

MAINTENANCE AND OPERATION OF YOUR LETMO MD-2,5 engine

This engine is replica of original engine LETMO MD-2,5 from Mr. Pfeiffer from Brno, Czech Republic. LETMO MD-2,5 arose from LETMO MD-3 so as was possible with it compete. The design of the engine is typical first postwar long stroke, self-ignition, plain bearing, piston controlled induction, "T" type side scavenging, axial three beam type crankcase. The new replica is practically the same engine like original Mr. Pfeiffer's LETMO except: heat treatment of the crankshaft (the original was from mild steel and less grinding surfaces) and the cylinder liner (the new is nitrocarburized, the original was standard hardened tool steel). The other change is the new shape of portion window in liner wall. The reason is better starting and better power. The engines are produced on modern CNC machines like standard MP JET engines. The engines are produced in 1000 pcs limited serie, each engine has serial number (on the rear side of the crankcase). The spare parts of engine are at disposal, the replacement of crankcase will be only like exchange to old damaged one.

Be sure to study these instructions very carefully. If you follow the given instructions carefully you will enjoy smooth operation and the required durability.

We thank you for having bought our product and hope that it will quite comply with your requirements.

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A. Getting familiar with the engine

1. SPECIFICATION

A two stroke diesel engine equipped with an integral tank, self ignition, plain bearing crankshaft, piston controlled induction, single transfer and two exhaust ports ("T" scavenging).

Bore	13,4 mm
Stroke	17,7 mm
Swept volume	2,49 ccm
Weight	145 g
Recommended speed	4 000 - 8 000 r.p.m.
Recommended propeller	11/7" (280/180 mm)

2. ENGINE FUNCTION

With regard to the construction of the engine (small swept volume, long stroke type, piston controlled induction) its sensitivity to weather changes and to the readjustments of the control elements (fuel needle and compression lever) is relative slow. In each case it is necessary to consider that any readjustment and control must be done very sensitively. As you will operate your engine at a relatively low speed (e.g. up to 4 000 - 8 000 r.p.m.) you have to consider that the response to readjustment of the adjusting elements (namely of the fuel needle) will take longer than is the case with the modern high speed engines. The most appropriate way for adjusting the maximum revolutions is similar to that with modern engines:

- by handling the compression lever and the fuel needle the maximum revolutions have to be adjusted (e.g. the compression must be increased and then the revolutions readjusted with the fuel needle, after that the compression again increased and finally the final adjustment made with the fuel needle until the condition has reached when under a further compression increase no higher speed can be achieved anymore).
- after achieving the highest speed, the compression lever is to be loosened by about 10°-15° and the speed finally adjusted with the fuel needle in order to get as much affluent mixture as possible but in a way that the speed will not start to drop with the new position of the compression lever. Following the above given instructions you will prevent the spontaneous compression increase due to the warming up of the engine during a longer operation. Many other circumstances affect the optimum adjustment of the compression lever, for example temperature and air pressure, fuel mixture ratio, size and shape of the prop, and also the mechanical condition of the engine.
- lock the compression lever and the needle of the needle valve

3. FUEL

A correct fuel is one most important prerequisites for a proper function and good service life of the engine. The fuel for diesel engines contains high volatile aether, and therefore it is necessary to pay maximum attention to storage and handling, so as to make its evaporation and consequently fuel depreciation impossible. Using a fuel with low aether content, it is not possible to tune up the engine correctly-it does not keep set speed, it overheats itself and does not reach a sufficient power output. Besides, it needs a higher compression for running and appears as difficult to run. In case of these symptoms, look for defect first of all in the fuel composition or quality.

- optimum home mixed fuel composition for:	running in	sport service
aether	33%	33%
castor oil	32%	27%
kerosene	35%	40%
- commercial fuel for:	running in	sport service
Model Technics	D1000	D2000

To achieve maximum output, use the fuel for sports service with addition of 2-3% amyl nitrate or isopropyl nitrite. However, it is necessary to point out that an addition of merely 0,5% substantially improves starting, running and output of the engine.

- Important advice!**
- a) nitrated fuel may not be used before a thorough running-in of the engine.
 - b) after application of the nitrated fuel, it is inevitable to rinse out the engine with a standard fuel, so as to prevent corrosion of individual engine parts.
 - c) filtration, chemical purity and good quality of individual fuel components are unconditionally necessary for problemless engine operation.

4. PROPELLER

Use only first-rate, intact and well balanced propellers. Observe propeller manufacturers instructions, especially concerning maximum allowable r.p.m. and maintenance. Do not forget that an unbalanced airscrew will destroy not only your engine, but also engine bed, and as the case may be, the RC set. The propeller bore for the engine crankshaft must have only a minimal clearance, in case the propeller has an excessive bore, always use an reducing adapter insert. Regular test of the propeller balance are necessary.

