

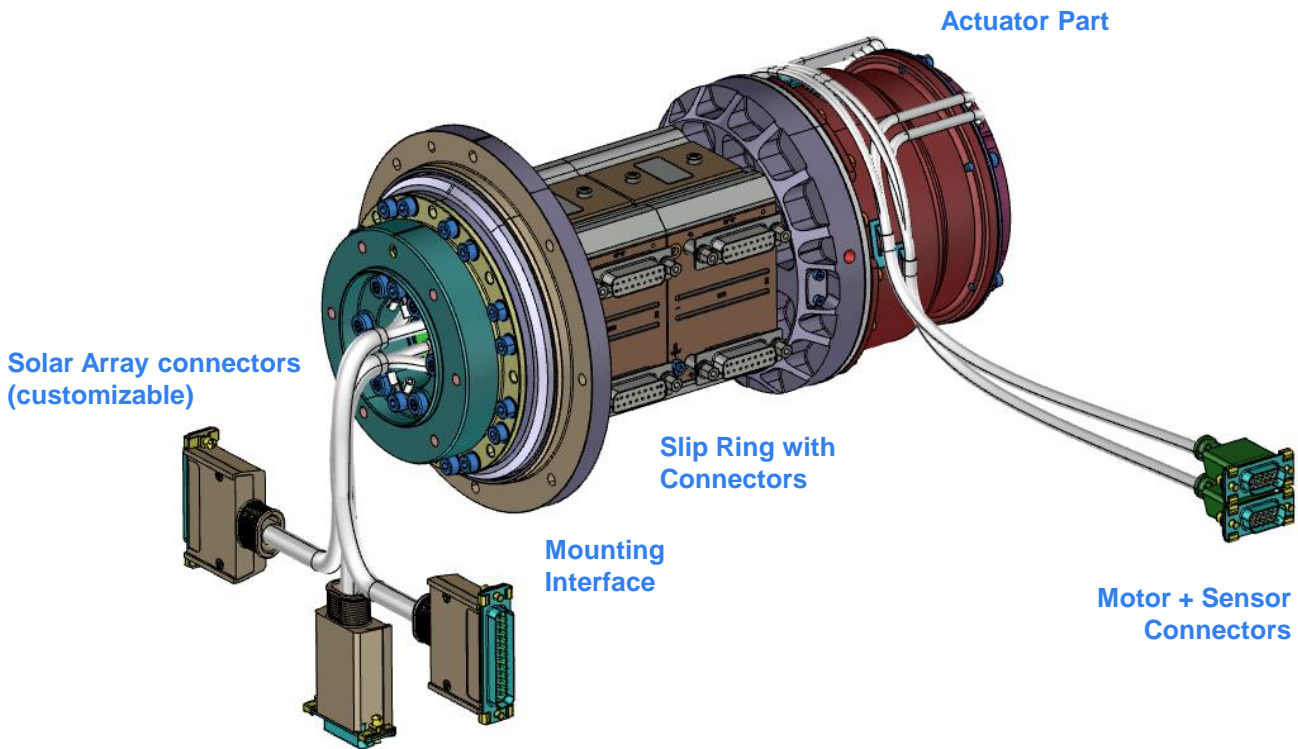


SEPTA36

Solar Array Drive Mechanism for your demanding mission

Beyond Gravity offers a modular family of Solar Array Drive Mechanisms, to serve a large range of spacecraft. The SEPTA36 is fully qualified and is 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

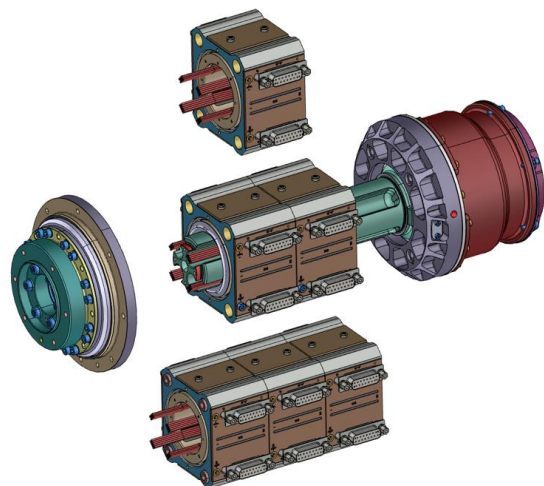
Robust and Proven

- Flight proven slip ring technology
- Standard actuator, components flying since decades
- Enormous database of unit data, family trend and comparisons
- Qualified for LEO and GEO missions

