

# **OPERATING INSTRUCTIONS FOR ENYA ENGINES**

## **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.

## **BREAKING IN**

To obtain the highest performance, smooth running, and long life from your ENYA engine, it is recommended to break it in carefully during first 1 or 2 hours.

It is important to run the engine with slightly rich mixture during the breaking in period. When the engine has a tendency to slow down or stop, it means that it is not yet fully broken in.

It may take about 2 ~ 4 hours running for the engine to reach its peak in power and smoothness.

## **FUEL**

ENYA engines will operate satisfactorily on most kinds of high quality fuel for model engines sold on the market. The standard mixing ratios of components are as follows.

STANDARD VOLUMETRIC RATIO OF FUEL COMPONENTS					
	Glow plug engine			Diesel engine	
	No. 1	No. 2	No. 3	Amyl nitrate	1 ~ 3%
Methyl alcohol	80%	75%	70 ~ 60%	Kerosene	37 ~ 36%
Nitro methane	0	5%	10 ~ 20%	Ethyl ether	37 ~ 36%
Castor oil	20%	20%	20%	Castor oil	25%

## **GLOW PLUG**

Almost all 1/4 ~ 32 thread glow plugs are suitable for ENYA Glow Engines. But as the glow plug has a very delicate nature, it is recommended that you test your engine with different kinds of glow plug to get the best performance.

ENYA glow plugs are very suitable to ENYA Engines.

## **PREPARATIONS BEFORE STARTING THE ENGINE**

1. Mount your engine securely on the test stand or plane.
2. Clean the fuel tank and line. Dirts in them sometimes cause troubles.
3. Set the fuel tank closely behind the engine in such a position that the height of the fuel surface is nearly equal to the height of the carburetor.
4. Test your battery to be sure that it can heat the glow plug satisfactorily.
5. Attach the glow plug and propeller to the engine securely.

## **STARTING THE ENGINE**

An ENYA Engine starts quite easily with proper handling.

1. Close the needle valve, and fill the fuel tank with fuel.
2. Open the needle valve as follows.  
ENYA 09, 15, 19: 1½ ~ 2½ turns.  
ENYA 049, 06, 06-II, 06D-II, 08, 10, 29, 35, 45, 60: 2 ~ 3 turns.  
Inject several drops of fuel both in the air intake and the exhaust port, and crank the engine 2 or 3 turns.  
In case the carburetor is too high compared with the fuel surface, or the fuel line is too long, it is necessary to choke the engine by holding your finger on the air intake port.
3. Connect one lead from the battery to the glow plug and the other lead to ground.
4. Crank the engine counter-clockwise quickly by flipping the propeller with your finger until it begins to pop and starts.  
When the quantity of the fuel injected is proper and the glow plug is heated sufficiently, the engine will start with one or two smart flippings.
5. After your engine starts, it will be running slowly due to the rich mixture. Adjust the needle valve carefully to the best running position. It is recommended that you run your engine with a slightly rich mixture while it is new, and not broken in.
6. When the speed of the engine becomes pretty fast, remove the battery connection from the glow plug.
7. Close the needle valve when you want to stop the engine.

ENYA Diesel Engines also start very easily, but read the instructions for them before you begin to handle them.

## **ENYA THROTTLE VALVE (CARBURETOR)**

ENYA throttle valves are especially designed and produced for radio control planes, cars and boats. You can get a very wide speed range with them. There are several types in design.

### **I. ENYA throttle valve normal**

This type has a simply designed throttle drum and idling mixture adjusting air valve. Easy to adjust.

ENYA 09-IV, 09-IV BB, 15-IV, 19-VI 19-VIBB, 29-V (option), 29-V BB (option), 35-V (option), 35-V BB (option), 40,45-II.

### **II. ENYA G type throttle valve**

This type has a precisely machined fuel metering groove on the surface of the throttle drum to feed the engine always with slightly rich mixture from the idling to medium speed. And also the fuel suction is reasonably strong at this speed range. Idling mixture adjusting air valve is equipped for the fine adjustment of idling. The mixture control at full throttle is made by the adjustment of main needle valve.

