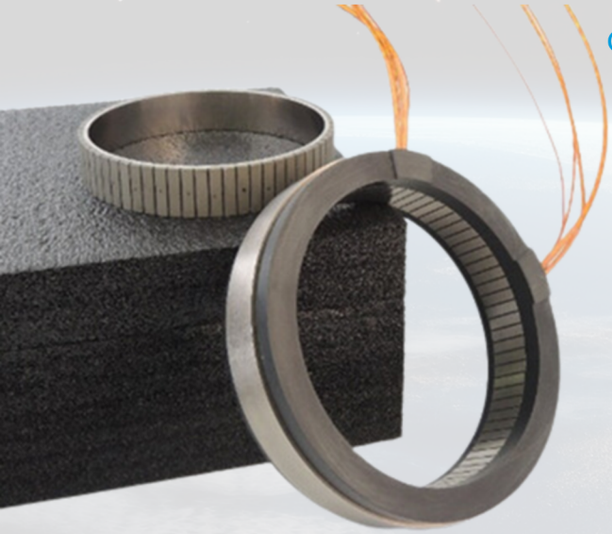
SPACE

Space-Rated Motors

Linear & rotary direct drives | Limited Angle Torquers | Servomotors

MACCON develops and supplies high-performance electric motors and customized electromagnetic designs for demanding space environments.
Typical configurations include 3-phase, multi-pole, inner rotor PM-BLDC motors with brushless architecture, optimized for precise control and high reliability.
Outer rotor variants and alternative motor technologies are also available, tailored to specific mission requirements.



Kit Motors

Our Solutions

- Permanent Magnet Synchronous Motors (PMSM)
- Brushless DC Motors (BLDC)
- Stepper Motors
- Limited-Angle Torque Motors
- Zero-Cogging Motors
- Magnet-Free Reluctance Motors
- Linear Motors and Voice-Coil Actuators
- Rotary and Linear Solenoids

Housed Motors

Key Features

- Customized motor designs for mission-specific requirements
- Manufacturing based on ESA standards
- Frameless kit motors for direct mechanical integration
- Housed Motors opt. with gearboxes
- Hollow-shaft and thin-ring configurations
- Optimized for minimal mass and low energy consumption
- Redundant designs available on request
- Low outgassing & vacuum compatibility
- Cryogenic and high-temperature options available

Typical Motor Parameters

Operating voltage	5 - 90 V (higher ranges available on request)
Torque range	0.05 - 15 Nm (higher torque versions available)
Speed range	5 - 3.000 rpm (up to 25.000 rpm for fluidic pumps)
Outer diameter range	20 - 200 mm
Overall length range	10 - 100 mm

Typical Environmental Conditions

Operating temperature range	-40°C to +105°C (Optional -55°C to +125°C)
Low outgassing	TML < 1%, CVCM < 0.1%
Radiation	TID = 30KRAD (higher radiation tolerance available on request)

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MACCON
MOTION UNDER CONTROL

Selection of Space Programs employing MACCON Motors

Satellite/Mission	Mechanism	Application
Ariane 6	FLPP-HCV	Valve actuator
Ariane 6	FLPP-OCV	Valve actuator
BepiColombo	Antenna, de-spin	ADM Actuator
BepiColombo	STR	Shutter
BepiColombo	Simbio-SYS	Shutter
Chang'e 5	Lunar Drilling	Actuator
Columbus/ISS	Biolab micro-gravity	Centrifuge
Cosmo 2nd.Gen	AU1, AU2	CMG
EnMap	FHD Actuator	Shutter
FY-3	MWHS	Scanner
FY-3	TRIPM	Filter wheel actuator
LEMA	IBDM Actuator	Docking
MeteoSAT		Dual-scanner
MetOp NG	MWS, MWI/ICI	Scanner
MetOp NG	METimage	Scanner
OPTEL	TESLA Motor	Scanner
PRISMA	Small	Shutter

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MOTION UNDER CONTROL

Selection of Space Programs employing MACCON Motors

Satellite/Mission	Mechanism	Application
PRISMA	Main Port	Shutter
PRISMA	Solar Port	Shutter
Sciamachy	Main	Scanner
Sentinel 3	SLSTR OME, SDM	Scanner
Sentinel 3	SLSTR OME, FMM	Shutter
TerraSAR-X	LCTSX	
FY-3	MWRI SCM	Scanner
FY-3	MWRI SDM	Scanner
LiQuaRD	LIDAR	Scanner
Commercial Space	CPA Azimuth	Laser comm.
Commercial Space	CPA Elevation	Laser comm.
PLATiNO	CMG	Actuator
K 425	CMG	Actuator
AWS (Artic weather satellite)	Cross-Track-Mikrowellenradiometer	Actuator
I-HAB	ATCS (Active Thermal Control System=	Valve actuator
	RVS3000	LIDAR Modul (Scanner)
Badr-8	TELEO Demonstrator	Laser-based satellite communication

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MOTION UNDER CONTROL

Engineering & Design Services

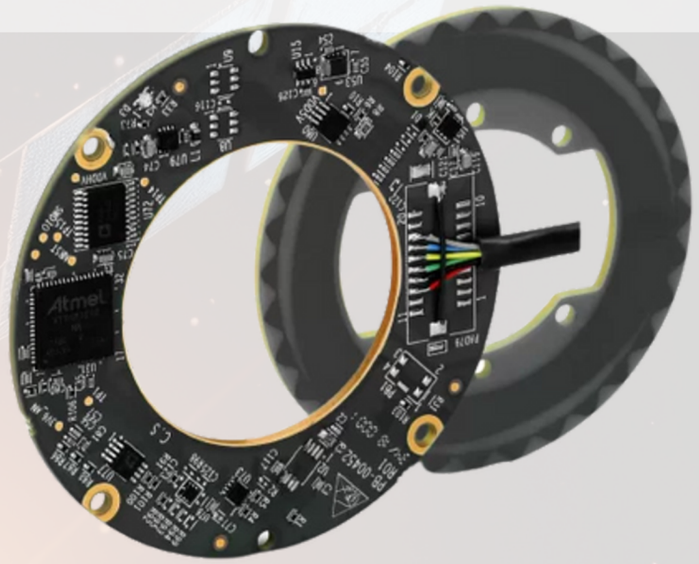
- Electromagnetic design studies
- Magnetic stray-field analysis
- Servo system analysis and simulation
- Design analyses, including:
  - Interface design
  - Mechanical design
  - Thermal analysis
  - Radiation analysis

Control Electronics

- Motor power and control electronics for space programs
- Support digital commence interfaces (e.g. SpaceWire) and position feedback devices

Position sensors & feedback devices:

- Integrated Hall-effect commutation sensors
- Absolute Position Sensors from MACCON, and Netzer, also 3rd party encoders
- Typically hollow-shaft (flexible ID); low-profile, redundancy possible



VLS Series | ABSOLUTE ROTARY ENCODER | Leo - Space | Hollow Shaft

Qualification & Test

- Thermal-vacuum testing
- Shock and vibration testing
- Electromagnetic compatibility (EMC) testing
- Outgassing tests
- Performance tests