



# GF-6汽油引擎使用說明與介紹

自西元2009年，SH的研發團隊即開始著手研發小排氣量的汽油模型引擎。其目的與宗旨是為了因應模型用木精燃料日漸昂貴與市面取得不易的難題，並突破現有的汽油模型車、飛機、船用汽油引擎體積龐大、價格昂貴與攜帶不便的問題。經過了多年的經驗累積與突破，終於在2015年推出全球首創的1/8車用5.1cc高性能汽油引擎(GC31引擎)。

上述研發期間，SH研發團隊克服了所有現行市面上遙控模型用汽油引擎的最大通病...高溫及轉速低等各種問題，並且研發出全球獨創的多項世界專利設計，結合現代高科技的加工技術，秉持著最完美的品質理念，成功量產出小排氣量的CDI點火汽油引擎。

雖然GC31系列CDI點火汽油引擎是達到預期的功能與成效，卻擺脫不了有CDI點火器而衍生的缺點：重量增加與佔用安裝空間，以及高電壓的干擾與故障率難題。因此SH的研發團隊持續努力尋求突破，終於在2017年正式成功量產出免CDI點火器的“電熱式點火汽油引擎”(GC31 SPEC2)。緊接著因應航模市場需求，2017年底推出了全球第一顆排氣量僅6cc的電熱式點火飛機用二行程汽油引擎(GF-6)。

GF-6汽油引擎不但具有高馬力、高轉速、壽命長與運轉穩定特色，並具有易調整、散熱佳之卓越性能；以及降低燃料費用的高經濟效益優勢，相信GF-6將會是遙控飛機玩家最新的最愛。

◎ GF-6引擎，適用於二行程25~40級各廠各式機型。

◎ 為了能讓GF-6引擎充分發揮其最大馬力及最長的壽命，請確實做好飛行前的試車（磨合）工作。

## 注意事項

1. 發動引擎時，請確實將引擎固定於飛機引擎座或試車台上，並把化油器固定螺絲鎖緊，以防止鬆動造成引擎不能順暢運轉。
2. 使用燃油：92無鉛汽油(另購)和SH專用二行程機油(另購)互相混合。

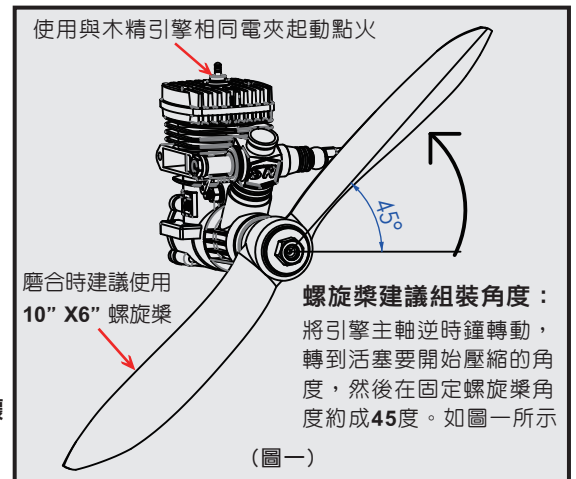
**建議使用最佳機油混合比例為20：1，約4.76%**

250ml機油，可混合5公升的汽油；或者是  
80ml機油，可混合1.6公升汽油。(1600/80=20)

3. 火星塞：引擎上附有一顆SH原廠的汽油專用火星塞，其點火電壓1.5V。(與一般的木精引擎火星塞相同)。
4. 螺旋槳：建議使用10"X6"的螺旋槳，並依右圖(一)建議角度安裝

**※如果使用過大的螺旋槳，將會導致引擎過負載，因而造成引擎損壞或是縮短引擎使用壽命。**

**※請確實鎖緊螺旋槳，以防止脫落造成人身意外傷害發生。**



## 磨合時化油器調整設定與試車磨合步驟

以下說明和設定，均是以出廠標準配備下，搭配10X6螺旋槳的設定，如果自行將消音器加裝諧振管，或者是更換加速管使用時，則主油針需要大幅退出到4圈半~5圈後，再視使用情況進行微調。使用小於10"X6"的螺旋槳時，主油針也需要先大幅退出，避免因轉速過高，貧油潤滑不足而損壞引擎零件。

