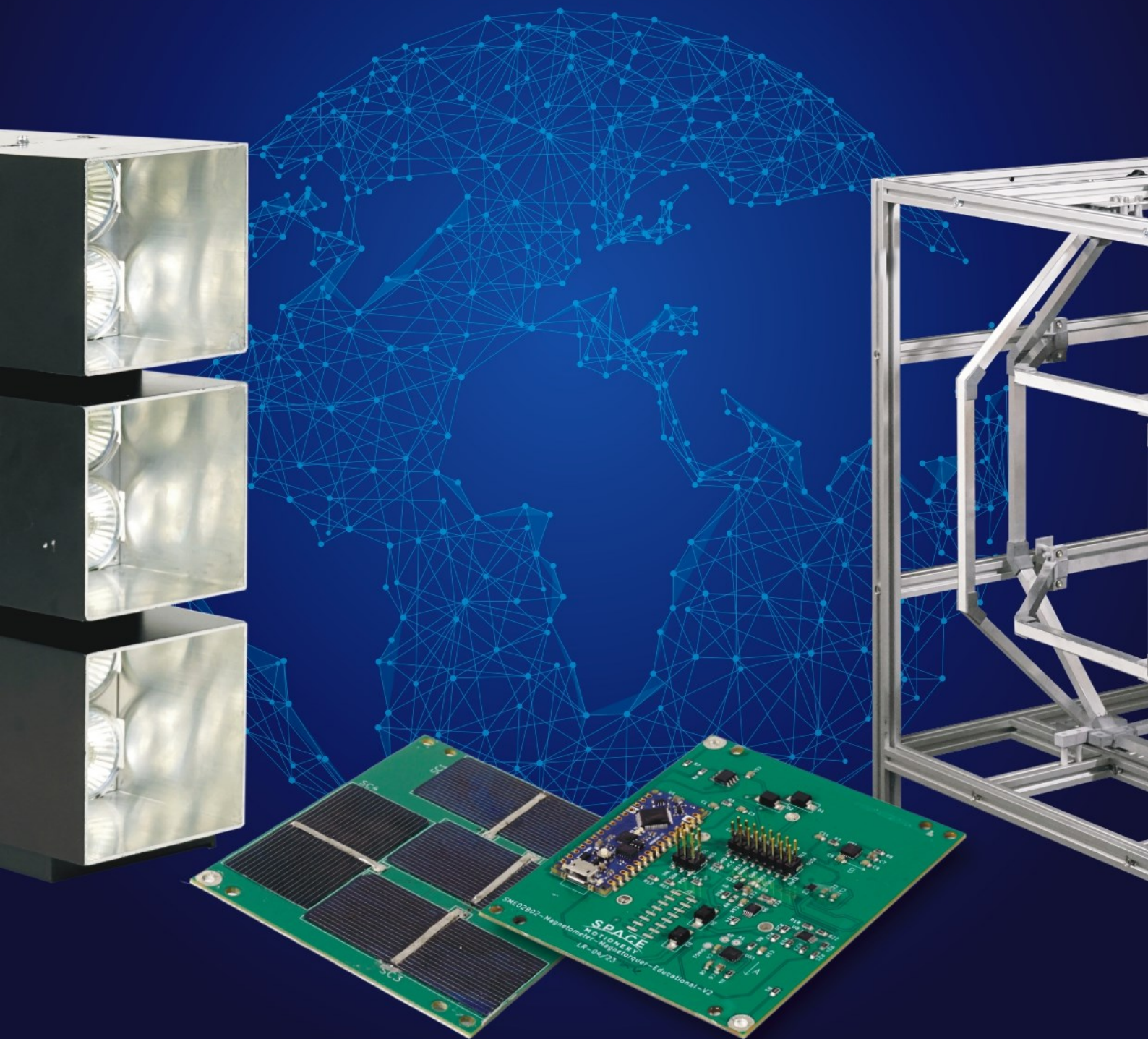


SPACE MOTIONERY



PRODUCTS CATALOG
2026-27

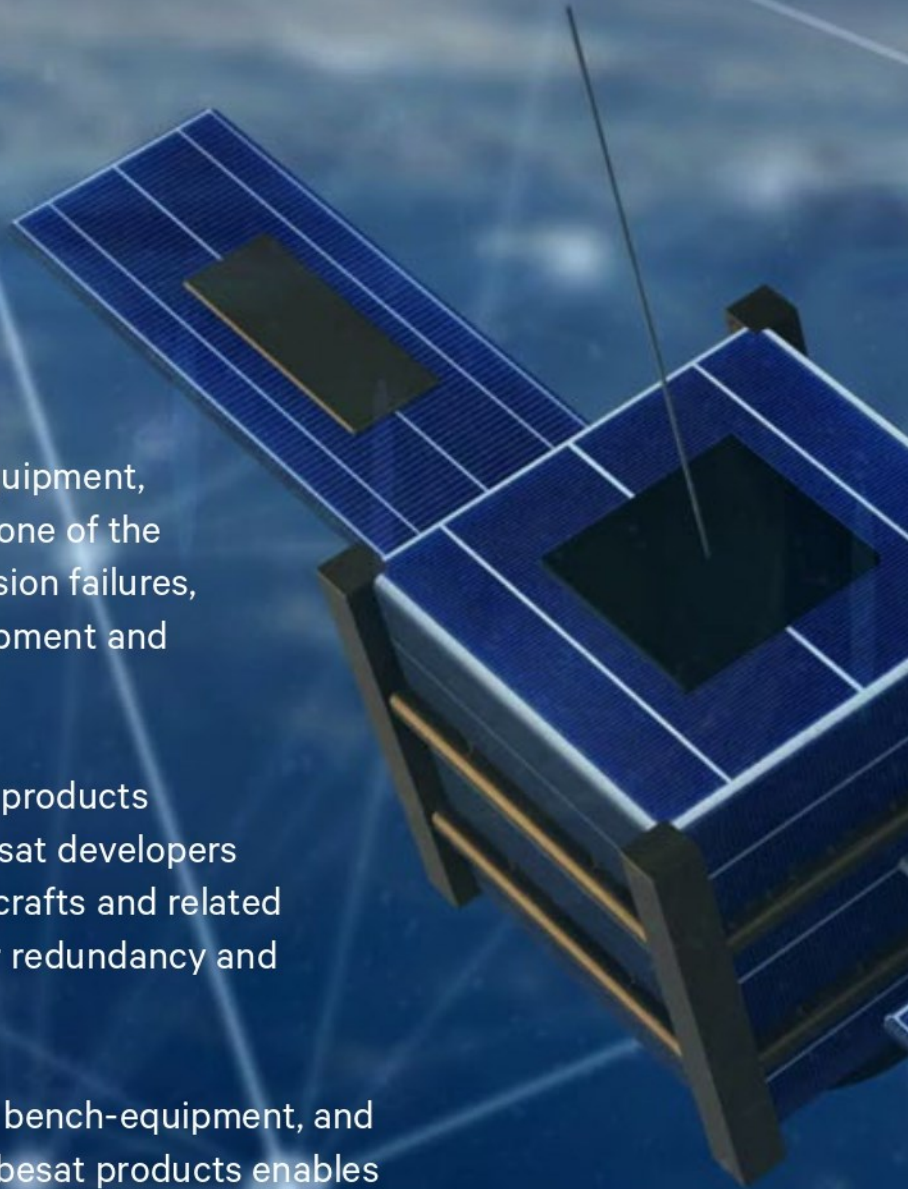
Make your satellite reliable make your mission successful

In the field of low cost space equipment, inadequate testing is currently one of the most significant causes for mission failures, impairing all the design, development and launch efforts and costs.

SpaceMotionery's TT4Cubesat products represent the solution for Cubesat developers to validate and test their spacecrafts and related payloads, reducing the need for redundancy and increasing reliability.

The great ease of use, being all bench-equipment, and the very low cost of the TT4Cubesat products enables low-cost operators to perform iterative design including validation and final testing campaign to reduce infant-mortality of their space equipment.

TT4Cubesat products can also be usefully employed in the field of Space education (high schools and universities), equally affected by usability and budget issues.





PRODUCTS CATALOG 2025-26

SMT Testing

- SMT01 Solar
- SMT02 Attitude
- SMT03 Thermovacuum
- SMT06 Thermomechanical
- SMT07 Orbital
- SMT10 Data Acquisition
- SMT11 Stands
- SMT3x Testing Labs

SME Education

- SME02 Teaching Aids Space

SMV Valya

- SME02 Stratospheric Balloons

SMT01

Solar



SMT01A01 Solar Simulator, 1U, WiFi



A calibrated light source capable of illuminating a square object of up to 10x10 cm² (e.g., one or two adjacent faces of a 1U CubeSat) at different angles of incidence with nearly uniform spatial distribution. Light is not collimated.

