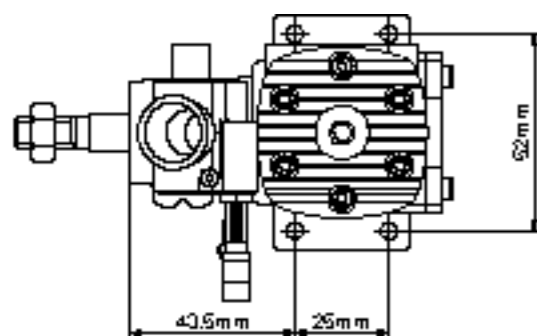


# OPERATOR'S MANUAL

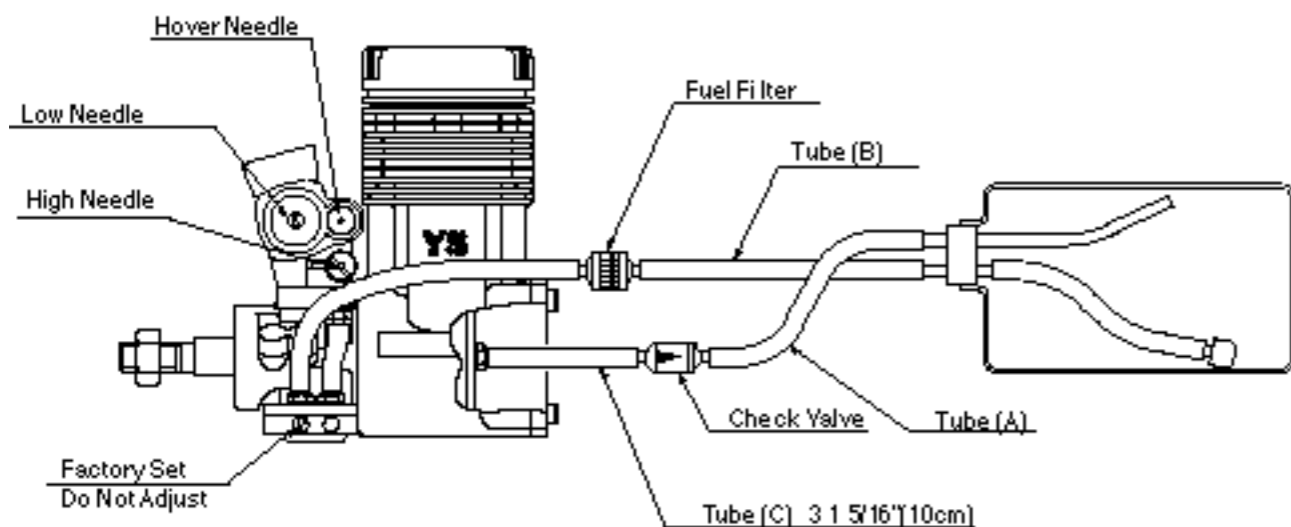
## 91ST (Helicopter Engine/ Part No. YS0059)

Fig.1



### SPECIFICATIONS

Bore	27.7mm
Stroke	24.8mm
Displacement	14.95cc
Weight	540g
Practical rpm	2,000 ~17,000



### FEATURES

- New large bore cylinder design for superior operation.
- New carburetor design for easier adjustments.
- Factory preset fuel regulator.

### CAUTION

Using gear ratios higher than 9.0 to 1 may result in engine damage from overspeed.

### GEAR RATIO

You should be using an engine to main rotor gear ratio of 1-7.5 to 1-8.0. Please check with your helicopter manufacturer to obtain the correct gear ratio.

### INSTALLATION

1. The fuel lines should be connected to the fuel tank as shown in the above figure. Be careful to install the check valve in the correct direction. Since the tank is exposed to high pressures, be sure that all connections are tight to prevent pressures leakage.
2. Since the engine is sensitive to dirt in the fuel, a fuel filter must be used. (We recommend the 6720 fuel filter.)
3. Tube(C) should be set exactly at 3 15/16" or (10cm) between the engine and check valve. DO NOT use any other type of check valve. The check valve is designed exclusively for the 91ST.

4. Adjust your throttle linkage and curve using the alignment indentations on the carburetor body located on the throttle arm side of the carb body. PLEASE NOTE that the hover position is at 40% see FIG 2.

### START UP

1. Always remove Tube(A) at the check valve first before fueling. The fuel tank is pressurized and you need to relieve the pressure first. Disconnect Tube(B) at the filter and fill the tank. Reconnect Tube(A) and (B).
2. From the fully closed (clockwise) position, turn the needle valves counter clockwise as follows.

