青鳥三面掃氣POWER PLUS 40F, 46F & 51F FSR AAC 引擎系列說明書

INSTRUCTIONS FOR BLUE BIRD POWER PLUS 40F,46F & 51F(ABC) FSR AAC ENGINE SYSTEM

青鳥ＡＡＣ系列引擎係採用最新引擎的高級材質，加以設計製造成的模型發動機。本系列引擎具有鋁合金活塞、鋁合金汽缸套管，經特殊硬鉻電鍍，具有最佳熱膨脹效率，耐磨、耐熱、微震動、高轉速、散熱佳之超輕量特殊效果。

本系列引擎並具有兩個高速滾珠軸承及自動控制燃料空氣混合比的化油器，更配有特別設計之消音器，使引擎之馬力與順暢發揮最大效率。

●空中試車

爲了使引擎發揮正常的功能和壽命，每個引擎在使用之前，必須經過試車的過程，其程序及要領如下。（但初學者在按裝引擎於模型之前，最好能將引擎固定於試車台上試車。其方法參照，試車台試車乙節。）

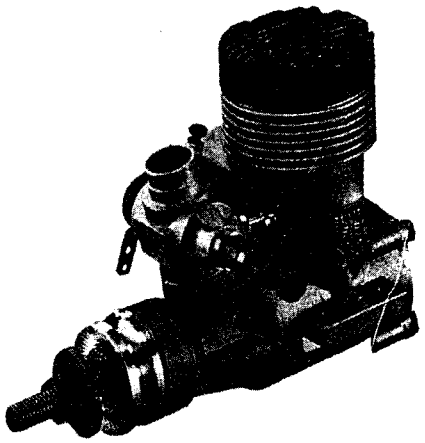
1. 將引擎按裝於模型飛機上，配上合適的螺旋槳（螺旋槳之選擇請參照另表。），使用溫和的燃料（不超過５％之硝基甲烷含量），蓖麻油含量不少於20％。
2. 將化油器之節氣閥全部開啓，同時將油針順時關緊後再反時針方向旋開２圈，以左手大拇指塞住化油氣進氣口，右手以拇、食和中指持螺旋槳，反時針方向轉動螺旋槳，此時，油箱內之燃料應順利被吸至化油器（油意燃料吸至化油器進油嘴時再轉動螺旋槳２～３捲即可，吸油過量會有起動困難的現象），然後以一般方法或起動引擎。起動後，取下電夾並將油針再旋開，使引擎保持在類似四行程運轉（註一）而不致息火的低速。這樣持續數分鐘後，再漸漸將油針旋緊，使引擎轉速昇高至稍微富油（註二）的二行程運轉，並維持這個狀態至整個油箱的燃料（約240 C.C.）耗完爲止。但切勿讓引擎在多灰塵或多砂的環境中運轉，這些灰砂吸入引擎，會使引擎很快磨損。
3. 接著將油針保持在上述的位置，做２～３次的飛行。此時，引擎雖因富油而無法發揮其最大馬力，但應足以應付飛行所需，除非模型飛機本身太重、太大，或强風中飛行。
4. 有時因爲油箱位置變化的關係，飛行中吸入引擎的混合氣會逐漸稀薄而使引擎逐漸加速並過熱。一旦發覺這種情況，應立即關閉氣閥，使引擎變爲低速，將飛機降落並把油針旋開一些，恢復原來的富油狀況後，再次飛行。
5. 以後的３～４次飛行中，可逐次將化油器的油針旋緊些，使引擎馬力稍稍加大，但切忌調至最大馬力。在這幾次飛行中，應避免作像“失速反轉”或“帽型”等須要使飛機垂直爬昇的特技動作。但“斛斗型”動作卻有助於試車，因爲它會使引擎在短時間內因貧油而加速又立刻恢復到富油的運轉狀況。對一個試車中的引擎而言，使它進入貧油的高速後立刻退回富油的運轉，是十分重要的。
6. 在６～10次飛行後，可將油針再旋緊調整引擎至最高速。若引擎能在此油針設定下，保持最高轉速不變，那麼引擎可說是已完成試車過程。切忌爲了想使引擎轉速再提高些，而把油針旋入貧油的位置，這樣反會因潤滑不足而使引擎過熱並損壞重要組件。