ENYA 049-II, 06-II, 08, 10, 11CX, 19X, 21X, 21CX, 25X, 29-V, 29-V BB, 35-V, 35-V BB, 35-4C, 40X, 45X, 40CX, 45CX, 49X, 60-III B, 60XF-II.

### **III. ENYA GM type throttle valve**

This carburetor is a highly modified model of G type. Read the special instruction for it.

ENYA 49X Helicopter, 60XF-III, 60XF-II Ring (Heli.).

## **VENTURI INSERT**

ENYA 15-IV, 29-V, 35-V, 45-II, 40 and 60-III B for C/L planes have 2 kinds of venturi inserts of different diameters. Select the one suitable to your use.

Small dia. venturi: Fuel suction is strong. Suitable for U control stunt planes.  
Fuel consumption is small.

Large dia. venturi: Power is strong. Suitable for speed and free flight racing planes.

# OPERATING INSTRUCTIONS FOR ENYA ENGINES

## ● BREAKING IN

To obtain the highest performance, smooth running, and long life from your ENYA Engine, it is recommended that you break it in carefully.

Breaking in period	ENYA049, 06-II, 06D-II, 08, 10, 09-III, 15-IV, 19-VI, 60-III B, 45-II, 40, 60X, 40X, 19X	1/2 ~ 1 hour
	ENYA29-IVB, 35-III B,	1 ~ 1 1/2 hour

Proper sizes of propellers to break ENYA engines in. dia. x pitch. in.										
ENYA 049	ENYA 06-II	ENYA 06D-II, 08	ENYA 09-III, 10	ENYA 15-IV		ENYA 19	ENYA 29-IVB	ENYA 35-III B	ENYA 40, 45	ENYA 60
6 x 3	7 x 3 ~ 4	8 x 3 ~ 4	8 x 3	9 x 3		9 x 4	10 x 5	10 x 5	11 x 5	12 x 5

It is important to run the engine with slightly rich mixture during the breaking in period. When the engine has a tendency to slow down or stop, it means that it is not yet fully broken in.

It may take about 2~4 hours running for the engine to reach its peak in power and smoothness.

## ● FUEL

ENYA engines will operate satisfactorily on most kinds of high quality fuel for model engines sold on the market. The standard mixing ratios of components are as follows.

STANDARD VOLUMETRIC RATIO OF FUEL COMPONENTS					
Glow plug engine			Diesel engine		
	No. 1	No. 2	No. 3	Amyl nitrate	1 ~ 3%
Methyl alcohol	80%	75%	70 ~ 60%	Kerosene	37 ~ 36%
Nitro methane	0	5%	10 ~ 20%	Ethyl ether	37 ~ 36%
Castor oil	20%	20%	20%	Castor oil	25%

The idling performance of the ENYA T. V. type Engine is sometimes influenced by the fuel, and it is recommended to try different kinds of fuel to get the best idling performance.

## ● GLOW PLUG

Almost all 1/4~32 thread glow plugs are suitable for ENYA Glow Engines. But as the glow plug has a very delicate nature, it is recommended that you test your engine with different kinds of glow plug to get the best performance.

ENYA glow plugs are very suitable to ENYA Engines.

## ● PREPARATIONS BEFORE STARTING THE ENGINE

1. Mount your engine securely on the test stand or plane.
2. Clean the fuel tank and line. Dirts in them sometimes causes troubles.
3. Set the fuel tank closely behind the engine in such a position that the height of the fuel surface is nearly equal to the height of the carburetor.
4. Test your battery to be sure that it can heat the glow plug satisfactorily.
5. Attach the glow plug and propeller to the engine securely.

## ● STARTING THE ENGINE

An ENYA Engine starts quite easily with proper handling.

