THE NEW GENERATION OF HIGH-PERFORMANCE BRUSHLESS MOTOR FANS & BLOWERS
The company's new range of brushless motors equips axial fans and centrifugal blowers for applications such as energy storage cooling, engine cooling, and HVAC – including the SBL300 sealed brushless motor that features a wide range of benefits. Because of the use of high-energy rare earth magnets, and a state-of-the-art sine wave sensorless drive, the SBL 300 can reach a remarkable electrical efficiency of 85%. This makes it one of the most efficient motors in the 300W power range. This is further sustained by the use of dedicated high-performance fan designs that optimize fluid dynamic performance. The result is high airside performance at minimum electrical load. The SBL300 is IP68 and IP6K9K compliant, and that means that the motor is fully sealed and can operate in the presence of any aggressive or hazardous substance. The integrated power and control electronics are separated within the motor to ensure the control electronics operate at lower surface temperature levels, this greatly increasing durability and overall product reliability. The SBL300 has a double-sealed ball bearing design, guaranteeing an impressive product life of more than 30,000 hours.

STANDARD FEATURES
• PWM and analog input for continuous adjustment of fan speed
• Open collector diagnostic output
• EMC directives: 2006/28/EC
• Protection:
  - Overtemperature
  - Overcurrent
  - Mechanical overload
  - Locked rotor
  - Load dump
  - Overvoltage
  - Undervoltage
• RoHS compliant: totally lead-free electronic assembly process

ADVANCED FEATURES
• High efficiency and low power consumption
• Low Noise, Vibration and Harshness
• Electronic controls with on-board diagnostics
• Motor with integrated electronics
• Battery compensation system
• Proprietary sine-wave sensorless drive (Spal-patent)
• Low inertia inner rotor design
• Low weight motor
• Higher ambient working temperature

NO WORRIES
• Patented internal and external design guarantees a 100% active and passive safety protection
• Fully sealed and fireproof motor with internal electronics
• IP68 and IP6K9K protection
• High resistance to vibration and mechanical stress
• Very long life under all operating conditions
• Spark free

OPTIONALS
• Full reversibility
• Active reverse polarity protection
• Personalised control strategies
• Black (cataphoresis) coating
• Noise dampers on shroud
• Speed control strategy for a direct interface to an external temperature sensor
• Heavy-duty configuration

TYPICAL RATINGS @ CONTINUOUS OPERATION

• 350 W  LINE POWER @ 95°C MOTOR-FAN AMBIENT TEMPERATURE
• 300 W  LINE POWER @ 120°C MOTOR-FAN AMBIENT TEMPERATURE
• OPERATING TEMPERATURE RANGE: -40 ÷ 120 °C
• STORAGE TEMPERATURE RANGE: -40°C ÷ +150°C
• LIFETIME OVER 30,000 HOURS (DEPENDING ON SPECIFIC MISSION PROFILE)
• OPERATING VOLTAGE RANGE: 8 ÷ 16 VOLT AND 16 ÷ 32 VOLT
• STAND-BY CURRENT < 0.1 MA
From the raw material to the moulding of plastic components; from the copper wire to the fabrication of the electric motor; from the complete assembly to the end of line test of the finished production part: all steps of the manufacturing process are carried out in our facilities in Correggio.

This high level of vertical integration allows us to control the quality of every single step of the manufacturing process and achieve the well known “SPAL quality standard”, which for half a century has distinguished SPAL products in the marketplace. A highly-qualified team of engineers aided by the latest software tools and state of the art rapid prototyping equipment ensure a seamless execution of our project; from customer’s requirements to production.

DEVELOPMENT AND MANUFACTURING PROCESS FLOW

- R&D DEPARTMENT
- TESTING & RELIABILITY LABORATORIES
- TOOL DESIGN AND SIMULATIONS
- RAPID PROTOTYPING
- TOOL SHOP
- ELECTRONIC BOARD MANUFACTURING (SMT)
- INJECTION MODULING DEPARTMENT
- INDUSTRIAL ENGINEERING
- E.C. BRUSHLESS ASSEMBLY LINE
INNOVATION

Spal maintains its leadership position in large part due to its continuous investment in innovation. Spal employs a large team of engineers, designers and technicians in new product development and prototype testing.