Recommended propeller sizes are as follows:

a) engine running-in	11/6" (280/150 mm)
b) free sport model	11/7" (280/180 mm)
c) RC model	11/7" (280/180 mm)

B. Engine running-in

Every engine is functionally tested by the manufacturer, however it has not been run in. We recommend that the engine should be run on the engine test, consequently not in the model. In no case use for attachment a vise or other clamping aids that could damage the crankcase or other engine part. Connect the fuel installation, fit on the propeller and close the fuel needle. During the running in self proceed as follows:

- fill the fuel tank with the fuel.
- close the fuel needle, let the compression lever loose and turn the engine several times with the prop.
- put several drops of fuel through the exhaust opening above the piston.
- while the compression lever is loosened start to turn the engine and at the same time gradually turn up the compression. It is necessary to react very sensitively to the amount of the fuel injected into the engine, for example if the engine runs with difficulty, let the compression lever loose and by letting the engine run get rid of the surplus fuel.
- the engine will start, it will use up the injected fuel and then halt.
- once again inject the fuel into the exhaust opening, open the fuel needle by 3 revolutions and turn the prop until the engine starts running.
- in case you should fail repeat these steps once more.
- after the first 10 minutes of running adjust the engine with a more rich mixture and a lower compression - lower speed (the engine is going to "tarokee"). After this time try to adjust the maximum speed by handling the compression lever and the fuel needle. If the engine is able to run at least for two minutes at full speed, you may consider it being run-in.

Important advice! - pull the compression lever with the greatest caution and much sensitivity because otherwise the crank mechanism might get damaged.

- do not use electric or mechanical starting machine. If your engine overfloded, starter can damage the crankshaft or conrod of your engine.

C. Mounting the engine in a model

Mount the engine in principle on a sufficiently dimensioned firewall from hard wood or aircraft plywood. Use 3 pcs of screw M3 optimum length. See about easy access to the engine controls - the compression lever and the fuel needle. A well accessible venturi enables you simple cleaning of the tank and the fuel jet without disassembling the engine out of the model. With covering the engine, it is necessary to allow for a sufficient cooling air inlet. Make sure that the fuel system is really tight. For sporting models use the tanks delivered together with the engine or your own tank, which you will connect with the fuel pipe to the take in coupling. If an exact running time of the engine is required (free flying models) it is possible to set its run by adjusting the length of the fuel pipe in original tank. Adjust the length in such a way that after the fuel tank has been refilled by injecting fuel with a syringe while the engine is running, the engine will run for the required time.

D. Engine maintenance

In principle, do not disassemble the engine. Every, also for the best executed disassembly, reduce the engine life. In case of extreme necessity disassemble only the crankcase cover, or if need be remove the lower tank lid. If the engine becomes soiled (e.g. owing a crash), proceed in this way:

- in no case rotate the propeller.
- disassemble carefully the engine from the model.
- detach the lower tank lid.
- dismount the front crankcase cover with crankshaft and propeller driver.
- dismount the cylinder liner head, put out the complete liner (liner, contrapiston, piston and conrod)
- wash the engine carefully with fuel by means of a syringe and oil thin with conservation oil the crank pin, the bore (through the exhaust port).
- re-mount the cylinder liner with contrapiston, piston and conrod, screw in the front crankcase cover (with crankshaft and propeller driver).
- control that the conrod is on the crankshaft pin.
- put the cylinder liner head and tighten up
- test the front cover tightness with fuel (bubbles at turning propeller). In case of untightness change the front cover seal.

- Important advice!**
- a) never forget to wash out the engine and conserve it with several drops of good conserving oil after every flying.
 - b) liner and piston must be still in the same position. If you turn them (for example cleaning of the engine or dismounting) the compression seal will be lost very quickly.
 - c) the front crankcase cover must be assembled only with two pin special key. For locking this part is suitable LOCTITE 603 agent.
 - d) entrust any bigger repairs always to the manufacturer.

E. Guarantees

Full guarantee for manufacturing and material defects lasts 6 months from the purchase date. Transmit the defective engine direct to the manufacturer's address. Describe briefly the troubles, if possible let know their probable causes. Provided that the defect will pertain to the guarantee for manufacturing and material defects, the defect will be repaired free. If the guarantee will not apply to the defect, MP JET ENGINES will inform of the repair extent and price. A condition of guarantee validity is a warranty sheet (part of the operating instructions) confirmed by the dealer.

F. Important safety advices

- do not start the engine in a room.
- do not smoke while filling the tank with fuel or handling it.
- the diesel fuel is highly inflammable, keep maximum caution at storage and handling.
- inhaling the fuel and its products during the engine run is unhealthy.
- for starting use an effective finger protection. An interference of fingers or another part of body with the rotating propeller can result in very serious injuries.
- never stand in the plane of the rotating propeller during engine run. A propeller rupture can cause very serious injuries.
- protect your hearing by means of an effective protection.
- secure that the onlookers stay at a safe distance when the engine runs.