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: 19'503 revs as sweeps LEO qualification campaign: 152'437 revs as continuous revs and sweeps		
Delivered Torque			
Unpowered holding torque	~7 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			
	SEPTA36-1	SEPTA36-2	SEPTA36-3
Number of tracks (all tracks identical and usable for power or signal transfer)	30	60	90
Number of lines (1 line = 2 tracks)	15	30	45
Total Power transfer	6.3 kW	12.6 kW	18.9 kW
Max current per track	3.5 A _{RMS} (simultaneously on all tracks) 4.0A (maximum per individual track ; as-qualified)		
Max. voltage across tracks	120V		
Connector-to-Connector Resistance (at 22 °C, with 250mm harness)	< 140 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)		
Potentiometer End-to-End Resistance	10 kΩ ±10%		
Operating Voltage	2.5V .. 12V (nominal 5V)		

Motor Characteristics						
Coil Resistance @ 20°C	76 Ω ± 10%					
Coil Inductance @ 20°C	160 mH ± 20%					
Motor time constant	2 ms					
Mechanical Dimensions & Mass						
	SEPTA36-1	SEPTA36-2	SEPTA36-3			
Max. Outer Diameter mounting flange	144 mm					
Length from front of flange	162.5 mm	212.5 mm	262.5 mm			
Length Overall	202 mm	252.0 mm	302 mm			
Mass (excl. customer-specific harness)	4.0 kg	4.6 kg	5.4 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	4'800 N					
Radial Load	6'200 N					
Bending Load	400 Nm					
Torsional Load	>55 Nm					
Stiffnesses						
	SEPTA36-1	SEPTA36-2	SEPTA36-3			
Axial stiffness (along y)	5.0 × 10 ⁷ N/m	4.7 × 10 ⁷ N/m	4.4 × 10 ⁷ N/m			
Shear stiffness (along x, z)	2.1 × 10 ⁷ N/m	2.1 × 10 ⁷ N/m	2.0 × 10 ⁷ N/m			
Torsion angular stiffness	5.28 × 10 ³ Nm/rad	2.52 × 10 ³ Nm/rad	1.76 × 10 ³ Nm/rad			
Bending angular stiffness	47.7 × 10 ³ Nm/rad	42.6 × 10 ³ Nm/rad	38.0 × 10 ³ Nm/rad			
First mode frequency with 2.5 kg @ 50mm from S/A interface	207 Hz	193 Hz	173 Hz			
Mechanical Qualification Levels (from SEPTA36-3 QM – SEPTA36-1 and -2 can take higher loads)						
High level sine vibrations:	Frequency (Hz)			Qualification Level		
	0-20			±11mm		
	20-100			25g		
Random vibrations:	⊥ MOUNTING PLANE (Y)		// MOUNTING PLANE (X)		// MOUNTING PLANE (Z)	
	Freq. (Hz)	Level (g ² /Hz)	Freq. (Hz)	Level (g ² /Hz)	Freq. (Hz)	Level (g ² /Hz)
	10.00	0.01	10.00	0.01	10.00	0.01
	60.00	0.50	60.00	0.50	60.00	0.50
	444.40	0.50	255.00	0.50	264.00	0.50
	465.00	0.10	265.00	0.30	275.00	0.30
	515.00	0.10	285.00	0.30	295.00	0.30
	538.87	0.50	296.17	0.50	306.56	0.50
	700.00	0.50	700.00	0.50	700.00	0.50
	2000.00	0.07	2000.00	0.07	2000.00	0.07
Global:	23.2 g _{rms}		23.74 g _{rms}		23.74 g _{rms}	
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.						

Shock levels for each axis (X, Y, Z):	Frequency	Shock input levels	
	100 Hz	60 g	
	1000 Hz	1600 g	
	10000 Hz	1600 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 (SEPTA 36 QM)			
	S/C conductive interface	S/C radiative interface	
Ground Storage	10°C ... 30°C	10°C ... 30°C	
Hot Non-Operational (Survival)	+ 90°C	+ 65°C	
Hot Operational	+ 70°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	