●試車台試車

1. 將引擎按裝於堅固的試車台上，配上９×５或10×４的螺旋槳，將化油器節氣閥全部開啓並旋開油針２圈，發動引擎後再調節油針至更低速的富油狀況，並維持這種低速運轉十分鐘以上。
2. 將油針逐漸旋緊使出現較高速的二行程運轉，但這樣時續勿超過 30秒，然後，再將油針旋開，回到原來的低速運轉使引擎的溫度降低。如此反覆進行約２分鐘左右。
3. 反覆上述的油針調整動作，且每次都將高速運轉的時間延長些，一直到高速運轉部份的時間累積至30分鐘以上。高速運轉時引擎會很熱，而在低速運轉時溫度卻會降低。試車中，使引擎的溫度冷熱交替變化，可加速完成試車。
4. 接著旋緊油針調整引擎至最高轉速，然後再旋開３～４格，若是引擎在此情況下能保持最高轉速不變，則試車過程完成，否則須再延長上述之試車動作。
5. 試車完成後，欲將引擎裝於模型之前，請注意檢查化油器的調整。其要領請參閱化油器部份說明書。

●注意事項

經常發現有些模型迷，將引擎在試車台上做長時間的低速富油試車，然後立刻裝在模型上以高速飛行。這不但是錯誤的用法，同時也容易做引擎在貧油的高速運轉下損壞。因此，若您將引擎用於固定翼飛機時，希望能依上述空中試車的要領試車，因爲可能在初期的數十趟飛行中，盡量將油針調整在較富油的位置。反之，若引擎用於直昇機，則不建議您按空中試車的要領試車，因爲富油的調整，將使化油器在較小開口的情況時，容易發生混合氣過濃的現象而熄火所以用於直昇機上的引擎，飛行前必須在試車台上做完全的試車，以確保每次飛行時，都能將引擎順利調至最佳狀況。



規 格 表 SPECIFICATION

型　式	type	40RF AAC PLANE	46F AAC PLANE	51F ABC PLANE
行程容積	displacement	6.49c.c.	7.45c.c.	8.27c.c.
汽缸直徑	bore	21.2mm	21.8mm	22.4mm
行　程	stroke	19.6mm	19.6mm	19.6mm
實用回轉數	Practical R.P.M.	2000-16000	2000-17000	2500-18000
消音器	muffler	附贈 included	附贈 included	附贈 included

BLUE BIRD ACC Model Engines have been devel-oped specially to answer the needs of R/C modelers all over the world. They incorporates automatic mixture control carburettor, high silicon conetent aluminum pison, aluminum alloy cylinder with chromed lining. "Powerful" "Reliable" and "High performance".

● RUNNING-IN ("Breaking-in")

For long life and high-performance, every engine needs to be properly "run-in", or "broken-in", before being put to full use.

The procedure is as follows:

(Note for Beginners: Before installing the engine in a model, beginners are recommended to fllow the test-bench running-in procedure as explained later.)

1. Install the engine in your model and fit a suitable propeller (for example: a 9×5 or 10×4 depending on the type of model.) Use mild fuel (e.g. not more than 5% nitromethane) containing not less than 20% castor-oil).
2. Open the needle-valve 2 truns from the full closed position and prime and star in the usual way. For the first few minutes, leave the needle-valve a very rich setting so that, with the throttle full open, the engine is "four-cycling". Then gradually screw in the needle-valve until the engine just breaks into rich two-cycle operation. Leave the needle-valve at this point and let the engine run until the tank is empty. (Do not run the engine in dusty or gritty surroundings. Such foreign matter sucked into the engine (anruin it in a few seconds.)
3. Now, with the same needle-valve setting, make two or three flights. Although the engine will still be running rich and not delivering its full power, revolutions should be quite sufficient unless the model itself is too large or too heavy or an attempt is made to fly in weather that is too windy.
4. It sometimes happens that, due to the tank position in the model, the mode! the mixture becomes leaner in flight. If this should happen, c s the throttle, land the model and open the needle-valve slight before taking off again.
5. For the next three or four flights, the needle-valve can be gradual-