1. Close the needle valve, and fill the fuel tank with fuel.
2. Open the needle valve as follows.  
ENYA 09, 15, 19: 1 1/2~2 1/2 turns.  
ENYA 049, 06, 06-II, 06D-II, 08, 10, 29, 35, 45, 60: 2~3 turns.  
Inject several drops of fuel both in the air intake and the exhaust port, and crank the engine 2 or 3 turns.

## SPECIFICATIONS OF ENYA ENGINES

	Type	Main bearing	Bore x Stroke	Displacement	Weight oz.		Compression ratio
			in.	cu. in.	Standard	T.V. type	
ENYA 049-II	Glow Shaft rotary valve	Light alloy	0.413 x 0.370	0.049(0.8 c.c.)	2.0	2.2	8 : 1
ENYA 06-II	Glow Shaft rotary valve	Light alloy	0.437 x 0.405	0.061(0.99c.c.)	2.9	3.1	8 : 1
ENYA 06D-II	Diesel Shaft rotary valve	Light alloy	0.437 x 0.405	0.061(0.99c.c.)	3.2	3.4	Variable
ENYA 08	Glow Shaft rotary valve	Light alloy	0.476 x 0.480	0.086(1.4 c.c.)	3.0	3.2	8 : 1
ENYA 10	Glow Shaft rotary valve	Light alloy	0.516 x 0.480	0.101(1.64c.c.)	3.0	3.2	8.0 : 1
ENYA 09-III	Glow Shaft rotary valve	Bronze	0.512 x 0.480	0.099(1.62c.c.)	3.4	4.1	7.5 : 1
ENYA 15-IV	Glow Shaft rotary valve	Bronze	0.590 x 0.551	0.15 (2.47c.c.)	5.3	5.7	7.5 : 1
ENYA 19-VI	Glow Shaft rotary valve	Bronze	0.654 x 0.590	0.198(3.25c.c.)	5.3	5.7	7.5 : 1
ENYA 19-VI B	Glow Shaft rotary valve	2 ball bearings	0.654 x 0.590	0.198(3.25c.c.)	5.9	6.3	8.5 : 1
ENYA 19X	Glow Shaft rotary valve	2 ball bearings	0.654 x 0.590	0.198(3.25c.c.)	-	8.5	low 9 : 1 high 10.5 : 1
ENYA 29-IVB	Glow Shaft rotary valve	Bronze	0.736 x 0.704	0.299(4.91c.c.)	7.7	8.6	low 7.5 : 1 high 9.0 : 1
ENYA 29-IV Special	Glow Shaft rotary valve	2 ball bearings	0.736 x 0.704	0.299(4.91c.c.)	8.6	9.1	low 7.5 : 1 high 9.5 : 1
ENYA 35-III B	Glow Shaft rotary valve	Bronze	0.803 x 0.704	0.357(5.85c.c.)	7.7	8.6	low 7.5 : 1 high 9.0 : 1
ENYA 35-III Special	Glow Shaft rotary valve	2 ball bearings	0.803 x 0.704	0.357(5.85c.c.)	8.6	9.1	low 7.5 : 1 high 9.5 : 1
ENYA 40	Glow Shaft rotary valve	2 ball bearings	0.823 x 0.748	0.398(6.52c.c.)	9.8	10.5	10.0 : 1
ENYA 40X	Glow Shaft rotary valve	2 ball bearings	0.823 x 0.744	0.396(6.48c.c.)	-	12.5	11.0 : 1
ENYA 45-II	Glow Shaft rotary valve	2 ball bearings	0.878 x 0.748	0.452(7.42c.c.)	9.8	10.5	9.0 : 1
ENYA 60-III B	Glow Shaft rotary valve	2 ball bearings	0.944 x 0.865	0.606(9.95c.c.)	13.7	15.0	10.0 : 1
ENYA 60-III B TVG-8	Glow Shaft rotary valve	2 ball bearings	0.944 x 0.865	0.606(9.95c.c.)	-	15.0	10.0 : 1
ENYA 60XF TV AL-CHROME	Glow Shaft rotary valve	2 ball bearings	0.944 x 0.865	0.606(9.95c.c.)	-	16.6	10.5 : 1

In case the carburetor is too high compared with the fuel surface, or the fuel line is too long, it is necessary to choke the engine by holding your finger on the air intake port.