Although the light spectrum emitted by the 1U Solar Simulator and its color temperature are not identical to that of the sun, SpaceMotionery's patented technique calibrates light source at firmware level to compensate differences and produce equivalent effects to sunlight, both on Earth surface (AM1) and outside the atmosphere (AM0).

The Solar Simulator allows to perform the following measures:

- Thermal effects on black, white or colored surfaces;
- Photoelectric effects in different types of solar cells (single and triple junction);
- Overall behavior of CubeSats in sunlight.

Light can be modulated in time to simulate, e.g. sat revolutions.

Specifications

- Optical power: AM2.5 (700W/m²) to AM0 (1360W/m²);
- Power uniformity: +/-15% (worst case) inside 10 x 10 cm²;
- Color temperature: 3000K, but compensated to provide same effects of solar light;
- Heated air flow from back: 130W;
- Case temperature: 25°C above ambient after 1h at max power;
- Internal overtemperature protection.

Typical applications

- Thermal and electrical testing of nanosatellites (CubeSats in primis) and solar cells
- Demonstration of small thermal solar plants
- Didactic experiments of thermology or physics.

Integration and compatibility

The Solar Simulator can be associated with the 3U Fixed Stand or 3U Turn Table for straightforward testing of various objects, including CubeSat and solar cells.

The Solar Simulator can be connected to up to six SpaceMotionery's sensors, e.g. to measure the temperature or some electrical parameter of the illuminated objects.

