

KONGSBERG

SADM for Rosetta (recurring on MarsExpress and VenusExpress)



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The SADM, was qualified for the Rosetta Mission and has been successfully adopted for the follow-on ESA missions: VenusExpress and MarsExpress.

The SADM is developed to handle deep space interplanetary cruise with long hibernation phase as well as planetary orbit operation.

The power transfer is via a Twist Capsule system with flex-tapes allowing $\pm 180^\circ$ rotation.

The SADM consists of the mechanism with structural interfaces, drive line and position sensor, and the Twist Capsule for rotary power and signal transfer.

The position sensor is an optical encoder with high accuracy and a 16-bit binary absolute position output.

The SADM complies to requirements by virtue of 4 main functions:

1. Retain solar array; keep S/A attached to the S/C and react forces resulting from launch loads and in orbit manoeuvre.
2. Point the S/A in desired direction up to $1.5^\circ/s$
3. Transfer power and signals from S/A rotating reference frame, to S/C stationary reference frame
4. Redundant position feedback in absolute position over 360° .



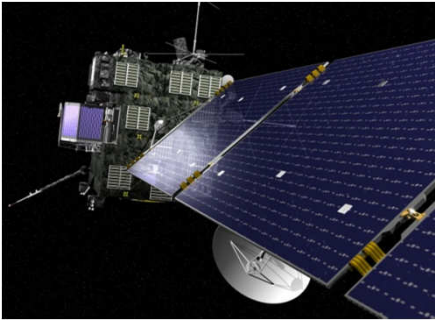
Features

General

- Wide temperature range
- High pointing accuracy
- High reliability
- High load capacity
- Accurate position feedback
- Hard end stops
- Long hibernation capability
- Supplied with SADE operating one or two SADMs

Twist capsule configuration

- Flex tape in clock spring configuration
- Moderate power capability
- Low mass
- High reliability
- $\pm 180^\circ$ rotation capability



Rosetta (1998)



MarsExpress (1999)



VenusExpress (2003)

SADM for Rosetta Technical Data	
Mechanism	
Motor type	Redundant two phase bipolar stepper
Rotational speed capability	1.5°/s,
Full step resolution	0.012°
Pointing accuracy	< 0.05° half cone
Qualified operational life	7 years
Qualification revolutions	100 000 of output shaft
Power requirements	5 W
Non-powered hold torque	> 8 Nm
Max torque capability	75 Nm
Solar Array inertia load capability	> 40 kgm ²
Typical Twist Capsule performance	
Power tracks	56 / 3A
Signal tracks	48 / 2 A
Total power	1.5 kW
Position feedback	
Type	Encoder,
Range	360° absolute
Accuracy	< 0.01° half cone
Resolution	16 bit binary
Qualification temperatures	
Non-operational	-55 °C to +85 °C
Operational	- 45°C to +75 °C
Mass	
Depending on configuration	5 kg
Qualification loads	
Axial	3 kN
Radial	3 kN
Cross axis moment	250 Nm
Dimensions	
Length	203 mm
Diameter	210 mm