

# Instruction Manual

## SPE-40CC



# Safety Precautions

**This engine is for experienced flyers only and could cause serious harm if used incorrectly. Always take care when running large gas engines.**

- Read this manual in its entirety before commencing use of this engine.
- This engine is specifically designed for use on a radio controlled model plane. If it is used for any other purpose, we cannot be held responsible for its reliability or safety.
- Check the propeller prior to each use and replace if damaged.
- Always mix fuel in a well ventilated space.
- Never operate this motor alone
- Keep clear of the prop while motor is running.
- Any adjustments to carburetor must be done with engine and ignition turned off
- Engine can draw any loose items into propeller. Do not run engine near loose debris, dust, loose clothing or long hair
- Any one in the immediate area should wear safety specs while motor is running
- Never stand in front of or to the side of propeller while motor is running. Always stand behind
- Always install ignition kill switch which is easily accessible from outside the aircraft for emergency use
- Check propeller is secure before each start
- Ensure idle stop screw is adjusted to allow engine to stop when carburetor is fully closed
- Ensure spinner cone does not touch the propeller
- Never operate engine indoors or in a confined space
- Keep immediate area clear of spectators

- Gasoline is extremely flammable. Always allow engine to cool before refueling and keep fuel away from other ignition sources
- Always perform Radio range check before flying with engine running. If glitches are noticed, **do not fly**. Check spark plug lead for holes or nicks and check there is no vibrating metal to metal connections

## Mounting and set up of the engine

- Make certain the engine is mounted on aircraft grade plywood firewall with a thickness of at least 6mm and is firmly bolted using all four mounts. Flat body washers are recommended on the back side to prevent crushing of plywood.
- We recommend blue loctite on all bolt connections to prevent any bolts coming loose during flight. Regularly check all connections to insure their integrity.
- Be careful using shims or spacers behind mounting brackets and always make sure the firewall connections are flat so as to not put a twisting load on the crankcase.
- Ensure the carburetor has plenty of clearance, allowing plenty of airflow to achieve good aspiration
- This carburetor is spring loaded to idle/cut of in case of throttle linkage or servo failure. As a personal preference this can be disengaged if desired but it is not recommended for safety reasons
- Soft mounts may be used but beware that excessive movement can cause problems with throttle linkages and cowl penetrations
- The throttle arm should be fitted with a ball link to pushrod to prevent any vibration. Do not use any metal to metal connections that may vibrate and cause radio interference.
- The choke can be operated manually or by mini servo.

- As this engine has a pumped carburetor the position and height of the fuel tank can be freely selected. The tank will need to be vented but no back pressure is required from the exhaust system.
- Make sure engine and firewall are secure
- As this engine runs on petroleum, it is important that all plumbing and associated items are compatible (no silicon) and it is recommended to clamp tubing connections with small cable ties
- Fuel tank should have two outlets, one for pick up with clunk and one to top for vent. Vent should be run to out side of aircraft.

## **Propeller sizes**

Recommended prop sizes are as follows:

- 20X10 Sport Flying, War birds, Pattern (more speed)
- 21X8 3D/Freestyle Flying

This engine produces its best performance around 8,000 RPM. Prop size is dependent on the style of flying and the type and weight of the plane. Choose a propeller within the range that achieves 6,700 RPM – 9,000 RPM while in flight.

## **Fuel**

Fuel mix should be 2 stroke unleaded petrol mixed at a ratio of 50:1 for high quality synthetic racing 2C oil. We recommend Motul 800 2T synthetic racing oil or equivalent available at most motorbike shops. Never use alcohol or similar based fuels.

## Setting up ignition

- When setting up the ignition system, do not use light gauge wire for supply to ignition module.
- The ignition runs on a standard 6V flight pack. We recommend using a 900ma pack as a minimum.
- We recommend using high quality heavy duty radio switch for ignition such as JR 6v HD
- The ignition unit should be mounted away from excessive heat and firmly held with cable ties or Velcro straps. Be sure to use foam between support and ignition box to prevent vibration damage.
- Protect the shielded plug wires from rubbing against fiberglass or sharp edges as this could damage the wire and allow radio noise out causing interference.
- Keep ignition components and wiring separated as much as possible from receiver, receiver battery servos and switches.
- Always perform radio range check before flying, with engine running and **one section only** of antenna extended.

## Starting and operating

- 1) Fill the fuel tank.
- 2) Close the choke valve and open the throttle valve approximately  $1/3 \sim 1/2$  of the full open position. Switch on the ignition battery.
- 3) Quickly flip the propeller in the counterclockwise direction. When flipped several times, the engine will momentarily fire and a popping sound of initial explosion is heard.
- 4) Open the choke valve and set the throttle valve at the idle position (or at a position slightly open from the idle position)

and flip the propeller. This should start the engine.

- 5) Let the motor warm up for a few seconds before advancing the throttle.

**Be sure to lower throttle to idle position once choke is removed to avoid hard kickback when starting. Always have aircraft restrained adequately during this process.**

## Carburetor adjustment

- The needle farthest from the cylinder is the “high end” needle while the closest is the “low end” (see the L and H letters engraved on the carburetor). Winding the needle clockwise will lean the engine and anti clockwise will richen the engine.
- The setting will vary with altitude, temperature, humidity etc. A general starting point is 1 3/8 open on the low end and 1 3/4 open on the high end.
- Adjusting either needle may have some effect on the other, so some re-adjustment may be necessary when tuning.
- Adjust high end needle at full throttle to peak RPM, then richen slightly to ensure engine is not running too lean in flight.
- Adjust low end needle to achieve a smooth idle and readjust high end if needed.
- Set the high end needle slightly rich during running in period.
- Further adjusting may be necessary once cowl is placed as this often changes air pressure around carburetor intake

## **Trouble shooting**

### **Engine won't start:**

- Engine could be flooded (the SPE 40CC only needs choking for the first start of the day).
- Low battery voltage.
- Check tank venting, clunk position, fuel flow.
- Check fuel lines for kinks, holes or damage.
- Check fuel flow while flipping.
- Check throttle is open.
- Ensure prop is flipped over with authority.

### **Motor runs poorly:**

- Engine could be too rich. Ensure both needles are adjusted correctly.
- Ensure carburetor has not become loose, causing air leakage.
- Check all ignition connections and switches.
- Ensure fuel is freshly mixed and is free of humidity and water.

## **Warranty**

- Your SPE 40CC engine and ignition system are covered with a two year warranty from the initial date of purchase for defects in workmanship or materials
- Any modifications to, or disassembly of engine or ignition will void warranty of that item
- Replacement items will not be shipped until defective items are received by Precision Aerobatics

This warranty does not cover:

- Shipping or damage incurred from shipping to and from Precision Aerobatics
- Damage caused by improper handling, operation, maintenance, modifications, fuel or crash

## Specifications

Capacity:	40CC
Configuration:	2C single cylinder air cooled
Carburetor:	Walbro pump
Ignition:	CDI ignition
Power supply:	4.8V
Weight	1460g including ignition and muffler
Maximum output:	2.5KW/3.4 BHP
Maximum RPM	9000
Idle rpm	1300 RPM
PETROL/GASOLINE:	Unleaded 2 stroke 30:1-50:1
OIL:	2 stroke (synthetic is recommended)
MIX:	1:30 to 1:50
Recommended oil	2C racing oil and mix 1:50
Prop selection:	18X10 - 22X6
Static thrust:	20X8 prop >9kg

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