

EMA scale

Instruction Manual


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Dear customer,
with the EMA scale you have acquired a very high quality electric drive. The drive consists of a motor from LMT, that drives with a 90% efficiency the aerodynamically shaped planetary gear, in which even the planets are needle bearing mounted. As a result of optimal adjustment between motor, gear, propeller and battery in combination with the extremely low air resistance, it was possible to realize an excellent visually appealing climbing aid for scale-soaring.

Installation:

1. Find a suitable place on top of the fuselage for installation, usually about 5 centimeters behind the main joiner box. The propeller is at the rear, it's a pressure drive!
2. Drill a 10 mm (EMA scale 200 - EMA scale 600)/ 14 mm (from EMA scale 800) hole at this spot into the center of the fuselage.

Caution: The fuselage mold seem is not always in the center!

3. Adjust the mushroom-shaped plywood block to fit to the fuselage contour. Assure to set the proper angle as follows:
 - **T- tail:** The motor thrustline must be parallel in line with the fuselage axis.
 - **X- tail:** The motor thrustline must be tilt 3-5° in the direction of elevator.
 - **V- tail:** The motor thrustline must be tilt 2-4° in the direction of V-tail.The exact angle should be adjusted such that the horizontal stabilizer is in the airflow of the propeller.
4. Sand the fuselage inside where the "mushroom" will be installed.
5. Before you glue the EMA-mount into the fuselage, the joining tube needs to be glued to the mount.
6. Using Uhu Plus Endfest or equivalent, glue the mushroom into the fuselage, making sure all angles are correct. It may be best to do this while the fuselage is upside down. The EMA should be inserted during the gluing process. The joiner needs to be wetted with teflon oil or something similar to prevent a possible sticking. Later the joiner needs to be degreased to ensure a good grip during operation.
7. Once the mushroom installation is complete and the glue has cured, insert the EMA scale and drill the 2 mm hole for the safety screw. Make sure the unit is securely installed and that the motor aims straight at the horizontal stabilizer.
8. From EMA scale 800 we offer EMA-mounts with different radiuses to assure perfect fitting. To ease selection there is a supplement in our download area with all available fuselage-shapes.

Warning:

These engines are not continuous run motors!

Time for switching on is maximum 60 seconds (EMAs without fan cooling)/ 120 seconds (EMAs with fan cooling).

After that a pause interval lasting 5 minutes (EMAs without fan cooling)/ 1 minute (EMAs with fan cooling) must be maintained to cool the engine down. It would be ideal to operate the drive system in short intervals to be sure that the engine may cool down trustworthy. If the ambient temperature exceeds

27°C (80°F) the cooling phase must be extended. The times above are only valid during flight.

A ground operation for testing is only possible for a few seconds, since the cooling is too low

without the air flow. The temperature behavior of the motor can be read off from the 4 dots temperature sensor. The fourth dot with 71°C shall never get black! If this happen the motor was probably overheated and must be sent in for check-up to Schambeck Luftsporttechnik. **It is crucial that the user is oriented to the temperature dots and then self-determines the runtime.** Disregard may cause heavy damage of the engine.



Elevator trim under power:

Expect a pitch-down moment due to the high thrust axis. Mixing in about 10% up-elevator during power-on typically suffices to counteract the pitch-down.

Electrical interference:

See description on range test and takeoff, do not alter the wiring at the controller. It is recommended to twist the three phase wires. This often has a positive effect on interference resistance.

Speed controller (ESC):

Please refer to the programming manual and the manufacturer's instructions. Brake and acceleration should not be set on "hard". We recommend YGE speed controllers where the brake is already set and can not be disabled without programming card. Of course there are many similar speed controllers from other manufacturers. These controllers act very different depending on the design and software version (e.g. acceleration, timing, break...). You can find detailed settings in our download area. For the correct functioning of a speed controller we can not assure guarantee, warranty or liability. The same applies also for the interaction between the speed controller and the EMA. In any case you have to refer to the manual of the speed controller.

Rotating direction:

In any case pay high attention to the correct direction of rotation of the propeller. The rotating direction can easily be changed by swapping two of the three connecting cables from the motor.

Partial load:

Attention: Many controllers may not be operated in partial load for a longer timespan.

Partial load may only be used for takeoff and motor soft-start. The partial load ist supposed to be shorter than 10 seconds.

Battery:

It is essential to follow the accompanying safety instructions for handling batteries!

Turning on the system:

First of all switch on the transmitter (with throttle at neutral position), then turn on the receiver and plug-in the main battery. Especially recommended for safe and easy use of engines is our Safety switch (for example our [Safety switch 80 A](#)).

Takeoff:

Please operate a range check prior every start. Even a small change, such as changing some wires can cause a loss of range. In case of bad range, you can try to use a ferrite ring or an optocoupler to put this right. Beneath the classical ground takeoff, it is also recommended to do a bungee start. Always keep a safe distance to people and objects. The model and the EMA may cause severe damages (see [I. Warnings and safety instructions](#))

Turning off the system:

Remove the contact pin of Safety switch, unplug main battery, power down the receiver, switch off your transmitter. If the main battery remains plugged in, it slowly discharges, and at the next time turning on the system it may be dangerous.

