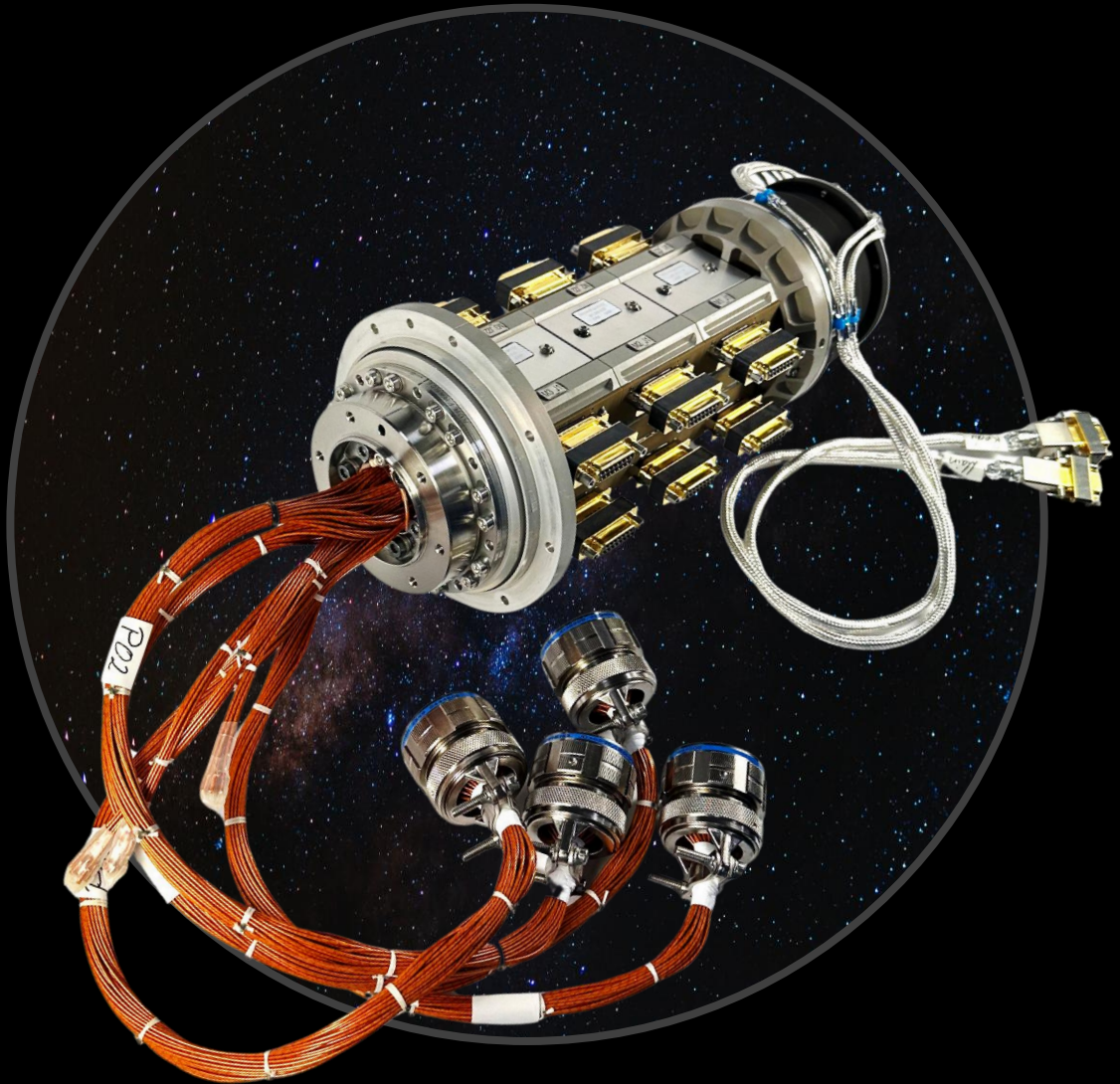


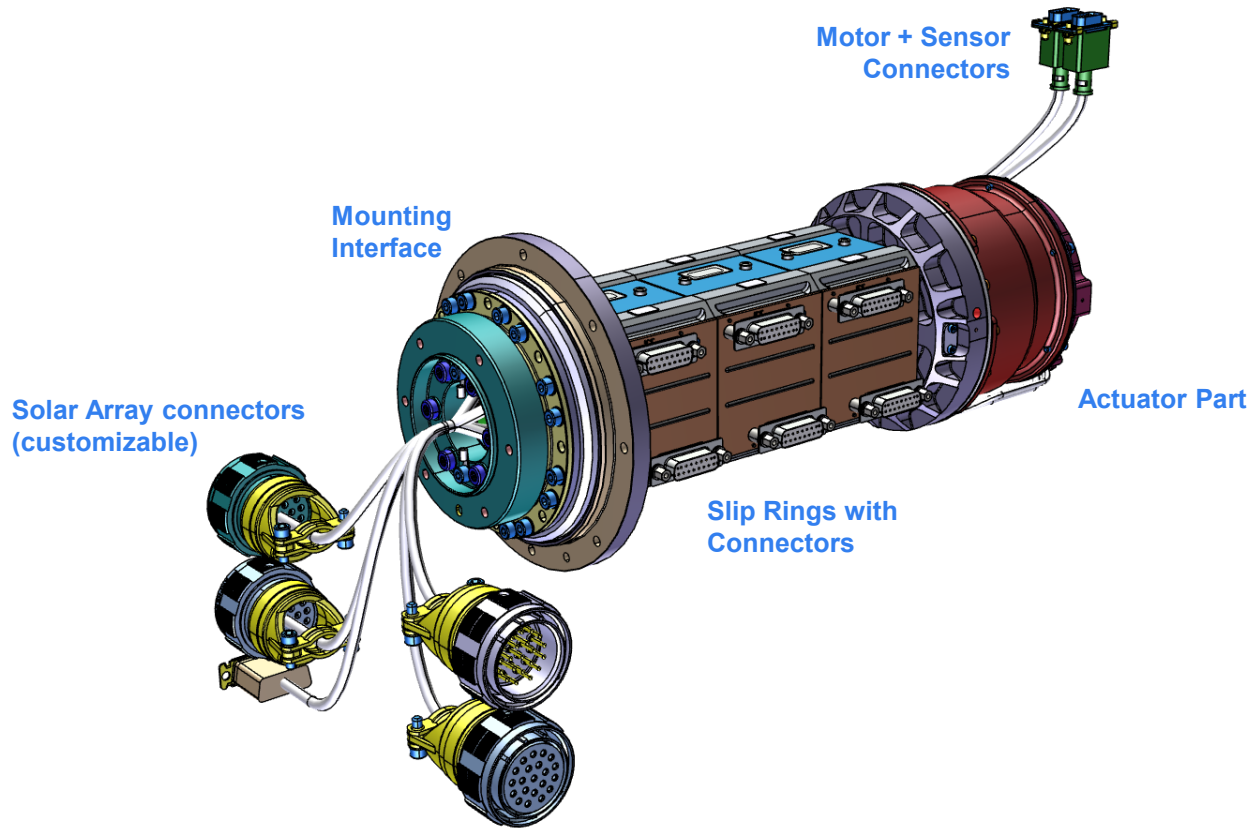


SEPTA36G

Solar Array Drive Mechanism for your demanding mission

SEPTA36 is Beyond Gravity's institutional-class high-performance high-reliability Solar Array Drive. Its modular design supports different slip ring sizes and quantities for up to 27kW power transfer on the high-power SEPTA36G variant. SEPTA36 & SEPTA36G are fully qualified for LEO/MEO/GEO, have extensive flight heritage including on multiple ESA and NASA missions, and are available at attractive lead times.

