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*the newest information
about DG for glider pilots*

*DG-Flugzeugbau GmbH
D-76646 Bruchsal, Germany*

Special Edition

DG-505MB

The self launching two seater sailplane of the new environmentally friendly generation

The DG-505MB is the latest version of the DG-500M. The power plant was designed using the concept of the DG-800B, but with a more powerful engine and a larger propeller (1.60m dia.). With the DG-505MB we are offering a two seater self launcher with low noise emission similar to the DG-800B. The DG-505MB can be delivered with a 22m wingspan or with a 20m span with winglets similar to the DG-500/20 Elan Winglets or with both options.

The Engine

The engine SOLO 2625 was developed by the German company SOLO especially for self launching sailplanes with retractable power plant. Its main features are low weight, compact dimensions, dual ignition and long life-time. A TBO of at least 400 hours running time is given without any limitation in years of operation. The version used in the DG-505MB produces a power of 47 kW (64 hp).

Environmentally friendly

It is advantageous that the engine produces the required power at only 6500 RPM. With the toothed belt reduction of 3:1 the propeller turns at only appr. 2170 RPM. The low propeller and engine speed produce low noise emission, since the noise increases excessively with RPM. The low frequency noise makes the engine sound agreeable and it will be drowned out by the ambient noise. Also the water cooling will cut off the emission of high frequencies out of the combustion chambers. Engine and exhaust system are located inside the fuselage, so the fuselage acts as a noise damping device and a large muffler can be installed as well.

Easy Maintenance, Compact Unit

The propeller mount is connected rigidly to the motor. For retraction the engine rotates inside the fuselage. With the propeller mount extended, all parts such as ignition, carburetors, water pump etc. which may need service are accessible. Removing the power plant from the fuselage, although easy, is only necessary for overhaul of the engine.

Automatic power plant control

The DG-505MB is equipped with the same automatic power plant control as the DG-800B, which is only available with DG-motor gliders. In addition, an automatic fuel injection system, which is similar to the DG-500M and DG-800B, is installed for engine starting instead of a choke. This makes starting the two-stroke as easy as a modern car-engine.

Safety

DG sailplanes provide a high level of pilot safety features. We are involved in safety related research programs. The latest findings from these programs are adopted as soon as possible into series production. The powerful engine allows for a short take off roll and high climb rate. This is important especially for short runways at high altitudes. Further safety features are the dual ignition, the automatic control hook ups, the splendid visibility, the safety cockpit, the powerful air brakes and the high landing gear with large tire. All controls including the engine are operated with the left hand, which allows the right hand to remain on the control stick. Controls for all important functions including the engine are installed in both cockpits.

Comfort and Independence

Thanks to its steerable nose wheel and the wing tip wheels the DG-505MB is fully maneuverable on the ground without the need for a helper. Superior gliding performance, fast roll rates, excellent visibility and comfortable seating will make flying the DG-505MB a thrilling experience of pure pleasure.

Thanks to the SOLO 2625 engine the DG-505MB is expected to be the two seater self launcher with shortest take off roll, highest climb rates and lowest noise emission.

The DG-505MB is the right glider not only for competition pilots but especially for cross country safaris and for flying "just for fun".

Duo with Solo

A test report from Gerhard Marzinik in the June, 1999, Aerokurier

It doesn't always have to be 25 meters span or more. The way for two people to enjoy soaring, without the accompanying outlandings, is with a self launching glider in a smaller, more manageable form. It is not necessary to reduce your expectations below that of a similar single-seater. Today, there is only one glider that meets the above expectations, the DG-Flugzeugbau DG-505MB. It can be delivered with a 4-part wing divided at either 22 meter wing or 20 meter with winglets. They both have in the "B" version a 65 HP, dual carburettor Solo 2625 engine. The stimulus toward the modern "B" model was given when Rotax stopped delivering two cycle engines for motorgliders. The revised engine is a good match for the DG-505. The glider not only has an increase in power, it is considerably quieter.

In the "B" model, the motor remains in a sound absorbing compartment in the fuselage while under power. In the fashion of the Binder design, only the propeller is rotated out of the fuselage. This design makes room for a large muffler and this, in connection with the water-cooling system, results in very low noise levels. The average noise level (according to paragraph X LSL) is 64 dB(A) for the 20 meter version and 63.8 dB(A) for the 22 meter version. This is 9 dB(A) under the maximum allowable level! The DG-505MB achieves this increased level of noise protection and this will be true of models built next year also because beginning in the year 2000, the allowable maximum noise levels will be reduced by 7 dB(A) in Germany. Thus the expenditure for redesign remains in check.

