

SPE[®] Engines Operator's Manual for SPE-40

SPECIFICATIONS

Displacement: 40cc (2.5 cube inch)

Horsepower: 3.2 BHP

Ignition Style: Electronic Ignition w/ auto advance timing

RPM: 1,500 – 9,000 RPM

Fuel: Mixed Gasoline

Weight: Approximately 53oz with all accessories

EXCLUSIVE US DISTRIBUTOR: Cermark LLC

SAFETY TIPS AND WARNINGS

1. 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. ·
2. 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. ·
3. Securely tighten the spinner and prop on the engine to prevent it from being thrown off the engine while running. ·
4. 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. ·
5. 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. ·
6. Keep onlookers away from the running engine, especially small children. ·
7. Do not attempt to stop the engine by throwing anything into the path of the propeller. ·
8. 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.

OPERATOR'S MANUAL FOR SPE-40CC

1. Do not use silicone fuel line because it will be attacked by the fuel. Use vinyl or neoprene rubber fuel line.
2. Always secure the fuel line away from the cylinder head. The engine's heat can damage the fuel line.
3. Never touch the engine after a run. The engine will be hot and it may burn you.
4. Before transporting your model, remove all the fuel from the fuel tank and fuel lines.
5. Always use high-quality oil intended for 2-stroke engines.
6. Use only low octane, alcohol-free gasoline. The carburetor diaphragm will gradually deteriorate if you use gasoline with alcohol (ethanol, gasohol, etc.).
7. You will need to replace the diaphragm in about 80 hours of operation if you use gasoline with alcohol.
8. Muffler pressure to the fuel tank is not required.
9. 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.
10. 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.
11. 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.
12. 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.

13. A rubber mount is not necessary if the engine is mounted on a model airplane.
14. Do not operate the engine in a closed room or where ventilation is not adequate.
15. 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.
16. This engine was designed for use in a model aircraft. Do not attempt to use it for any other purpose.
17. Always install a kill switch that can be operated both manually and through the R/C transmitter.

PARTS LIST

1. SPE-40cc Engine with side mount Muffler (SPE403002S)
2. Ignition Module (MAI-II-40)
3. Propeller Hub and Washers assembly (SPE403027)
4. (1)10mm x 55mm propeller bolt with 5mm center hole for Spinner (SPE403030)
5. (4) 5mm x 22mm Socket head cap screws with Lock washers and Flat Washers (SPE403036)
6. (4) 5mm x 25mm Socket head cap screws with Lock washers and Flat Washers (SPE403027)
7. (2) 4mm x 40mm Socket head cap screws with Lock washers (SPE403031)
8. Spark Plug Spanner (SPE403034)
9. (4) 35mm aluminium Standoffs with flat washer (SPE403033)
11. Plywood mounting template (Not listed)

FEATURES

1. Automatic Ignition Timing: The SPE-40cc 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
2. The ignition module is waterproof and vibration proof
3. The ignition module runs on any 5 cell NiCad/NiMH or 2S Li-Poly pack
4. The current consumption is approximately 200 mA, 700mAh or higher packs are preferable

SPARK PLUG

The recommended spark plug is a Champion RCJ 6Y. 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-40cc turned a 20 x 10 JXF wooden prop at 6850 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: 18 x 8" through 22 x 6" BEST 20 X 10

The 4mm x 38mm Cap screws are used to secure the propeller to the mounting flange.

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 5mm x 22mm socket head cap screws.
3. Secure the ignition control module ground wire to the engine using one of the 5mm x 25mm 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 pack, it can be used any 5 cell or 2S Li-Poly packs with at least 700mAh. Do not allow the battery to drop below 4 volts or damage to the module could occur.

INSTALLING THE SPE-40cc 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 laser cut plywood mounting template to drill the engine mounting bolt holes and the necessary clearance hole on the firewall.
2. Install the engine on the firewall using four 5mm x 25mm 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 (EDR-107). Purchase from Cermark. 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-40cc 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-40cc 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"].



