Golden Skies R/C Aircraft, Inc.

SPE ENGINES

Operator's Manual for SPE-26cc

SPECIFICATIONS
Displacement: 26cc 1.6 ci
Horsepower: 2.3 BHP
Ignition Style: Electronic Ignition w/ auto advance
RPM: 1,400 – 9,000 RPM
Fuel: Mixed Gasoline
Weight: Approximately 36 oz with all accessories

SAFETY TIPS AND WARNINGS

- Always use a balanced spinner and a balanced prop. An unbalanced spinner and prop combination will cause high levels of vibration and may cause the propeller shaft to break. ·
- Always use a lightweight spinner on your engine. Lightweight spinners are considered to be those with a cone wall of 1mm or less. Heavy spinners could cause the propeller shaft to break. ·
- Securely tighten the spinner and prop on the engine to prevent it from being thrown off the engine while running. ·
- Never use a prop that has hit the ground. Even though it may look good from the outside, it may be cracked on the inside which may cause it to disintegrate while in use. Do not use a nicked, cracked or split propeller. ·
- Keep foreign objects away from the propeller. Make sure that nothing can be “sucked in” by the propeller. Never start the engine on loose gravel or sand. ·
- Keep onlookers away from the running engine, especially small children. ·
- Do not attempt to stop the engine by throwing anything into the path of the propeller. ·
- Make sure the fuel line is well-secured to the engine and to the fuel tank so that it won't come off in flight.

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- Do not use silicone fuel line because it will be attacked by the fuel. Use vinyl or neoprene rubber fuel line.
- Always secure the fuel line away from the cylinder head. The engine's heat can damage the fuel line. ·
- Never touch the engine after a run. The engine will be hot and it may burn you.
- Before transporting your model, remove all the fuel from the fuel tank and fuel lines.
- Always use high-quality oil intended for 2-stroke engines.
- Use only low octane, alcohol-free gasoline. The carburetor diaphragm will gradually deteriorate if you use gasoline with alcohol (ethanol, gasohol, etc.).
- You will need to replace the diaphragm in about 80 hours of operation if you use gasoline with alcohol.
- · Muffler pressure to the fuel tank is not required.
- · Do not install your throttle servo or kill switch servo inside the engine compartment. Doing so could cause radio interference. Install all electronic radio devices at least 305mm [12"] away from the engine. The throttle pushrod should be non-metallic.
- If the engine is not to be used for more than a month, drain the fuel tank and remove any fuel from inside the carburetor. Do this by running the engine at idle until it quits by running out of fuel. Keeping gasoline inside the carburetor over an extended period of time will damage the diaphragm valve and clog passages inside the carburetor.
- Because the carburetor is more complicated than those used in glow engines, keep the fuel clean by using a fuel filter. Use a filter intended to be used with gasoline engines. Metal filters intended for glow engines are too coarse and will

not screen out finer particles. Always filter your fuel by using an appropriate filter before putting it into the airplane's fuel tank.

- · If you intend to run this engine on an engine stand, or on any other rigid mount, use rubber mounts. The crankcase and other parts of the engine may crack if you do not provide some kind of vibration absorption mechanism.
- A rubber mount is not necessary if the engine is mounted on a model airplane.
- Do not operate the engine in a closed room or where ventilation is not adequate.
- Gasoline is extremely flammable. Keep it away from an open flame, excessive heat or sources of sparks. Do not smoke near the engine or the fuel tank.
- This engine was designed for use in a model aircraft. Do not attempt to use it for any other purpose.
- ·Always install a kill switch that can be operated both manually and through the R/C transmitter.

PARTS LIST

SPE-26cc Engine w/Muffler
Ignition Module
Propeller Flange with Propeller Washer
Propeller Bolt
(4) 6mm x 10mm socket head cap screws with Lock Washers and Flat Washers
(4) 6mm x 12mm socket head cap screws with Lock Washers and Flat Washers
Spark Plug Wrench
4mm Allen Wrench

FEATURES

- Automatic Ignition Timing: The SPE-26cc features an electronic ignition system that advances the ignition timing as the engine RPM increases. This insures a retarded ignition timing at low RPM for easy starts and good low-end engine performance, and advanced timing at high RPM for good high-end power. ·
- The ignition module is waterproof and vibration proof. ·
- The ignition module runs on any 4.8V battery.
- The current consumption is approximately 188 mAh. ·

SPARK PLUG

The recommended spark plug is a Champion RDJ-8J. To avoid improper operation or possible engine damage, do not use any other type of spark plugs. The plug gap should be 0.4mm to 0.6mm [0.016" to 0.024"]. If the plug gap is incorrect, adjust it with a spark plug gapping tool, wash it with gasoline and allow it to dry completely before you reinstall the plug in the engine.

