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answer to 25%

MLD Engines
www.mldengines.com



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remember to register your engine for a free gift.

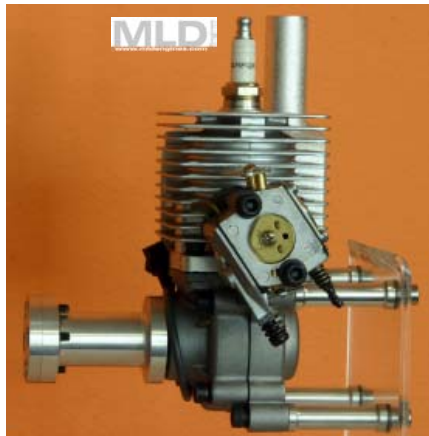
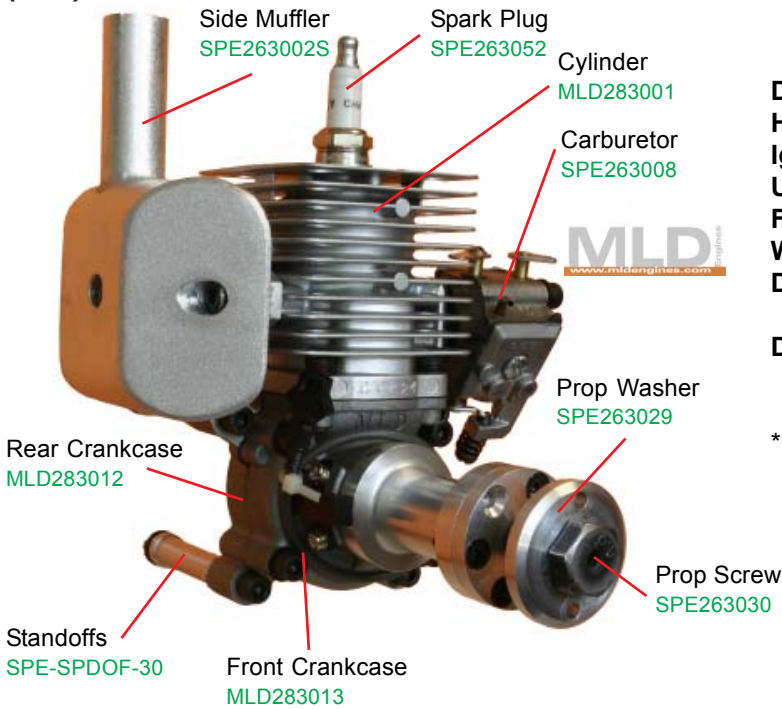
Operating Manual MLD-28S

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 is not included

BOX CONTENT

- (1) MLD-28cc engine [\[MLD283000\]](#)
- (1) Side mount muffler [\[SPE263002S\]](#)
- (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 [\[MLD263051\]](#)

SAFETY 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-stroke engines.
- 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

Comp: 15 x 8 through 19 x 8

To the right are 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. These data (chart on the right) were collected in Southern CA, at 82 degrees F, at 180' above sea level. Your performance will also improve significantly after proper breaking-in.

We highly recommend that you keep a record or log of your MLD engine.

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 8	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) or 5 (6.0V) cell NiCD/NiMH.
- Consumes rate is approximately 200mA.
- Do not allow the battery to drop below 3 Volts which may damage your ignition module.

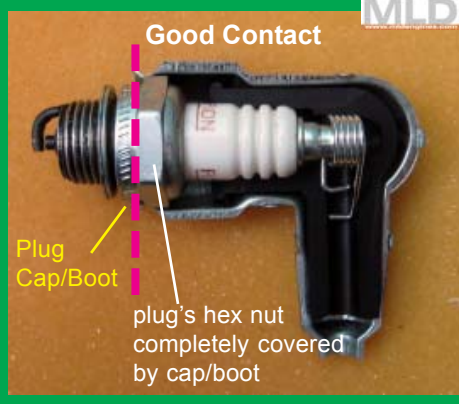
There are a couple important facts that will ensure MILD ignition system performance.