Two or more 1U Solar Simulators can be stacked or paired to illuminate 2U, 3U, 6U, 12U CubeSats or comparable size objects (approximately multiple 10x10x10 cm³).

Modularity: Single 1U Solar Source; Multi-U Solar Source.

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

DC 20V, 9A.

The product also includes as many commercial AC power supplies 110-220V, 50-60Hz, 180W

Environmental

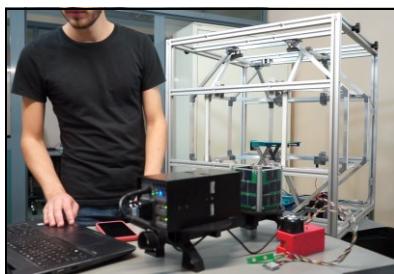
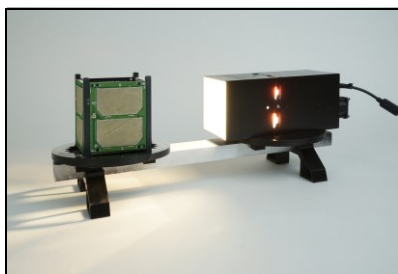
- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (for max 5min) to 100kPa
- Protection: IP20

Size and Weight

Size: 10cm x 22cm x H10cm plus external power supply

For transport: 15cm x 15cm x 45cm

Weight: 1.3kg



SMT01A03 Solar Simulator, 3U, WiFi



A calibrated light source capable of illuminating a square object of up to 10x35 cm² (e.g., one or two adjacent faces of a 3U CubeSat) at different angles of incidence with nearly uniform spatial distribution.

Although the light spectrum emitted by the 3U Solar Simulator and its color temperature are not identical to that of the sun, SpaceMotionery's patented technique calibrates light source at firmware level to compensate differences and produce equivalent effects to sunlight, both on Earth surface (AM1) and outside the atmosphere (AM0).

The Solar Simulator allows to perform the following measures:

- Thermal effects on black, white or colored surfaces;
- Photoelectric effects in different types of solar cells (single and triple junction);
- Overall behavior of CubeSats in sunlight.

Light can be modulated in time to simulate, e.g. sat revolutions.

Specifications

- Optical power: AM2.5 (700W/m²) to AM0 (1360W/m²);
- Power uniformity: +/-15% (worst case) inside 10 x 35 cm²;
- Color temperature: 3000K, but compensated to provide same effects of solar light;
- Heated air flow from back: 130W;
- Case temperature: 25oC above ambient after 1h at max power;
- Internal overtemperature protection.

Typical applications

- Thermal and electrical testing of nanosatellites (CubeSats in primis) and solar cells

- Demonstration of small thermal solar plants
- Didactic experiments of thermology or physics.

Integration and compatibility

The Solar Simulator can be associated with the 3U Fixed Stand or 3U Turn Table for straightforward testing of various objects, including CubeSat and solar cells.

The Solar Simulator can be connected to up to 18 SpaceMotionery's sensors, e.g. to measure the temperature or some electrical parameter of the illuminated objects.

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

3 x DC 20V, 9A.

The product also includes as many commercial AC power supplies 110-220V, 50-60Hz, 180W

Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (for max 5min) to 100kPa
- Protection: IP20

Size and Weight

Size: 10cm x 22cm x H36cm plus external power supply and modem. For transport: 30cm x 30cm x 45cm

Weight: 4kg



SMT01A12 Solar Simulator, 12U, WiFi



A calibrated light source capable of illuminating a square object of up to 22x35 cm² (e.g., one or two adjacent faces of a 12U CubeSat) at different angles of incidence with nearly uniform spatial distribution.

Although the light spectrum emitted by the 12U Solar Simulator and its color temperature are not identical to that of the sun, SpaceMotionery's patented technique calibrates light source at firmware level to compensate differences and produce equivalent effects to sunlight, both on Earth surface (AM1) and outside the atmosphere (AM0).

The Solar Simulator allows to perform the following measures:

- Thermal effects on black, white or colored surfaces;
- Photoelectric effects in different types of solar cells (single and triple junction);
- Overall behavior of CubeSats in sunlight.

Light can be modulated in time to simulate, e.g. sat revolutions.

Specifications

- Optical power: AM2.5 (700W/m²) to AM0 (1360W/m²);
- Power uniformity: +/-15% (worst case) inside 22 x 35 cm²;
- Color temperature: 3000K, but compensated to provide same effects of solar light;
- Heated air flow from back: 130W;
- Case temperature: 25°C above ambient after 1h at max power;
- Internal overtemperature protection.

Typical applications

- Thermal and electrical testing of nanosatellites (CubeSats in primis) and solar cells

- Demonstration of small thermal solar plants
- Didactic experiments of thermology or physics.

Integration and compatibility

The Solar Simulator can be associated with the 12U Fixed Stand or 12U Turn Table for straightforward testing of various objects, including CubeSat and solar cells.

The Solar Simulator can be connected to up to 18 SpaceMotionery's sensors, e.g. to measure the temperature or some electrical parameter of the illuminated objects.

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

6 x DC 20V, 9A.

