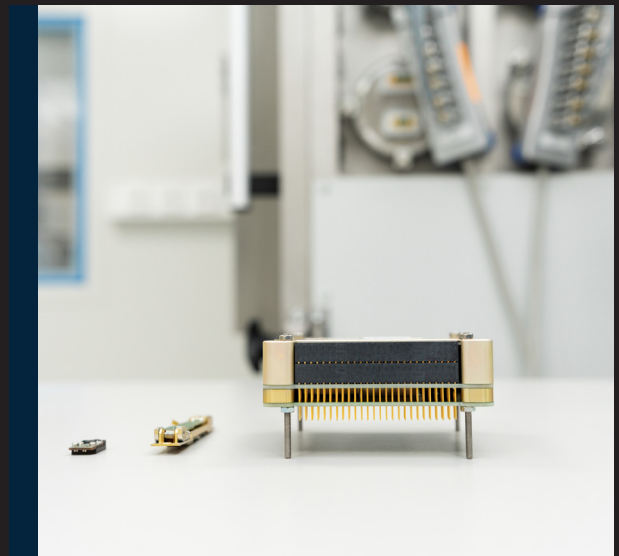




VAC 02 ADCS SOLUTION

PLUG-AND-PLAY ATTITUDE DETERMINATION
AND CONTROL SYSTEM SOLUTION (ADCS)
FOR CUBESATS

VAC02 is a fully integrated, versatile ADCS solution designed for CubeSats with 1U to 3U form factor. It is equipped with three reaction wheels, three magnetorquers as actuators and up to six fine sun sensors, two magnetometers, and three gyroscopes as sensors. This compact solution with Cortex-M7 computer provides exceptional pointing awareness and performance for smaller CubeSats.



BASIC PROPERTIES OF VAC02

Property	SERENUM SPACE RW25 reaction wheel	WITTENSTEIN cyber® reaction wheel 2
Mass	Central unit: 414.4 g, external magnetometer: 9.9 g Total: 424.3 g (including SunSensors and typical harness)	Central unit: 384.4 g, external magnetometer: 9.9 g Total: 394.3 g (including SunSensors and typical harness)
Dimensions	27×94×94 mm (0.27U)	25×94×94 mm (0.25U)
Pointing precision (sunlight)	RPE (jitter): 0.0028° during 10 ms @ 1 σ APE (absolute pointing error): 1.0° @ 1 σ	RPE (jitter): 0.0028° during 10 ms @ 1 σ APE (absolute pointing error): 1.0° @ 1 σ
Total momentum storage (per axis)	0.6 mN·m·s	2.0 mN·m·s
Maximum torque (per axis)	0.2 mN·m	0.4 mN·m·s
Magnetic moment	X,Y: 0.27 Am ² , Z: 0.217 Am ²	X,Y: 0.27 Am ² , Z: 0.217 Am ²
Sensors	Internal and deployable 3axis magnetometers 6x sun sensors 3x 3axis MEMS gyroscope	Internal and deployable 3axis magnetometers 6x sun sensors 3x 3axis MEMS gyroscope
Actuators	3x reaction wheel 3x magnetotorquer	3x reaction wheel 3x magnetotorquer
Radiation tolerance	36 krad	>20 krad
Communication interfaces	CAN, I ² C, UART CubeSat Space Protocol	CAN, I ² C, UART CubeSat Space Protocol
Supply voltage	5.0 V or 8.0 V (based on motor type)	5.0 V or 8.0 V (based on motor type)
Power consumption	Idle: 375 mW, Nominal: 960 mW, Peak: 1400 mW	Idle: 391 mW, Nominal: 1550 mW, Peak: 4900 mW

OPERATIONAL MODES

- Stand by
- B-dot
- Inertial pointing
- Sun pointing
- Nadir pointing
- LLA Target tracking

QUALIFICATION (QT) AND ACCEPTANCE (AT) TESTING

Functional	QT	AT
Vibration	QT	
Mechanical shock	QT	
Thermal vacuum cycling	QT	