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MLDEngines
www.mldengines.com



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remember to register your engine for a free gift.

Operating Manual

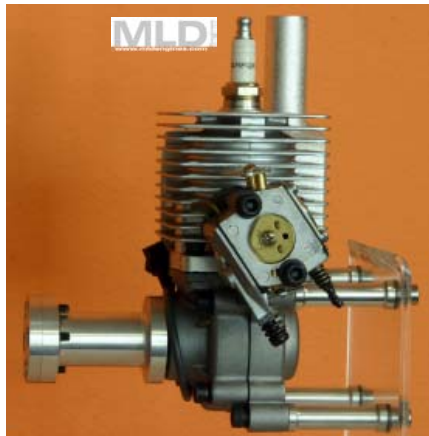
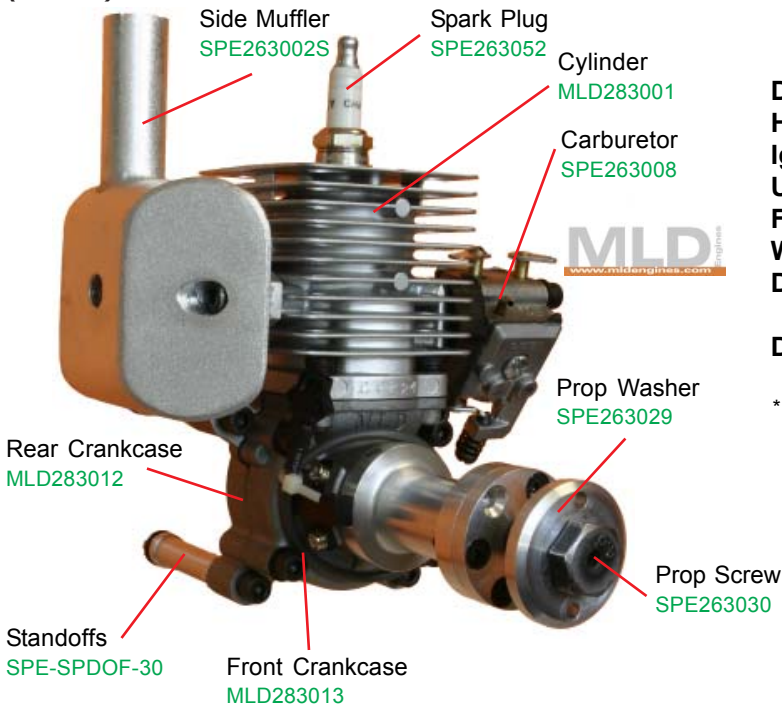
MLD-28S

North American version only

serial #: _____
date of purchase: _____

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SPECIFICATIONS

Displacement: 28 cc or 1.71 ci
Horse power: 2.8 BHP
Ignition Style: Electronic Ignition with auto advance
Useful RPM: 1,800 – 9,600 RPM
Fuel: Mix of gasoline & 2 cycle oil
Wt. Gross: 37 oz or 2.30 pounds w/muffler
Dimension: Engine + Side muffler:
 Width: 5 3/4", Height: 8", Depth: 5"
Dimension: Engine + Rear muffler*:
 Width: 6", Height: 8", Depth: 6 1/2"
 * Rear muffler sold separately

BOX CONTENT

- (1) MLD-28cc engine [MLD283000]
- (1) Side mount muffler [SPE263002S]
- (1) Velocity stack kit (complete) [MLD-28VLCS]
- (1) AMSOil Saber synthetic 100-1 [ATPPK-EA]
- (1) Electronic ignition module with auto advance [MAI-II-26]
- (1) Propeller flange with propeller washer [SPE263029]
- (1) Propeller bolt 10 x 55mm [SPE263030]
- (4) 5mm x 27mm (22) socket head cap screws with lock washers and flat washers
- (4) 5mm x 30mm (25) socket head cap screws with lock washers and flat washers
- (2) 4mm x 38.5mm (34) socket head cap screws
- (1) Spark plug Wrench (spanner) [SPE263034]
- (4) 30mm mounting standoffs [SPE263033]
- (1) Plywood mounting template [MLD283051]
- (1) Registration card / sheet [MLD-28REG]

SAFTEY TIPS & WARNINGS

- Use rubber mounts or other vibration absorption mechanism when running this engine on an engine stand, or on any other rigid mount to help dissipate vibration.
- A rubber mount is not necessary when mounting on a model airplane.
- Always install a kill switch that can be operated both remotely and manually.
- Radio interference can be caused by electronic devices too close to the engine (12"), so install throttle servo and/or kill switch servo outside the engine compartment.
- Use vinyl or neoprene rubber gasoline safe fuel tubing. Do not use silicone fuel line.
- Secure the fuel line away from possible abrasion and engine heat.
- Use high-quality oil intended for 2-cycle engines. We recommend AMSOIL synthetic oil.
- Use proper gasoline fuel filters, because glow engine filters will not filter fine particles.
- Use only standard or medium octane, and alcohol-free gasoline. If gasoline with alcohol can not be avoided, we then recommend replacing the diaphragm after 50 hours of use. We also recommend that you do a maintenance check after every 10 hours.
- Gasoline with alcohol such as ethanol, gasohol, and etc erode your carburetor diaphragm
- Always tighten your balanced spinner and balanced prop are securely prior to starting.
- Never use a prop that has hit the ground, due to propeller internal structural damage.
- Operate the engine in an open or well ventilated area.
- Keep foreign objects, loose gravel, sand, parts away from the propeller during start.
- Never touch the engine after a run. The engine will be hot and it may cause burns.
- Remove all the fuel from the fuel tank and fuel lines before transporting your model.
- The throttle pushrod should be non-metallic when possible.
- Gasoline is extremely flammable. Keep it away from an open flame, heat and sparks.