●安　裝

引擎必須確實的安裝於硬木引擎座上，並以鋼製的螺絲、螺帽及合適的墊圈固定之。同時要注意兩邊引擎座的平行，其頂面也要保持在同一平面上。不正確的安裝將導致額外的震動，運轉不安定及效率下降。引擎座所裝的孔必須和引擎固定座上的孔完全對正。以螺絲強行鑽入不正的孔，會使引擎本體變形而導致上述的運轉不安定和效率下降。

●然　料

盡量選用市售的高級燃料或與附表所列成分相同的燃料。A種適合一般使用，B種在須高馬力輸出時使用。最好使用蓖麻油和高純度木精之混合然料。合成潤滑油在貧油運轉時，潤滑效果較差。因此，假如您選用的然料屬於合成潤滑油系統，爲了防止引擎在空中飛行時過於貧油，起飛前調整油針時，必須調至稍微富油的狀況，以獲得最順暢之運轉。切勿使用任何潤滑油含量低於20%之燃料。

燃　料	A	B
甲　醇	75%	65%
蓖麻油	20%	20%
硝基甲烷	5%	15%

●火星塞

由市面銷售的火星塞中選用最能發揮引擎效率的一種。
建議編號 3～5 號型中溫火星塞

●螺旋槳

選用平衡校正精確的螺旋槳。由於模型的型式、重量及大小均會影響螺旋的性能。因此，請由實際飛行狀況，選出理想、合適的螺旋槳。

●螺旋槳尺寸參考表　　直徑（吋）×螺距（吋）

引擎型別	40	46～51
搖控特技飛行	10×6～11×6	10×7～11×6
像眞機飛行	11×6～12×4	11×6～12×5
一般搖控飛行	10×6～11×6	10×7～11×6

〔注意〕

使用尼龍螺旋槳時，由於天氣狀況及引擎高速運轉的影響，螺旋槳極有可能因而斷裂並造成傷害。因此，當引擎在運轉時，切勿使身體的任何部份進入螺旋槳的迴轉面。調整油針時，最好由螺旋槳的後方調整。附近圍觀的群衆也應使其遠離，最好退至飛機後方。裝配機頭罩時注意容納螺旋槳的缺口處應有足夠的空間而不致壓迫到螺旋槳葉片，切勿削螺旋槳的根部來配合機頭罩的缺口，這樣將減弱螺旋槳的強度，引起斷裂並造成傷害。

●保　養

1.除非必要，盡量勿拆卸引擎。
2.經常保持引擎的清潔，勿讓任何砂塵由進氣口或排氣口進入引擎內部。

〔註一〕四行程運轉：二行程引擎在富油狀況的低速運轉時，會產生類似四行程引擎的特殊運轉現象，此時排氣的爆音較爲渾濁而不清澈。

〔註二〕富油：燃料和空氣的混合中，燃料較空氣多即爲富油。反之，空氣較燃料多即爲貧油。

●化油器調整說明書●

●化油器

本化油器採最進步之雙針式設計，無論節氣閥在任何開度，皆能保持良好敏捷的反應，對於飛行中的姿勢變化亦能保持相當安定的運轉，甚至初學者也能容易的調整出最佳狀況。低速油針在工廠內已調效完畢，只須再於試車完畢後做稍微調整即可。

調整方法

本化油器共有三個調整點：

1.油針（位於化油器的右側）
2.燃料空氣混合比副油針（位於化油氣的左側）
3.節氣閥固定暨慢車調整螺（位於化油器右後上方）

ly closed to give more power, but always keep the setting richer than the full-power setting. During these early flights, avoid manoeuvres such as the "stall turn" or "top hat" which require the model to fly vertically upwards. Loops, howeker, are helpful to running-in as they allow the enigne to briefly speed up and then run rich again. In running an enigne, it is important that the mixture should become rich again immediately after running lean.

