



# RC SHOWCASE

**RCS/SV 90cc (91.5cc) 2 Stroke Gasoline Engine**  
**Fuel: 32:1 gas/oil mix. Ignition: Auto advance 4.5 - 6.0 volts.**  
**( 24x12, 26x10-12, 27x10 props )**

The RCS series of engines are specially manufactured for use in R/C flying models, and, therefore, their designs are laid-out, calculated and optimized for this application.

A few words of caution, RCS Engines are very powerful engines, and this power coupled to a large propeller in your model means that YOU are responsible for the safe operation at all times. Safety starts when you are deciding which type of aircraft is within your building and flying capabilities, takes shape while you are building your model, continues through the safe installation phase of your engine and avionics, the initial test runs and finally to flying your new creation.

Remember, the spark plug cap has a very high voltage passing to it. If the ignition is on, and the prop is turned, an unconnected cap can give a very nasty shock to anyone holding it, so please make it part of your post-flight/maintenance checks to disconnect the ignition battery and wait a few seconds for the charge in the ignition capacitors to decay before disconnecting the plug lead. You have been warned...!!

## **Cooling and Air in General**

RCS Engines do not require an excessive cooling opening in the cowling, the scale size inlets of most models normally suffice (exceptions being liquid-cooled prototypes such as Spitfires, Hurricanes and Mustangs, where some additional air entry must be made.) Generally, it is not how large the air entry is, but how large the exit is, we recommend that the outlet be twice the size of the inlet to stop pressure building up inside the cowling. Furthermore it is important that the cooling air flows around the carburetor and cylinder cooling fins. Air, like all fluids, takes the line of least resistance and will normally not flow through the fins. This can be solved by close-fitting Balsa or lite ply baffles (remember metal-to-metal contact causes RF interference) within the cowl to duct air through the cylinder fins. ***YOU MUST take all necessary precautions to ensure the engine will cool properly. Any damage or failures caused by overheating WILL NOT be covered under Warranty.***

Getting air to the carb

Since the RCS/SV 90 is a rear inducted engine (fancy word for rear carb mounting) some thought must be given to supplying all the air that the carb needs. So we recommend mounting the engine so that the carb is a minimum of 1" from the firewall. The provided standoffs accomplish this.

## **Fuel Tank**

The advantage of the RCS pumped carburetor allows the tank to be sited almost anywhere in the model, it should be at least of 32 ounce capacity for normal use. With a 26x10 prop and running at full throttle the RCS/ SV 90 draws just over 3.5 fluid ounces of fuel a minute. The tank and fuel line must be rated for use with gasoline. Since the engine is equipped with a pump type carburetor no external tank pressure is required. The only connections needed are a tank overflow line to outside of the airframe and a connection to the carburetor from the "clunk" line in the tank. Either a fueling dot or a simple "T" may be fitted in the carburetor line for filling the tank. Don't worry about using a "T" and the gas going into the engine, during fueling. The carburetor design prevents this from happening. Just cap off the "T" when you have filled the tank.

## **Ignition Module**

The Ignition system features a microprocessor controlled advance/retard function. The voltage input range is 4.5 to 6.0 volts. The average current drawn from the battery is 600 mA at full RPM. If you want to take advantage of the light weight Duralite batteries than a suitable regulator must be used. Regulators, sometimes included with an on/off switch for the battery, are available from several sources.

A power connector is supplied to connect your battery. The battery must be connected through a heavy duty or equivalent switch harness(or regulator switch combination). A Battery of 800-1200 mAH capacity is recommended. Crimp AND solder the supplied pins to your battery and switch wires and then insert them into the connector housing. Observe correct polarity of the pins (clearly marked on the ignition module label). If you have connected the input power wires correctly, the LED next to the power input connector will light. Reversed polarity will not damage the module. Make sure that all the wiring for the ignition is secured in the model so it does not "flop" around and does not contact the engine, the warranty does not cover damaged wires. The RCS/SV 90 is fitted with an ignition timing sensor . This is the wire and connector coming from the front of the engine. Plug in the connector (it is keyed and will only go in one way) into the ignition module. The spark plug boot is made from steel but care is required in the handling of it. It fits VERY tightly on the spark plug. The removal procedure is easy, but does require care. Do NOT twist the boot or the internal parts will be damaged. The boot needs to be PRIED off gently (while pulling it upward) with a suitable levering action between the cylinder head and boot rear edge. You must insure that the braided cable is secured in such a manner as to not flutter about or cause un-necessary movement during flight. This will reduce the possibility of the cap loosening on the plug as well as reducing the possibility of radio interference.

**ALWAYS ASSUME THAT THE IGNITION POWER IS APPLIED UNLESS YOU HAVE POSITIVELY TURNED IT OFF. AN IGNITION LEFT IN THE ON POSTION IS AN ACCIDENT WAITING TO HAPPEN.**

## Breaking in the Engine

It is recommended that high quality petroleum based motor oil, such as Pennzoil Two Cycle Air Cooled Oil or Yamalube 2R at a 32:1 mixture be used for the life of the engine. A RPM increase of up to 10% can be expected during the break in time. Avoid running the engine, for prolonged periods, at maximum RPM for the first few tanks of fuel. Your reward will be prolonged engine life.

## Fuel

Normal 87 Octane unleaded gasoline mixed with a ratio of 30:1 is recommended. We recommend using a petroleum based oil (Pennzoil Air cooled) for the break-in period to speed the seating of the ring.