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)

Ignition system



IMPORTANT: Make certain that your metal spark plug cap boot extend past the spark plug's hex nut.



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.

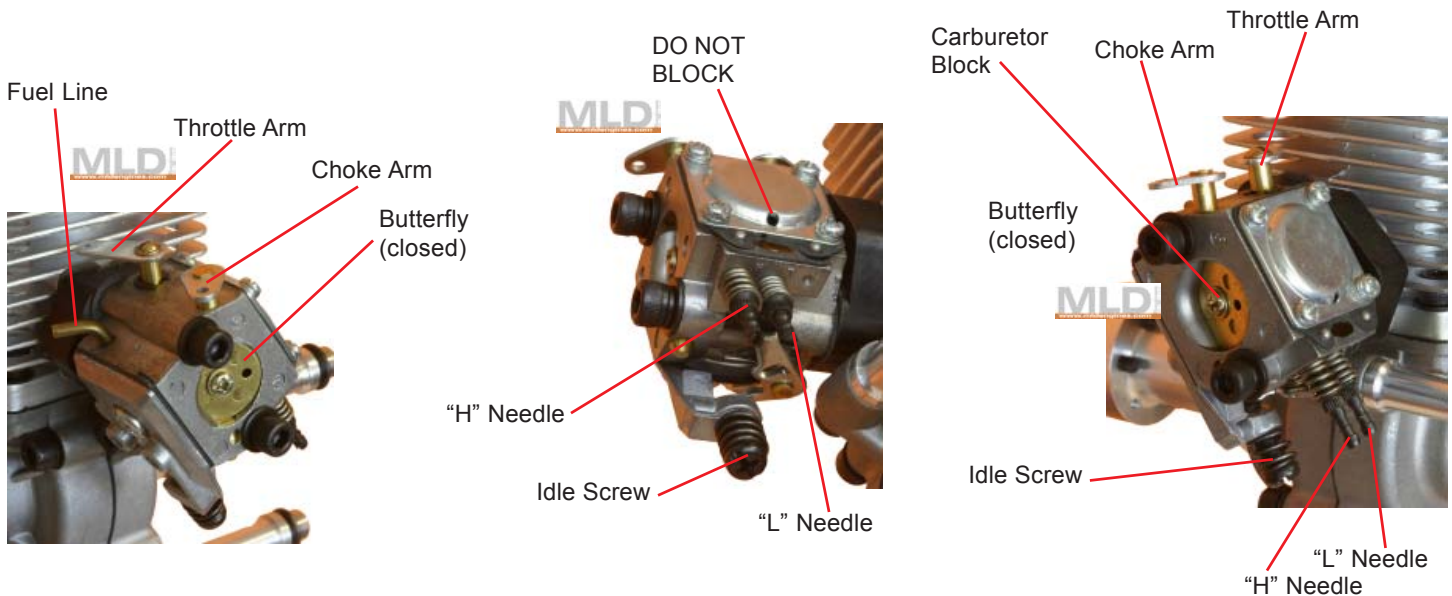
Note: If you want to check to see if the spark plug works, remove the spark plug from the engine, connect it to the coil and make sure the metallic threaded end of the spark plug touches the engine. Spin the propeller rapidly through top dead center and check for a spark. This procedure only works in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

Use quality 2-cycle oil such as Pennzoil Air Cooled at recommended oil to fuel ratio. **Break-in:** 2 gallon of gasoline with 30:1 or 32:1 oil content ratio. **After Break-in:** 45:1 or 50:1 oil content ratio. Synthetic oil can be use after break-in, and the ratio can vary pending oil mfg's recommendation.

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 5 hours or 2 gallon of gasoline at 30:1 or 32:1 gasoline to oil content ratio. This will allow the rings to seat quickly. 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 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 to 20th hour. The power thereafter the 20th hour should remain consistent.