Scalable High Power SADM for all missions



Modularity for lowest cost

- Family of SADM for a large range of missions
- Standard mechanical interfaces
- Standard actuator with huge flight heritage
- Rolling Stock enables short lead times and flexibility

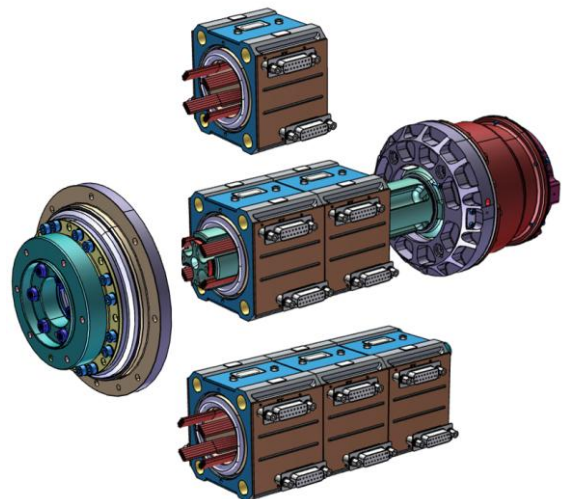
Robust and Proven

- Flight proven slip ring technology
- Standard actuator, components flying since decades
- Large database of unit data and family trend available
- Qualified for LEO and GEO missions
- Proven drive electronics available: Both SADEs or direct drive via BG's constellation onboard computer (cOBC) supported, which further reduces S/C cost by entirely avoiding separate SADEs.

Tailored for you

- Huge engineering expertise allowing adaptation for unusual and specific applications
- Adapted interfaces, test scope, modifications, are feasible on request.

Modularity Concept



Interfaces remain the same, regardless of power class. Ideal for your scalable platform.

Operational Performance			
Drive direction	Continuous rotation in forward and reverse direction		
Max. output speed	1.0 °/s		
Output Step Size (full step)	0.00625°		
Lifetime	15 years in orbit		
Qualified Lifetime (as tested)	500 full revs on ground GEO qualification campaign: 25'903 revs as sweeps (LEO environments qualified via SEPTA36 qualification campaign)		
Delivered Torque			
Unpowered holding torque	>6 Nm (without optional detent break)		
Powered Holding Torque	max. 55 Nm		
Delivered Output Torque @ 200 mA	> 55 Nm		
Delivered Output Torque @ 300 mA	> 55 Nm		
Back-Drivability	Possible with unpowered motor		
Motor Back-EMF Constant	2.33 Vs/rad		
Slip Ring Characteristics	SEPTA36G-1	SEPTA36G-2	SEPTA36G-3
Number of tracks (all tracks usable for power or signal transfer)	30	60	90
Number of lines (1 line = 2 tracks)	15	30	45
Total Power transfer	9 kW*	18 kW*	27 kW*
Max current per track	4.8 A _{RMS} (simultaneously on all tracks) 5.5A (maximum per individual track ; as-qualified)		
Max. voltage across tracks	150V		
Connector-to-Connector Resistance (22°C, per transfer, 250mm harness)	< 80 mΩ		
Noise (RMS ; per line, i.e. 2 transfers in series)	≤ 28mΩ		
Insulation	≥ 100 MΩ @ 500 V, 30s		
Dielectric Strength:	No breakdown at 500 VAC		
Position Measurement			
Position Output Accuracy	± 1° (outside of potentiometer dead band)		
Position Output availability	0° ... 356.5°		
Max. Dead Band	< 3.5°		
Alignment between main and redundant	0° or 180° (customer's choice) (± 1.5° accuracy)		
Potentiometer End-to-End Resistance	10 kΩ ±10%		
Operating Voltage	2.5V .. 12V (nominal 5V)		

* power transfer capability may be increased depending on the thermal boundary conditions. Please contact Beyond Gravity for further information