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PROPELLER SELECTION

The recommended propeller ranges from:

Wood: 16 x 8 through 19 x 6 (XOAR or JXF beechwood version)

Comp: 15 x 8 through 19 x 8 (APC Sport and Wide versions)

To the right is data collected from a new 30 minutes engine with 30-to-1 oil/gasoline mix.

Break-in test results (chart on the right) may differ pending atmospheric conditions such as temperature, humidity, elevation and etc. This data was collected in Southern CA, at 82 degrees F, at 180' above sea level with 30-to-1 ash 2-cycle oil. Your performance will also improve significantly after proper breaking-in [page 5].

We highly recommend that you keep a record or log of your MLD engine [page 12].

Size	Wood	Comp
15 x 8		9,500
15 x 10		9,050
16 x 6*	9,000	
16 x 8	8,600	8,800
17 x 6		8,800
17 x 7	8,100	
17 x 8	7,900	8,100
18 x 8W	7,000	7,800
19 x 8	6,500	

Wood Prop: JXF, Wood Prop*: JZ Pro,
Comp Prop: APC

DETAILS & RECOMMENDATIONS

LONG TERM STORAGE [over 1 month]

Drain the fuel tank and remove any fuel from inside the carburetor by running the engine at idle until the engine quits by running out of fuel. Keeping gasoline inside the carburetor over an extended period of time will damage the diaphragm valve and clog carburetor passages.

ELECTRONIC IGNITION SYSTEM (also known as CDI)

Your MLD-28cc features an electronic ignition system that advances the ignition timing as the engine RPM increases. This insures a retarded timing at low RPM for easy starts and good low-end engine performance, and advanced timing at high RPM for good high-end power.

- Water resistant and vibration proof.
- Operates on 4 (4.8V), 5 (6.0V) cell NiCD/NiMH or 2s LiPo (7.4V) power source
- Consumption rate is approximately 230mA.
- Do not allow the battery to drop below 3 Volts which may damage your ignition module.

There are a couple important facts that will ensure MILD ignition system performance.

1. Do not put voltage (power supply) to your MLD ignition system without the spark plug cap/boot is firmly attached to a spark plug or specific spark plug tester.
2. Do not fire the spark plug without a spark plug firmly attached to the plug cap/boot.
3. Make certain that your metal spark plug cap/boot is pushed past the spark plug's hex nut.
4. Over 95% of improper ignition or ignition failures result from misuse of 1, 2 or 3. (listed above). In most if not all of these cases, the rubber like insulator in the cap/boot has suffered IRREVERSIBLE damage(s). The high voltage discharge will simply shred the molecular structure of the rubber material, thus creating weak spots and tears within the insulation. The weak spots will then create current and voltage leakage during discharge (creating spark in the spark plug). The results are;
 - a. Weak performance (low sparks)
 - b. Irregular firing (feels like incorrect timing)
 - c. Inconsistent timing (unable to hold or to reach consistent RPM)
 - d. Radio interference (current / voltage leakage)

Here at CERMARK and MLD, we have taken drastic measures of improving and educating customers of the care and maintenance of your electronic ignition system. Please contact us at anytime if you have question.

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DETAILS AND RECOMMENDATIONS (CONTINUE)

SPARK PLUG

MLD recommends both Champion and NGK spark plugs [SPE263052]. The plug gap should be 0.5mm to 0.6mm [0.020" to 0.025"]. If the plug gap is incorrect, adjust it with a spark plug gapping tool. Remember to allow the plug to dry completely after cleaning with gasoline before reinstalling.

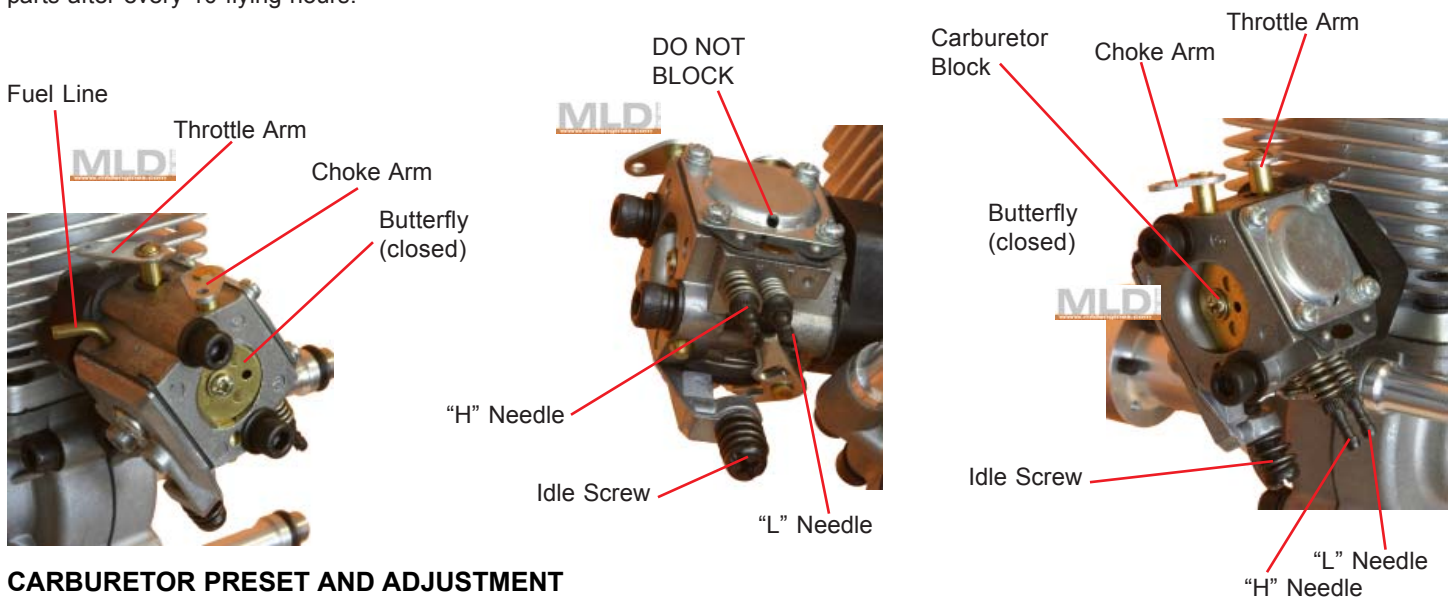
Note: If you want to check to see if the spark plug works, remove the spark plug from the engine, connect it to the coil and make sure the metallic threaded end of the spark plug touches the engine. Spin the propeller rapidly through top dead center and check for a spark. This procedure only works in a dark room or against a dark background. (this procedure needs to be verified for accuracy and correctness) — LJ indicated that this procedure may cause ignition film rupture or pre-mature thinning. The failing ignitions generally produces "CLICKING" noise.