The product also includes as many commercial AC power supplies 110-220V, 50-60Hz, 180W

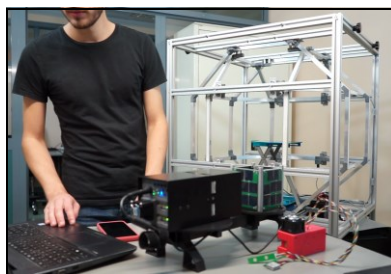
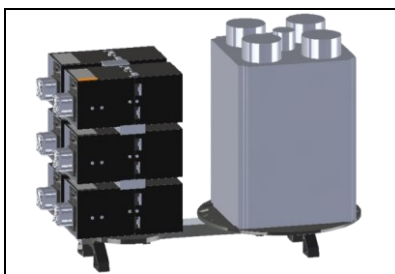
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (for max 5min) to 100kPa
- Protection: IP20

Size and Weight

Size: 25cm x 22cm x H36cm plus external power supply and modem. For transport 52cmx52cmx64cm.

Weight: 8.5kg. Packaging: 25kg



SMT01A27 Solar Simulator, 27U, WiFi



A calibrated light source capable of illuminating a square object of up to 35x35 cm² (e.g., one or two adjacent faces of a 27U CubeSat) at different angles of incidence with nearly uniform spatial distribution.

Although the light spectrum emitted by the 27U Solar Simulator and its color temperature are not identical to that of the sun, SpaceMotionery's patented technique calibrates light source at firmware level to compensate differences and produce equivalent effects to sunlight, both on Earth surface (AM1) and outside the atmosphere (AM0).

The Solar Simulator allows to perform the following measures:

- Thermal effects on black, white or colored surfaces;
- Photoelectric effects in different types of solar cells (single and triple junction);
- Overall behavior of CubeSats in sunlight.

Light can be modulated in time to simulate, e.g. sat revolutions.

Specifications

- Optical power: AM2.5 (700W/m²) to AM0 (1360W/m²);
- Power uniformity: +/-15% (worst case) inside 33 x 35 cm²;
- Color temperature: 3000K, but compensated to provide same effects of solar light;
- Heated air flow from back: 130W;
- Case temperature: 25°C above ambient after 1h at max power;
- Internal overtemperature protection.

Typical applications

- Thermal and electrical testing of nanosatellites (CubeSats in primis) and solar cells

- Demonstration of small thermal solar plants
- Didactic experiments of thermology or physics.

Integration and compatibility

The Solar Simulator can be connected to up to 54 SpaceMotionery's sensors, e.g. to measure the temperature or some electrical parameter of the illuminated objects.

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

9 x DC 20V, 9A.

The product also includes as many commercial AC power supplies 110-220V, 50-60Hz, 180W

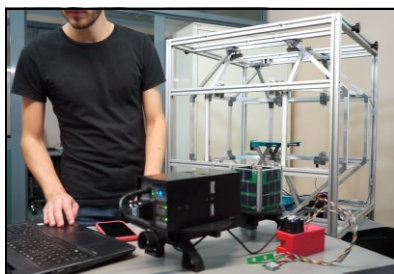
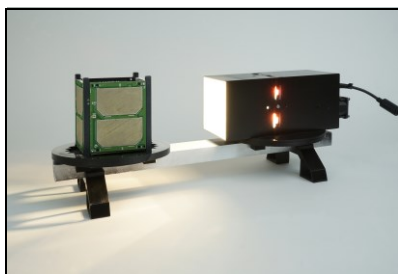
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (for max 5min) to 100kPa
- Protection: IP20

Size and Weight

Size: 38cm x 22cm x H36cm plus external power supply and modem.

Weight: 12.5kg



SMT02 Attitude



SMT02A31 Controlled Gimbal, 3DOF, 10RPM, 12U

A nonmagnetic, three-degree-of-freedom (DOF) motorized gimbal for rotating a 12U spacecraft around its center, without angular constraints, at up to 10 RPM.

The product does NOT include the containing magnetic cage shown in photo, which must be acquired separately (see SMT02C13 Helmholtz Cage or SMT02C17 Merritt Cage).

This system can rotate a CubeSat object up to 12U both within a magnetic field (e.g., generated by a SpaceMotionery Helmholtz or Merritt Cage) and in free space, without interfering with the magnetic field, based on user-initiated attitude commands.

It also allows other objects or test equipment to be rotated (e.g., SpaceMotionery's Star Tracker test equipment).

It must be inserted inside a SpaceMotionery's Cage (to be acquired separately), at its shares Cage's structure.

Specifications

- Unlimited angle around any axis
- Allowed CubeSat sizes: 1U, 2U, 3U, 6U short and long, 12U short and long
- Balancing masses provided for strongly unbalanced CubeSats
- Load capacity: up to 25 kg (or more upon request)

Typical applications

- ADCS Testing on Small Spacecraft
- Rotating Objects in Space

Integration and compatibility

It integrates natively with the SpaceMotionery Helmholtz and Merritt Cages.



It is fully compatible with SpaceMotionery's Orbital Geomagnetic Attitude software and other SpaceMotionery test equipment, such as the Star Tracker Test Equipment.