SPE 263033 &
SPE 403033

Standoffs
8 different sizes
(30, 35, 40, 45, 50, 55, 60, 65mm)

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-40cc while flying your airplane. Just make sure you observe all recommendations above.

STARTING PROCEDURES

There are two recommended ways to start the SPE-40cc Engine.

A. Manual Starting:

Note: Use a thick glove to protect your hand while hand-starting the SPE-40cc 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.



Installation



CERMARK 3.5" precut spinner fits
20x10 JXF or APC propeller



PRE flight

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.



CERMARK 5:1 reduction gear starter easily starts the SPE-40 gas engine

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:

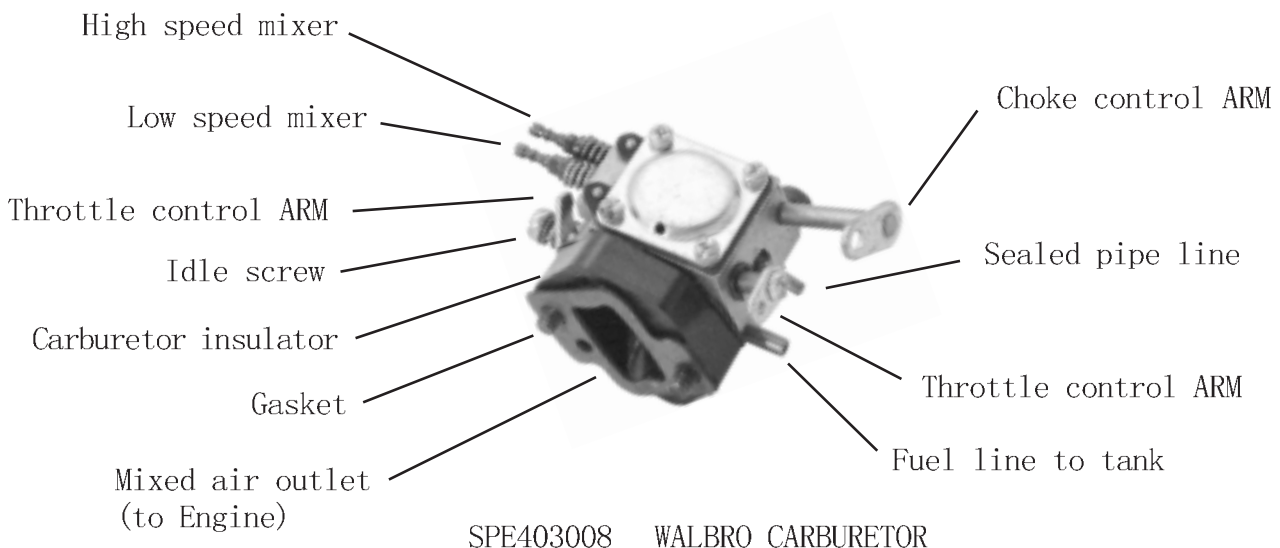
It is not necessary to change the needle settings if the engine runs smoothly. Normally only the “H” needle will need adjustment from time to time and only by a small amount.

H: Open the needle 2 turns from the closed position ($\pm 1/4$ of a turn in winter).

L: Open the needle 1-3/8 turns from the closed position ($\pm 1/4$ 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 two (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 75% 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 (CERMARK LLC)

9830 BELL RANCH DRIVE
SANTA FE SPRINGS CA 90670
(562) 906-0808

www.cermark.net or www.speengine.com

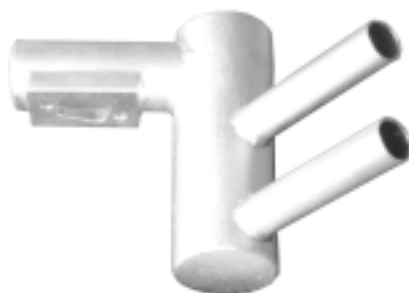
Along with your engine and proof of purchase date, please include a complete written explanation detailing the problem(s). State your name and address clearly. For repairs not covered under warranty, you will be notified of the charges so you can send a check.