Note: If you want to check if the spark plug works, remove the spark plug from the engine, connect it to the coil and make sure the metallic threaded end of the spark plug touches the engine. Spin the propeller rapidly through top dead center and check for a spark. This procedure only works in a dark room as there is too much light outside to see the spark.

The various spark plug manufacturers have much information on their web sites regarding spark plug performance and health. For more information, check:
http://www.championsparkplugs.com/sparkplug411.asp

PROPELLER

Always use a well-balanced, high-quality propeller.
During our tests, our SPE-26cc turned a 16 x 8 JXF wooden prop at 7850 RPM. The engine was new with 90 minutes of breaking in. The test conditions Were: Temperature 10°C [50°F], humidity 45%, elevation at sea level. Performance may vary depending on atmospheric conditions.

The recommended propellers are: 16 x 8” through 18 x 6”

OIL
Select the best quality oil you can find for 2-cycle model airplane engines.
Use the standard fuel/oil ratios as shown below. Never experiment with cheap oil or with obscure brand name oils.. ·
Break-in: 1 gallon of gasoline with 25:1 (4%) oil content ratio. · Normal running: 40:1 (2.5%) oil content ratio.

PREPARE THE ENGINE
1. Check to see that all screws and bolts are tight. Check carefully for any cracks, broken or missing parts. Tighten or replace before proceeding.
2. Install the engine mounting stand-offs on the engine using four 6mm x 12mm [3/16" x 15/32"] socket head cap screws.
3. Secure the ignition control module ground wire to the engine using one of the 6mm x 12mm [3/16" x 7/8"] socket head cap screws.
4. Connect the ignition control module to the pick up sensor. The connector is polarized and will only plug in one way.
5. Connect a kill switch to the ignition control module. It is recommended to install a manual switch and a servo operated switch. This can be accomplished using two receiver On/Off switches.
6. Connect the ignition module battery. Any 4.8V, 500mAh and above battery will work well for this. The approximate current consumption of the ignition switch module is 188mAh.

INSTALLING THE SPE-26cc ENGINE ON YOUR AIRPLANE
Note: The length of the engine from the back on the engine mount to the propeller washer is 154mm [6.0625"].
1. Use the supplied mounting template (on the back cover of this manual) to drill the engine mounting bolt holes and the necessary clearance hole on the firewall.
2. Install the engine on the firewall using four 6.mm x 12mm **or** [10-24" x 3/4"] socket head cap screws, four #10 flat or lock washers and four #10 blind nuts. Use thread-locking compound for security
3. Install a manual and radio operated kill switch (GPMG2150). Install a kill switch servo at least 305mm [12"] away from the engine.
4. Install the throttle servo at least 305mm [12"] away from the engine. Make sure that you get the carburetor's full range of rotation with your servo travel.
5. Install the ignition module securely in the airplane forward area. It is recommended that a thin piece of foam rubber be placed between the module and the mounting surface and that rubber bands are used to hold the module in place. 4mm [5/32"] screws and washers can also be used to secure it in place, but soft mounting the module is always the best choice.
6. Secure all connections with shrink tubing.
Note: The SPE-26cc engine must be installed on a 9mm [3/8"] lite-ply firewall or on a 6.4mm [1/4"] birch ply firewall. The firewall must be securely glued to the airplane. Use triangle stock and pin the firewall with hardwood dowels to reinforce the firewall glue joints. **Never** install the SPE-26cc engine onto a firewall thinner than specified because it may fail due to the power of the engine.
7. Cut all necessary clearance and cooling holes in the cowl.
8. Make sure the cowl is secured to the airplane and that the spinner to cowl clearance is at least 3mm [1/8"].

BREAKING IN THE ENGINE

·Do not adjust the high-speed needle on the carburetor to break in the engine. If you do so, carbon will accumulate in the spark plug and that will make ignition difficult. · Do not run at full power for extended periods of time while breaking in your engine. · Make sure that the engine has adequate cooling. While breaking in, the engine may run at slightly higher temperatures. · If you wish to do so, you can break in your SPE-26cc while flying your airplane. Just make sure you observe all recommendations above.