6. After six to ten flights, it should be possible to run the engine continuously on its optimum needle-valve setting. This setting is with the needle-valve adjustment ¼ to ½ turn on the rich side of the position at which the engine reaches its very highest speed. Your engine can be said to have completed its running-in period when it holds, a steady speed at this optimun setting. Never attempt to gain a few, more r.p.m. by running the engine on a lean setting: it will run hotter and may eventually become damaged by over-heating.

●Test Bench (Running-in)

1. Instail the engine in a suitable bench mount. Use a 10×6 or 11×6 propeller and run the engine for approximately 10 minutes with the throttle fully open but with the needle-valve adjusted for rich, "four-cycle" operation.
2. Now close the needle-valve until the engine speeds up to "two-cycle" operation. Allow it to run like this for about 30 seconds only, then re-open the needle-valve to bring the engine back to four-cycle operation and run it for a further two minutes.
3. Repeat this procedure, alternately running the enigne fast and slow by means of the needle-valve, but gradually extending the short periods of high-speed running until a total of at least 30 minutes running time has been accumulated. At a two-cycle setting an engine runs hot, whereas, at a four-cycle setting, it runs cool. It is very helpful to induce such changes of temperature within the engine during the running-in period.
4. Now aradually close the needle-valve until the engine reaches its maximum r.p.m., then re-open the needle-valve very slightly as a safety margin. It, at this stage, the engine holds a steady speed; the initial running-in is complete. If it dose not extend the running-in period as necessary.
5. After running-in, and before installing the engine in your model, it is advisable to check carburettor adjustment. Refter to the sparate carburettor Instructions sheet.

● INSTALLATION

Mount the engine securely on rigid hardwood mounts with steel screws and locknuts and suitable washers. Make sure that the mounting beams are parallel and that their top surfaces are in the same plane. Poor installation may cause vibration, erratic running and loss of performance. Make sure that the mounting holes are accurately aligned with those in the engine mounting lugs. Forcing screw through dealy aligned holes may deform. the engine housing.

● FULL

Use a good quality commercial fuel or one of the blens shown in the table.
Fuel "A" is for ordinary use.
Fuel "B" is for use where, higher output is required.

	A	B
Methanol	75%	65%
Castor oil	20%	20%
Nitromethane	5%	15%

Use only castor oil and methanol of the highest available purity and chemical neuterness. Syntheic lubricants are less tolerant of "lean rub" than castor oil if, therefore, a synthetic is employed in the fuel, the needle-valve should be re-adjusted to a richer setting, as an additional safety measure, in case the mixture runs too lean in the air. In helicopter installations, it may be helpful to experiment with different fuels and glowplugs to obtain optimum mid-range performance.

Whatever fuel is used, the engines should be checked out to make sure that it is sufficiently run-in to operate satisfactorily on that particular fuel. Do not use fuels containing less than a 20% lubricant content.

一、主油針係用來調整高速域之混合比。調整時先將節氣閥完全打開，並將油針由關閉位置反時針方向旋開1.5-2圈，按發動步驟程序再逐漸將油針旋緊將引擎調至稍爲富油的最高轉速。（注意：調整最高轉速時，最好使機頭朝上再將油針調至最先現最高速的位置即勿再旋緊油針。此時若將機身平放時，引擎轉速有時會稍稍下降，但切勿因此而再將油針旋緊企圖再提高引擎的轉速。否則在飛行過程中會由於油箱內燃料的逐漸消耗及由飛行姿勢引起的油位變化而使混合氣變得過於稀薄。）無論在任何狀況，切忌將油針調入貧油的高速運轉位置，此舉不但容易使引擎過熱而降低效率且容易縮短引擎壽命。

二、燃料空氣混合比副油針係用來調整中低速域的燃料空氣混合比。當油針依上述要領調妥後，關閉節氣閥至開口間隙約1m/m左右，此時引擎應可維持穩定的慢車運轉，否則，請依照下列調整方法：