- Avoid adjusting your high-speed (outside) needle on the carburetor during break-in process.
- Avoid full power for extended periods of time while breaking in your engine.
- Make sure that the engine has adequate cooling during break-in. Alternating between full and low throttle during break-in is 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 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. Install the engine on the firewall using 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.*
4. Cut all necessary clearance and cooling holes in the cowl.
5. 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.
6. 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.
7. 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.
8. Secure all connections with shrink tubing.
9. Make sure your cowl is secured.

STARTING

PREPARING 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 your MLD-28 to your engine stand-offs (available in 25mm, 35mm, 40mm... or 65mm lengths) using four 6mm x 12mm [3/16" x 15/32"] socket head cap screws.
3. Secure the ignition module ground wire to the engine using a 6mm x 12mm [3/16" x 7/8"] socket head cap screws.
4. FIRMLY insert the spark plug cap/boot to your engine's spark plug. Make certain that the cap/boot extend past the hex section of the spark plug..
5. Connect the ignition control module to the pick up sensor.
6. Make certain that the system (switch) is in the OFF position
7. Connect the ignition module battery to its power supply (4.8V – 6.0V). [4KR-1100AAU or 5KR-1100AAU, 4HR-1650AAU, 5HR-1650AAU]

STARTING PROCEDURE

1E. 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 hand held starter [PG-51 or START100]. Please follow spinner and propeller instruction to help reduce accidents.

1M. Manual Start: Install propeller on prop spacer for comfort while flipping through compression. Use a thick glove to protect your hand.

2. Always position the propeller so that the magnets are 20° clockwise from the magnet pick up.

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STARTING PROCEDURE (continue)

- 3. Have someone help you hold the airplane while you start the engine.
- 4. Make sure the ignition is OFF, close the choke plate on the carburetor and open the throttle slightly from the idle position.
- 5E. **Electric Start:** Use your electric starter to turn the engine over for several seconds.
- 5M. **Manual Start:** 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.
- 6. Switch the ignition to ON and open the choke.
- 7. Set the throttle to high idle
- 8. Use your electric starter or flip your prop manually through compression to turn over the engine until it starts. If done properly, the engine will start between the first and the tenth flip of the prop.
- 9. 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.
- 10. If your engine does not start, repeat the procedure.

TROUBLESHOOTING





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	<p>Open your low speed needle, "L", (1/8 of a turn);</p> <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? 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 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 ONE year 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.

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.

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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?

MLD!

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 5 hours or 2 gallon of gasoline at 30:1 or 32:1 gasoline to oil content ratio. This will allow the rings to seat quickly. 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 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 to 20th hour. The power thereafter the 20th 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 Pennzoil Air Cooled 2 stroke oil.

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, to 20th hour. The power thereafter the 20th 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 2 full gallons of fuel or 4-5 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 every 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 past 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.

WARRANTY

MLD Engines warranty this product to be free from defects in materials and workmanship for a period of one (1) 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.
- 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.

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WARRANTY (continue)