STARTING PROCEDURES
There are two recommended ways to start the SPE-26cc Engine.

A. Manual Starting:
Note: Use a thick glove to protect your hand while hand-starting the SPE-26cc Engine.
1. The propeller should be installed on the prop spacer so that it is comfortable for you to flip it through compression. You also need to position it in a way that when you flip the propeller; the magnets are 20° clockwise from the magnet pick up.
2. Have someone help you hold the airplane while you start the engine.
3. Make sure the ignition is OFF, close the choke on the carburetor and open the throttle slightly from the idle position.
4. Rotate the propeller slowly about 10 to 20 times (more in winter) until fuel begins to be drawn into the carburetor. Another way to prime the engine is to rotate the prop clockwise from bottom dead center to top dead center (compression) and then counterclockwise back to bottom dead center repeatedly.
5. Switch the ignition to ON.
6. Flip the propeller clockwise several times briskly.
7. After you hear some initial firing sounds, move the choke lever to the OPEN position.
8. Set the throttle to a high idle. Set the prop so that the magnets are 20° clockwise from the magnet pick up when viewed from the front.
9. Flip the prop through compression rapidly. If this is done properly, the engine will start between the first and the eighth flip of the prop. During our testing, starting took an average of 3-4 flips.
10. After starting, let the engine idle for two to three minutes. Open and close the throttle slowly until the engine runs smoothly at idle and at full throttle. Acceleration should also be smooth.
11. If your engine does not start, repeat the procedure.

B. Electric Starter Starting:
1. Make sure you use a good quality, lightweight aluminum spinner.
2. Have someone help you hold the airplane while you start it.
3. Make sure the ignition is OFF, close the choke plate on the carburetor and open the throttle slightly from the idle position.
4. Use your electric starter to turn the engine over for several seconds.
5. Switch the ignition to ON and open the choke.
6. Set the throttle to high idle and use your electric starter to turn over the engine until it starts.
7. After starting, let the engine idle for two to three minutes. Open and close the throttle slowly until the engine runs smoothly at idle and at full throttle. Acceleration should also be smooth.
8. If your engine does not start, repeat the procedure.

ENGINE ADJUSTMENTS
· Always make high- and low-speed needle adjustments with the engine shut off. Also make sure the ignition is OFF. · Adjust the needle marked “H” for high-speed RPM. Adjust the needle marked
“L” for low-speed RPM.

A. Normal high- and low-speed needle settings:
It is not necessary to change the needle settings if the engine runs smoothly. Normally only the “H” needle will need adjustment from time to time and only by a small amount.
H: Open the needle 2 turns from the closed position (±1/4 of a turn in winter).
L: Open the needle 1-3/8 turns from the closed position (±1/4 of a turn in winter).
Only adjust the high- and low-speed needle within the above range.

B. Idle adjustment:
Note: Do not confuse the idle screw with the low-speed needle “L”. The idle screw physically adjusts how much the carburetor valve can close. The low-speed needle “L” adjusts the gasoline-to-air mixture when the engine is running at low RPM. If your engine appears to work correctly except that the low RPM are not as low as you want them to be, and then adjust the idle screw. If your engine behaves erratically at low RPM, then adjust the low-speed needle “L”. When adjusting, turn the screw about 1/8 of a turn each time. A dirty plug will make it difficult to adjust the idle RPM. Follow the recommended procedures if any of the following happens:
Problem:
1. The engine hesitates when accelerated rapidly.
2. The RPM increases at idling.
3. The engine stops when the throttle is moved from high to low.
Solution:
Your low-speed needle “L” is too lean. Open it up about 1/8 of a turn and try again.
Problem:
The idle is not steady.
Solution:
Your low-speed needle “L” valve is too rich. Close it 1/8 of a turn and try again.