A迅速完全打開節氣閥，此時若引擎遲緩片刻才能達到調速運轉。極可能是由於慢車時的燃料空氣混合比過濃所致。但爲了確定上述情況，可將節氣閥再度關閉至慢車位置，並使之運轉約5秒鐘以上，然注意引擎轉速是否漸漸轉慢，而且會從氣閥噴出油來，這即是低速運轉太過富油，此時可用⊖字型小螺絲刀將燃料空氣混合比副油針順時針方向旋進½圈左右，再反覆上述的動作檢查調整情形是否恰當。

B反之，當燃料空氣混合比過稀時，節氣閥關閉至慢車位置，或由慢車位置開至大車時均容易突然熄火。但此時熄火現象與A之不同處爲節氣閥不會噴油，而且引擎處於低速時會漸漸提高轉速的現象，此時，可將混合比副油針以反時針方向旋開，每次調整½圈左右至獲得最佳狀況止。然料空氣混合比調整閥的調整並不很困難，只要記著上述混合氣過濃或過稀時對引擎所產生的影響，便可十分容易調出最佳狀況。

三、氣節閥固定與慢車調整螺係用來固定節氣閥，及控制限引擎的慢車最低迴轉數。當節氣閥閉至慢車位置時，若轉數仍嫌過高，可反時針旋開調整螺，使節氣閥的開口關得更小，轉速便相對下降。反之，則依相反方向調整。

〔注意〕

本化油器必須配合「消音器加壓」系統使用，方能發揮最大效能，通常本化油器一旦調得最佳狀況，並不須要經常再調整。除非曾更換不同的燃料，火星塞或螺旋槳，甚至天候狀況變化較大時，化油器可能須要再稍微加調校以適應改變使用條件後的狀況。

青鳥科學模型股份有限公司

公　　司：台中縣大雅鄉永興路1～8號

電　　話：(04)5666130～2

傳　　眞：(04)5671100

統一編號：55953972

郵政劃撥：台中0241270～1

BLUE BIRD MODEL MFG. CO., LTD.

1-8. YONG HSING ROAD. TA YA, TAICHUNG HSIEN, TAIWAN, R. O. C.

CABLE: "BLUE BIRD" FENG YUAN

PHONE:(04)5666130-2

F A X:886-4-5671100

● GLOW PLUGS

Select a plug that will give the most satisfactory results after tests of available P/C plugs. Prefer cold glow plugs. MEDIUM TYPE

● PROPELLER

Use well balanced propellers only. As the ideal prop diameter, pitch and blade area vary according to the size, weight and type of model, final prop selection, can be made AFTER PRACTICAL EXPRIMENT.

● Warning:

There is always a danger, especially with nylon props and depending on engine speed and weather conditions, of the propeller, fracturing and a blade flying off and, obviously, this can cause injury. Therefore, never crouch over the engine when it is running and keep all onlookers well back-preferably behind the model. If a spinner is used, make sure that the spinner notches are large enough to clear the prop blades and so do not cut into and weaken the blade roots.

	40	46～51
R/C STUNT	10×6～11×6	10×7～11×6
SCALE	11×6～12×4	11×6～12×5
R/C SPORT	10×6～11×6	10×7～11×6

Dia×Pitch

● MAINTENANCE

1. Avoid unnessary dismantling of your engine.
2. Always keep your engine clean and do not let dirt or dust enter through the intake or exhaust. Fuel should be filtered. use a fuel filter on your fuel container and another filter in the fuel line to the carburettor.
3. If the engine is to be fitted with flywheel instead of an aircr-aft, propeller, do not allow it to run at peak revolutions without adequate provision for coolin.