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

DC 20V, 9A.

The product also includes a commercial AC power supply 110-220V, 50-60Hz, 180W

Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: 100kPa +/-10%

Size and Weight

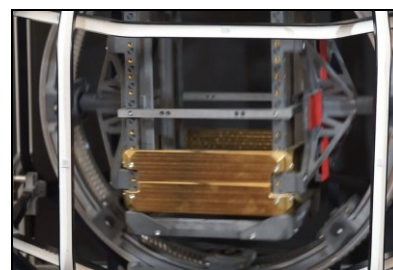
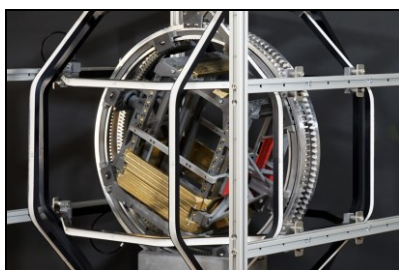
Size: 81cm x 81cm x H103cm

For transport: 82cm x 24cm x 104cm

Packaging: 112cm x 89cm x H42cm

Fits inside SpaceMotionery's 27U Helmholtz and Merritt Cages (it shares Cage structure)

Weight: 15kg (plus the weight of the hosting Helmholtz Cage)



SMT02A31 CubeSat Adapter, 12U



A configurable adapter capable of hosting 1U, 2U, 3U, 6U short and long, 12U short and long.

Specifications

Typical applications

It is used to support and protect a user CubeSat, during storage or during testing, for instance inside one of the many SpaceMotionery's test equipment or inside any user-defined system.

The adapter has a set of tapped holes which can be used to fix balancing masses (up to 10kg of masses are provided),

supports or any other user-defined element which has to be located closed to the CubeSat during testing.

Integration and compatibility

User Interfaces and Control

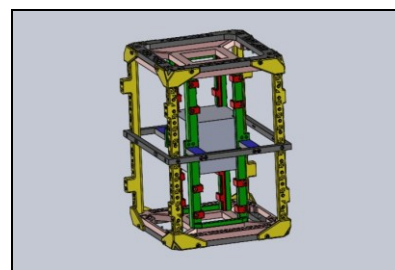
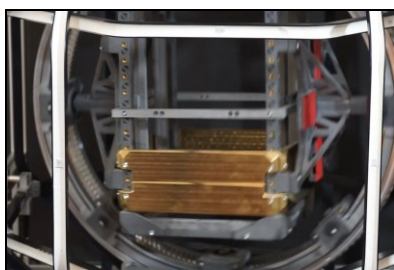
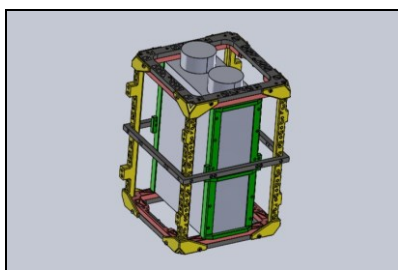
Power Supply

Environmental

Size and Weight

Size:

Weight: From 3kg (without balancing masses) up to 13 kg (with ten balancing masses)



SMT02A34A/D Frictionless and Dragless Bearing, 1DOF, 200N (or 50N)

An innovative patented equipment to mimic 1DOF air bearings overcoming the limitations of classical air bearings.

It can either:

- Forcedly rotate in 1-D, unlimited angle, a CubeSat up to 12U. It can receive rotation commands from the Orbital Geomagnetic Attitude Software or any other attitude control SW;
- Mimic frictionless 1D rotational air bearings for magnetorquers (in this case it should be used inside a Helmholtz or Merritt Cage) or reaction wheels without the angular and balancing limitations of real air bearings;
- Compensate the air drag which applies a breaking torque to the spacecraft under test during rotation, emulating both a frictionless and a dragless environment as in real space, at least in 1D. This becomes very relevant especially when the spacecraft has deployed solar panels;
- Measure the momentum of inertia along rotation axis;

Thanks to its patented control equipment, Our Frictionless and Dragless Bearing suspends the spacecraft, but it is NOT a classical suspension wire (which has limited rotation angle). This frictionless bearing has no limitation of rotation angle.

Specifications

Rotation angles: any, no limitation

Spin: up to 10RPM around vertical axis



Remaining friction: less than 50uNm (or 10uNm)

Air drag compensation (after calibration): better than 5%

Typical applications

Testing of ADCS of small spacecrafts

Integration and compatibility

Integrates natively with SpaceMotionery's Helmholtz or Merritt Cage, but it can also be used standalone.

User Interfaces and Control

WiFi, Matlab/Python

Power Supply

DC 20V, 9A.

