REACTION WHEEL UNIT

▲ Reaction Wheel Assembly (RWA)

Single-Channel Wheel Drive Electronics (WDE)▼

A Bradford Reaction Wheel Unit (RWU) typically consists of four Reaction Wheel Assemblies (RWA) and one Wheel Drive Electronics Box (WDEB).

The Reaction Wheel Assembly (RWA) is a rotating inertial mass, driven by a brushless DC electric motor. When power is applied to the motor, the wheel accelerates, causing the satellite body to which the motor housing is attached to rotate in the opposite direction due to the induced counter torque.

A minimum of three sets of Reaction Wheel Assemblies (RWA) are needed per satellite to allow rotational control around the X, Y and Z-axes. One extra RWA is generally present for redundancy purposes. All these four RWA can be controlled from one Wheel Drive Electronics Box (WDEB). The WDEB design provides internally for redundancy.

Bradford offers three different Reaction Wheel Assemblies to the market, each specifically sized for a particular angular momentum control range. In addition three different electrical interfaces are available, so a total of nine (9) unique RWA models are available to provide a good match to customer requirements. All these wheels are based on the same proven design, maximising the available heritage database.

PERFORMANCE CHARACTERISTICS

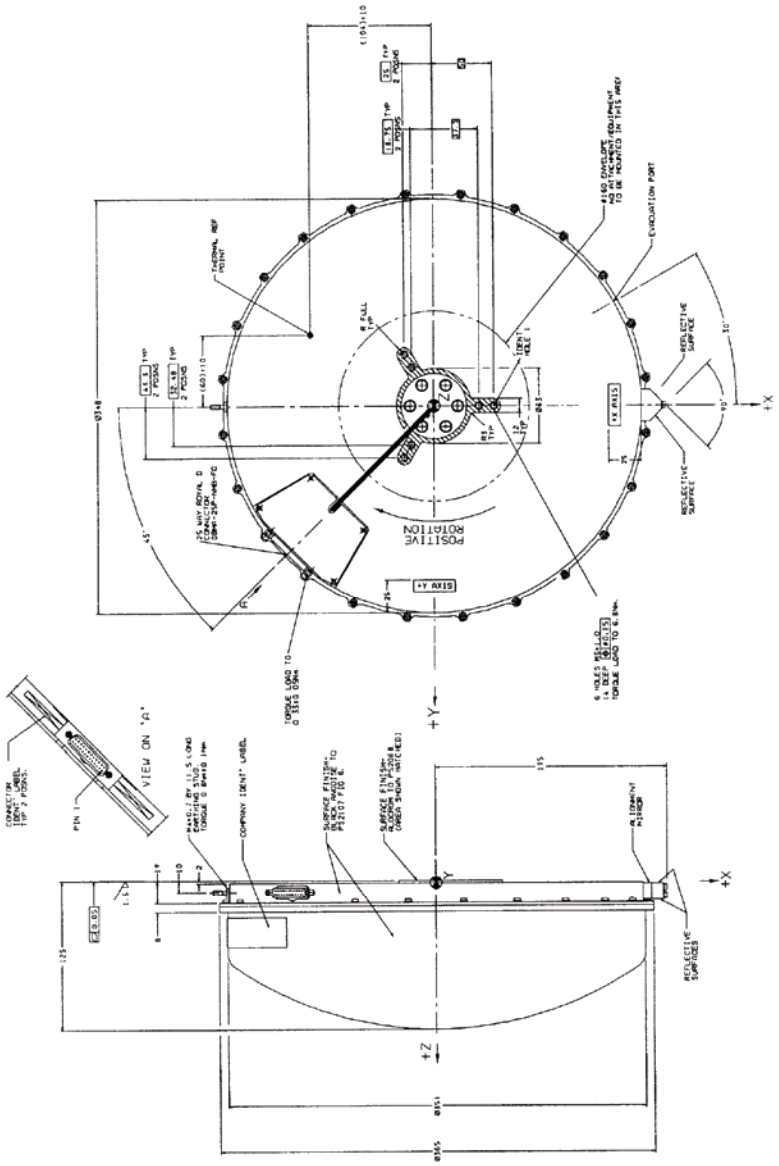
	Reaction Wheel Assembly (RWA) Model		
	W05	**W18**	**W45**
Angular momentum range	3 … 7 Nms	7 … 28 Nms	20 … 70 Nms
Speed range (both directions)	6000 rpm	6000 rpm	6000 rpm
Output torque capability	0.1 Nm	0.2 Nm	0.3 Nm
Dimensions (D x H)	235 x 123 mm	295 x 123 mm	365 x 123 mm
Mass	3.2 kg	4.95 kg	6.95 kg
Power consumption @ 3000 rpm			
• 0.1 Nm torque	73 W	63 W	64 W
• Zero torque	16 W	17 W	17 W

	Wheel Drive Electronics
Mass	8.8 kg (2.2 kg per channel)
Dimensions (L x W x H)	291 x 259 x 181 mm (81 x 259 x 181 mm per channel)
Power bus voltage	22 … 55 Vdc
Electrical Interface	Analogue voltage command, MACS bus, MIL-STD-1553B Bus
Design Life	10 years

REACTION WHEEL UNIT

Typical Reaction Wheel Interfaces

(W45, customer adaptive)



Design Heritage

The Reaction Wheel technology proven design of concept is directly based on the Astrium Ltd. products. Successful in-flight demonstrated heritage available from the following missions:

Olympus (1989)	SOHO (1995)
Radarsat (1995)	Seastar (1997)
Skynet-4 (1998)	XMM (1999)
Integral (2002)	Rosetta (2004)

ADM Aeolus (to be launched in 2007)

Bradford Engineering

Bradford Engineering B.V. is specialised in engineering, design and development, production and testing of spaceflight components, systems and subsystems for a multitude of satellite and human spaceflight applications.

We are a hundred percent Dutch company and internationally considered to be one of the leading space engineering companies in The Netherlands. Bradford's quality system is certified according to the EN-9100:2003 standard for aerospace quality management systems. Having our own development, mechanical and electronics engineering as well as test facilities, our company is an efficient and cost-conscious partner in realising your goals.

Contact

Bradford Engineering B.V.
De Wijper 26
4726 TG Heerle (NB)
The Netherlands
T: +31 (0)165 – 305 100
F: +31 (0)165 – 304 422
E: info@bradford-space.com
W: www.bradford-space.com