3. Connect one lead from the battery to the glow plug and the other lead to ground.
4. Crank the engine counter-clockwise quickly by flipping the propeller with your finger until it begins to pop and starts.

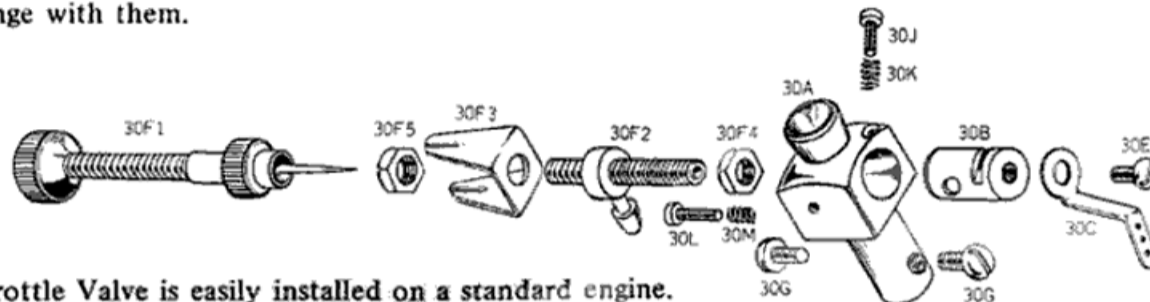
When the quantity of the fuel injected is proper and the glow plug is heated sufficiently, the engine will start with one or two smart flippings.

5. After your engine starts, it will be running slowly due to the rich mixture. Adjust the needle valve carefully to the best running position. It is recommended that you run your engine with a slightly rich mixture while it is new, and not broken in.
6. When the speed of the engine becomes pretty fast, remove the battery connection from the glow plug.
7. Close the needle valve when you want to stop the engine.

ENYA Diesel Engines also start very easily, but read the instructions for them before you begin to handle them.

### ● ENYA THROTTLE VALVE

ENYA Throttle Valves are especially designed and produced for radio control planes and boats. You can get a very wide speed range with them.



An ENYA Throttle Valve is easily installed on a standard engine.

As for ENYA 60-III B T.V. read the special instruction.

### ● VENTURI INSERT

ENYA 15-IV, 29-IV B, 35-III B, 45-II, 40 and 60-III B have 2 or 3 kinds of venturi inserts of different diameters. Select the one suitable to your use.

Small dia. venturi: Fuel suction is strong. Suitable for U control stunt planes.  
Fuel consumption is small.

Large dia. venturi: Power is strong. Suitable for speed and free flight racing planes.

### ● CYLINDER HEAD

ENYA-29 IV B and 35-III B are especially provided with 2 kinds of cylinder head; low compression one and high compression one. And you can choose the better compression ratio of your engine according to your use.

Low compression cylinder head: Engine running is smooth and handling is easy. Power is moderate.  
Suitable for breaking in, U control stunt, sport, and R/C planes.

High compression cylinder head: The power is much stronger especially at high speed.  
Suitable for U control speed, combat, team race and all other racing planes.

It is recommended that you avoid to use the high compression head until the engine is fully broken in.

### ● CYLINDER HEAD AND VENTURI INSTALLATION

1. Remove one of the head screws. Consider this screw the 12 o'clock position. Next remove the head screws at the 6, 2, 8, 4 and 10 o'clock positions in that order. The reverse procedure is followed when installing a cylinder head.
2. First remove the spray bar nut and needle setting spring. Then pull the spray bar out and remove Venturi. When installing a Venturi, have the spray bar fuel intake on the exhaust port side of the engine.