1. 首先請將節流閥怠速流量孔用遙控器調整至如背面附圖(二) ③ 所示位置，約2.0m/m處。並將已經調好機油比例的燃油注入油箱。油針細微調整時，以時鐘一圈等分12小時進行調整，一次只調1~2小時。
2. 第一階段磨合：主油針及副油針，於出廠時，就已大略設定好了。若您有轉動過，請將主油針如背面附圖(二) ①，從完全關閉開始轉開4圈，副油針調整時，請先將風門全開，之後再將副油針鎖到底再轉出1 3/4 圈，然後再將化油器風門開到約一半位置，用手堵住化油器進氣口，再以逆時間方向撥轉動引擎，目視燃油確認已吸入化油器中，讓燃油吸入引擎的內部，然後再插上電夾，用馬達啟動器發動引擎，讓引擎保持中速運轉，然後可將電夾移開。
3. 此時先觀察引擎的轉速，如果引擎轉速太高時 (RPM5000轉以上時)，可將主油針以逆時針方向轉出，每次調整約轉動2小時，直至引擎能穩定的富油運轉。若引擎因太過於富油而停止，可將主油針以順時針方向轉入，每次調整約轉動2小時，直至引擎能穩定富油運轉，此階段的初步磨合需經過約500cc的燃油磨合。 ※請注意此時排氣口的排煙必須是濃煙富油的。
4. 接著請調整設定遙控器，將節流閥的怠速關至預設的怠速孔位置，約2mm處，如背面附圖(二) ③，以觀察怠速的運轉情形，如果引擎轉速有持續升高的現象，即表示已經太貧油，副油針需反轉兩小時，如果引擎的怠速會因太富油而降慢，甚至是熄火，即表示已經太富油，副油針需正轉兩小時，直到引擎能夠穩定的怠速運轉，此時的怠速應該是RPM3000轉為最佳。

(怠速時當移開電夾後，轉速會略微降低是屬於正常的。)

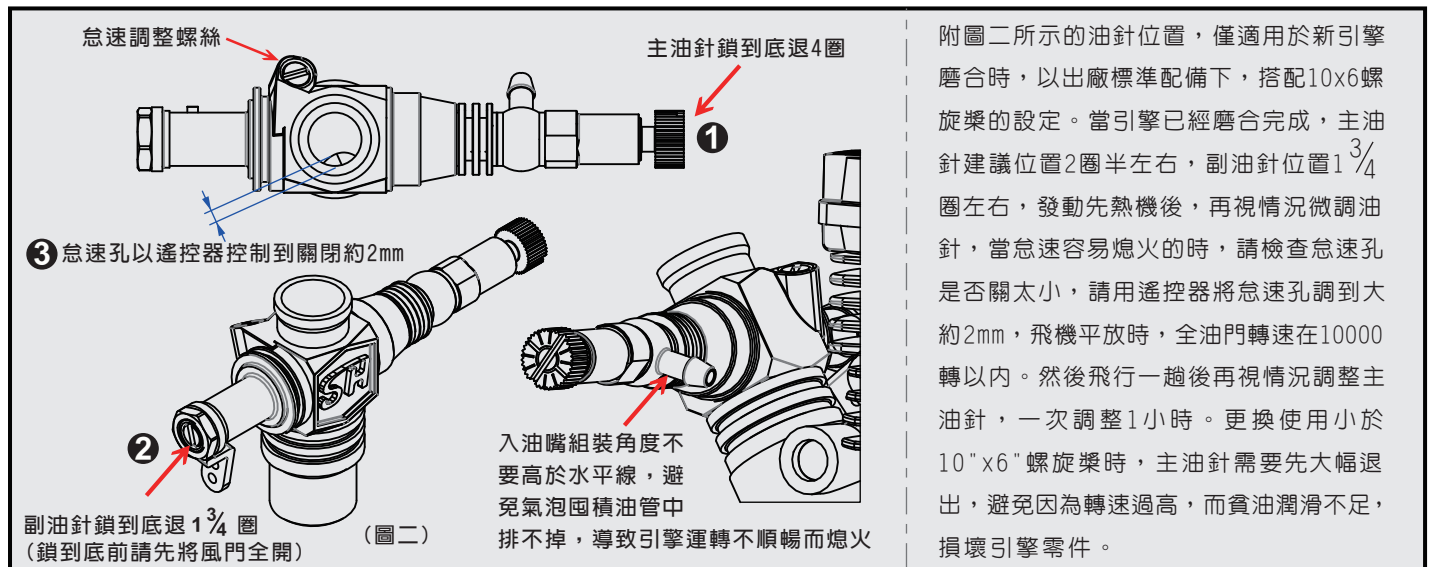
(背面接續說明)