## Carburetor

One of the major advantages of RCS/SV 90 design layout is the convenient positioning of the carburetor linkages and it is unlikely that you will have to fit bell cranks to achieve a satisfactory throttle cable run. There are two mixture adjustment needles: H=full throttle (high) L=Idle(low) These are factory set, and should need only minor adjustment if the propeller size changes, generally the full-throttle needle will need to be richened (screw turned anticlockwise) for larger sizes. The idle needle should not need to be adjusted more than three turns open, and twiddling here points to other problems such as air in fuel line, insufficient chocking/priming or wrong starting technique. To check for current carb adjustment, you can tell roughly from performance in flight or examining the plug color on the ground. Stop the engine at high-speed without letting it idle on the ground and immediately remove the plug. A black/oily appearance indicates over-rich, white/glazed is too lean.

Unlike glow engines the needles on a gasoline pump style carburetor do NOT require constant adjustment. This is a feature to be taken advantage of.

## Starting the Engine

First make sure that power to the ignition is **ON**.

### Then:

- 1) Open the throttle about to full; close the choke and flip the prop CCW until fuel flows into the carburetor and the engine runs briefly and then stops.
- 2) Open the choke and close the throttle to the idle position.
- 3) **Make sure that your model is securely held by another person and that the throttle is set to the IDLE to 1/8 position**

Then, once or twice, give the prop a smart flip to the left (CCW) and the engine should start. Although gas engines do not generally kick back it is recommended that an electric starter be used. If you MUST hand start then a heavy glove should be worn, set the location of the prop so that it comes on to compression at a 2 o'clock position. Proper hand technique is to flip your hand in an **upward, over and away from the engine** motion so that when the engine starts it does catch your fingers. An APC prop is sharp edged and the engine is quite powerful...don't get your hands or fingers in the prop arc while the engine is running!!

## Carburetor Adjustment

The carburetor is set up at the factory for the best operation of the engine; a good idle and a smooth transition to full throttle. If adjustments are desired; follow the instructions for starting the engine (a good starting place for the L and H adjustments is 1.5 turns from fully closed) and let it idle for about two minutes to warm up properly. Then adjust the carb's L screw for a better idle. Make only small adjustments. After adjusting the low RPM setting, open the throttle to full and make the adjustment of the H screw in the same way, this time tuning for the fastest RPM. Now close the throttle and vary it from closed to mid range. If there is hesitation or gurgling, adjust the carburetor's L screws for a good transition and an acceptable idle. Make the H setting slightly rich during the break-in period. (6 running hours)

**EVEN THOUGH THE CARBURETOR IS LOCATED FAR FROM THE PROPELLER , GREAT CARE MUST BE TAKEN WHILE ADJUSTING IT . ALSO, THE MODEL MUST BE FIRMLY HELD BY ANOTHER PERSON WHILE MAKING THESE ADJUSTMENTS.**

### **Warranties for DL, MT, DA, RCS, ZDZ, SV, Moki, and more.**

Warranties are broken down into two groups. Either you pay more for the engine and you get a very inclusive warranty, or you pay a low price for the engine and the warranty is very basic. It is your option. You choose what you want. All engines that TBM carry are excellent and have few factory defects. If you are handy with engine repairs, then I suggest you purchase one of the lower priced engines. The lower priced engines have excellent reliability, power and performance, very comparable to the higher priced engines. The higher priced engines are proven performers, offer excellent performance and offer a warranty which pays labor costs as well. Desert Aircraft offers the best warranty of ANYTHING ANYWHERE. Sometimes they don't even charge for repairs that they should charge for, but you will pay a little more for the products.

**Basic Warranty** – DL, MT, RCS/SV, offer a basic warranty which is less expensive than a full blown warranty, so the price of the engines is the lowest. These warranties are all similar, which is that if there is a defective part in the first 12 months after purchase, it is replaced by the factory. There is no provision for shipping of the parts or shipping of the engine to a warranty repair center. TBM will replace the warrant part at no charge once the part has been verified by the factory to be bad. We need photos to send to the factory for them to authorize the replacement. Once factory authorized, TBM will ship the part to you or to the repair center of your choosing. TBM only charges for the shipping. TBM will get the part replaced by the factory later. Then you replace the part yourself or have your repair facility replace the part. The customer pays for any labor and shipping involved. TBM may recommend outside service contractors to perform warranty repairs for these engines, or TBM may do the warranty work in house.

**Full Blown Warranty** – Desert Aircraft, RCS/Moki Radials, and ZDZ engines sell at a premium price yet offer a premium warranty. Warranty on the RCS/Moki radial engines and ZDZ are all 3 years parts and labor (not shipping). Warranty on the Desert Aircraft are all 2 years parts and labor (not shipping). Desert Aircraft handles their own warranty issues. RCS/Moki engines and ZDZ engine warranties are handled by TBM. Labor is paid for by TBM only if the issue is warranty related and the engine was purchased from TBM. Parts are paid for by the manufacturer, and manufacturer authorization is required. If the engine was purchased from RC Showcase or any other retailer, the warranty is limited to parts only. Warranty is limited to the original owner only.

There is no warranty on any manufacturer's ignition. If ignitions are exposed to more than 6v they can stop working. Since there is no way to tell if the ignition was operated with a higher voltage, then there is no warranty on it.



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