The product also includes a commercial AC power supply 110-220V, 50-60Hz, 180W

Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size:

Weight: Packaged: 25kg



SMT02A34B Sensing Head for Frictionless Bearing, 200N (or 50N)



Replacement sensing head for the Friction and Dragless Bearing

Specifications

Typical applications

Integration and compatibility

User Interfaces and Control

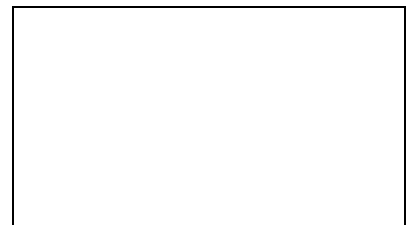
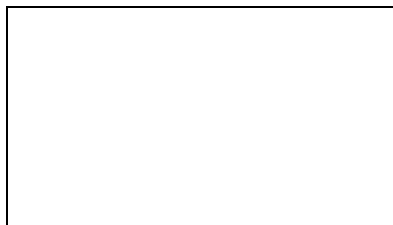
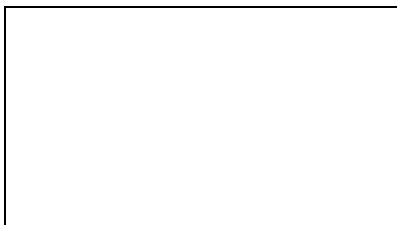
Power Supply

Environmental

Size and Weight

Size:

Weight:



SMT02C13C Controlled Helmholtz Cage, 27U, 4G, WiFi



A Helmholtz Cage to generate a user-defined 3-D magnetic field for CubeSat testing and STEM applications in educational laboratories.

The Helmholtz Cage creates a uniform magnetic field, either fixed or slowly rotating, inside a sphere of 60 cm in diameter, or a cube of 35x35x35 cm³.

The Helmholtz Cage can either:

- cancel the Earth's magnetic field, generating a volume with a field close to zero;
- produce a magnetic field with user-defined intensity and oriented at will in space;
- produce a slowly rotating magnetic field.

Specifications

- Magnetic field generated: up to 4G with +/- 1% accuracy; 5G peak non continuous
- Magnetic noise can be added with spectrum up to 10Hz;
- Spatial uniformity: +/-2%, in absence of perturbing magnetic objects (or better for smaller volume);
- Field direction: any
- Rotation speed of magnetic field: up to 1 revolution per second;
- Zeroing external uniform and constant fields: up to +/- 0.01G, in absence of perturbing magnetic objects;
- Coil overtemperature: 30°C;
- The case can be opened and closed in a few minutes to fit large satellites.

Typical applications

- Testing of 1D, 2D or 3D geomagnetic sensors;
- Testing of magnetic-based modules or components for attitude determination and magnetic measurement of satellites spin;
- Testing of ADCS systems for satellites;

- Calibration of magnetic sensors;
- Educational STEM laboratories or labs on magnetic determination of the attitude;
- Educational laboratories on ADCS systems for satellites;
- Experiments on biological samples or animals.

Integration and compatibility

The Helmholtz Cage can be easily combined and integrated with other SpaceMotionery products (e.g. the Solar Simulator; the Solar Sensor and Star Tracker test systems; the 3D Gimbal for satellite attitude control).

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

DC 20V, 9A.

The product also includes a commercial AC power supply 110-220V, 50-60Hz, 180W

Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: 100kPa +/-10%
- Protection: IP20

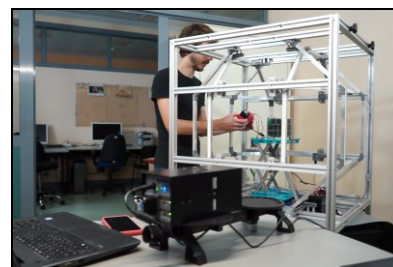
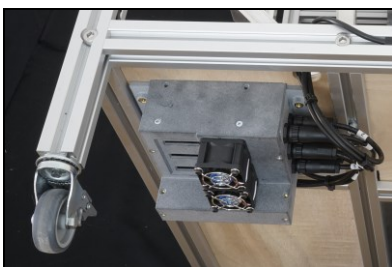
Size and Weight

Size: 81cm x 81cm x H103cm

Transportation packaging: 112cm x 89cm x H42cm

When folded: 82cm x 24cm x 104cm

Weight: 35kg



SMT02C13U Helmholtz Cage, 27U, Without Control



A Helmholtz Cage to generate a user-defined 3-D magnetic field for CubeSat testing and STEM applications in educational laboratories.

The Helmholtz Cage creates a uniform magnetic field, either fixed or slowly rotating (depending on external control of coils), inside a sphere of 60 cm in diameter, or a cube of 35x35x35 cm³.

When properly controlled, the Helmholtz Cage can either:

- cancel the Earth's magnetic field, generating a volumen with a field close to zero;
- produce a magnetic field with user-defined intensity and oriented at will in space;
- produce a rotating magnetic field.

Specifications

- Magnetic field generated: up to 4G; 5G peak non continuous. Either constant or rotating, depending on the external controller;
- Magnetic noise can be added, if the external controller allows for it;
- Spatial uniformity: +/-2% in absence of perturbing magnetic objects (or better for smaller volumen);
- Field direction: any
- Coil overtemperature: 30oC;
- The case can be opened and closed in a few minutes to fit large satellites.

Typical applications

- Testing of 1D, 2D or 3D geomagnetic sensors;
- Testing of magnetic-based modules or components for attitude determination and magnetic measurement of satellites spin;
- Testing of ADCS systems for satellites;

- Calibration of magnetic sensors;
- Educational STEM laboratories or labs on magnetic determination of the attitude;
- Educational laboratories on ADCS systems for satellites;
- Experiments on biological samples or animals.