• Hover	1.75 open	1.75 ~1.50
• Low	1.25 open	0.75 ~0.50
• Full	1.25 open	1.25 ~0.75

3. Close the throttle to the idle position and connect the glow plug driver. The engine is now ready for starting.

### BREAK-IN

It is not necessary to mount this engine on a set stand for break-in. However, the engine should be adjusted slightly on the rich setting for the first few flights to insure proper break-in. Always use a good quality fuel which contain 15 ~30% nitromethane and an oil content of 20 ~23% low viscosity oil.

### NEEDLE VALVE ADJUSTMENT

Idle, Hover and High needle valves all work the same way. Turning the needles clockwise will lean the fuel mixtures and counter clockwise will richen the fuel mixtures.

1. Set needles as described in START-UP.
2. Start the engine and check idle. Adjust as needed.
3. Lift helicopter into a hover and check for the correct rotor RPM recommended by the kit manufacture. Once this is done take note of the amount of smoke being produced by the muffler. The mixture is correct for hover when there is a steady stream of smoke being produced.
4. Land the helicopter for approximately 20~30 second Lift the helicopter into a hover again taking note of the transition from idle to hover. If the engine exhibits a large amount of smoke and the throttle response is sluggish, you will need to adjust the idle and or the hover needle leaner to achieved a smooth transition. If the engine detonates and the smoke is inconsistent or a small amount is produced, the mixture is too lean.
5. The high speed needle refines the fuel mixture for forward flights without affecting the hovering adjustment. After the engine is started and warmed up, lift off into a hover and check that the engine is running smooth with a good trail of smoke. If everything is fine, open the throttle and enter forward flight. Take note of the amount of smoke like we did in a hover adjustment. It is correct when you see a noticeable steady smoke trail. Adjust the high-speed needle valve to obtain slightly rich but consistent setting.

### STOPPING THE ENGINE

1. Fully close the throttle barrel to stop the engine.
2. As soon as the engine stops running, be sure that a fuel line clamp is used in Tube(B) to prevent fuel from flowing into the engine.
3. On the final flight of the day, the fuel line clamp should be used to stop the engine in order to prevent rust and corrosion.

### FUEL AND GLOW PLUG

We have found that the fuel and glow plugs listed below will give the best engine performance.

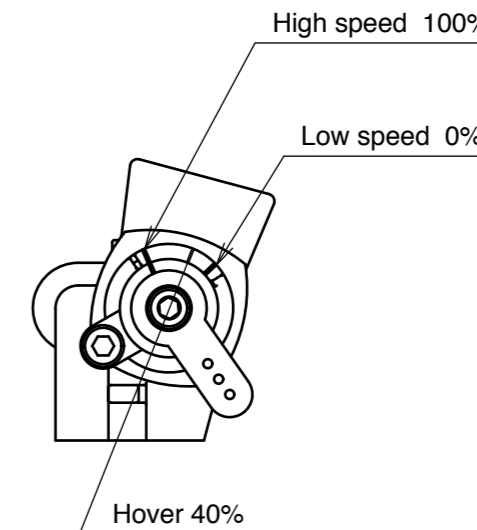
Fuel  
Powermaster 30% Special Heli Blend  
Cool Power 30% Special Heli Blend