OIL (2-CYCLE)

Use quality 2-cycle synthetic such as Saber Professional (100:1) or low ash 2 cycle oil at recommended ratio. **Break-in:** One to two gallons of gasoline at 100:1 oil content ratio with Saber Professional synthetic oil from AMSOIL. **After Break-in:** 100:1 oil content ratio with Saber Professional synthetic oil from AMSOIL. It is highly recommended to use a proven synthetic oil such as Sabre Professional. We have provided a 1 gallon premix packet for you. **IMPORTANT: Tests indicate higher performance and lower residues with AMSOIL Sabre Professional 100-1 at both "PRE" and "POST" break-in.** **Non Synthetic Oil:** If you do not have the recommended synthetic oil, you can use Pennzoil Air Colled at 30:1 or 32:1 at break-in, and 45:1 or 50:1 after break-in.

GASOLINE

Fresh standard (87) to mid(89) octane unleaded gasoline is recommended. Please avoid alcohol gasoline, because the alcohol in the mixture will shorten the life of the rubber diaphragms. If it is unavoidable, then remember to inspect the seals and the other parts after every 10 flying hours.



CARBURETOR PRESET AND ADJUSTMENT

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

"H" needle: Open the needle 1-3/4 turns from the closed position ($\pm 1/4$ of a turn in winter).

IDLE Screw: Once your engine operates properly at both high and low speed, and your low RPM is not as low as you wish, **then and only then** do you adjust your engine's idle screw.

- Always make high speed and low-speed adjustments with the ignition and the engine OFF.
- Do not change your mixture settings needlessly. Normally, only the high speed mixture requires minor (1/4 turn max) adjustment due to atmospheric (temperature, elevation, humidity...) changes.
- Adjust your idle, low and high settings independently to reduce confusion.
- Low speed needle => air/fuel mixture for low RPM situation (marked "L"), 1/8 turn max.
- High speed needle => air/fuel mixture for high RPM situation (marked "H"), 1/8 turn max.
- Idle screw => controls carburetor valve, provide RPM setting for idle situation (the larger screw with spring attachment), adjust with 1/8 turn each time.

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ENGINE BREAK-IN

The recommended break-in time is around 2.5 hours or 1 gallon of gasoline at 100:1 gasoline to **SYNTHETIC** oil content ratio. If synthetic oil is not available, then use Pennzoil Air Cool (2-cycle) at 30:1 or 32:1. Please use a prop that will allow the peak RPM to be over 7,500. Make certain that the needle to be slightly rich during break-in. Alternating between high and low temperatures improves longterm engine performance. The power of your MLD engine will increase with proper breaking in. The power difference should be noticeable from initial to 2nd hour to 10th hour and on. The power thereafter the 10th hour should remain consistent.

- Avoid adjusting your high-speed ("H" or outside) needle on the carburetor during break-in process.
- Avoid full power for extended periods of time during break-in period of your engine.
- Make sure that the engine has adequate cooling during break-in. Alternating between full and low throttle during break-in is highly recommended.
- Keep your engine slightly rich during this process reduces carbon deposit on your spark plug.
- Break-in your MLD-28cc by flying is acceptable as long as all recommendations are observed.

ENGINE INSTALLATION

Note: The MLD-28cc engine must be installed on a quality lite-ply firewall or on a birch ply firewall. The firewall must be securely glued to the airplane, and reinforced with triangular stock.

1. Because your spinner must clear the cowl by 3mm [1/8"] or more, you need to calculate or add in engine depth (from the mount to the propeller washer) of 6 inches or 154mm.
2. Use the supplied laser cut mounting template [MLD263051] to drill the engine mounting bolt
3. Secure the 4 xc standoffs (available in 25mm, 35mm, 40mm... or 65mm lengths) to the firewall with four 6mm x 12mm or [10-24" x 3/4"] socket head cap screws, four #10 flat or lock washers and four #10 blind nuts. *Hint: use thread-locking compound.*
4. Install the engine to your engine stand-offs using four 6mm x 12mm [3/16" x 15/32"] socket head cap screws. The standoff are secured to the firewall with four 6mm x 12mm or [10-24" x 3/4"] socket head cap screws, four #10 flat or lock washers and four #10 blind nuts. *Hint: use thread-locking compound such as Loctite.*
5. Cut all necessary clearance and cooling holes in the cowl.
6. Install a manual and radio operated kill switch [RDR-107] for safety reasons. Install the kill switch servo at least 305mm [12"] away from your engine and ignition module.
7. Install the throttle servo at least 305mm [12"] away from the engine. Make certain that your carburetor gets full range of rotation with your servo travel.
8. Install the ignition module securely in the airplane forward area (away from your receiver). You can use rubber bands or Velcro to hold your ignition module in place. 4mm [5/32"] screws and washers can also be used to secure the module in place, but a softer mount is always preferred.
9. Secure all connections with shrink tubing.
10. FIRMLY insert the spark plug cap/boot to your engine's spark plug. **IMPORTANT:** Make certain that the cap/boot extend past the hex section of the spark plug..
11. Connect the ignition control module to the pick up sensor.
12. Make sure your cowl is secured.