INSTRUCTIONS FOR 40RF, 46RF & 51F AUTOMATIC CARBURETTOR

BLUE BIRD carburettor incorporates an automatic mixture control device which ensures that the engine receives a correctly balanced mixture of fuel and air at all throttle settings. The device progressively reduces, the effective size of the fuel jet orifice as the throttle is closed, thereby preventing the engine from running too rich at ow speeds. This also means that an airbleed is on longer required and, with its elimination, maximum suction is maintained at the fuel jet at all times. This is a most, important factor where manoeuvres have to be executed at low engine speeds and through wide variations of fuel level within the fuel tank. Under average operating conditions, the carburettor will normally function satisfactorily as factory set. Simply start the eigine in the normal way and adjust the main needle-valve maximum r.p.m. on closing the throttle, the engine should idle at between 2,000 and 2,500 r.p.m. and also run steadily at all intermediate speeds. However, different fuels and /or climatic conditions, may require minor readjustments of idle screw for optimum results.

● ADJUSTING THE CARBURETTOR

There adjustable controls are provided on this carburettor:

(1) The Main Needle-Valve (located on right-hand side of carbu-rettor).

(2) The Mixture Control Screw (conter needle valve).

(3) The Throttle Rotor Set-Screw (angled at rear of body).

I. The Main Needle-Valve is used in the same way as on all model engines, i.e., for adjusting the high-speed mixture strength. Stat the engine and, with the throttle fully open, gradually close the Needle-Valve until it is running at its maximum speed. Caution: Do not close Main Needle-Valve to too "lean" a setting as this will cause the engine to overheat and slow up. Set the Main Needle-Valve very slightly to the "rich" side of the peak r.p.m. setting. Make sure that the engines is fully "broken-in" (about 1 hour of total running time in short runs) before operating it continuously at full

青鳥引擎零件表

BLUE BIRD POWER PLUS 40F,46F ENGINE PARTS LIST

Item No.	品名 DESCRIPTION	數量 Q'TY	編號 Item No.	品名 DESCRIPTION	數量 Q'TY
E-4601	引擎本體（曲軸箱） Crankcase	1	E-4621	斷面華司 Spring washer	1
E-4602	後培林 Rear ball bearing	1	E-4622	固定梢螺母 Setting pin nut	1
E-4603	主軸 Crankshaft	1	E-020	化油器主體 Carburetor main body	1
E-4604	後蓋墊圈 Rear cover washer	1	E-020-1	化油器"O"圈 Carburetor "O" ring	1
E-4605	後蓋 Rear black cover	1	E-023	主油針 Main needle valve	1
E-4606	後蓋螺絲 Rear cover bolt M3×8	4	E-023-1	主油針"O"圈 Main needle valve "O" ring	1
E-4607	汽缸套 Cylinder sleeve	1	E-024/46	副油針 Counter needle valve	1
E-4608	連桿 Connecting rod	1	E-024-1	副油針"O"圈 Counter needle valve "O" ring	1
E-4609	活塞 Piston	1	E-025	油針座 Needle valve seat	1
E-4610	活塞止梢 Piston gudgeon pin	1	E-026	注油嘴 Oil supply nozzle	1
E-4611	"G"型扣 "G" pin snap ring	1	E-027	注油嘴墊片 Oil supply nozzle washer	1
E-4612	汽缸蓋墊圈 Cylinder head washer	1	E-028	節氣閥 Throttle	1
E-4613	汽缸蓋 Cylinder head	1	E-029	節氣閥固定螺絲 Throttle setting screw	1
E-4614	汽缸蓋螺絲 M3×12 cylinder head bolt	6	E-030	節氣閥定位彈簧 Throttle setting spring	1
E-4615	前培林 Front ball bearing	1	E-031	節氣閥控制片 Throttle controller	1
E-4616	驅動輪軸套 Drive sleeve	1	E-032	固定螺導座 Throttle screw setting seat	1
E-4617	驅動輪 Drive gear	1	E-033	導座鎖定螺母 Throttle setting nut	1
E-4618	螺旋槳墊圈 Propeller washer	1	E-034	主油針固定彈片 Main needle valve setting spring	1
E-4619	螺旋槳螺母 Propeller nut	1	E-035	油針座墊片 Needle valve seat washer	1
E-4620	化油器固定梢 Carburetor setting pin	1	E-036	控制片螺絲 Controller bolt	1

throttle. After setting of Main-Needle valve for max R.P.M. only adjustment of idle setting screw is required for idle setting. Don't try to adjust idle mixture with the main needle valve.