- 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	MLD283021	Piston	1	\$11.00
SPE263002S	Muffler (side mount)	1	\$35.00	MLD283022	Piston rings	2	\$ 6.00
SPE263002R	Muffler (rear mount)	1	\$45.00	MLD283023	Piston pin	1	\$ 2.00
SPE263003	Muffler gasket	1	\$ 1.00	SPE263024	Piston pin retainer	2	\$ 1.00
SPE263004	Muffler mounting screws	2	\$ 1.00	SPE263025	Small end bearing	1	\$ 4.50
SPE263005	Carburetor Insulator block		\$ 8.00	SPE263026	Stop ring	1	\$ 3.00
SPE263006	Carburetor Insulator gasket		\$ 1.00	SPE263027	Prop hub	1	\$20.00
SPE263007	Carburetor gasket	1	\$ 1.00	SPE263028	Prop washer (rear)	1	\$ 6.00
SPE263008	Carburetor (by Walbro)	1	\$79.00	SPE263029	Prop washer (front)	1	\$ 5.00
SPE263009	Carburetor screws	2	\$ 2.00	SPE263030	Prop screw	1	\$ 4.00
MLD283010	Cylinder gasket	1	\$ 3.00	SPE263031	Prop washer front screws	2	\$ 2.50
MLD283011	Cylinder screws set	4	\$ 2.00	SPE263032	Flywheel nut	1	\$ 1.00
MLD283012	Crankcase (rear)	1	\$25.00	SPE-SPDOF-30	Engine standoffs (30mm)	4	\$24.00
MLD283013	Crankcase (front)	1	\$30.00	SPE263034	Spark plug spanner	1	\$ 4.00
SPE263014	Crankcase screws set	4	\$ 1.50	SPE263036	Prop washer (rear) screw	4	\$ 2.00
MLD283015	Crankcase gasket	1	\$ 1.50	SPE263037	Standoff screws	4	\$ 2.00
SPE263017	Oil seal	1	\$ 3.00	SPE263038	Standoff/firewall screws	4	\$ 2.00
SPE263018	Crankcase bearings set (front & rear)	2	\$15.00	MAI-II-26	CDI, Auto advance timing ignition system	1	\$70.00
MLD283019	Crankshaft assembly (counter balance & connecting rod included)	1	\$38.00	MLD263051	Engine mounting template (laser cut template)	1	\$ 5.00
SPE263020	Woodruff Key (template)	1	\$ 2.00	SPE263052	Spark plug (Champion or NGK)	1	\$ 7.00

RECOMMENDED ITEMS

Part #	Optional Items	Price	Part #	Optional Items	Price
JXF 1508	JXF 15 x 8 wooden propeller	11.00	LP 15080	APC 15 x 8 Composite propeller	12.17
JXF 1608	JXF 16 x 8 wooden propeller	12.00	LP 15010	APC 15 x 10 Composite propeller	12.17
JXF 1610	JXF 16 x 10 wooden propeller	12.00	LP 16060	APC 16 x 6 Composite propeller	12.17
JXF 1706	JXF 17 x 6 wooden propeller	13.00	LP 16080	APC 16 x 8 Composite propeller	12.17
JXF 1708	JXF 17 x 8 wooden propeller	13.00	LP 16010	APC 16 x 10 Composite propeller	12.17
JXF 1710	JXF 17 x 10 wooden propeller	13.00	LP 17060	APC 17 x 6 Composite propeller	16.10
JXF 1806	JXF 18 x 6 wooden propeller	15.00	LP 17080	APC 17 x 8 Composite propeller	16.10
JXF 1807	JXF 18 x 7 wooden propeller	15.00	LP 17010	APC 17 x 10 Composite propeller	16.10
JXF 1808	JXF 18 x 8 wooden propeller	15.00	LP 18060	APC 18 x 6 Composite propeller	20.90
JXF 1908	JXF 19 x 8 wooden propeller	16.00	LP 1806W	APC 18 x 6 Wide composite prop	20.90
JXF 1910	JXF 19 x 10 wooden propeller	16.00	LP 18080	APC 18 x 8 Composite propeller	20.90

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RECOMMENDED ITEMS (continue)