	Max. power H.P.		R.P.M.		Proper size of propeller dia. x pitch. in.		
	Standard	T.V. type	Standard	T.V. type	U control stunt	Free flight	R/C
ENYA 049-II	0.08	0.07	9.000 ~ 16.000	2.500 ~ 16.000	5½ ~ 6 x 3	6 x 3	6 x 3
ENYA 06-II	0.12	0.10	9.000 ~ 16.000	2.500 ~ 13.000	6 ~ 7 x 4 ~ 3	6 ~ 7 x 4 ~ 3	6 ~ 7 x 4 ~ 3
ENYA 06D-II	0.16	0.13	9.000 ~ 16.000	2.500 ~ 13.000	7 ~ 8 x 4 ~ 3	7 ~ 8 x 4 ~ 3	7 ~ 8 x 4 ~ 3
ENYA 08	0.20	0.16	9.000 ~ 16.000	2.500 ~ 13.000	7 ~ 8 x 5 ~ 4	7 ~ 8 x 4 ~ 3	7 ~ 8 x 5 ~ 4
ENYA 10	0.22	0.18	9.000 ~ 16.000	2.500 ~ 13.000	7 ~ 9 x 5 ~ 3	7 ~ 9 x 5 ~ 3	7 ~ 9 x 5 ~ 3
ENYA 09-III	0.20	0.16	8.000 ~ 16.000	2.500 ~ 13.000	7 ~ 8 x 6 ~ 4	7 ~ 8 x 4 ~ 3	7 ~ 8 x 5 ~ 3
ENYA 15-IV	0.33	0.28	8.000 ~ 16.000	2.500 ~ 14.000	8 x 6 ~ 5	8 x 4	8 ~ 9 x 5 ~ 4
ENYA 19-VI	0.42	0.36	8.000 ~ 16.000	2.500 ~ 14.000	8 ~ 9 x 6 ~ 5	9 x 4	8 ~ 9 x 6 ~ 4
ENYA 19-VIBB	0.46	0.40	8.000 ~ 18.000	2.500 ~ 16.000	8 ~ 9 x 6 ~ 5	9 x 4	8 ~ 9 x 6 ~ 4
ENYA 19X	-	0.55	-	2.500 ~ 19.000	-	-	8 ~ 9 x 6 ~ 4
ENYA 29-IV B	0.80	0.50	9.000 ~ 17.000	2.500 ~ 13.000	9 ~ 10 x 7 ~ 5	10 ~ 11 x 5 ~ 3	9 ~ 10 x 6 ~ 5
ENYA 29-IV Special	0.85	0.55	10.000 ~ 18.000	2.500 ~ 13.000	9 ~ 10 x 7 ~ 5	10 ~ 11 x 5 ~ 3	9 ~ 10 x 6 ~ 5
ENYA 35-III B	0.80	0.60	8.000 ~ 16.000	2.500 ~ 13.000	10 x 6	10 ~ 11 x 5 ~ 3	9 ~ 10 x 6 ~ 5
ENYA 35-III Special	0.85	0.65	10.000 ~ 17.000	2.500 ~ 13.000	10 x 6	10 ~ 11 x 5 ~ 3	9 ~ 10 x 6 ~ 5
ENYA 40	1.10	1.00	9.000 ~ 16.000	2.500 ~ 15.000	10 ~ 11 x 6 ~ 5	-	10 ~ 11 x 6 ~ 5
ENYA 40X	-	1.20	-	2.500 ~ 17.000	-	-	10 ~ 11 x 6 ~ 5
ENYA 45-II	1.15	1.05	9.000 ~ 15.000	2.500 ~ 14.000	10 ~ 11 x 7 ~ 5	-	10 ~ 11 x 6 ~ 5
ENYA 60-III B	1.45	1.30	9.000 ~ 14.000	2.500 ~ 13.500	11 ~ 13 x 8 ~ 5	12 ~ 13 x 6 ~ 5	11 ~ 12 x 8 ~ 6
ENYA 60-III B TVG-8	-	1.45	-	2.500 ~ 14.000	-	-	11 ~ 12 x 8 ~ 6
ENYA 60XF TV AL-CHROME	-	1.70	-	2.500 ~ 16.000	-	-	11 ~ 12 x 8 ~ 6