C. High-speed Adjustment:
The high-speed RPM and transition performance is adjusted with the high-speed “H” needle valve. When adjusting, turn the screw about 1/8 of a turn each time. The position of the “H” needle will vary according to air temperature and field elevation. If your engine is running smoothly, then do not adjust this needle valve. Follow the recommended procedures if any of the following happens:
Problem:
1. Engine stops at full throttle.
2. Engine hesitates when accelerated rapidly.
3. The engine will not come up to full RPM at full throttle.
Solution:
Your high-speed needle valve “H” is too lean. Open it up 1/8 of a turn and try again.
Problem:
1. Your engine does not reach full RPM.
2. Carbon build-ups appear consistently on your spark plug.
Solution:
Your high-speed needle valve “H” is too rich. Close it up 1/8 turn and try again.

2-Year Limited Warranty For USA
SPE Engines warranty’s this product to be free from defects in materials and workmanship for a period of three (2) years from the date of purchase. During that period, SPE Engines will, at its option, repair or replace without service charge any product deemed defective due to those causes. You will be required to provide proof of purchase date (receipt or invoice).
• This warranty does not cover damage caused by crash, abuse, misuse, alteration or accident. Damage caused by customer disassembly, tampering, use of substandard fuel, use of incorrect accessories (spark plug, prop, etc.) or any use of the engine for which it is not specifically intended will automatically void the warranty of the engine. If there is damage resulting from these causes within the stated warranty period, SPE Engines will, at its option, repair or replace it for a

service charge not greater than 50% of the current retail list price. Be sure to include your daytime telephone number and e-mail address in case we need to contact you about your repair.
• Under no circumstances will the purchaser be entitled to consequential or incidental damages. This warranty gives you specific legal rights and you may also have other rights, which vary from state to state.
• If you attempt to disassemble or repair this unit yourself, it may void the warranty.
For service on your SPE Engines product, either in or out of warranty, send it post paid and insured to:
SPE ENGINES
9830 BELL RANCH DRIVE STE #101
SANTA FE SPRINGS CA 90670
(562) 906-0808
www.cermark.com
Along with your engine and proof of purchase date, please include a complete written explanation detailing the problem(s). State your name and address clearly. For repairs not covered under warranty, you will be notified of the charges so you can send a check.
Outside USA and Canada, contact local importer for warranty information.

REPLACEMENT PARTS

1	SPE001	CYLINDER ONLY FOR 26CC
2	SPE002	REPLACEMENT MUFFLER FOR 26CC
3	SPE003	MUFFLER GASKET ONLY FOR 26CC
4	SPE004	MUFFLER SCREW ONLY FOR 26CC
5	SPE005	CARBURETOR INSULATOR FOR 26CC/40CC
6	SPE006	CARBURETOR INSULATER GASKET FOR 26CC
7	SPE007	CARBURETOR GASKET FOR 26CC
8	SPE008	WALBRO CARBURETOR FOR 26CC
9	SPE009	CARBURETOR SCREW FOR 26CC
10	SPE010	CYLINDER GASKET FOR 26CC
11	SPE011	CLYINDER SCREW FOR 40CC
12	SPE012	REAR CRANKCASE FOR 26CC
13	SPE013	FRONT CRANKCASE FOR 26CC
14	SPE014	CRANKCASE SCREW FOR 26/40CC
15	SPR015	CRANKCASE GASKET FOR 26CC
16	SPE016	REAR CRANKCASE GASKET FOR 40CC
17	SPE017	FRONT CRANKCASE GASKET FOR 26CC
18	SPE018	BEARING FOR 26/40CC
19	SPE019	CRANKSHAFT WITH CONNECTING ROD 26CC
20	SPE020	WOODRUFF KEY FOR 26/40CC
21	SPE021	PISTON FOR 26CC
22	SPE022	PISTON RING FOR 26CC
23	SPE023	PISTON PIN FOR 26CC
24	SPE024	PISTON PIN RETAINER FOR 26CC

25	SPE025	SMALL END BEARING FOR 26CC
26	SPE026	FRONT CRANKCASE RING FOR 26CC
27	SPE027	PROP HUB FOR 26CC ENGINE
28	SPE028	REAR PROPELLER WASHER 26CC
29	SPE029	FRONT PROPELLER WASHER 26CC
30	SPE030	PROP SCREW FOR 26CC
31	SPE031	REAR PROP WASHER SCREW FOR 26/40CC
32	SPE032	FLYWHEEL NUT FOR 26/40CC
33	SPE033	STANDOFFS FOR 26CC
34	SPE034	SPARK PLUG SPANNER FOR 26/40CC
35	SPE035	AUTO ADVANCE TIMING IGNITION 26CC