STARTING

PREPARING ENGINE

1. **Check to see that all screws and bolts on the engine are tight and secure.** Check carefully for any cracks, broken or missing parts. Tighten or replace before proceeding.
2. Make certain that the system (switch) is in the OFF position
3. Make certain that the ignition module battery power supply (4.8V – 8.0V) is fully charged. [4KR-1100AAU or 5KR-1100AAU, 4HR-1650AAU, 5HR-1650AAU]
4. Close the choke or make certain that the choke plate on the carburetor is close (
5. Position the round magnet on the prop hub [SPE263027] to the letter "L" of "MLD" casting on the cylinder [MLD283001].
6. Mount the prop horizontally to the engine (90 degree to the magnet) or in the same direction as your carburetor [SPE263008].

STARTING PROCEDURE

1. Make sure the ignition is OFF.
2. **Check to see that all screws, bolts, spinner and props are on tight.**
- 3E. **Electric Start:** Make sure you use a good quality, lightweight aluminum spinner from Spin-Right [SR300W or SR350W], Tru-Turn or quality spinner mfg, and a quality high torque hand held starter [PG-51 or START100].
- 3M. **Manual Start:** Wear a thick glove to protect your fingers while flipping through compression.

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STARTING (continue)



4. Have someone help you hold the airplane while you start the engine.
5. Switch the ignition to ON.
6. Close the carburetor's choke plate, and open the throttle slightly from the idle position.
7. Position the propeller at 45 degree (2 o'clock) before compression and quickly flip the propeller counter clockwise through the compression. REPEAT step #7 until the engine fires.
8. The engine will only run for one to three seconds due to the closed choke (until air runs out).
9. Open the choke (open the choke plate).
10. Position the propeller at 45 degree (2 o'clock) before compression, and quickly flip the propeller counter clockwise through the compression with gloved hand or electric starter. REPEAT step #12 one to 10 time until the engine fires. If done properly, the engine should start between the first and the tenth flip of the propeller. If not, then go to step #6.
11. After starting, allow the engine to warm up by idling for two to three minutes. Open and close throttle after warm up so that engine runs smoothly at idle and at full throttle. The transition speed or responsiveness should also be smooth and reasonable.

TROUBLESHOOTING MLD!

Symptoms	Possible Solutions
Engine (crankcase housing) is flooded	Turn the engine so that the fuel runs out. You can remove and dry the spark plug if necessary. Try starting again without using the choke.
Engine does not start	<ol style="list-style-type: none"> 1. Flooding (see above) 2. Check battery voltage (should be at least 5.0+ volts) and all ignition connections, wiring, and switches. 3. Check tank venting, clunk position, and fuel flow. 4. Check all fuel lines for kinks, pin holes or damage. 5. Does fuel move toward the carburetor when the prop is flipped? 6. Is the throttle set at idle or slightly higher after engine "pops" and choke is opened? 7. Flip the prop over with authority. The ignition won't fire at low speed. 8. High voltage insulation rubber in the spark plug cap/boot is damaged, and requires replacement.
Fuel is not moving toward the carburetor	<ol style="list-style-type: none"> 1. Close the choke plate completely. 2. Is the carburetor or carburetor mount loose? If it is loose then it can cause air leak.
Engine starts after choked, but stops soon after	Open your low speed needle, "L", (1/8 of a turn); <ol style="list-style-type: none"> 1. your "L" or low speed mixture is too lean (80%) 2. your carburetor is dirty your ignition is faulty
Engine hesitates when accelerated rapidly. RPM increases at idling. Engine dies quickly when the throttle moves from high to low.	Open your low-speed needle, "L", 1/8 of a turn, because low-speed mixture is too lean.
Idle is unsteady after 1 minute warm up.	Close your low-speed needle "L", 1/8 of a turn, because low-speed mixture is too rich. Clean or replace spark plug, because your engine may be old.
Engine stops at full throttle. Engine hesitates when accelerated rapidly. Engine will not come up to full RPM at full throttle.	Open your high-speed needle "H", 1/8 of a turn, because high-speed mixture is too lean.
Engine does not reach full RPM.	<ol style="list-style-type: none"> 1. Prop too large? => reduce prop. 2. Close your high-speed needle, "H", 1/8 of a turn, because high-speed mixture is too rich. 3. Proper muffler or exhaust? <u>MLD!</u> 4. Overheating? 5. Defective spark plug
Engine "stutters" or "coughs" in the mid range or when the throttle is advanced,	Low end is too rich, so your need to lean the "L" needle. Sometime you may also need to lean the "H" needle if the troubling range nears 5,000 RPM.
RPM drops during full throttle, or RPM fades during a long vertical maneuver	Your "H" setting is too lean, and the engine is over heating. So richen the setting and/ or improve cooling.

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TROUBLESHOOTING (continue)

Symptoms	Possible Solutions
Engine runs different in the air versus ground. Engine runs different with and without cowl. 	Needle settings may need adjustment when the engine is moved from one plane to another or cowl configurations (= airflow and pressure) is changed. <ol style="list-style-type: none"> 1. Airflow change (velocity stack can help reduce that effect) 2. Air pressure change (steady the airflow around the carburetor or drag a tube from the carburetor hole to a location where air pressure changes properly)
After break-in, the engine experiences poor transition, pre-mature carbon buildup, fouled plugs, excessive exhaust residue, sticking rings, and/or overall rough running.	Your engine has been running more rich than preferred. It requires leaning out. It may require cleaning. You can send your engine into CERMARK for annual checkup or cleaning.
Combination (2 or more) of following symptoms: Engine does not hold RPM at higher throttle, Misfire (inconsistent firing), Sudden change in performance, Irregular timing (sequence), Radio interference	High voltage insulation rubber in the spark plug cap/boot is damaged, and requires immediate replacement. 
High RPM drops after every start	It is normal due to heat built up
Engine vibrates hard and runs rough	<ol style="list-style-type: none"> 1. Balance the propeller. 2. Check the ignition timing. 3. Check your plumbing for air/fuel leaks. 4. Check your spark plug for carbon deposits and plug gap. 5. Check the engine and propeller bolts. 6. Check the rigidity of the motor mount.