Automatic connection of controls, including the connections between the inner and outer wing panels, along with an assembly device for the heavy inner panels makes the assembly and disassembly easier. The standard model includes a 38 litre fuselage fuel tank for the two stroke mixture. Only if the optional 15 litre wing fuel tanks are ordered, is it necessary make fuel connections with their associated problems. At least in the standard model there is no problem of fuel odours.

With an empty mass of about 570 Kg, the DG-505MB is twice as massive as a 15 meter single-seater, but one does not have to push it by hand very much. Thanks to the wing wheels and the steerable tail wheel, the DG-505MB is easily movable. It can be taxied almost from the hangar to the start line using its own motor.

The cockpit comfort has been increased from the 1995 "500" to the present "505". A whole host of changes have been made which reduce the pilot load and increase the comfort of both pilots. When you climb into a DG-505MB from a DG single-seater, you feel immediately at home.

The cockpit is arranged in the familiar DG fashion. Motorglider pilots who know the DG-400 and DG-800B will find the well known, fully automatic electronic DEI control system for the motor. Thanks to the DEI, the great change in the motor compartment is hardly noticeable in the cockpit. The flap, spoiler and gear handles are on the left side of the cockpit. The control elements which are not used very often, for instance the main switch, are placed on the right side console. The ventilation control is

on the right side. The adjustable back, front rudder pedals, and seat pan allows comfortable seating for the tallest and shortest pilots with the controls all very reachable. The cockpit offers plenty of width and elbow room.

In the future, when new aircraft crew rules are instituted, self launching gliders like the DG-505MB and sustainers, may be flown with only a glider license after instruction and notation in the PPL-C authorizing "Self launching" in Germany and many other countries. (PPL-C - Private Pilot License for Gliders)

The DG lends itself to this type of instruction quite well; much better than a touring motorglider that offers none of the construction specialities of a glider with flaps.

The peculiarities of flaps may be demonstrated very simply. One could argue that the integrated starting procedure and system monitoring done by the DEI cuts out all the possible failures right from the beginning. The motto for the DG-505MB could be: "Climb in, start the motor and fly."

Turning on the ignition opens the engine compartment doors and brings the propeller up. When the propeller is all the way up, the starter engages. A cold starting system makes a choke superfluous. With an idle throttle setting, the Solo starts immediately. It did the same later during a test flight, except that it required a little time to run smoothly before full throttle could be given. After the motor check it can be accelerated rapidly. With the cockpit loaded, the nose wheel is already on the ground and careful acceleration to keep the nose off the ground, as in some single seaters, is not necessary.

The flaps require no special attention. Before takeoff, the flaps are set at +10 degrees and left there until the transition to glider configuration. Even on soft grass, as in Karlsruhe-Forchheim at the end of March, the 20 meter version of the DG-505MB accelerated and climbed very impressively. From the beginning of the take off roll to 700 meters altitude took only 4 minutes.

Even though this motorglider sounds very quiet on the outside, the occupants need ear protection for good radio and cockpit communication. Rapid reduction of the throttle setting demonstrates the motor is not sensitive to stalling. The speed falls off rapidly but not so badly that releasing back pressure on the stick a little late causes stalling. The most economical form of long distance flying with the motor is the "saw tooth" technique. This is not always possible. If one needs to fly under Class B or C airspace where a small working altitude is available, it may be necessary to fly at a fixed altitude. At about 150 km/hr and 6,200 rpm, the DG cruises at this inefficient loading quite well.

The change-over to gliding configuration is done without special attention. Just reduce to idle throttle setting and turn off the ignition! If the prop stops in a position at which it cannot be retracted, it is only necessary to push the starter button to get it into proper position. The prop will be automatically stopped by the brake and the retraction accomplished. In soaring flight, the DG-505MB is right in it's own element. Thanks to its self-starting plus a little cruising capability, we could make out thermal clouds

over the Schwarzwald. We couldn't see them from Karlsruhe because of the low-lying location of the airfield.