The R&D structure integrates all the know-how elements to master the product needs. Design and development of motors, fans and shrouds needs mandatory mastering of following know-how:

- FLUID-DYNAMICS
- THERMODYNAMICS
- ELECTRONICS
- ELECTRO-MAGNETIC
- MECHANICS

THE FAN FLUID-DYNAMIC DESIGN PROCEDURE CONSISTS OF DIFFERENT PHASES:

- Optimization of airfoil profile
- 3D blade theoretical design (proprietary SPAL design code)
- 3D model
- CFD analysis
- FEM analysis
- Rapid prototyping of fans and shrouds
- Performance, efficiency and noise bench test
- Reliability and environmental test (vibration, temperature, endurance, ...)

By random vibration analysis we get deformation and stress during component life cycles.
SPAL has developed a new generation of Brushless motor with integrated electronics built to IP68 and IP6K9K specification (TÜV certified IP6K9K, according EN 60529). Our motors are waterproof, provide superior performance and also a longer life under all operating conditions. Motor components are fully protected against dust, water, saline fog and chemicals aggressions. Maintenance free over full expected life. Open brushless motors are subject to ingress of external agents which may cause corrosion and degradation of performance and product life. The picture show rust on a not sealed motor of the competitors.

**Sealed is better than Open!**

Brushless motor fans and blowers for all conditions

- product reliability in extremely tough operating conditions
- ideal for specific environments and conditions: heat, cold, humidity, shock, salt fog and vibration.
- manufacturing flexibility and custom tailored solutions
- the ability to match motor to country specific norms

**Mud and Sand resistant**

The IP68 and IP6K9K protection guarantees fully sealed and fireproof motor (with internal electronics). The power board is separated from the electronic circuits for increased safety.

- SPAL SBL 300 is intrinsically safe and self protected against mechanical and electrical overloads.
- Power electronics are based on a LEAD FRAME structure separated from logic electronics board (as requested by most important car manufacturers).
- SEALED MOTOR and ALUMINUM CASE are an additional guarantee that in case of overheating prevent fire generating from the motor

**Safe is better than Sorry!**

Suitable for battery cooling where there exists a possibility of inflammable gas.
BRUSHLESS MOTOR FANS AND BLOWERS

- PWM and analog input for continuous adjustment of fan speed
- EMC directives: 2006/28/EC
- RoHS compliant: totally lead-free electronic assembly process
- Nominal power 300W
- Operating temperature range: -40 ÷ 120 °C
- Protection:
  - Overtemperature
  - Overcurrent
  - Mechanical overload
  - Locked rotor
  - Load dump
  - Overvoltage
  - Undervoltage

IP68 & IP6K9K PROTECTION
VERY LONG LIFE (OVER 30,000 hrs)
HIGH EFFICIENCY
FAN DIAMETERS FROM 140 mm TO 405 mm
AIRFLOWS UP TO 5,000 m³/h

BRUSHLESS AXIAL FANS RANGE

<table>
<thead>
<tr>
<th>Diameter</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>140 mm</td>
<td>5.5” inches</td>
</tr>
<tr>
<td>190 mm</td>
<td>7.5” inches</td>
</tr>
<tr>
<td>305 mm</td>
<td>12” inches</td>
</tr>
<tr>
<td>385 mm</td>
<td>15” inches</td>
</tr>
<tr>
<td>405 mm</td>
<td>16” inches</td>
</tr>
</tbody>
</table>

BRUSHLESS CENTRIFUGAL BLOWER RANGE

<table>
<thead>
<tr>
<th>Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>TYPE 019-BBL301-95</td>
<td>24V</td>
</tr>
<tr>
<td>TYPE 020-BBL303-95</td>
<td>24V</td>
</tr>
</tbody>
</table>

Besides standard solutions, SPAL Automotive, for special requirements, can provide custom designed shrouds and fans.
SOLUTIONS FOR EVER GROWING COOLING NEEDS

HEATING, VENTILATION, AIR CONDITIONING

POWERTRAIN COOLING

BATTERY THERMAL MANAGEMENT SYSTEM

ON-BOARD ELECTRONICS COOLING

✓ CAR
✓ BUS
✓ AGRICULTURAL TRACTOR
✓ OFF-HIGHWAY VEHICLE
✓ TRUCK
✓ POWERSPORT
✓ HYBRID AND ELECTRIC TECHNOLOGY
✓ ECOLOGICAL ENGINEERING

OUR CLIENTS ARE OUR BEST REFERENCE. WE WORK WITH THE BEST OEM MANUFACTURES