

ELECTRICAL & POWER



 **ENGINEeUS**[™]

 **SAFRAN**

ENGINEUS™

Electrical motors



ENGINEUS™ ELECTRICAL MOTORS

Our vision is to deliver **smarter electrical solutions for a better flight.**

We are convinced tomorrows' flights will be hybrid electric and even fully electrically powered. We will be flying VTol (Vertical Take off and landing), light jets and urban mobility solutions that will revolutionize the way we fly.

Building on our decades of expertise in generation and the expertise of our work workforce, we have designed a full range of ENGINEUS™ electrical motors. They are smart, efficient, optimised and adapted to a wide range of applications from actuation to propulsion.

Advantages

• Integrated motor controller solution → Smart Motor:

- Power electronics inverter integrated within the electrical machine.
- Remote or embedded control board: both options available.
- Drastic motor feeders and inverter EMI filters weight reduction.
- Lighter, cheaper, easier A/C integration compared to a split inverter solution.

• Air cooling is the baseline: with or without integrated fan, both options available:

- Air cooling feasibility assessed up to 100 KW.
- Liquid cooling may be proposed as an option.
- Common cooling system for motor and motor controller unit.

• Design for direct drive operation:

- Well adapted to propeller or e-fan speed (from 1500 rpm and above).
- No need for additional gear box between the E-smart motor and the propeller.

• Design to be structural:

- All the shaft propeller loads withstand by the motor structure.

• Sealed design, developed for harsh environment based on SAFRAN in service background.

• Use of E mag advanced material. Wide band gap SIC MOSFET inverter-technology available if needed.

• Optimized multi phases motor/inverter design:

- Losses spreading for efficient and lightest integrated air cooling system.
- Fault tolerant design available.
- Scalable design.

• High reliability:

- Digital sinusoidal position sensorless control.
- Reliable inverter packaging.
- No electrolytic capacitor.

• Design for large volume production:

- Made of power electronics building bricks.
- Automatic winding.

Performance

• Unrivaled smart motor power density at low speed:

- 2,5 KW/Kg @2500 rpm for 45 KW continuous power → power density based on smart motor total weight.
- >15N.m/Kg @2500 rpm for 172 N.m continuous torque → torque density based on motor e mag only weight.
- >10 N.m/Kg @2500 rpm for 172 N.m continuous torque → power density based on smart motor total weight.

• Efficiency > 94% for the whole smart motor.

• Customized power rating from 45 KW based on a large power range building brick family.

ENGINEUS™ : Major breakthrough in aerospace motor drive solution

**POWERED
BY TRUST**

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