \*OPTIONAL SPECIAL MUFFLER WITH FLEXIBLE TUBE

Soft noise, minimum power loss

30cm



(Seal here with silicone sealing material)

(Weight 140g)

## ✿ SPECIAL ATTENTION

1. In general, model engine is very powerful and runs at very high speed. Never handle it carelessly. "Safety first" is most important in all respects when you run model engine.
2. Before you run your engine, take care of the following points.
  - Tighten the engine mounting screws and propeller nut once again.
  - Make sure that there are nobody near around (except your assistant).
  - When you fly your plane, or run your boat, it is most important to confirm that your radio control equipment works well. If you find a defective point on it, stop to fly your plane, and repair it perfectly.

## ✿ FUEL

To obtain good results with ENYA 90-4C, it is recommended to use high quality fuel for glow plug engine which contains 5 ~ 15% of nitromethane.

STANDARD VOLUMETRIC RATIO OF FUEL COMPONENTS	
Castor oil or high quality synthetic oil	15 ~ 20%
Nitro-methane	5 ~ 15%
Methyl-alcohol	80 ~ 65%

## ✿ GLOW PLUG

ENYA glow plug No. 3 and No. 4 is the best for 90-4C.

## ✿ PROPELLER

At first choose a well balanced 15 x 6 or 13 x 7 propeller of high quality for your 90-4C. You can get smooth running and good idling with the propellers made of glass fibre as they perform as an adequate fly-wheel. When you use a wooden propeller of rather light weight, it is recommended to use a spinner as fly-wheel. It is important to screw up the prop. nut tightly.

## ✿ FUEL TANK

The fuel consumption is about 20 ~ 25cc per minute. Then, about 360cc fuel tank is recommended for usual flight. To make the engine start easy, set the fuel tank at nearly same level as the carburetor.

## ✿ PREPARATIONS BEFORE STARTING

1. Connect a piece of vinyl pipe of about 10 cm length on the breather-nipple, to lead the excess oil in the crank-case out of the fuselage.

## ✿ STARTING AND RUNNING

2. Attach the muffler tightly, and set the engine on the test stand or plane securely. Usually it is needless to pressurize the fuel tank.
  3. Set the glow plug and propeller tightly. Choose the best setting angle of propeller at the compression stroke to flip it with your finger.
1. Fill the fuel tank with fuel, and open the throttle valve fully, and needle valve 6 ~ 7 turns. Then, close the choke valve and turn the propeller counter-clockwise 2 ~ 3 turns until a small amount of fuel is sucked into the cylinder. After priming, open the choke valve again. Another method of priming is to inject several drops of fuel into the muffler and turn the propeller clockwise 2 ~ 3 turns.
  2. After priming the engine, flip the propeller 2 ~ 3 turns and be sure that the priming is normal. When the priming quantity is too much, the compression becomes very high, and you cannot start the engine. In such case, turn the propeller counter-clockwise slowly until the excess fuel leaks out of the combustion chamber and the compression becomes normal.
  3. Connect the battery to glow plug and flip the propeller counter-clockwise smartly at the compression stroke. In case of 4 stroke cycle model engine, the clockwise flipping is also very effective for starting. It is recommended to try the both methods.
  4. When the priming and other conditions are proper, the engine starts easily.
  4. After your engine starts, open the throttle valve fully, and adjust the needle valve slowly to the best running position. But it is very important to run the engine always with a slightly rich mixture to get the best performance.
  5. Close the throttle valve slowly and check the idling. The reasonable idling speed of 90-4C is 2,700 ~ 3,000 r.p.m.. Usually, 90-4C prefers rather rich mixture at idling. Control the idling mixture with the idling mixture adjusting screw. When you want richer mixture, close this screw 1/2 or 1 turn at one time, seeing the result carefully.
  6. Try hi-lo and lo-hi operation several times, and make sure that the engine has no tendency to stop.
  7. In the medium speed range between full throttle and idling, the engine runs steadily with the slightly rich mixture fed by the G type carburetor.
  8. You can start ENYA 90-4C most easily by an electric starter. But, do not use it when the engine is over primed.

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## \* BREAK IN

Break in your 90-4C about 1/2 hour. During this period the engine running is sometimes unsmooth and unsteady. But as you continue the breaking in, the engine running will become smoother and more powerful. Usually, it will take 1 ~ 2 hours for the engine to reach its peak in power and smoothness.