Motor Characteristics				
Coil Resistance @ 20°C	76 Ω ± 10%			
Coil Inductance @ 20°C	156 mH ± 20%			
Motor time constant	2 ms			
Mechanical Dimensions & Mass	SEPTA36G-1	SEPTA36G-2	SEPTA36G-3	
Max. Outer Diameter mounting flange	144 mm			
Length from front of flange	177.5 mm	237.5 mm	297.5 mm	
Length Overall	217 mm	277.0 mm	337 mm	
Mass (excl. customer-specific harness)	4.2 kg	5.2 kg	6.2 kg	
S/C Interface	8 through holes Ø 4.5mm on a circle with D = 132mm			
S/A Interface	6 threaded blind holes MJ5x0.8 on a circle of D = 76mm (asymmetrically distributed to ensure orientation)			
Static Loads (non-simultaneous ; simultaneous load cases available on request)				
Axial Load	6'670 N			
Radial Load	4'890 N			
Bending Load	420 Nm			
Torsional Load	>56 Nm			
Stiffnesses	SEPTA36G-1	SEPTA36G-2	SEPTA36G-3	
Axial stiffness (along y)	4.5 × 10 ⁷ N/m *	4.27 × 10 ⁷ N/m *	4.0 × 10 ⁷ N/m	
Shear stiffness (along x, z)	1.85 x 10 ⁷ N/m *	1.85 x 10 ⁷ N/m *	1.76 x 10 ⁷ N/m	
Torsion angular stiffness	4.62 × 10 ³ Nm/rad *	2.21 × 10 ³ Nm/rad *	1.54 × 10 ³ Nm/rad	
Bending angular stiffness	39.16 × 10 ³ Nm/rad *	34.98 × 10 ³ Nm/rad *	31.2 × 10 ³ Nm/rad	
First mode frequency (effective mass >10%)	>260 Hz			
	(* values estimated based on S36G-3 QM test data)			
Mechanical Qualification Levels (from SEPTA36G-3 QM for SEPTA36G-1 and -2 the notching is slightly different)				
High level sine vibrations:	Frequency (Hz)		Qualification Level	
	10 - 24.2		±12.7mm	
	24.2 - 36		15g	
	36 - 55		20g	
	55 -100		7g	
Random vibrations:	⊥ MOUNTING PLANE (Y)		// MOUNTING PLANE (X&Z)	
	Freq. (Hz)	Level (g²/Hz)	Freq. (Hz)	Level (g²/Hz)
	20	0.05	20	0.021
	60	0.4	80	0.2
	422.5	0.4	700	0.2
	445	0.15	2000	0.026
	495	0.15		
	520	0.4		
	600	0.4		
	2000	0.036		
Global:	19.33 g _{rms}		14.92 g _{rms}	
Note: All dynamic mechanical levels are understood with a 2.5kg mass with a CoG at 50mm from the SA interface plane. Other levels or other yoke masses are possible on request.				

Shock levels for each axis (X, Y, Z):	Frequency	Shock input levels	
	100 Hz	80 g	
	1000 Hz	2543 g	
	10000 Hz	2543 g	
Note: All dynamic mechanical levels are understood with a 2.5kg mass with a CoG at 50mm from the S/A interface plane. Other levels or other yoke masses are possible on request.			
Qualification Temperature Levels (SEPTA36G QM)			
	S/C conductive interface	S/C radiative interface	
Ground Storage	10°C ... 30°C	10°C ... 30°C	
Hot Non-Operational (Survival)	+ 85°C	+ 65°C	
Hot Operational	+ 80°C	+ 60°C	
Cold Operational	– 35°C	– 30°C	
Cold start-up limit	– 40°C	– 30°C	
Cold Non-Operational (Survival)	– 40°C	– 30°C	
Other			
Reliability (MIL-HDBK-217)	>0.9998		
Total Ionizing Dose (TID) tolerance	>1E8 rad (worst-case component ; located inside spacecraft)		
Acceptance Testing			
Standard test program	Visual, physical, electrical, functional, 3-axis RND vibe, TVAC 1x NOP + 4x OP cycles		
Optional tests	Static load, sine-vibe, EMC, Combined SADM-SADE tests, etc. available upon request.		