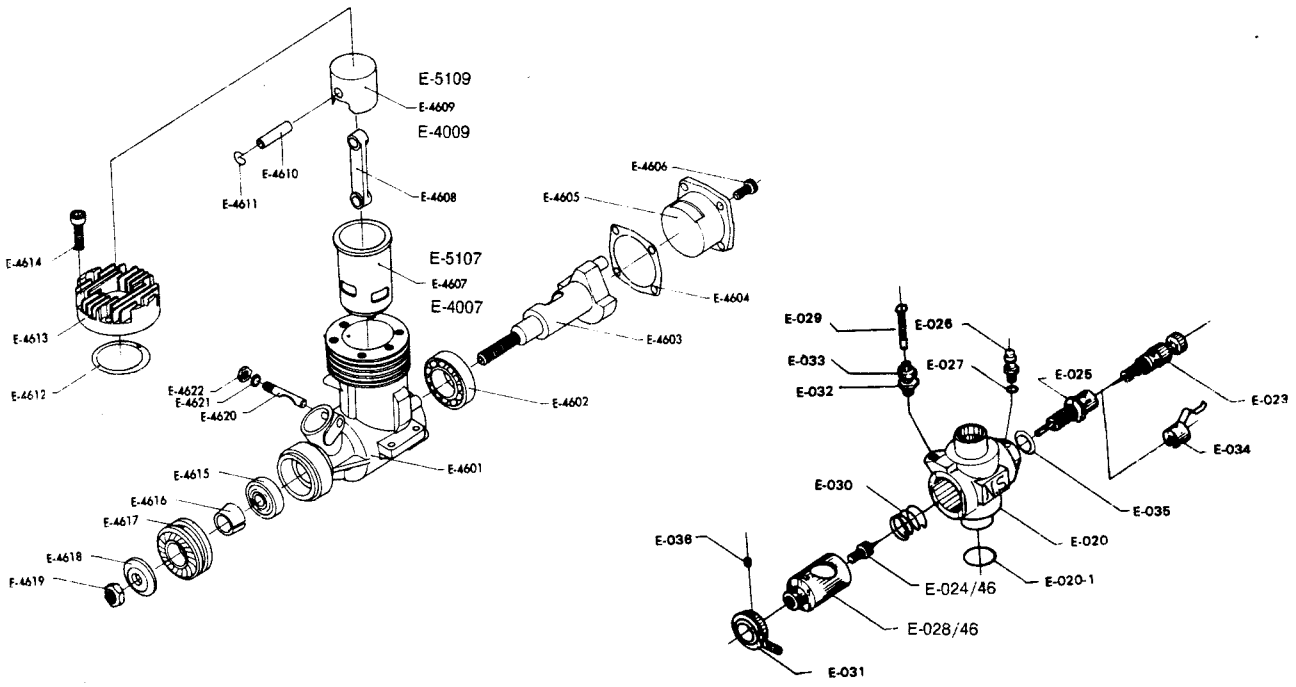
II. The Mixture Control Counter Needle Valve is for adjusting fuel mixture at part-throttle and idling speeds. Having set the Main Needle-Valve as detailed above, close the throttle. The engine should idle continuously and stedily without futher adjustment.

(a) If. however, the engine begins to idle unevenly, open the throttle. If the engine then hesitates before picking up to full speed, it is probable that the idling mixture is too rich. Check this by closing the throttle again and letting the engine idle for 5 seconds before again opening up. If the engine now puffsout a good deal of smoke and hesitates or even stops, it will be necessary to close the Mixture Control Counter Needle Valve. Do this by inserting a small screwdriver into the recessed, screw on the right-hand side and turning it clockwise. About one-half turn should be sufficient.