5. 第二階段磨合：接著可試著將節流閥拉開至全開位置做加速動作，以便調整主油針，由於此時引擎尚在磨合階段，因此引擎必須是處於富油狀態，此時排氣口會噴出豐沛的燃油及濃煙。如果引擎轉速太高時（高於RPM8000轉時），請立即將主油針以反時間方向轉出，直至轉速低於RPM8000轉的狀態下做運轉。若引擎因太過於富油而停止時，請將主油針以順時針方向轉緊，一次轉約兩小時，直至引擎能夠保持富油狀態下中速運轉，**此第二階段高速磨合，需持續運轉約400cc燃油。**
- ※請隨時注意引擎轉速及油量，避免讓引擎轉速高於RPM8000轉以上。**
6. 當完成上面的磨合步驟後：此引擎的磨合工作已經算是初步完成，不過引擎現在尚處於全新的狀態，因此接下來就是準備做實際的首次飛行了。

首先確認接收電池電量充足，確認油箱燃油已加滿，確認伺服器正反動方向正確，然後再度啟動引擎讓引擎中速運轉2分鐘熱機後，將飛機平放抓緊固定好再將油門全開，再次調整主油針的最終位置，請利用轉速表作量測，在飛機平放時引擎的最高轉速以RPM 10000轉為最佳設定，如果將飛機頭抬高約70-80度時，轉速會提昇至11500轉左右，然後再放平，轉速會降回10000轉為最佳

當飛行兩趟後再視情況些微的縮緊主油針，讓飛機在平放時的引擎轉速都調整在RPM10000轉以內做操作飛行。此時，引擎的磨合終告完成了，期望此汽油引擎的誕生，能為你帶來更多的飛行樂趣，以及節省更多的燃料費用。

**※新引擎如果轉速設定高於RPM10500時，將會導致引擎過熱容易熄火的問題產生**



### / 注意事項 /

1. 若引擎有不順暢或化油器不易調整時，請檢查各部油路，是否有漏油或阻塞，建議你在油箱內加裝SH(SB001)汽油專用濾泡器，以確保油路順暢。
2. 為了能使引擎正常的運轉，請務必使用**原廠SH專用機油**，以"20：1"的機油比例和92無鉛汽油做混合，約4.76%，並搭配SH的GT4或GT5的汽油專用火星塞，能讓引擎更容易調整，發揮其最高的性能。建議使用10"x6"的螺旋槳，**如果使用過大的螺旋槳，將會導致引擎過負載，因而造成引擎損壞或是縮短引擎使用壽命。**



注意

1. 此SH汽油引擎只能適用SH的汽油專用火星塞，才能夠正常運轉及發揮優異的馬力性能。
2. 此引擎所使用的油箱，油管都必須是耐汽油專用的材質。
3. 此引擎禁止使用含有硝基甲烷的木精燃料。

3. 當操作的飛行環境有了巨大的變化時，(熱/冷或高低海拔差異)，必須重新設定化油器。
4. 當引擎使用一加侖汽油後，請將火星塞與燃燒室拆下做細微的清理，如果火星塞已經嚴重積碳，或是燃燒室底部預熱網變形了，請立即換新的零件(火星塞和燃燒室屬於消耗品，請依使用情形適時更換)。
5. 燃油是危險的易燃品，請不要在附近有火源的地方發動引擎，並注意周邊安全。飛機不使用時，請務必將油箱燃油清空。使用不完的燃油，請妥善收放，避免發生危險。
6. 在試車期間，若有發生廠商疏忽之機件損壞，請轉交購買商店寄回原廠，SH定會給您合理及完善的售後服務。
7. 當引擎放置長時間沒有使用時，剛開始準備發動會有化油器吸不到油的情形，此時請檢查所有油管油路是否順暢，並檢查油箱內濾心是否阻塞，化油器部分請將主油針和副油針拆下，將油針上累積的油垢清洗乾淨，再將油針依建議設定鎖回去化油器，以上檢查完畢後再重新安裝相關零件和油管，重新發動引擎。

