

## WARNING

You have purchased a Vintage Model Airplane Engine. Many of the features are not as simple as on modern model engines. YOU must exercise extreme care if you intend to operate this engine. YOU are responsible for the special care required for safe operation of this engine. DO NOT OPERATE THIS ENGINE IF YOU ARE NOT EXPERIENCED IN THE OPERATION OF VINTAGE MODEL ENGINES.

No matter what engine you run, always follow ~~safety~~ instructions supplied with this sheet.

Bore ..... 15/16"

Stroke ..... 15/16"

Displacement ..... .647 cu. inches

Type..... Rotary Shaft Valve, 2 Port, 2 Cycle

Operation ..... Upright, Inverted or on Either Side.

Mounting ..... Three Point Radial - The same type as used in large radial aircraft engines. This is the simplest, strongest and most accessible type of mounting. However, if radial mounting is not adaptable to your particular airplane, lugs for beam mounting your engine are provided.

Cylinder ..... Machined from one piece alloy steel-Fins integral with sleeve.

Piston..... Machined from cast iron - Ground and individually lapped to cylinder.

Cylinder Head ..... High compression head (10 to 1) machined from aluminum alloy.

Connecting Rod ..... One piece, machined from aluminum alloy.

Wrist Pin ..... Tubular steel, hardened, ground and fitted with end pads to prevent scoring of cylinder wall.

CrankshaftOne piece, fully counterbalanced, machined from alloy steel. Shaft milled to receive ignition cam and drive washer.

CrankcaseAluminum alloy sand casting for greater strength. Meehanite main bearing pressed in place.

Ignition Timer ..... Aluminum alloy cast housing. Spring steel moveable breaker fitted with Tungsten points. Fully adjustable by means of eccentric phenolic insulator. Timer tension adjustable by means of brake shoe in housing.

Carburetor..... New Atomizer Carburetor-Improved type needle valve allows broad adjustment. Friction lock prevents any change of adjustment through vibration.

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# INSTRUCTIONS

## FOR OPERATION OF THE CUNNINGHAM .647 BLUESTREAK ENGINE

### FOREWORD:

Your Cunningham .647 is a two cycle, two port, rotary valve type gasoline engine. All parts are machined to a specific tolerance and then fitted by hand to give long wear and the best possible performance. The construction is simple and rugged and with reasonable care your engine will give you years of trouble-free service.

Your engine has been inspected at the factory but will require breaking in before flying. 20 minutes to a half hour of bench running on a 13 or 14 inch propeller will be sufficient for free flight or safe control line flying. An additional hour or so of running in the ship should completely break in the engine. When you can fully advance the spark and the engine runs evenly without any fluctuation in speed, then the engine is fully broken in.

This engine has been designed and built to give you that extra reserve of power necessary to put your ship up there for contest winning performance. Control line flyers will appreciate this power while doing those difficult maneuvers which are known only to their branch of model flying.

### IGNITION

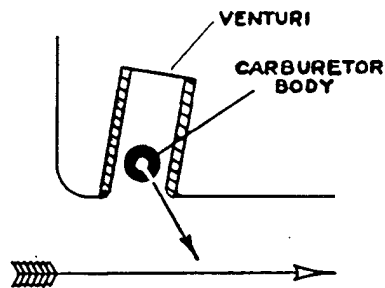
The friction adjustment on the ignition assembly may be varied by tightening or loosening the spark adjustment arm. When the desired tension is found, tighten the locking nut to retain this setting. You will find this method of friction control will enable you to set the spark control completely free (for remote control of ignition), or so tight you are unable to move it, or at any point between these two extremes.

The point gap (.005" to .010") may be varied by loosening the brass point band and rotating the eccentric phenolic insulator to close or open the points. The tension on the point spring may be adjusted by removal of the spring and bending same slightly. For most efficient operation there should be just enough tension on the point spring to keep the points from floating at high speed. Never use a file on the points, sufficient cleaning may usually be obtained by passing a piece of heavy paper between them. When the points do become pitted, smooth them down with a fine oil stone.

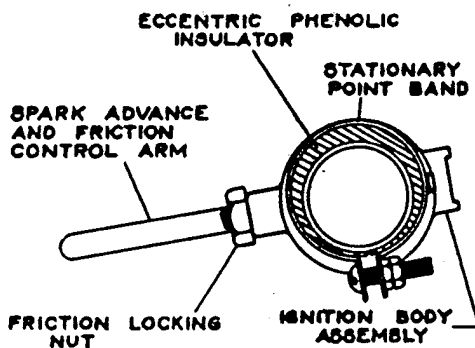
For correct timing, rotate engine until piston is at top dead center, retard spark, and install cam so that any further rotation will open the points. (Rotation is counterclockwise.)

### CARBURETION and FUEL

The hole in the carburetor body (spray bar) must be pointed as shown in the sketch, or



**HOLE IN CARBURETOR BODY SHOULD BE POINTED DOWN AND TOWARD FRONT OF ENGINE AS SHOWN**



the engine will not function properly. The fuel tank should be mounted in such a position that the top of the tank is approximately level with the carburetor.

Use a mixture of three parts by volume of untreated white gasoline and one part of S.A.E. 70 oil (Valvoline brand oil is recommended). Use no gasoline containing Tetraethyl Lead. We do not recommend the use of alcohol, ether or similar fuels.

### PROPELLER

The size and pitch of the propeller depends to a large degree upon your model. However, we recommend a 13" or 14" diameter with 6" to 8" pitch for free flight models, and an 11" to 12" diameter with 8" pitch for scale and stunt type control line models. Fasten propeller securely to shaft in most convenient position for cranking. If you are in the habit of using a large propeller, and running your engine at slow speeds, change to a small diameter prop (9" or 10") occasionally, and let your engine really turn up-this will help to clean out the carbon and free up the engine.

### BATTERIES

Use fresh batteries, special 3 volt battery or two flashlight cells (1 1/2 volts each) connected in series. For bench testing and booster starting use two large dry cell batteries.

### TO START ENGINE:

(1) Be sure that:

Batteries are fresh.

Wiring is properly hooked up and all connections should be soldered and insulated.

Spark plug is clean and has from .015" to .020" gap.

Breaker points are clean with from .005" to .010" gap

Propeller is mounted securely.

Fuel line and needle valve are clean.

Fuel tank is filled.

(2) Retard spark by dropping spark lever to a horizontal position. (If engine shows tendencies to kick when cranking, drop spark lever slightly lower).

Open needle valve 5 or 6 turns from closed position. Choke engine by holding finger over intake tube and flipping propeller over 5 or 6 times (counter-clockwise).

(3) Connect batteries and flip propeller over quickly until engine starts (2 or 3 times is usually sufficient). After engine starts, advance spark control lever and adjust needle valve until engine is running smoothly. After the proper needle valve setting has been obtained, 2 or 3 turns open from this position, should be sufficient for additional starting.

If engine fails to start, repeat instructions 2 and 3 after first checking spark by holding spark plug wire 1/8" to 3/16" away from plug and flipping propeller. If no spark occurs, check wiring and batteries. Due to the high compression ratio it is essential to have at least 1/8" of spark. (3/16" to .1/4" is preferred).

Do not be afraid to choke engine. It will not flood easily and in the event that it does, is readily cranked out. 10 to 15 flips usually being sufficient to clear engine.

(4) To stop engine, open switch or disconnect batteries.

(5) Engine will operate inverted or on either side, but it is best to become familiar with its operation in an upright position.

**DISCONNECT WIRES TO ENGINE WHEN NOT RUNNING TO SAVE COIL AND BATTERIES.**