Glow Plug \_ YS #2 Enya #3 OS #8

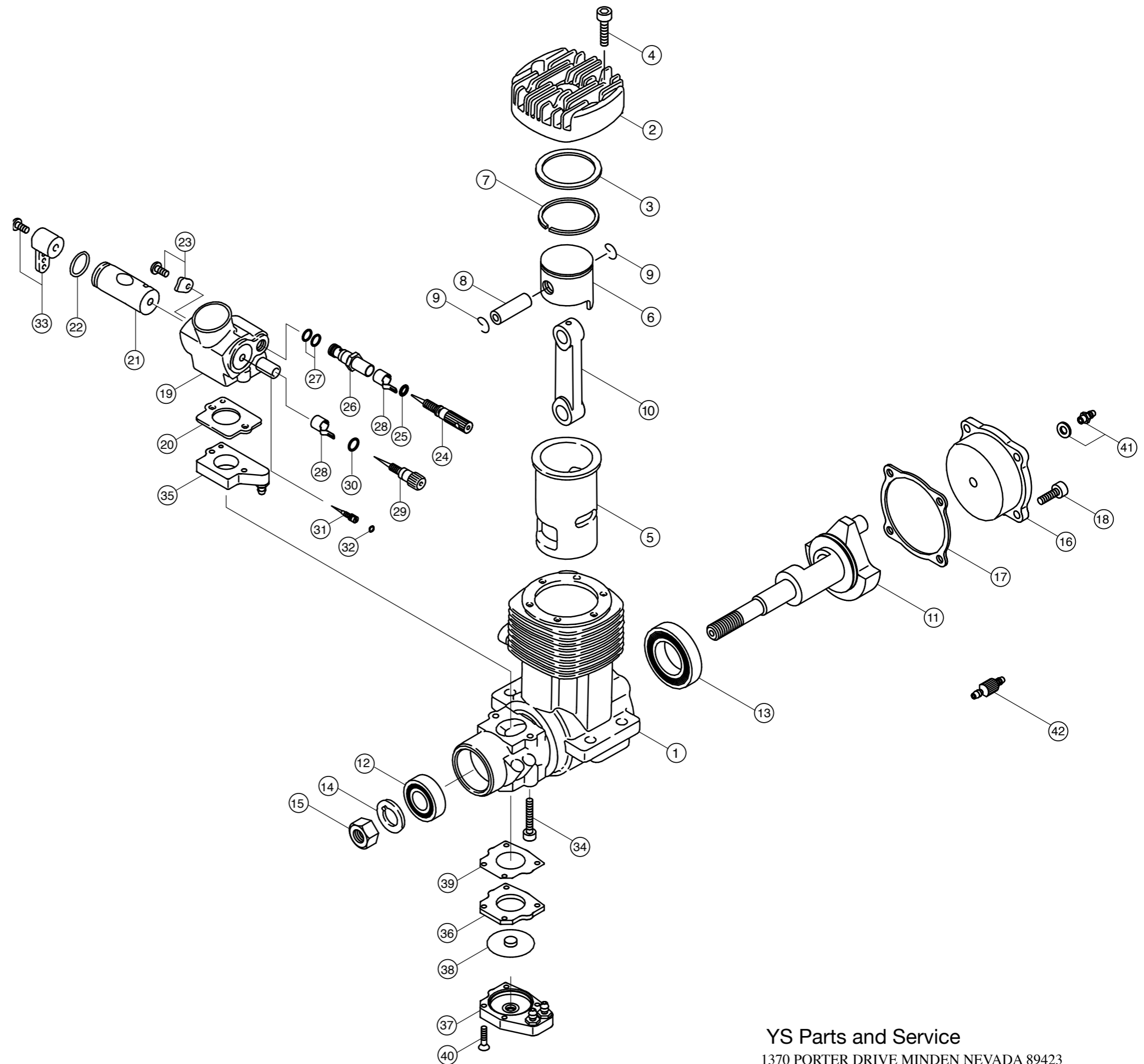
### IMPORTANT!

Silicone rubber is used in many parts of the YS engine. Use only glow fuel of methanol for cleaning. Gasoline and other volatile solutions will damage silicone if used.

Fig.2



NO.	PART#	NAME	QTY
1	YS4770	Crankcase	1
2	YS4775	Cylinder Head	1
3	YS4780	Head Gasket	1
4	YS4785	Head Screws	6
5	YS4790	Cylinder Liner	1
6	YS4795	Piston	1
7	YS4800	Piston Ring	1
8	YS2385	Wrist Pin	1
9	YS4803	Wrist Pin Retainer	2
10	YS4805	Con Rod	1
11	YS4810	Crankshaft	1
12	YS1050	Front Bearing	1
13	YS2430	Rear Bearing	1
14	YS1220	Drive Washer Spacer	1
15	YS0490	Propeller Nut	1
16	YS4815	Back Plate	1
17	YS4820	Back Plate Gasket	1
18	YS1070	Back Plate Screw	4
19	YS4825	Carburetor Body	1
20	YS4830	Carburetor Gasket	1
21	YS4835	Throttle Barrel	1
22	YS4840	Seal Ring	1
23	YS1090	Throttle Barrel Retainer	1
24	YS4485	Hover Needle Valve	1
25	YS2695	Hover Needle O Ring	1
26	YS2700	Hover Needle Seat	1
27	YS2705	Hover Needle Seat O Ring	2
28	YS2710	Needle Detent	2
29	YS4140	High Speed Needle	1
30	YS2695	High Speed Needle O Ring	1
31	YS4845	Low Speed Needle	1
32	YS4150	Low Speed Needle O Ring	1
33	YS0200	Throttle Arm	1
34	YS2435	Carburetor Screws	2
35	YS4850	Carburetor Subplate	1
36	YS2445	Regulator Subplate	1
37	YS4155	Regulator Assy	1
38	YS2460	Diaphragm	1
39	YS2480	Regulator gasket	1
40	YS4155	Regulator Screws	2
41	YS3036	Nipple	1
42	YS2510	Check Valve	1
	YS4855	Gasket Set	3
	YS4160	O ring set	7
	YS4685	Carburetor Assy.	1
	YS4860	Piston / Ring / Liner Set	1
	YS4480	Needle Valve Assy	1



**WARRANTY**

Strict quality control is implemented by our factory in all phases, from parts manufacturing to final assembly. If performance deteriorates or a part fails due to a manufacturing error, YS engine will repair or replace the engine at no charge in the period of one year from date of purchase. Warranty does not cover normal maintenance. Should the engine be modified, incorrectly assembled or abused, there will be a normal charge for parts and labor.

**YS Parts and Service**

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