FREQUENTLY ASKED QUESTIONS & ANSWERS (FAQ)

Q1. Where can I find warranty information on my MLD™ engine?

A1. For information regarding MLD's industry leading warranty on your MLD engine's warranty coverage, please refer to your original operator's manual.

Q2. How long is the warranty coverage?

A2. MLD™ Engines and CERMARK promises to repair any MLD consumer engine at no charge for a period TWO years from the time of purchase if there is a defect in materials or workmanship of the MLD engine provided that the engine is covered under N.American or USA Warranty. Please ask your shop or dealer for proper warranty coverage.

Q3. What should I include with my MLD™ engine when sending it for inspection, warranty services or non-warranty services?

A3. MLD Engines and CERMARK apologize that your equipment needs to be evaluated, and if necessary repaired, by one of our technicians. We hope we can make the process as easy as possible.

Please be as accurate as possible include your information (Name, Address, Telephone, Email), the specific problem(s) as you experience. Also include photocopies of your proof of purchase or receipt, and MLD™ N.American/USA Warranty. We recommend shipping the product insured via a carrier that provides you with a tracking number. Please enclose the product in a plastic bag and pack it in a sturdy box with several inches of a quality packing material on all sides. Please send only equipment you wish to have repaired. Keep a record of the model and serial number. If your product cannot be repaired under warranty, we will contact or send a service estimate for your approval. Our service center evaluates each case on a case-by-case basis and every consideration will be given to your circumstances.

Refuse the repair and your item will be returned to you for a nominal shipping charge. Normally the item will be serviced and returned to you, generally within 7 to 10 business days after we receive it.

Q4. What does my warranty covers?

A4. MLD Warranty covers your N. American MLD engine and its hardware from defects in materials and workmanship for a period of ONE year starting from the date of purchase. Only properly registered MLD product are covered under N. American WARRANTY.

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FREQUENTLY ASKED QUESTIONS & ANSWERS (FAQ) *(continue)*

Q5. How do I order engines or parts?

A5. Contact your favorite hobby shop. If they are unable to help you, please go to www.mldengines.com or contact **CERMARK** at (562) 906-0808 or sales@cermark.com

Q6. Is MLD a SPE engine?

A6. Like Toyota and Lexus, MLD is a different engine. It does share limited quality parts with SPE. The cylinder, crank housing, crank, piston and other critical components are completely different. There are so many critical differences between the SPE and MLD. You will feel the difference.

Q7. Where do I ship my MLD engine to?



A7. Please send your package post paid and insured to:

CERMARK,

C/O: MLD Engines

9830 Bell Ranch Drive, #101, Santa Fe Springs, CA 90670

Q8. How long should the break-in be? What prop and what RPM?

A8. We recommend 2.5 hours or 1 gallon of gasoline at 100:1 gasoline to Saber Professional synthetic oil ratio. This will allow the rings to seat quickly. Please use a 16x8, 17x6, 17x7 or 17x8 prop that will allow the peak RPM to be over 7,500. Make certain that the needle to be slightly rich during break-in. Alternating the high and low temperature of your MLD engine will also improve breaking in process. The power of your MLD engine will increase with proper breaking in. The power difference should be noticeable from initial to 2nd hour to 10th hour. The power thereafter the 10th hour should remain consistent.

Q9. What octane of unleaded gasoline should be used?

A9. Standard 87 to mid 89 octane unleaded gasoline is recommended.

Q10. What 2 cycle oil should I use?

A10. We recommend AMSOIL, Saber Professional (100:1) synthetic. It is available in 1,5oz, 3.5oz, 8oz and 1qtr sizes.

Q11. When will my MLD reach peak performance?

A11. The power of your MLD engine will increase with proper breaking in. The power difference should be noticeable from initial to 2nd hour to 10th hour. The power thereafter the 10th hour should remain consistent.

Q12. I am experiencing radio interference.

A12. Be certain that the MLD spark plug cap is firmly seated to the spark plug. The metal cap should cover the hex nut portion of the spark plug. Another possibility is that the plug wire is not properly grounded. Another possibility is your throttle is metal, which could be amplifying the engine noise. Another source is high voltage leak from the spark plug cap area. This leak is generally hard to detect, because the rubber insulation material is damaged internally. The damage is often not detected by untrained human eyes.

Q13. Is it normal for the engine to be rich at startup?

A13. It is normal for a cold engine to feel rich at start up. This symptom usually goes away after 30 seconds to 1 minute. Therefore is not recommended to tune a cold engine. Allow the engine to warm up (1 minute if possible) before tuning.

Q14. What is the difference between L (low speed) and H (high speed) needle/mixture valve?

A14. "L" or low speed needle/mixture valve changes the oil emulsion mixture at lower RPM (up to 5,000 RPM). The "H" or high speed needle/mixture valve alters the oil emulsion formula at 5,000 or higher RPM.

Q15. Is a Tachometer necessary for tuning?

A15. Yes, a good optical tachometer is critical for tuning. A properly tuned engine should have a constant idle RPM. We generally recommend a simple hand held optical tachometer such as [ONETOUCH or ONETOUCH-PLUS]

Q16. Does my engine come tested or tuned?

