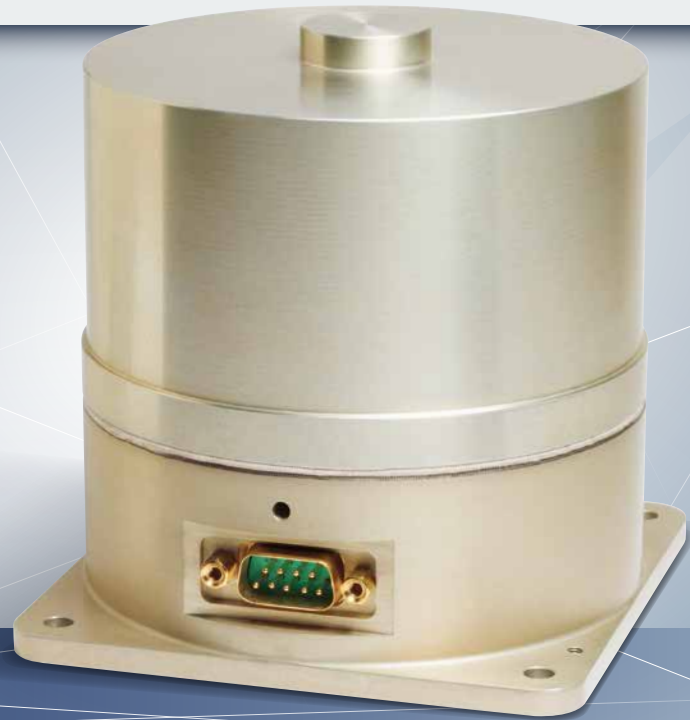


# REACTION WHEEL



## PERFORMANCE

	NRWA-T005	NRWA-T065	NRWA-T2
<b>FUNCTIONAL CHARACTERISTICS</b>			
Max wheel torque	10 mNm	20 mNm	94 mNm
Max wheel momentum	0.05 Nms (at 10 mNm)	0.65 Nms (at 20 mNm)	1.6 Nms
Speed range	-9000 to +9000 rpm	-9000 to +9000 rpm	-3050 to +3050 rpm
Rotor moment of inertia	0.2 x 10 <sup>-3</sup> kg.m <sup>2</sup>	1.0 x 10 <sup>-3</sup> kg.m <sup>2</sup>	1.4 x 10 <sup>-3</sup> kg.m <sup>2</sup>
Speed control accuracy	<1 rpm @ >100 rpm	<1 rpm @ >100 rpm	<1 rpm >100 rpm
<b>PHYSICAL CHARACTERISTICS</b>			
Dimensions (wheel)	65 mm x 65 mm x 65 mm	102 mm x 102 mm x 105 mm	150 mm x 150 mm x 75 mm
Dimensions (electronics)	100 mm x 100 mm x 75 mm	Internal	Internal
Mass	500 g (wheel only)	1.55 kg	2.55 kg
Power	40 mA / mNm	40 mA / mNm	12 mA / mNm
<b>ENVIRONMENTAL CHARACTERISTICS</b>			
Thermal (acceptance)	-30 °C to +60 °C	-20 °C to +60 °C	-20 °C to +60 °C
Mechanical Tests (qualification)	14 g <sub>RMS</sub> (random)	16.95g <sub>RMS</sub> (random)	14g <sub>RMS</sub> (random)
Radiation (TID) (qualification)	10 krad (component level)	10 krad (component level)	10 krad (component level)
<b>INTERFACES</b>			
Power supply	5 V, 12 - 20 V	28 V unregulated	28 V unregulated
Data	RS-422 or TTL UART	RS-422	RS-422
Connector	9-pin D-type (power); 26-pin HD-type (data interface)	9-pin D-type Male	9-pin D-type Male
Mechanical	4off M3	4off M5	4off M5

**ACCEPTANCE TESTING:** All FM parts undergo random vibration (10 rms) as well as thermal cycling (four cycle ambient pressure) to five degrees beyond operational thermal specifications. However, NewSpace can perform additional environmental testing if required by a client.

**CONFIGURATION MANAGEMENT:** Specifications are subject to change. Please refer to latest version.

# REACTION WHEEL



## FEATURES

- Wheel torque and momentum capacity suited to client mission requirements
- Current, speed and Torque control
- Simple digital interface to spacecraft bus
- Integration with an optional gyroscope for inertial rate control and inertial angle control modes possible
- Hermetically sealed
- Long demonstrated lifetimes

## APPLICATIONS

- High performance three-axis torque and momentum exchange actuators for agile small satellite missions
- Momentum bias
- Inertial rate control for accurate pointing of imagers

## QUALIFICATION

The latest generation, the NRWA-T065, is TRL 9 and has extensive in-orbit heritage. Flying since 2014, this wheel has more than 3 million failure-free hours in-orbit with no reported SEU's. Given the robust nature of the T065 wheel, this product has become a preferred choice for longer lifetime missions and constellation programmes.

## UTILITY

A high performance alternative to propulsion based reaction control system, reaction wheels provide spacecraft with control torque by means of momentum exchange between the satellite body and the rotating wheel. The increasing popularity of these wheels coupled with our commitment to high quality, fit-for-purpose components has resulted in NewSpace (NSS) offering these wheels in a range of sizes (NRWA-T005, NRWA-T065 and NRWA-T2).

Typically, three to four reaction wheels are needed to provide full three-axis control of a spacecraft. The additional integration of these wheels with external gyroscopes enables full three-axis control using inertial rates. With high torque stability, wheel momentum capacity and accurate speed control; the NSS reaction wheels are ideal for agile small satellite missions requiring accurate pointing.