專利證號

NO.	申請國家	專利證號	NO.	申請國家	專利證號	NO.	申請國家	專利證號
1	台灣	M441718	3	德國	202012102665.1	5	台灣	M477016
2	大陸	ZL201220334172.9	4	美國	8985078	6	美國	9169776



# GF-6 2-Stroke Electric Ignition Gasoline Engine Manual (for .30 size Aircraft)

The SH R&D team started developing the mini gasoline engine back in 2009. The purpose was to respond to the challenge between high nitro fuel costs and the difficulty of obtaining it in the market. The goal was also to improve the inconvenience of carrying bigger size engines for car, aircraft and boat applications. SH finally launched the world's first 5.1cc (GC31) high performance gasoline engine for 1/8 scale use in 2015, after years of experience and major breakthroughs.

The SH Team overcame the common problems plaguing existing gasoline engine in the RC market; including high temperature, low speed and so on, during the research and development period. Not only were exclusive designs from world patents applied, but SH also combined CNC high-tech processing. Here SH has successfully produced a small displacement CDI ignition gasoline engine with their persistent efforts and continuous improvements.

Although the GC31 CDI ignition gasoline engine series achieves the performances and effects as expected, it still couldn't get rid of the defects from the CDI igniter; such as increasing weight, space limitations during installation and high voltage interference, with some other trouble challenges. Therefore, SH continuously tested and finally made a breakthrough, officially releasing the electric ignition gasoline engine (GC31 SPEC2) in 2017. According to the demand of the aircraft market, the world's first 6cc 2-stroke electric ignition gasoline engine (GF-6) was produced in the same year, at the end of 2017.

GF-6 gasoline engine comes with great power, high speed, lasting life, operational stability, easy adjustment, excellent cooling and economic fuel consumption! That's why we strongly believe it will be the best choice for all the aircraft pilots.

- Suitable for all 2-stroke .25-.40 size model aircrafts on the market
- Proper run-in (break-in) of the engine is a very important step in ensuring that you get the highest performance and lifetime of your engine.

## ATTENTION

1. Please make sure the engine is mounted to your model securely and that the fixed screw is locked tightly to the carburetor in case of any issues causing unsmooth performance.

2. Use a mixture of 92 Octane gasoline and SH specified 2-cycle oil.

**Suggestion: the best gasoline and engine oil is 20:1, roughly around 4.76%**

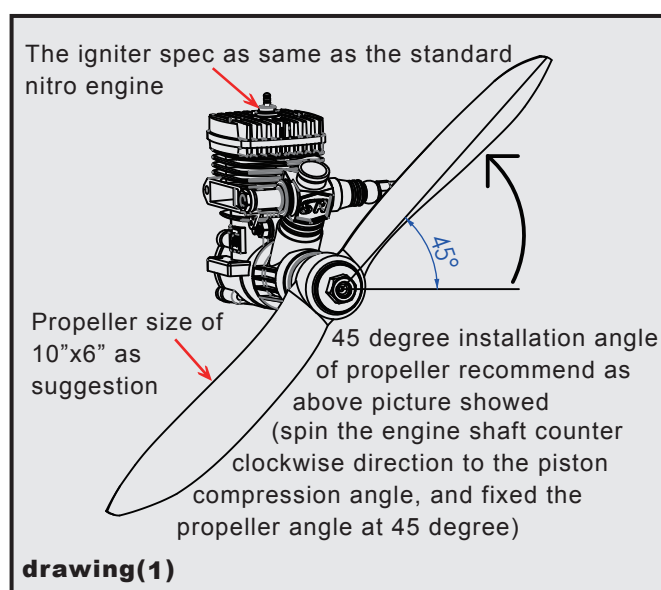
**250ml engine oil can be mixed with 5 liters of gasoline or 80ml engine oil mixed with 1.6 liters of gasoline. (1600/80=20)**

3. Plug: The engine is equipped with an SH factory specified manufacture plug, with a 1.5A voltage applied.

(the plug spec as same as the standard nitro engine).

4. Propeller: We suggest a propeller size of 10"x6" and the installation angle recommend as the below drawing (1) showed

- An inappropriate (too big) propeller may cause the engine to become overloading, and potentially shorten its life.
- Please make sure the propeller is tightly locked in case of any issues occurred by an accident.





