REACTION WHEEL

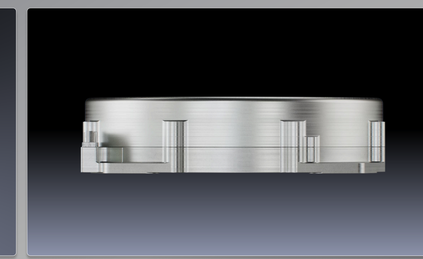
UMBRA

THE UMBRA REACTION WHEEL delivers precise and reliable attitude control for small satellites, focusing on responsible space debris mitigation. Designed for demisability per NASA standards, this > 2 Nms reaction wheel offers high torque and momentum in a compact, lightweight package. Optimized for seamless integration with other Umbra Components and test levels tailored for Falcon 9 Rideshare, it provides a qualified, high-performance solution for demanding missions.

>2Nms ASSEMBLY

RE-ENTRY DEMISEABLE

MULTI ORBIT



GENERAL SPECIFICATIONS

MAX DIMENSIONS	6.0 in x 6.0 in x 1.5 in
MASS	2 kg
INPUT VOLTAGE RANGE	24-32 V
INPUT VOLTAGE NOMINAL	28 V
PEAK POWER	100 W at maximum torque (typical)
AVERAGE POWER	5 W steady state draw
ELECTRICAL INTERFACE	15-Socket Micro-D Connector
DATA INTERFACE	RS-485
INTENDED SPACE ENVIRONMENT	Multi-orbit
HERITAGE	Qualification testing complete in Q2 2026
DESIGN LIFE	5+ Years
PRODUCTION	Assembled and tested in the USA
MOMENTUM	+/- 2.0 Nms (at max rpm)
MAX TORQUE	250 mNm

ENVIRONMENTAL SPECIFICATIONS

RANDOM VIBE	Qualified to 14.16 G_{rms} profile enveloping GEVS, Falcon 9, SpaceX Rideshare, and Electron levels
SHOCK	Qualified to 1000g peak profile enveloping GEVS, Falcon 9, SpaceX Rideshare, and Electron levels
OPERATING TEMPERATURE	-34°C to 70°C
SURVIVAL TEMPERATURE	-34°C to 80°C
TOTAL IONIZING DOSE DESIGN CAPABILITY	Designed to withstand at least 30 krad TID

CONFIGURATIONS

TYPE	DESCRIPTION & DETAILS	SPACE READY	TYPICAL LEAD TIME	COST
EDU	Suitable for use in Hardware-in-the-Loop testbeds and software development testbeds	No	< 4 Weeks	CONTACT
FLIGHT	Flight Hardware with Acceptance Testing	Yes	< 12 Weeks	CONTACT
CUSTOM	Umbra Space Systems is adding additional wheel sizes to our catalog. Please contact us with your needs.	Inquire	Inquire	CONTACT

FEATURES

RESPONSIBLE DE-ORBITING | DEMISEABLE DESIGN

Engineered for complete demisability upon atmospheric re-entry in compliance with NASA-STD-8719.14C, this reaction wheel minimizes space debris. This commitment to responsible space operations is crucial for sustainable LEO activities and simplifies the licensing process.

HIGH-PERFORMANCE CONTROL | MOMENTUM

Providing >2 Nms of momentum and 100 mNm of maximum torque, the Umbra Reaction Wheel enables precise attitude control and agile maneuvering for small satellites. This high-performance capability allows for demanding pointing requirements and quick response to disturbances.

BUILT FOR RELIABILITY | REDUNDANCY & QUALITY

Built for dependable operation, the Umbra Reaction Wheel features redundant Hall Effect control and ABEC 7 ceramic angular contact bearings. These high-quality components enhance reliability and ensure long-term performance in the harsh space environment.

STANDARD INTERFACE | EASY INTEGRATION

Designed for optimized performance and seamless integration with any GNC system utilizing RS-485 communication, the Umbra Reaction Wheel works harmoniously with other Umbra components. Contact us for more information on Umbra's fully integrated GNC solution, utilizing Umbra Reaction Wheels.

DATA SHEET 5021D0002 REV 02
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