I. Warnings and safety instructions

The operation of an EMA unit can be dangerous. With inappropriate treatment, such an engine, which may transfer up to 2 kW to the propeller, can cause substantial damage. You now own a very efficient EMA that requires know-how, discipline, regular service and maintenance. Errors and lack in the assembly or with the operation of a model with an EMA can lead to property damages or body injuries.

Attention!

Before you take a model airplane in operation, you must find out about the legal regulations in your country. Legally, a model aircraft is an aircraft subject to relevant laws that must be observed at all times. Please notice rules like start-permissions or insurance obligations. In addition legal requirements that relate to the radio control system need to be considered. The regulations of the respective country must be observed accordingly.

Warning!

It is your responsibility to protect others from injuries. The minimum distance from residential areas to ensure the safety of people, animals and buildings must be at least 1,5 km. Keep distance from power supply lines. Do not fly the model in bad weather with low clouds or fog. Never fly against direct sunlight because you may lose the eye contact with the model. To avoid collisions with manned or unmanned aircraft, please land immediately when approached by such aircraft.

Attention!

People or animals must observe the following minimum safety distances from the aircraft engine:

- Before the engine 5 m
- On the side of the engine 10 m
- Behind the engine 2 m

Warning!

Commissioning and operation of the Model and / or the engine under the influence of alcohol, drugs, medicines, etc. is absolutely forbidden. The operator must be in the best physical and mental condition and also well concentrated. This applies both to the operator and any assistants.

Warning!

This engine was exclusively designed for model airplanes and is not suitable for any other purpose. In no case it shall be used for persons or goods or any other way of use, except exclusive for model airplanes, since any other intended use can lead to property damages or personal injuries.

Warning!

Note about the propeller: It is recommended to clean the blade with a damp cloth. In case of any damage or unbalance, immediately stop operation. Besides that the general safety rules for propellers are valid.

Warning!

Any deviation from the instructions in this manual, the use of other parts or materials and changes in construction, may impact adversely the functionality of the engine and must therefore be avoided under all circumstances.

Warning!

Never operate the engine in enclosed spaces. During testing and programming the transmitter or ESC, a 12 V battery can be used that if any mistake happens, the engine doesn't have full power. Prior every start a full range check must be performed.

Warning!

The operation of this EMA shall only be undertaken with exact observance of the guidelines in these instructions. Also to be considered are the general radio controls verifications and the CG of the airplane. All control surfaces need to be checked for proper operation/deflection, a full range check shall be made with collapsed antenna. The check shall be repeated with the EMA in operation and the model well attached to the ground. Besides that, refer to your radio control safety rules.

General information

The maximum lifetime of an EMA is five years. The gear grease should be exchanged at least once a year. The screws from the motor and the propeller need to be checked continuous for a strong connection.

Maintenance

All EMA engines need some maintenance. Once a year or after 100 starts the EMA shall be sent in to Schambeck Luftsporttechnik or its authorized partners for check up and readjustment. The operator himself is responsible to check all screws for correct fitting. The propeller must be checked for any damage prior start. It is essential to keep the electric contacts and wires clean, because bad contacts may cause damage of the ESC.

II. Exclusion of liability and damage

Compliance with the installation and operating instructions in conjunction with the model and the engine, as well as the installation, operation, use and maintenance of associated components can not be monitored by Schambeck Luftsporttechnik. Therefore, Schambeck Luftsporttechnik assumes no responsibility for any loss, damage or costs arising from the erroneous operation, erratic behavior or anything connected with the foregoing. Unless otherwise prescribed by law, the responsibility of the company Schambeck Luftsporttechnik (resulting from the use of the model and the engine) to pay damages for any reason is excluded (including personal injury, death, damage to buildings, as well as damage caused by revenue or loss of business, interruption of business or other indirect or direct damages). The total liability under any circumstances and in any case is limited to the amount that the buyer has actually paid for the airplane or the engine. Commissioning and operation of the model and the engine is done solely at the risk of the operator. The buyer agrees that Schambeck Luftsporttechnik is not able to monitor or control whether this manual - regarding the installation, operation, use of aircraft, engine and use of the remote control - is followed appropriately.

From Schambeck Luftsporttechnik neither promise, contract agreements, guarantees or other arrangements to any person or entity with respect to the functionality and commissioning of the model and the engine were made. At acquisition of the model or the engine, the customer has to rely on his own expertise and judgement and take on responsibility for it.

III. Terms of guarantee

The guarantee consists of free repair or replacement of any parts that have proven manufacturing or material defects during the warranty period from the date of purchase. Further claims are excluded. Transport, packaging and travel costs are at the expense of the buyer. We accept no liability for damage in transit. When returning to Schambeck Luftsporttechnik or to the approved service center for the country, a description of the fault and the invoice with the purchase date is needed. The warranty is void if failure of the component or model is caused by an accident, improper handling or incorrect usage.

IV. Checklist

Check prior start:

- Rx battery fully charged?
- Main battery fully charged?
- Control surface check and engine check.
- Tighten the binding screw of the EMA!
- Check the rotating direction.
- Radio range test!
- Initialize timer for engine runtime control.

Check after landing:

- Disconnect main battery!
- Switch off Receiver!
- Check the whole engine for any damage.