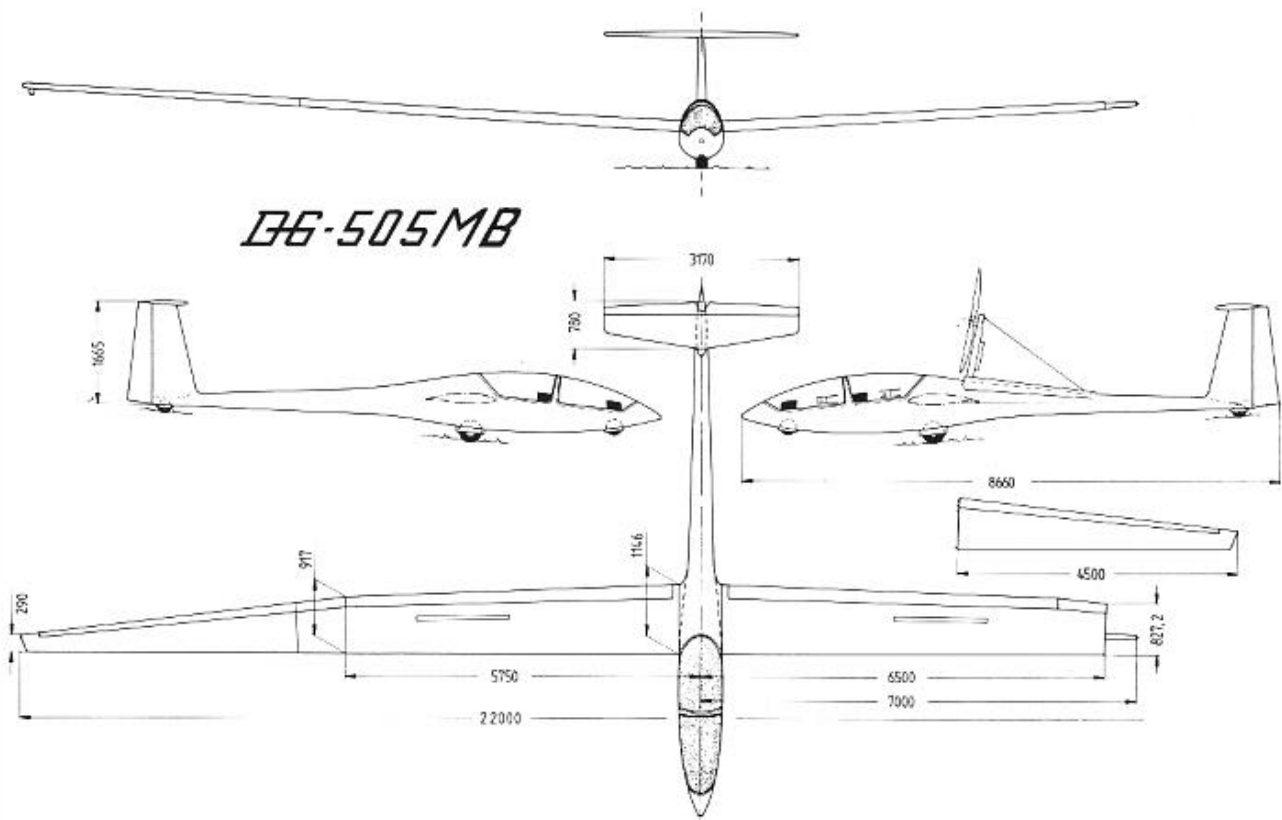
The rough spring thermals were a test for the DG. Continuous re-centering was required. The DG showed itself to be a heavier twin. The higher stick forces in comparison to 15 meter glider are, however, acceptable and no reduction in the joy of flight is noticeable. For its larger span, the DG is relatively easy to fly and manoeuvrable enough to jump here and there in steep turns chasing small thermals. If one circles too slowly, the flow separation becomes noticeable on the ailerons without the feeling of being threatened in any way by the ship.

The motorglider is well behaved in stalls. An extremely low horizon picture makes the situation unmistakable. When the DG quits flying, one wings falls low with moderate speed increase but with opposite rudder and relaxed back pressure on the stick it flies again with little altitude loss.

Later, in large, round, quiet thermals, the DG-505MB circled stabile with little need of re-centering effort. The roll rate from 45 degrees to 45 degrees is 6 seconds at 90 to 100 km/hr with 10 degrees of flaps. In straight flight it flies as if it were on rails. But at speeds above 180 km/hr, even with negative flaps, a strong forward force must be held on the stick. I had no chance to experience the differences between the 20 and 22 meter versions. Why do they offer two different spans at all? The shorter version with winglets will be of interest to competition pilots because the double seater class is limited to 20 meters anyway.

