



# TECHNICAL SUPPORT AGREEMENT

## GENERAL CONDITIONS OF SALE

Spin Applicazioni Magnetiche srl proposes this form of collaboration contract “TSA” (**Technical Support Agreement**), to provide a complete service and support in the design, optimization of devices and development of new products.

### Description of the service

This proposal consists in the supply of a number of days of activity, in agreement with the customer.

### Advantages for the customer

This service allows the customer to benefit some advantages:

- rapid response in starting activities
- save money compared to equivalent separate ordered activities
- flexibility in choosing the services requested
- Availability of human resources with specific preparation
- advanced software calculation tools

## Services provided

### Devices:

- Thermal behaviors
- Mechanical components
- Electric motors
- Electric generators
- Electromagnetic linear actuators
- Electromagnetic sensors
- Transformers – coils
- Induction heating systems
- Analysis and simulation of thermal behavior
- FEM analysis and optimization of structural, noise and vibration problems by means of FEM calculation programs for mechanical analysis
- Executive projects for the construction of prototypes
- Analysis of the technological compatibility of the project
- Characterization of magnetic laminations
- Technical-scientific support in the field of magnetic materials

## Calculation programs used by Spin technical team

**Electromagnetic Analysis:** Flux2D-3D by Altair,

**Thermal Analysis:** Flux2D-3D by Altair

**System Analysis-electronic controls:** Activate by Altair

**Mechanical Analysis:** OptiStruct and Inspire by Altair, Solid Works.

**CFD-fluid dynamics:** AcuSolve

**Optimizers:** Altair HyperStudy, Spin Bcs Magnetic Applications

## Spin technical team

Our staff consists of eleven technical people and one technical director

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Spin Applicazioni Magnetiche srl  
P. IVA 01328060338  
Cod. 2849490151  
Reg.Imp. n. 158044/1999  
Cap.Soc. 10.400 € i.v.



Activities are carried out or supervised from senior technicians.

## PROFESSIONAL PROFILES

### Alessandro Tassi (Ceo)

25 years of experience in the design of electromagnetic devices (Laboratorio Elettrofisico, Spin Applicazioni Magnetiche).

Founder of Spin Applicazioni Magnetiche (1999).

Experience in the field of design and simulation of different types of electromagnetic devices, rotating machines and systems for generating magnetic fields; collaborations with different research institutes and companies for various industrial applications (automotive, house appliance, defense, biomedical, automation).

### Luigi Rizzi (senior designer and planning supervisor)

Graduated in Electrical Engineering at the University of Pavia, Luigi Rizzi has been working as Mechanical designer for 21 years in the automotive and aerospace industry (MTA, Magneti Marelli, Temis). He joined SPIN in 2014.

Mainly involved in the structural static and dynamic analysis and also in the thermal analysis of electric and electronic equipment, he is currently studying the effect of electromagnetic forces on vibration and noise in electric motors.

Axial flow motor analysis for refrigeration compressors

Design and research of production technologies for brushless motors for break by wire systems

### Giuseppe Zanolchi (senior designer working on rotating electric machines)

14 years of experience in the design of rotating machines in the most different fields of application (MTA, Magneti Marelli, Temis).

In Spin since 2005; responsible for the training and the support to technicians using finite element software and other simulation software.

Among the main projects followed in Spin Applicazioni Magnetiche Srl:

3D modeling of high-power induction and synchronous generators for energy Permanent magnet brushless motors for type KERS / HERS / FORMULA E

Starter – six-phase generator for aeronautical application

LSPM brushless motor (without electronics) for aircraft pump

Brushless external rotor motors for electric fans (household appliances and industrial sector)

Brushless motors with Permanent Magnets for lift application

Induction motors for lift application

Linear stepper motor in the automotive sector

### Alex Quantelli (designer dedicated to electric machines)

4 years experience on the design of electric machines for automation, linear motors, sensors, coils, optimization and control software.

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In Spin since 2015; among the main projects followed in Spin Applicazioni Magnetiche:  
 IPM motor analysis without brushes;  
 Vibroacoustic analysis of traction motors and household appliances  
 IPM and IM high speed traction motor.  
 Analysis of single-phase and three-phase induction motors for industrial and household appliances.

**Umberto Bottero** (software development, customization, customized interfaces, designer electromechanical devices)  
 3 years' experience in development software for electricity and the calculation of electrical machines (linear motors, sensors, coils, optimization and control software).  
 In Spin since 2016; among the main projects followed in Spin Applicazioni Magnetiche:  
 Custom interface development and calculation procedure  
 Linear motor analysis and electromagnetic sensors  
 Design of wireless energy transfer system  
 Development of rapid calculation process and mapping for electric motors

**Alberto Rubino** (junior designer dedicated to electric machines)  
 design of electric motors for traction, aerospace and automation.  
 In Spin since 2017; among the main projects followed in Spin Applicazioni Magnetiche:  
 BPM brushless motor analysis for aerospace application.  
 Motor for - IPM generator  
 Design of induction motor for electrospindle  
 System analysis (battery management, thermal modeling, vehicle mission profiles)

**Simone Sgarzi** (laboratory measurements, software development)  
 Doctor in physics, graduated from the University of Parma  
 Magnetic and electrical measurements applied to electrical machines.  
 Software development for the customization of calculation procedure for electric machines.  
 In Spin since 2016; among the main projects followed in Spin Applicazioni Magnetiche:  
 Analysis and characterization of soft and hard ferromagnetic materials.  
 Development of rapid calculation process and mapping for electric motors.  
 Analysis of linear actuators

**Maurizio Presta** (mechanical engineer)  
 3 years' experience in mechanical design.  
 Design of brushless motors for brakes.

In Spin since 2017; among the main projects followed in Spin Applicazioni Magnetiche:



Brushless levitation motor analysis  
Hypermesh training  
Mechanical motor design for Break by wire  
Modeling a helicopter carrier

**Jacopo Sammarchi** (electronic engineer)

Degree thesis in power electronics.  
Design of sensors, induction heating systems, linear actuators  
In Spin since 2017; among the main projects followed in Spin Applicazioni Magnetiche:  
Inductors for brushless motor electronics  
Induction heating systems for copper and iron  
Analysis of electromagnetic linear actuators  
Electrostatic modeling

**Michele Orlando** (mechanical engineer)

A graduate of the University of Basilicata in Potenza, he has experience in dynamic analysis and is studying vibro-acoustics in electric machines.  
In addition, he is passionate about fluid dynamics and has followed a Master in aerodynamics in Modena.  
In Spin since 2018;  
among the main projects followed in Spin

Sizing of liquid cooling circuits for engines for electric traction.  
Fluid dynamic analysis of the forced air-cooling system of a brake bench motor.  
Dynamic analysis of the effects of electromagnetic forcing in electrical powertrains.

**Federico Frattari** (designer dedicated to rotating electric machines)

Degree in electrical engineering.  
Design of electric motors for automotive and automation.  
In Spin from 2018. Among the main projects followed in Spin Applicazioni Magnetiche:

BPM brushless motor analysis for automotive application.  
Motor for motor-generator IPM  
Analysis of linear electromagnetic actuators  
Control of electric motors