# Carburetor Setting and Run-In Procedure

Following setting all based on the factory standard; comply with the propeller size of 10"x6" as setting. If replace others muffler, the main speed needle need to adjust at 4 1/2 turns to 5 turns from the bottom and make slight adjustments accordingly to the condition. If use propellers size smaller than 10"x6", the main speed needle need to turns much more at rich condition to avoiding any damages to engine due to high RPM or too lean condition.

1. First, adjust the idling screw to the position showed in figure (2) of mark ③ , fully closed from the bottom and **open approx. 2.0mm**. Then add the 28.5:1 fuel/oil mixture into the fuel tank. For needle adjustments, image the slot in the needle is the hour band on a clock and only adjust the needle from 1-2 hour increments each change.

2. First stage of run-in:

The main needle and low speed needle are preset from the factory. Please turn the main needle see back side attached figure (2) of mark ① , Set the main needle at 4 turns from the bottom and low speed needle at 1 3/4 turns from the bottom. After that, open the carburetor about half position. block the carburetor inlet by hand and spin the engine counter-clockwise direction to help push fuel into the carburetor and inside the engine. Connect the plug igniter and apply an electric starter to start the engine; keeping the engine staying in mid-range running, and then you can remove the plug igniter.

3. Engine RPM observation:

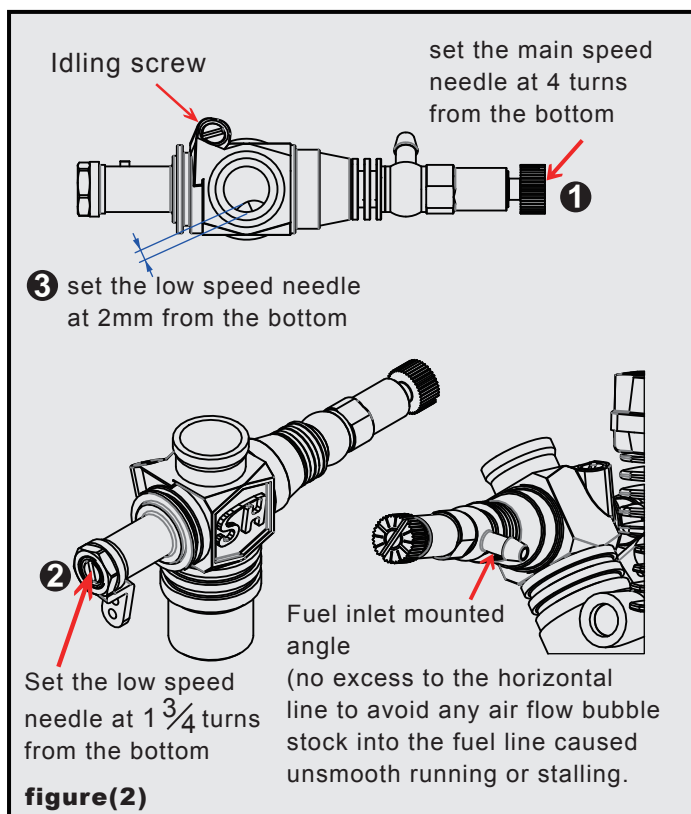
You can turn the main speed needle counter clockwise 2 hours if the engine reaches **over more than 5000 RPM's**. Adjust in 2 hour increments at a time until the engine is running rich. You can turn the main needle clockwise 2 hours if the engine is too rich and stops running. Adjust in 2 hour increments at a time, until the engine returns to a rich and smooth-running condition. **At this stage roughly required 500cc of fuel running through**

※**The exhaust should emit lots of dark blue smoke, indicating that the engine is in rich condition.**

4. Low speed needle adjustment:

Adjust the idling screw to the position showed in figure (2) of mark ③ , fully closed from the bottom and open approx. 2.0mm. If the engine idle speed is high and continues to increase and not slow down, it's too lean, and the low speed needle needs to be turned counter clockwise 2 hours until idle is stable. If the engine at idle speed is too low and leads to stalling, it's too rich and the low speed needle needs to be turned clockwise about 2 hours until the idle is stable. Stay at 3000 RPM for best idle speed of this time.