Those who don't care about competition may fly with a wing which has a true 2 meter increase in length.

Gerhard Marzinzik
translated by David Noyes, Ohio



Flight Comparison between a DG-500M and a brand new DG-505MB

We had the chance to do a flight comparison, between the new DG-505MB and an older DG-500M two-seater, equipped with a Rotax engine, in the process of licensing the DG-505MB in Germany.

The test was aiming at the performance difference of the two aircraft and was intended to show those differences, if present under real flight conditions to us.

Our main focus during the test series was the different power/engine setup. Which setup would perform best under the given normal flight situation? In order to solve that question we equipped both planes with enough weight so that their weight would be exactly the same. We did not check the difference in their gliding performance, because they are the same anyway. Therefore we did only bring the planes up to a similar weight but not to the same wing load.

The wingspan of the two aircraft were different on intention. We flew the DG-505MB in a 20m version with winglets, whereas the DG-500M was equipped with the standard 22m wings without winglets. In our opinion both wing setup's are comparable.

The planes were aligned on the wide landing strip of the Karlsruhe-Airport right next to the other and the pilots applied full throttle on command at the same time. Starting this way a number of flights were made, each ending at exactly 6000 ft.

Performing such tests one has to keep in the back of his or her mind, that the results and measurements can not be as accurate as comparative flights of sailplanes at great heights. Naturally the air has more turbulences closer to the ground than far up, but nevertheless the results of the tests were more than obvious:

The newly developed DG-505MB accelerated faster and got airborne earlier than it's predecessor, the DG-500M.

The DG-505MB's rate of climb was 15% superior to that of the DG-500M at heights of up to 3000 ft. But that's not the end yet. At heights of up to 6000 ft the DG-505MB surpassed the DG-500M by a margin of 20%!

We could not see any disadvantages of the DG-505MB resulting from the reduced wingspan.

The increase of performance is the result of the different engines. The DG-505MB is equipped with a more powerful 64 hp Solo Engine, whereas the DG-500M is equipped with a 60 hp Rotax engine - reduced to approx. 58 hp due to the exhaust system.

Further on the new "Technoflug" propeller apparently has a better effectiveness than the formerly used wooden propeller.

Last but not least there's the side of the aerodynamics: The air resistance of the "small" propeller shaft is a lot smaller than that of the complete engine in the DG-500M. The engine of the DG-500M is apparently in the way of the airflow and therefore causes a reduction of the performance of the propeller. However the rate of descent is the same with stopped engines. That's complete logical to us. The improved aerodynamics of the DG-505MB (caused by the engine, that is situated within the fuselage) is compensated by the larger propeller on the outside.

Result:

The brand new DG-505MB shows major overall improvements compared to its predecessor, not only seen from the noise point of view.

translated by Thiemo Gorath

DG-505MB - Successful noise measurements

On July 27, 1998, the weather conditions finally allowed for us to proceed with noise tests on the DG-505MB.

The measurements are based on Chapter X of the noise protection requirements for airplanes. LSL as well as ICAO Annex 16 Chapter 10, and the special rules of the BAZL in Switzerland. The measurements were taken during the ascent and the theoretical measuring point at 2.500 meters behind the point from where the plane starts to roll.

We could measure 63,8 dB(A) with 850 KG of weight. Because we developed the DG-505MB especially for low noise we were extremely happy with the test results.

In the meantime the maximum level for the additional noise protection is finalized by German lawmakers. After Jan. 1st 2000 it is 7 dB(A) under the LSL maximum or 66,5 dB(A).

Even the highest standard for noise protection has been met with a large reserve as you can see.

The results of the DG-505-MB are somewhat better than the official results from other motorized gliders with retractable engines of the new generation as published by the LBA:

the ASH25M was 64,4 dB(A) with 780 KG,
the Nimbus 4DM was 64,9 dB(A) with 820 KG.

The goal of our intensive development was a complete success.

DG Flugzeugbau GmbH
Tel.: 0049 (0)7251 3020-0

Otto Lilienthal Weg 2 D-76646 Bruchsal

Fax: 0049 (0)7251 3020-200

eMail: dg@dg-flugzeugbau.de.de

Internet: www.dg-flugzeugbau.de