



**FES**<sup>®</sup> More than 120 FES  
equipped sailplanes flying

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FES (Front Electric Self-launch / Self-sustainer system) is innovative propulsion developed for high performance sailplanes



EXPAND YOUR HORIZONS

... and give yourself the ultimate freedom of soaring, by going places you would never have dared before! The future lies in maximizing flying fun, without all the fuss and risks related to landing out. FES is the solution for all those pilots who wish to soar into a safer and more independent future.

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## Front Electric Self-launch / Self-sustainer

We have revolutionised the future of gliding with the development of a highly innovative and extremely effective propulsion system with a light but powerful brushless electrical motor and small and folding propeller in the nose of the sailplane.

We named it Front Electric Self-launch / Self-sustainer – FES.



### Why Front?

With a front engine, there is no additional drag of extended propeller arm, meaning less power is needed for equal performance. Less power means fewer expensive batteries and a smaller engine, resulting in less additional weight and costs. In this manner, we get the best sustainer system available for sailplanes.

### Why Electric?



The powerful electric motor is much smaller and lighter than a comparable combustion engine. It is easy to operate. No warm up is needed, just power switch ON and rotate throttle knob. It immediately gives full torque from zero to max RPM. Electric propulsion produces minimal noise, is clean, odourless and vibration free. The system is simple, reliable and with only a few rotating parts, virtually maintenance-free. Last but not least, the electric propulsion is environment friendly and leaves a significantly lower carbon footprint - especially with solar panel charging.

### When and why to use FES?

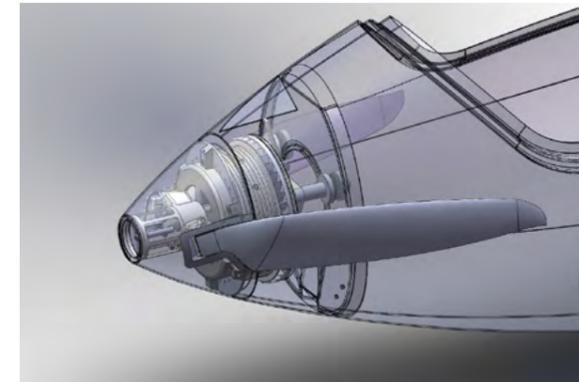
An electric motor with a folding propeller can be safely started at low altitude, which is very important feature on days with low cloud base and weak thermals.

At maximum power setting, you have a good climb rate available, to reach a safe altitude, then power can be reduced for horizontal flight to the nearest thermal or to your home airfield. For level flight only 4kW of power is required which means about one hour of endurance, allowing you to cruise a distance of around 100 km.

In case of system failure you can still land safely, as pure sailplane, without the additional drag of an extended propeller and motor.

During aerotow you can always release low in the first thermal and cut down expensive towing bills! When using winch or auto tow, FES could greatly expand your horizons.

**LAK17B FES, HPH 304ES - EASA certified**  
**Silent 2 Electro - certified by DAeC**



## TECHNICAL DATA

### FES is available in two configurations

- as self-sustainer system for heavier sailplanes
- as self-launch system for UL sailplanes

### Motor

- Specially designed for FES
- Outrunner BLDC brushless synchronous with permanent magnets with electronically controlled commutation system 3 phase
- 22 kW of max power
- Length: 100 mm
- Diameter: 180 mm
- Weight: of motor only 7,3 kg

### FCU – FES Control Unit instrument

- Standard 57 mm size
- Sunlight readable high resolution colour display
- Indicates important parameters: Temperature, RPM, Power, Voltage, Current, Battery capacity, Remaining Time
- Warning messages together with alerting sound

### Propeller

- Carbon fibre foldable propeller
- Blades bended according fuselage contour
- Diameter: 1.0 m
- Automatically opens when motor starts
- Folded blades are rotated closer to the fuselage
- Automatic positioning after stop

### FES Battery packs GEN2

- With integrated BMS (Battery Management System)
- Connectors for high power cables hidden inside of pack
- 2 battery packs needed, each weighting only 16 kg
- 14 lithium ion polymer cells in each pack
- Capacity of single cell: 40 Ah
- Total available energy: 4,2 kWh
- Supplies 12V power for all instrumentation on board
- Easy to take out of the fuselage to charge at home

### Charging

- Special 600W or 1200W chargers provided with the system

SAILPLANE TYPE	EMPTY WEIGHT	MAX DISTANCE IN LEVEL FLIGHT	MAX ALTITUDE GAIN	MAX CLIMB RATE
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### FES as self-sustainer system in 18m sailplanes

Ventus 2cxa FES	350 kg	95 km	1250 m	1,7 m/s
Discus 2c FES	340 kg	95 km	1250 m	1,7 m/s
LAK17B FES	320 kg	100 km	1300 m	1,8 m/s
HPH304S FES	360 kg	90 km	1150 m	1,6 m/s

### FES as self-launch system in UL sailplanes

SILENT 2 Electro	210 kg	110 km	1600 m	2,8 m/s
MiniLAK FES	220 kg	110 km	1500 m	2,8 m/s

Data in the table are just approximate values which vary in different conditions.

# HIGHLIGHTS

- High power electric motor, for a good climb rate
- Low noise level
- Folding propeller, with automatic positioning
- Low additional weight of the complete system (approximately 45kg)
- The aerodynamics of the sailplane are not changed during motor operation
- Low aerodynamic drag under power, so only small power is needed for horizontal flight
- No shift in the centre of gravity due to motor operation
- No need for additional Pb batteries - 12V for instruments is generated with DC/DC converter
- Reduced operating and towing costs
- Easy removal of Battery packs for safe charging out of sailplane
- Green solution



FES system development and production by:



AVIATION PRODUCTS

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## IMPRESSIONS

If you are a glider pilot and you haven't heard of FES, give yourself a slap! The Front Electric Sustainer (or Self-Launcher for Annex II gliders) is quite likely the most useful soaring invention since the variometer!

[FLYING THE FES, Sailplane & Gliding](#)

For me, it makes an enormous difference in the way I can now envision Soaring, and I believe it has the potential to revolutionize the way we practice soaring in the future.

[Flying the FES-equipped Silent 2 Electro, Francois Pin, Soaring Cafe](#)

»The combination of an electric motor, which always starts reliably, and an engine position with unproblematic execution of all operations, making mistakes virtually nonexistent, is an absolute plus in aviation safety.«

[Ludwig Haslbeck, Segelfliegen Magazin](#)

»The simplicity and reliability of the FES are one of the primary reasons that I purchased FES option.«

[LAKI7B FES flight impression by Renny Rozzoni, Soaring magazine](#)

[www.front-electric-sustainer.com](http://www.front-electric-sustainer.com)