## \* ADJUSTMENT OF THE VALVE CLEARANCES

The normal valve clearances of ENYA 90-4C are 0.05 ~ 0.10 mm when the engine is cold. It is recommended to make the first adjustment of valve clearances after first 1/2 ~ 1 hour of running with the special wrench and driver enclosed in the box. And it is also recommended to check the clearances sometimes after every 2 ~ 3 hours of running. It is important that the adjustment is to be made when the engine is cold. (The valve clearances become wider when the engine is hot because of the expansion of cylinder block.)

## \* MATTERS THAT DEMANDS SPECIAL ATTENTION

1. The disassembling and assembling of ENYA 90-4C is not so difficult. But do it carefully.
2. When you assemble the timing gear box, put the piston at the top dead center, and then combine the notches of gear shafts and the marks of cam shafts as shown in the sketch.

The standard timing of valves are as follows:

Inlet valve	open	20° B.T.D.C.
"	close	60° A.B.D.C.
Exhaust valve	open	60° B.B.D.C.
"	close	20° A.T.D.C.

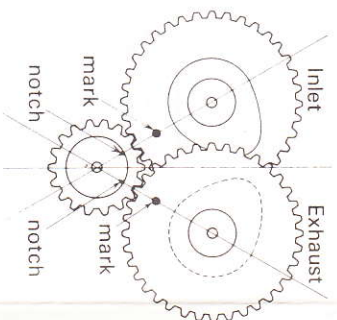
3. When you assemble the engine, proper lubrications on all the parts are recommended.

## \* CYLINDER HEAD GASKET AND VENTURI INSERT

In case you need higher power for your aerobatic or pattern plane, it is recommended to detach the aluminum cylinder head gasket and the venturi insert in the throttle valve. You will be able to get about 10% more power at the higher r.p.m. range of 10,000 ~ 11,500 with a smaller size propeller. (13"x7", 12"x8" etc.). In this case, the fuel containing 10 ~ 20% nitro-methane is very effective and usually it is needless to pressurize the fuel tank.

## \* MAINTENANCE

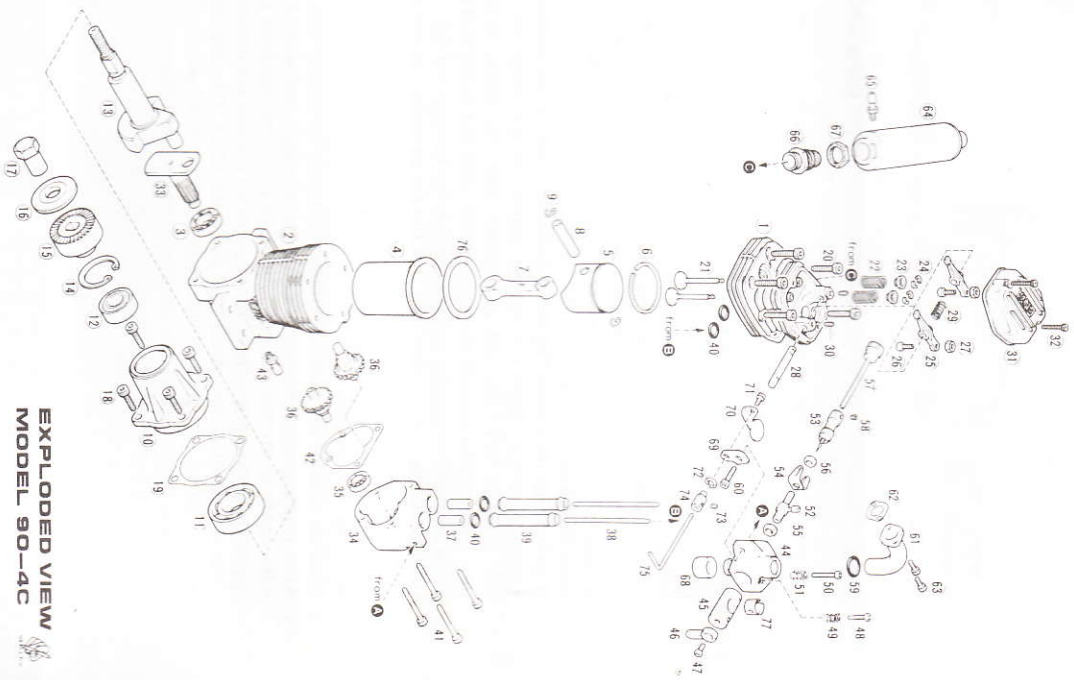
1. Supply a small amount of oil sometimes around the valves and lockers.
2. Do not screw up the cylinder head of 90-4C too tightly to avoid the deformation of cylinder liner.
3. It is usually needless to supply any oil to the inner mechanism, because the oil contained in fuel lubricates all of the inner parts.