Integration and compatibility

The Helmholtz Cage can be easily combined and integrated with other SpaceMotionery products (e.g. the Solar Simulator; the Solar Sensor and Star Tracker test systems; the 3D Gimbal for satellite attitude control).

User Interfaces and Control

No embedded controller is present (refer to the Controlled version, if required). Connections to the coils are via connectors.

Coils can also be connected in anti-Helmholtz mode.

Power Supply

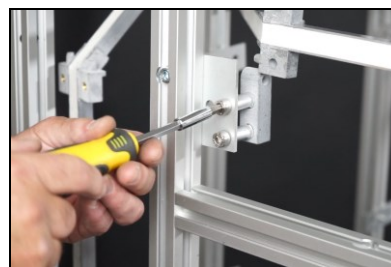
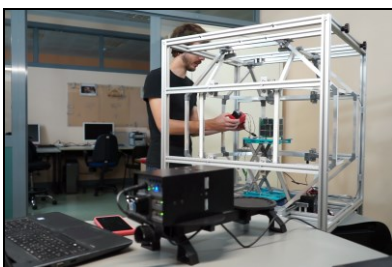
DC 8V max per coil;
Coil resistance about 1.50hm per pair of coils;
Magnetic constant: 65uT/A

Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size: 81cm x 81cm x H103cm
Transportation packaging: 112cm x 89cm x H42cm
When folded: 82cm x 24cm x 104cm
Weight: 35kg



SMT02C13F Helmholtz Cage Feet Extender



Four feet to increase the vertical position of the cage and the device under test.

Specifications

Stackable for additional increase of vertical position.

Typical applications

To increase vertical position of the device under test.

Integration and compatibility

Connected to SpaceMotionery's Helmholtz Cage feet by means of screws.

To be assembled by the user.

User Interfaces and Control

N/A

Power Supply

N/A

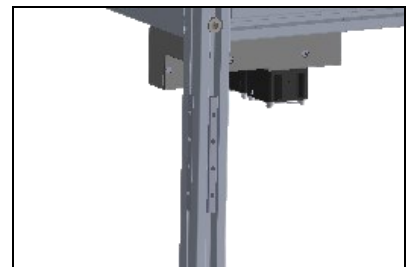
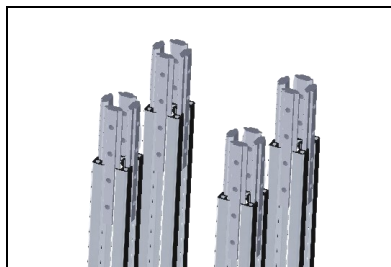
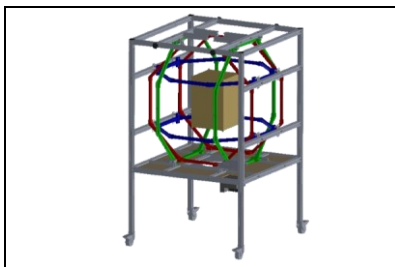
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size: 25cm additional height.

Weight: 1kg



SMT02C14 Helmholtz Cage Control Box



The Helmholtz Control Box is a WiFi-enabled controller which can be embedded into SpaceMotionery's Helmholtz Cages and used to drive Cage's coils to generate a user-defined 3-D magnetic field e.g. for CubeSat testing and STEM applications in educational laboratories.

NOTE: The Control Box is already embedded into several SpaceMotionery's Helmholtz Cage models. Pls verify if a given model already includes the controller or not.

When driven by the Helmholtz Control Box, SpaceMotionery's Helmholtz Cage creates a uniform magnetic field, either fixed or slowly rotating, inside a magnetic volume which depends on Cage model.

A single Helmholtz Cage Controller can drive a Helmholtz Cage either:

- to cancel the Earth's magnetic field, generating a volumen with a field close to zero;
- to produce a magnetic field with user-defined intensity and oriented at will in 3-D space;
- to produce a slowly rotating magnetic field.

Specifications

- Magnetic field generated: depends on Cage model (mostly up to 4G with +/- 1% accuracy (worst case); 5G peak non continuous)
- Magnetic noise can be added with spectrum up to 10Hz;
- Field direction: any
- Rotation speed of magnetic field: up to 1 revolution per second (60RPM);
- Zeroing external uniform and constant fields: up to +/- 1 uT;

Typical applications

(applies to the Control Box when connected to an Helmholtz Cage)

- Testing of 1D, 2D or 3D geomagnetic sensors;
- Testing of magnetic-based modules or components for attitude determination and magnetic measurement of satellites spin;
- Testing of ADCS systems for satellites;
- Educational STEM laboratories or labs on magnetic determination of the attitude;
- Educational laboratories on ADCS systems for satellites.

Integration and compatibility

The Helmholtz Control Box can be easily combined and integrated with other SpaceMotionery products (e.g. the Solar Simulator; the Solar Sensor and Star Tracker test systems).

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

DC 20V, 9A.