Part #	Optional Items	Price	Part #	Optional Items	Price
LP 1808W	APC 18 x 8 Wide composite prop	20.90	MAX-50 Thin	DPM MAX industrial CA - Thin, 50g, by Dave Patrick Model	4.99
LP 1908W	APC 19 x 8 Wide composite prop	23.80	One Touch	Digital optical tachometer with large LCD readout	36.95
SR300W	SpinRight 3.0" aluminum spinner	15.00	One Touch Plus	One Touch tach with voltage meter with probes & extension	41.95
SR350W	SpinRight 3.5" aluminum spinner	20.00	Pump-hand	Manual gas/glow fuel pump	9.95
4KR1100AAU-FJ	Sanyo 4.8V-1100mah flat w/Fut J.	16.00	SPE-SPDOF-25	Aluminium standoffs 25mm	24.00
4KR1100AAU-JR	Sanyo 4.8V-1100mah flat w/JR/S.	16.00	SPE-SPDOF-30	Aluminium standoffs 30mm	24.00
4HR-AAUF-FJ	Sanyo 4.8V-1650mah flat w/Fut J.	18.00	SPE-SPDOF-35	Aluminium standoffs 35mm	24.00
4HR-AAUF-JR	Sanyo 4.8V-1650mah flat w/JR/S.	18.00	SPE-SPDOF-40	Aluminium standoffs 40mm	24.00
4HR-3UF-FJ	Sanyo 4.8V-2700mah flat w/Fut J.	26.00	SPE-SPDOF-45	Aluminium standoffs 45mm	24.00
4HR-3UF-JR	Sanyo 4.8V-2700mah flat w/JR/S.	26.00	SPE-SPDOF-50	Aluminium standoffs 50mm	24.00
5KR1100AAU-FJ	Sanyo 6.0V-1100mah flat w/Fut J.	19.00	SPE-SPDOF-55	Aluminium standoffs 55mm	24.00
5KR1100AAU-JR	Sanyo 6.0V-1100mah flat w/JR/S.	19.00	SPE-SPDOF-60	Aluminium standoffs 60mm	24.00
5HR-AAUF-FJ	Sanyo 6.0V-1650mah flat w/Fut J.	23.00	SPE-SPDOF-65	Aluminium standoffs 65mm	24.00
5HR-AAUF-JR	Sanyo 6.0V-1650mah flat w/JR/S.	23.00	217DSCFJSW	DSC super switch for Futaba J	16.00
5HR-3UF-FJ	Sanyo 6.0V-2700mah flat w/Fut J.	30.00	247DSCJRSW	DSC super switch for JR/Hitec/AirZ	16.00
5HR-3UF-JR	Sanyo 6.0V-2700mah flat w/JR/S.	30.00	257DSCUNSW	DSC super switch for Universal	16.00
MAX-50 Flex	DPM MAX industrial CA - FLEX, 50g, by Dave Patrick Model	5.99	SMF-KillSW	SmartFly optical kill/cutoff switch	59.95
MAX-50 Med	DPM MAX industrial CA - Med, 50g, by Dave Patrick Model	4.99	C&H-229	C&H Ignition sys. for MLD-28	79.95
MAX-50 Thick	DPM MAX industrial CA - Thick, 50g, by Dave Patrick Model	4.99	BR-MLD28	Bowman performance piston ring	25.00

At this point we like to thank the following companies for their inputs, 3MM Engines, AeroWorks, AuStars Model, BCMA, Cactus Aviation, C.H. Ignitions, Dave Patrick Models, Desert Aircraft, ExtremeFlight, Frank Bowman, Melody, Roger Lee, and WildHare. Without their contribution this manual would not have been possible. If you have any question(s), located error(s), or have additional input(s)/suggestion(s) please email us at sales@cermark.com.

We at **CERMARK**, and **MELODY** are constantly trying to improve our service, and help our manufacturers improve hobby product that are suitable for your use. So we are continuous seeking your inputs for improvement at all levels. Please email us at sales@cermark.com or call us at (562) 906-0808.

Because of the policy, price, and parts changes, we highly recommend that you register your MLD engine at the earliest possible time. We do this to help isolate issue and upate user of data that we confirm. We also recommend that you keep log of your engine as a good practice. This will also improve your MLD engine resale value. At CERMARK, we offer checkups and other services. Please contact us for details.

SERIAL #: _____ Model#: _____ Date of Purchase: / /
 Store Name: _____ Payment Method: _____
 Store Location: _____

Date	Subject	Remarks
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