The following figure shows the correct positions of timing gears when the piston is at the top dead center.

## \* PARTS LIST \*

No. in drawing	Name of part	Qty.	Part No.
1	Cylinder head	1	904C01
	Crank case (with ball bearing)	1 set	904C03
2	Crank case	1	904C03A
3	Ball bearing	1	11CX03B
	Cylinder liner & piston assembly	1 set	904C04
4	Cylinder liner	1	904C04A
5	Piston	1	904C04B
6	Piston ring	1	904C04C
7	Connecting rod	1	904C05
8	Piston pin	1	904C06
9	Piston pin stop ring	2	60X61
	Front housing (with ball bearings)	1 set	904C07
10	Front housing	1	904C07A
11	Ball bearing A	1	904C07B
12	Ball bearing B	1	604C07C
13	Crank shaft	1	904C08
14	Ball bearing retaining C ring	1	604C62
15	Drive washer	1	904C10
16	Propeller washer	1	904C12
17	Propeller nut	1	904C14
18	Front housing setting screw (4x14)	4	60X15C
19	Gasket of front housing	1	60X16
20	Cylinder head setting screw (4x18)	5	904C15A
21	Inlet & exhaust valve	2	904C71
22	Valve spring	2	904C72
23	Valve spring washer	2	904C73
24	Valve cotter	4	354C74
25	Valve locker arm	2	904C75
26	Valve locker screw	2	354C76
27	Valve locker screw locking nut	2	354C77
28	Locker shaft	1	904C78
29	Locker arm spacing spring	1	904C79
30	Locker shaft setting hollow screw (3x5)	2	904C63
31	Cylinder head cover	1	904C65
32	Cylinder head cover setting screw (2.6x15)	2	904C66
33	Timing gear shaft	1	904C81
	Timing gear box (with ball bearing)	1 set	904C82
34	Timing gear box	1	904C82A
35	Gear box bearing	1	904C82B
36	Inlet & exhaust cam shaft	2	904C84
37	Tapet	2	604C86
38	Push rod	2	904C87
39	Push rod tube	2	604C68
40	O ring for push rod tube (P-6)	4	354C40M
41	Gear box setting screw (3x25)	4	904C89
42	Gasket of gear box	1	904C90
43	Breathing nipple	1	604C92
	Carburetor assembly	1 set	904C40
44	Carburetor body	1	904C40A
45	Throttle valve	1	904C40B
46	Throttle lever	1	354C40C
47	Throttle lever setting screw (3x12)	1	45B15A



EXPLODED VIEW  
MODEL 90-4C

48	Idling speed adjusting screw	1	19X40H
49	Spring	1	603301
50	Idling mixture adjusting screw (3X17)	1	604C40J
51	Spring	1	60230K
52	Needle valve assembly	1 set	904C40F
53	Spray bar	1	904C40F2
54	Needle	1	604C40F1
55	Needle stop spring	1	15220C
56	Spray bar locking nut	1	29440F4
57	4mm nut	1	09230F5
58	Needle extension	1	904C69
59	Needle extension setting screw (3x3)	1	604C63
60	O ring (P-9)	1	904C40M
61	Carburetor setting screw (3X12)	1	21CX15AC
62	Inlet manifold	1	904C41
63	Gasket of inlet manifold	1	904C42
64	Inlet manifold setting screw (2.6x6)	2	11CX15A
65	Exhaust muffler unit	1 set	M904C
66	Muffler body	1	904C98
67	Pressure nipple	1	093W03C
68	Muffler adapter	1	904C45
69	Locking nut	1	904C46
70	Choke valve assembly	1 set	904C93
71	Lip seal	1	604C94
72	Choke valve stay	1	604C95
73	Choke valve	1	11CX15A
74	Choke valve setting screw (2.6x6)	1	60X30LA
75	Spring washer 4mm	1	604C63
76	Choke lever setting screw (3x3)	1	604C96
77	Choke valve hinge pin	1	904C97
	Choke lever	1	904C99
	Gasket of cylinder head	1	904C40L
	Venturi insert (7.0mmφ)	1	

#### OPTIONAL SPECIAL MUFFLER

Photo. 1	Special muffler assembly	1 set	SM904C
2	Special muffler body	1	904C47
3	Flexible tube unit	1 set	904C48
4	Flexible tube	1	904C48A
5	Joint to engine	1	904C48B
6	Joint to muffler body	1	904C48C
	Flexible tube cramp	1	904C48D
	Muffler body setting band	1	TM19D1
	Screw	1	TM19D2
	Nut	1	TM19D3

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