**(RPM going a little lower is normal once you remove the plug igniter during idling)**



In Figure (2) the needle position showed is only for the new engine during the run-in, comply with propeller size of 10"x6" as suggestion. Once the run-in is completed, we suggest setting the main needle at 2 1/2 turn from the bottom, low speed needle at 1 3/4 turn from the bottom. Make slight needle adjustments according to the condition after the engine warms up. Please check if the idle hole is too small and set the throttle allowance about 2mm by radio when at idling condition but stalls easily. Also open the throttle fully and maintain around 10,000 RPM when the aircraft model is on a flat surface. Make main speed needle adjustments 1 hour increments each time after each flight. The main speed needle will need to be adjusted when switching to a different size propeller due to the loading difference or will cause the damages to the engine.



#### 5. Second stage of run-in:

Set the throttle to fully open position for accelerating, to set the main needle adjustment. The engine needs to stay in a rich condition during the run-in procedure and the exhaust should emit a lot of fuel and white/blue smoke at the same time. You can turn the main speed needle counter clockwise 2 hours if the engine reaches over more than 8000RPM. Adjust in 2 hour increments at a time, until engine returns to stable running under 8000 RPM. You can turn the main needle clockwise 2 hours if the engine is too rich, leading to stalling. Make adjustment in 2 hour increments at a time until the engine is back to a rich condition in mid-range running. **The run-in procedure at this second stage required at least 400cc of fuel running through.**

**※Always watch out for the engine speed and how much fuel is running through; make sure engine speed stays under 8000 RPM**

#### 6. After the first and second stage run-in procedure, preliminary engine run-in is complete, but the engine is still new. At this stage, we can proceed to our first initial flight.

Make sure the receiver battery is fully charged, fuel tank is full and the servos have the correct forward and reverse direction. Then start the engine and allow a 2-minute warm up in the mid speed range of running. Put the aircraft model on a flat surface, holding tight and set the throttle position to fully open to adjust the main needle. The idle engine RPM setting is around 10,000 RPM when the aircraft is on flat ground. When set the nose wheel around 70-80 degree, the RPM will increasing to 11,500 then put back to a flat surface the RPM will returning to 10,000.

After 2 flights, make slight main needle adjustments when the aircraft model is on a flat surface, and set the engine to maintain 10,000 RPM operation during flying. Finally, we have completed the run-in procedure. We hope this engine brings more flying fun and saves as much as fuel costs.

**※The new engine will flame out due to overheating if RPM exceeds 10,500 RPM**

## NOTES

1. Kindly check the fuel lines to ensure there is no leaking or clogged issue when the engine is running unsmooth or when you have needle setting difficulties. Installing a SH specified fuel filter SB001 into the fuel tank is suggested.
2. Please use the SH specified 2 cycle engine oil to maintain proper engine operation. Use 92 gasoline and SH specified 2 cycle oil mixed up; Gasoline and engine oil ratio is **20:1**, **roughly around 4.76%** SH specified plug of GT4 or GT5 plug is recommended and we also suggest the propeller with size 10"x6" to obtain the best performances.  
**(The engine may be overloaded, leading to shorten life if you use an inappropriate, or bigger, propeller size)**  
**A. Only use with SH specified gasoline spark plug to ensure the engine runs properly and has great performance.**  
**B. The fuel tank and fuel line need to be made from gasoline resistance material**  
**C. It is prohibited to use any nitro fuel which contains methane!**
3. The needles may need to be reset if there are any big changes to the operating flight environment.  
**(Hot/cold or any differences of the high altitude and low altitude)**
4. Please clean the spark plug and burn room after 1 gallon of fuel has run through the engine. If the heating screen of burn room has serious carbonated damage or the plug bottom is carbonated, Please replace with a new one (Both plug and burn room are consumables, please replace according to the use situation)
5. The fuel is flammable and dangerous; always stay away from sparks, heat or any other ignition source. Don't store the fuel in the gas tank after you have finished flying your aircraft model. Store your fuel, gasoline or mixed fuel safely in a cool, dry location.
6. Provided warranty conditions have been met, your product will be repaired or replaced free of charge. Repair or replacement decision is as the sole discretion of SH.
7. If the engine hasn't been used for a long time, the fuel may not get through the fuel line into the engine or carburetor. Please go check whether the fuel filter in the fuel tank is clogged, disassemble the carburetor and clean up. Adjust the needle setting as recommended and assembled the relative parts back. Then restart the engine.