A16. Your MLD engine is always tested and run at the factory. MLD factory will have set the setting accordingly. Generally, only minor adjustments are required. Remember, setting will vary with altitude, temperature, humidity, fuel, carburetor variances and air mixture changes.

Q17. Does adjusting either "L" or "H" needle have effect on the other needle?

A17. Yes, adjusting either needle can have an effect on the other (at specific RPM range). For an example, if you lean out the "L" needle you may have also slightly leaned the high RPM range at the same time.

Q18. Which needle, "L" or "H", do I adjust to help achieve smooth idle and reliable transition?

A18. In general, we recommend that "L" needle is adjusted to achieve smooth idle and a reliable transition to high throttle.

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Q19. When can I reduce running the engine rich?

A19. We recommend properly leaning out the engine after the engine completely broken in. The break-in process occurs after 1 full gallon of fuel or 2 to 2.5 hours.

Q20. Are the engines and ignition systems tested before leaving the factory?

A20. Before each engine and ignition system is shipped to North America, each and everyone one of them has to pass QC and test run. Basic adjustment is done at factor prior to boxing. Of course slight adjustments are required due to atmospheric differences. However the adjustments should not be severe. If you're experiencing difficulty, please contact CERMARK immediately so that we can reduce your frustration and minimize incorrect information.

Q21. My MLD engine is running inconsistently in the air, especially during maneuvers, what are the causes and solutions?

A 21. The two common causes of poor running during aerobatics with gas aircraft engines are;
 (a) the constant changes of airflow around the carburetor inlet and the carburetor pump vent hole.
 (b) the changing of air pressure around the carburetor inlet and the carburetor pump vent hole.

The airflow changes the quantity and quality of air that flow into the carburetor through the butterfly. The airflow is generally dictated by the orientation of the airplane, speed of the airplane, shape of the cowl and surrounding terrain that the air passes over/through. The concept is to stabilize or create a consistent airflow. One of the easiest solution is a velocity stack, which will extend pass the butterfly. The velocity stack generally reduces 2 issues, (1) turbulent airflow and (2) excess fuel vapor.

The air pressure change is generally exacerbated by sudden change in airflow created by airplane speed and orientation. The carburetor pump vent hole is located on the carburetor diaphragm cover. The carburetor has a tough time adjusting to positive and negative pressures in and around the cowl. If the vent hole senses the prop blast or sudden pressure change, it will usually get the carburetor to pump more fuel. This action makes your engine run rich. A common symptom is that the engine runs rich on take off.

Shielding the carburetor from the "hostile" airflow usually cures this problem. Cooling shrouds, between the cylinders and the bottom edge of the air inlets on the front of the cowl, not only lower the motors operating temperature, but also help to prevent air from rushing down the inside of the cowl and effecting the carburetor air flow. Cowl-in carburetors generally have less issues than those exposed to the outside airflow. A small air dam behind the carburetor pump vent can help give a good positive air flow to flush exposure. Another solution is to place a nipple to the carburetor pump vent, and then attach a tube that terminates inside the fuselage where airflow and air pressure are more stable.

Q22. How important are cooling and baffling for MLD engines?

A22. Baffling is the technique to channel / direct all intake air over the cylinder head, thus forcing air to flow across the engine rather than bypassing it. This is a very effective cooling method on air cooled engines. Deflecting or baffling of the air to and over the cylinder is highly recommended for proper cooling. The idea is to get all of the cool air that is coming through the air intake opening(s) to hit the middle of the cylinder(s) directly, and then be forced over the cylinder(s), creating turbulent air moving through the cylinder(s) fins. The freely flowing, but directed and turbulent air between the fins provides the maximum cooling for an air cooled engine. Without baffling the air (similar to water property) will take the path of least resistance. Some incoming air will bounce off the cylinder(s) and the rest will escape around the cylinder(s) without coming into contact with the cylinder(s).

To ensure constant flow of cold air around the cylinder, and to reduce the air pressure build-up inside the engine cowl, the hot air exhaust exit must have a much larger cross section area than the cold air intake. As a rule of thumb, allow 4 times the area for exhaust air than intake air, this may be achieved by reducing the intake area (as in a radial type cowl) and expanding the exhaust area. Air entering the smaller cowl opening will expand and cool existing at a lower velocity, further aiding cooling of the engine.

Q23. What are some airplanes that you would recommend for this engine?

It is not our position to recommend any particular mfg or vendor. However, the MLD-28 was designed around the following aircrafts:

Aeroworks: 80" Profile Extra, 72" Yak54 QB, CA Models (Aeroworks) Genesis

Cermark / Topgun: Spitfire, ME-109, P51 Mustang

Cermark / Scale Series 70": Edge 540A, Edge 540B, Extra 260, Sukhoi, Yak 54,

DPM (Dave Patrick Models): Extra 330L, (Dave Patrick Models) Piper PA-18 Super Cub, Piper PA-18 Clipped Wing Super Cub

Extreme Flight R/C, 74" Yak-54 1.60 (aerobatic)

Hangar9: 1/4 Scale J-3 Cub ARF, P-51D Mustang 150, P-47D Thunderbolt 150

Pacific Aeromodel: 69" Clipped Wing MonoCoupe, 82" Gee Bee Y,

QQ: 73 in. YAK-54

Wildhare RC: 73" Edge 540, 73" Extra 260

Q24. Why should I register my engine?

All of the MLD engines are serialized for everyone's protection. In the case of all North American version, we have made modifications so that your MLD engines will run smoother, consistent, and more powerful than those in other regions. In addition to the modifications, we have also provide additional features to further enhance your power to weight ratio. When you make your MLD purchase, make certain that what you have is an authorized version, so that you can enjoy everything you paid for.