Outside USA and Canada, contact local importer for warranty information.



SPE403002

Side mount & rear mount muffler



SPE403002R



Auto timing advance
ignition system

SPE[®]-40 Gasoline Engine

The price list of spare parts (USD)

	Part No.	Description	Type	Quantity	Sale
1	SPE403001	Cylinder	SPE40-1	1	\$40.00
2	SPE403002S	Muffler (side mount)	Single40S	1	\$40.00
3	SPE403002R	Muffler (rear mount)	Single40R	1	\$50.00
4	SPE403003	Muffler gasket	PQ-40D	1	\$1.00
5	SPE403004	Muffler mount screw	M5 x 20	2	\$1.00
6	SPE403005	Carburetor insulator	HJK	1	\$8.00
7	SPE403006	Gasket Insulator carburetor	HJK-40D1	1	\$1.00
8	SPE403007	Carburetor gasket	HJK-40D2	1	\$1.00
9	SPE403008	Carburetor walbro carburetor	WT433	1	\$89.00
10	SPE403009	Carburetor screw	M5 x 60	2	\$1.00
11	SPE403010	Cylinder gasket	QG-40D	1	\$1.50
12	SPE403011	Cylinder screw	M5 x 25	4	\$1.50
13	SPE403012	Rear crankcase	SPE40-2	1	\$22.00
14	SPE403013	Front crankcase	SPE40-3	1	\$22.00
15	SPE403014	Crankcase screw	M5 x 35	4	\$1.50
16	SPE403015	Crankcase gasket	QZ-40D	1	\$1.50
17	SPE403016	Rear crankcase gasket	12 x 22 x 7	1	\$3.00
18	SPE403017	Front crankcase gasket	12 x 32 x 8	1	\$3.00
19	SPE403018	Crankcase front/rear bearing	5P6201-Z3	2	\$15.00
20	SPE403019	Crankshaft(including connecting rod)	SPE40-4	1	\$38.00
21	SPE403020	Woodruff key	10 x 3	1	\$2.00
22	SPE403021	Piston	HSQ40	1	\$9.50
23	SPE403022	Piston ring	1.5 x 1.7	2	\$5.50
24	SPE403023	Piston pin	Q10 x 32	1	\$2.00
25	SPE403024	Piston pin retainer	Q10	2	\$1.00
26	SPE403025	Small end bearing	N10-14	1	\$4.50
27	SPE403026	Front crankcase ring	QQ32	1	\$2.00
28	SPE403027	Prop Hub	LQ38 x 46	1	\$22.00
29	SPE403028	Rear propeller washer	HQ38 x 10	1	\$7.00
30	SPE403029	Front propeller washer	QQ38 x 10	1	\$6.00
31	SPE403030	Prop screw	M10 x 55	1	\$4.00
32	SPE403031	Rear propeller washer screw	M4 x 40	2	\$2.50
33	SPE403032	Flywheel nut	M8 x 1	1	\$1.00
34	SPE403033	Standoffs set of 4 pes	35mm	4	\$24.00
35	SPE403034	Spark plug spanner	M18-16	1	\$4.00
36	MAI-II-40	Auto advance timing ignition	4.8V-18V	1	\$70.00
37	SPE403035	Ignition Timing Ring	GQ38.2x6	1	\$18.00
38	SPE403036	Standoffs screw for engine	M5 x 22mm	4	\$2.00
39	SPE403037	Standoffs screw for firewall	M5 x 25mm	4	\$2.00

**9830 Bell Ranch Drive, Santa Fe Springs, CA 90670 INFO: (562) 906-0808, FAX: (562) 906-0820
ORDER: (800) 70-Hobby or (800)704-6229, E-mail: sales@cermark.net Web: www.cermark.net**