(b) If instead of being set too rich, the Mixture Control Screw is set too lean, the engine wills top when the throttle is closed, or will lose speed while idling and then cut-out abruptly (without smoking) when, the throttle is opened again. In this case, turn the Mixture Control Screw about one-half turn counter-clockwise.

(c) Mixture Control Counter Needle Valve adjustment is not critical and by remembering the symptoms of rich and lean running quoted above, it is a very simple matter to establish the best setting.

III. The Throttle Rotor, Set-Screw is for establishing the minimum idling speed. if the engine runs too fast with the throttle closed, the Rotor Set-Screw should be turned counter clock wise to allow the throttle opening to be reduced.



MFA BLUEBIRD 40/46/51 ENGINE ADDITIONAL INSTRUCTIONS:

Please refer to your new engine's instructions carefully even if you are familiar with model engine operation. An 'AAC' engine (aluminium piston, chromed aluminium cylinder liner) gives good compression, the best heat dissipation, less friction therefore more power but requires a little more running-in care than a ringed piston engine. They are ideal for the appropriate MFA models requiring a .40/.46 engine and, of course, any model requiring a .40 -.51 cu.in. engine.

PLEASE NOTE WHEN INSTALLING IN THE MFA SPORT 500 HELICOPTER:

We advise your engine is run initially before fitting in the helicopter (See Test Bench Running In) because this not only enables the correct idle and full speed settings to be easily ascertained but, also allows the engine to be run in a little. It is also good for familiarising yourself with the engine. Having said this, it is not essential and if desired, like any modern engine, it can be put straight into the model with perfectly satisfactory results. Before fitting the silencer, first tighten the two halves of the silencer with the bolt running down the middle, setting the outlet pipe so that it clears the ground. We advise the main needle valve should be opened 3/4 - 1 turn from closed initially which is a little less than stated in the main instructions. IMPORTANT: NEVER ATTEMPT TO RUN YOUR ENGINE IN THE SPORT 500 HELICOPTER WITH THE HELICOPTER'S TRANSMISSION DISCONNECTED OR MAIN ROTOR REMOVED - this will over rev the engine or the transmission and cause possible damage to both.

RECOMMENDED STARTING PROCEDURE IN THE SPORT 500 HELICOPTER:

1. Fill the fuel tank. Use STRAIGHT glow fuel i.e. 20% castor oil, 80% methanol (and up to 5% nitromethane). DO NOT USE SYNTHETIC OIL FUEL, these give inferior lubrication and will rust the inner parts of the engine when left unrun for only a week or two. Pinch the two rubber vent tubes (the upper 2) to close them, now squeeze the fuel tank momentarily, this will force fuel up the line to the engine and prime it ready for starting.

2. Close the throttle to about 1/8 open. Connect up the belt (or Cone Adaptor if fitted), starter and glow clip (as illustrated in the Sport 500's instructions). Spin the engine to start, leave the glow clip connected for a few seconds.

3. NOTE: When the engine is new or has been unrun for awhile, difficulty may be found spinning it over initially. If you find this, proceed as follows: Prime the engine as 1 above. Remove the glow plug and spin the engine with the starter for a few seconds to free it. Replace the plug and proceed as 2 above. In cold weather, you may have to do the above at the start of each flying session.

GUARANTEE AND SERVICE: MFA guarantees your engine for a period of three months from date of purchase. Any defect due to materials or manufacture will be repaired or the engine replaced (at our discression) free of charge within this period. This guarantee does not cover crash damage, wear & tear, damage caused by bad handling or poor fuel, over-revving and/or extreme lean running. This guarantee is in addition to the purchasers statutory rights which are not diminished in any way. For service or repair, return the engine to MFA (pack carefully!) with a note stating the work required.

ACCESSORIES: MFA supply 'APC' propellers, glow plug, fuel filter, fuel tubing, electric starter, glow clip, Power Panels, Pocket Plug Driver, rechargeable batteries etc. for your Bluebird engine, just contact MFA for details.

Model Flight Accessories / Como Drills. 7/92.