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(v-4.1)

price subject to change without notice

WARRANTY



MLD Engines warranty 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, CERMARK 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 shipping to and from **CERMARK**, damage(s) caused by crash, damages incurred from shipping, abuse, misuse, alteration or accident. Damage caused by customer disassembly, tampering, use of improper fuel, fuel additives, 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, **CERMARK** 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.
- If the product is not covered under the North American Warranty, **CERMARK** then reserves the right to charge for its service.
- 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.
- Warranty item will not be replaced or shipped until defective item in question is received by **CERMARK**.
- If you attempt to disassemble or repair the engine or the ignition unit, it may void the warranty.
- For service on your MLD Engines product, either in or out of warranty, send it post paid and insured to:

CERMARK

C/O: MLD Engines
 9830 Bell Ranch Drive, #101
 Santa Fe Springs, CA 90670
 Tel: (562) 906-0808, Fax: (562) 906-0820
www.MLDengines.com Email: sales@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, please contact your local importer for warranty information.

PARTS LIST



Genuine MLD Parts are manufactured specifically for your MLD engine. They're the same parts your MLD engine was originally built with, so they're the best choice in terms of fit, performance, and overall quality.

Part #	Description	Quan	Price	Part #	Description	Quan	Price
MLD283001	Cylinder	1	\$40.00	MLD283022	Piston rings	2	\$ 6.00
SPE263002S	Muffler (side mount)	1	\$35.00	MLD283023	Piston pin	1	\$ 2.00
SPE263002R	Muffler (rear mount)	1	\$45.00	SPE263024	Piston pin retainer	2	\$ 1.00
SPE263003	Muffler gasket	1	\$ 1.00	SPE263025	Small end bearing	1	\$ 4.50
SPE263004	Muffler mounting screws	2	\$ 1.00	SPE263026	Stop ring	1	\$ 3.00
SPE263005	Carburetor Insulator block		\$ 8.00	SPE263027	Prop hub	1	\$20.00
SPE263006	Carburetor Insulator gasket		\$ 1.00	SPE263028	Prop washer (rear)	1	\$ 6.00
SPE263007	Carburetor gasket	1	\$ 1.00	SPE263029	Prop washer (front)	1	\$ 5.00
SPE263008	Carburetor (by Walbro)	1	\$79.00	SPE263030	Prop screw	1	\$ 4.00
SPE263009	Carburetor screws	2	\$ 2.00	SPE263031	Prop washer front screws	2	\$ 2.50
MLD283010	Cylinder gasket	1	\$ 3.00	SPE263032	Flywheel nut	1	\$ 1.00
MLD283011	Cylinder screws set	4	\$ 2.00	SPE-SPDOF-30	Engine standoffs (30mm)	4	\$24.00
MLD283012	Crankcase (rear)	1	\$25.00	SPE263034	Spark plug spanner	1	\$ 4.00
MLD283013	Crankcase (front)	1	\$30.00	SPE263036	Prop washer (rear) screw	4	\$ 2.00
SPE263014	Crankcase screws set	4	\$ 1.50	SPE263037	Standoff screws	4	\$ 2.00
MLD283015	Crankcase gasket	1	\$ 1.50	SPE263038	Standoff/firewall screws	4	\$ 2.00
SPE263017	Oil seal	1	\$ 3.00	MAI-II-28	CDI, Auto advance timing ignition system	1	\$70.00
SPE263018	Crankcase bearings set (front & rear)	2	\$15.00	MLD283051	Engine mounting template (laser cut template)	1	\$ 5.00
MLD283019	Crankshaft assembly (counter balance & connecting rod included)	1	\$38.00	SPE263052	Spark plug (Champion or NGK)	1	\$ 7.00
MLD283021	Piston	1	\$11.00	MLD-28VLCS	Velocity stack kit	1	\$ 9.99

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RECOMMENDED ITEMS

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Part #	Optional Items	Price	Part #	Optional Items	Price
	PROPS (WOOD)				
JXF 1508	JXF 15 x 8 wooden propeller	11.00	BR-MLD28	Bowman performance piston ring	25.00
JXF 1608	JXF 16 x 8 wooden propeller	12.00	One Touch	Digital optical tachometer with large LCD readout	36.95
JXF 1610	JXF 16 x 10 wooden propeller	12.00	One Touch Plus	One Touch tach with voltage meter with probes & extension	41.95
JXF 1706	JXF 17 x 6 wooden propeller	14.95	Pump-hand	Manual gas/glow fuel pump	9.95
JXF 1708	JXF 17 x 8 wooden propeller	14.95	VRJR-7	Voltage regulator for JR (7A max)	19.95
JXF 1710	JXF 17 x 10 wooden propeller	14.95	VRFJ-7	Voltage regulator for Futaba-J (7A)	19.95
JXF 1806	JXF 18 x 6 wooden propeller	16.65		ENGINE STANDOFFS	
JXF 1807	JXF 18 x 7 wooden propeller	16.65	SPE-SPDOF-25	Aluminium standoffs 25mm	24.00
JXF 1808	JXF 18 x 8 wooden propeller	16.65	SPE-SPDOF-30	Aluminium standoffs 30mm	24.00
JXF 1908	JXF 19 x 8 wooden propeller	18.50	SPE-SPDOF-35	Aluminium standoffs 35mm	24.00
JXF 1910	JXF 19 x 10 wooden propeller	18.50	SPE-SPDOF-40	Aluminium standoffs 40mm	24.00
	PROPS (COMPOSITE)		SPE-SPDOF-45	Aluminium standoffs 45mm	24.00
LP 15080	APC 15 x 8 Composite propeller	12.17	SPE-SPDOF-50	Aluminium standoffs 50mm	24.00
LP 15010	APC 15 x 10 Composite propeller	12.17	SPE-SPDOF-55	Aluminium standoffs 55mm	24.00
LP 16060	APC 16 x 6 Composite propeller	12.17	SPE-SPDOF-60	Aluminium standoffs 60mm	24.00
LP 16080	APC 16 x 8 Composite propeller	12.17	SPE-SPDOF-65	Aluminium standoffs 65mm	24.00
LP 16010	APC 16 x 10 Composite propeller	12.17		HEAVY DUTY CONNECTORS	
LP 17060	APC 17 x 6 Composite propeller	16.10	213FJ4	Extension: 4" for Futaba J	3.50
LP 17080	APC 17 x 8 Composite propeller	16.10	213FJ6	Extension: 6" for Futaba J	3.50
LP 17010	APC 17 x 10 Composite propeller	16.10	214FJ12	Extension: 12" for Futaba J	3.50
LP 18060	APC 18 x 6 Composite propeller	20.90	215FJ18	Extension: 18" for Futaba J	4.00
LP 1806W	APC 18 x 6 Wide composite prop	20.90	215FJ24	Extension: 24" for Futaba J	4.00
LP 18080	APC 18 x 8 Composite propeller	20.90	218FJ36	Extension: 36" for Futaba J	4.50
LP 1808W	APC 18 x 8 Wide composite prop	20.90	216FJY4	Y Adaptor: 4" for Futaba J	5.50
LP 1908W	APC 19 x 8 Wide composite prop	23.80	216FJY12	Y Adaptor: 12" for Futaba J	5.50
SR300W	SpinRight 3.0" aluminum spinner	15.00	213FJ6SR	Servo reverser for Futaba J	14.95
SR350W	SpinRight 3.5" aluminum spinner	20.00	213FJYSR	Servo reverser - Y for Futaba J	16.95
	IGNITION BATTERY PACKS		217FJSW	Heavy duty switch for Futaba J	7.00
4KR1100AAU-FJ	Sanyo 4.8V-1100mah flat w/Fut J.	16.00	217DSCFJSW	DSC super switch for Futaba J	16.00
4KR1100AAU-JR	Sanyo 4.8V-1100mah flat w/JR/S.	16.00	243JR4	Extension: 4" for JR/Hitec/AirZ	3.50
4HR-AAUF-FJ	Sanyo 4.8V-1650mah flat w/Fut J.	18.00	243JR6	Extension: 6" for JR/Hitec/AirZ	3.50
4HR-AAUF-JR	Sanyo 4.8V-1650mah flat w/JR/S.	18.00	244JR12	Extension: 12" for JR/Hitec/AirZ	3.50
4HR-3UF-FJ	Sanyo 4.8V-2700mah flat w/Fut J.	26.00	245JR18	Extension: 18" for JR/Hitec/AirZ	4.00
4HR-3UF-JR	Sanyo 4.8V-2700mah flat w/JR/S.	26.00	245JR24	Extension: 24" for JR/Hitec/AirZ	4.00
5KR1100AAU-FJ	Sanyo 6.0V-1100mah flat w/Fut J.	19.00	248JR36	Extension: 36" for JR/Hitec/AirZ	4.50
5KR1100AAU-JR	Sanyo 6.0V-1100mah flat w/JR/S.	19.00	246JRY4	Y Adaptor: 4" for JR/Hitec/AirZ	5.50
5HR-AAUF-FJ	Sanyo 6.0V-1650mah flat w/Fut J.	23.00	246JRY12	Y Adaptor: 12" for JR/Hitec/AirZ	5.50
5HR-AAUF-JR	Sanyo 6.0V-1650mah flat w/JR/S.	23.00	243JR6SR	Servo reverser for JR/Hitec/AirZ	14.95
5HR-3UF-FJ	Sanyo 6.0V-2700mah flat w/Fut J.	30.00	243JRYSR	Servo reverser-Y for JR/Hitec/AirZ	16.95
5HR-3UF-JR	Sanyo 6.0V-2700mah flat w/JR/S.	30.00	247JRSW	Heavy duty switch for JR/Hitec/AirZ	7.00
	2-CYCLE PROFESSIONAL SYNTHETIC OIL		247DSCJRSW	DSC super switch for JR/Hitec/AirZ	16.00
ATPPK-EA	Saber 100:1 syn, 1 gallon - 1.5 oz	1.50	257DSCUNSW	DSC super switch for Universal	16.00
ATPBA-EA	Saber 100:1 syn, 2 gallon - 3.5 oz	2.50	SMF-KillSW	SmartFly optical kill/cutoff switch	59.95
ATPBC-EA	Saber 100:1 syn, 5 gallon - 8 oz	4.99		HITEC SERVOS	
ATPQT-EA	Saber 100:1 2-cycle synthetic, 1 qt	11.99	31081S	HS-81	14.99
TDRQT-EA	Dominator 50:1 synthetic, 1 qt	11.99	33082S	HS-82	16.49
	INDUSTRIAL GRADE CA		32081S	HS-81MG	21.99
MAX-50 Flex	DPM MAX industrial CA - FLEX, 50g, by Dave Patrick Model	5.99	31225S	HS-225BB	20.99
MAX-50 Med	DPM MAX industrial CA - Med, 50g, by Dave Patrick Model	4.99	31425S	HS-425BB	14.99
MAX-50 Thick	DPM MAX industrial CA - Thick, 50g, by Dave Patrick Model	4.99	32625S	HS-625MG	35.99
MAX-50 Thin	DPM MAX industrial CA - Thin, 50g, by Dave Patrick Model	4.99	32645S	HS-645MG	35.99
	ACCESSORIES		92985S	HS-985MG	69.99
C&H-229	C&H Ignition sys. for MLD-28	79.95	35245S	HS-5245MG	49.99
			35625S	HS-5625MG	54.99
			35645S	HS-5645MG	54.99
			37985S	HS-7985MG	94.99
			37955S	HS-7955TG	119.95

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