The product also includes a commercial AC power supply 110-220V, 50-60Hz, 180W

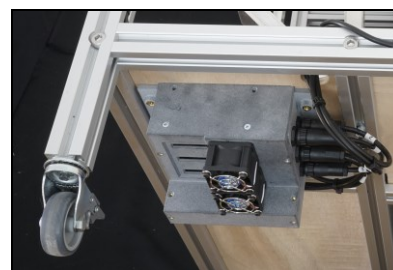
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: 100kPa +/-10%
- Protection: IP20

Size and Weight

Size: 14.5cm x 11.5cm x 8.5cm

Weight: 1kg



SMT02C15 Helmholtz Cage, Custom Size



A Helmholtz cage for generating a user-defined 3D magnetic field for CubeSat testing and STEM applications in educational laboratories.

This is the customizable version of SpaceMotionery's popular Helmholtz cage. The size and electromagnetic characteristics of the coils can be customized.

It is also available with the SpaceMotionery's Embedded Helmholtz Control Box (can be used with most customizations).

The Customizable Helmholtz Cage creates a uniform magnetic field, inside a sphere of user-defined diameter, or a cube of user-defined size.

The Customizable Helmholtz Cage can either:

- cancel the Earth's magnetic field, generating a volumen with a field close to zero;
- produce a magnetic field with user-defined intensity and oriented at will in space;
- produce a slowly rotating magnetic field.

Specifications

- Magnetic field generated: customizable
- Spatial uniformity: $\pm 2\%$, in absence of perturbing magnetic objects (or better for smaller volumen);
- Field direction: any
- Rotation speed of magnetic field: customizable;
- Zeroing external uniform and constant fields: depends on controller;
- The case can be opened and closed in a few minutes to fit large objects.

Typical applications

- Testing of 1D, 2D or 3D geomagnetic sensors;

- Testing of magnetic-based modules or components for attitude determination and magnetic measurement of satellites spin;
- Testing of ADCS systems for satellites;
- Educational STEM laboratories or labs on magnetic determination of the attitude;
- Educational laboratories on ADCS systems for satellites.

Integration and compatibility

The Helmholtz Cage can be easily combined and integrated with other SpaceMotionery products (e.g. the Solar Simulator; the Solar Sensor and Star Tracker test systems; the 3D Gimbal for satellite attitude control).

User Interfaces and Control

One cable per each coil (6 cables altogether) to be controlled by user equipment.

When controlled by SpaceMotionery's helmholtz Controlbox, the system can be controlled, via WiFi, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol and it easily interfaces with MATLAB/Octave/Python via WiFi or USB.

Power Supply

Customizable

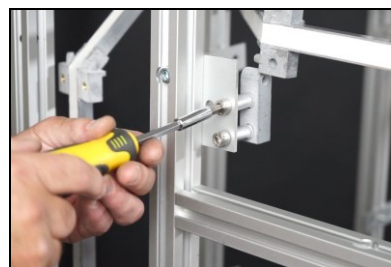
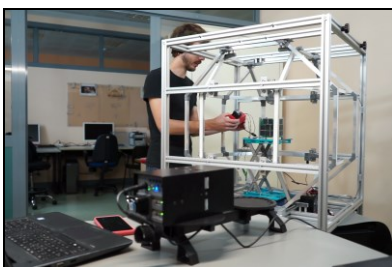
Environmental

Customizable

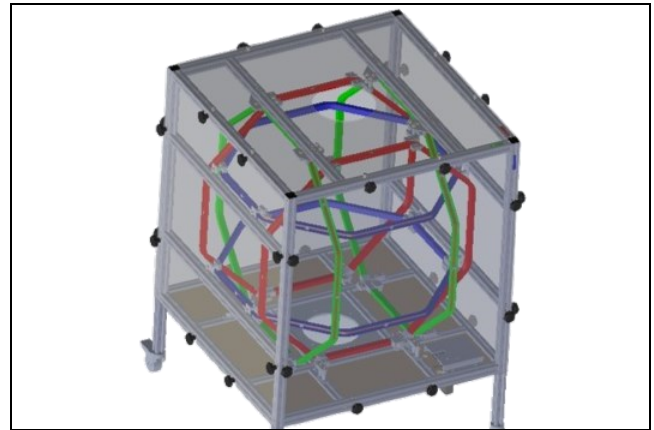
Size and Weight

Size: Customizable

Weight: Customizable



SMT02C16B Air Shield for Helmholtz Cage



A transparent air shield to protect the device under test from dust and to avoid the effects of unexpected air flows.

Specifications

Typical applications

- Measurements of very low torques produced by reaction wheels and magnetorquers.
- Frictionless emulations of in-space behaviour of ADCS systems.

Integration and compatibility

Designed to be integrated with SpaceMotionery's Helmholtz and Merrit Cages

User Interfaces and Control

N/A

Power Supply

N/A

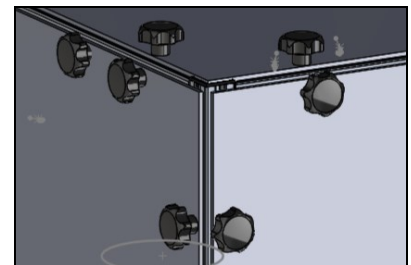
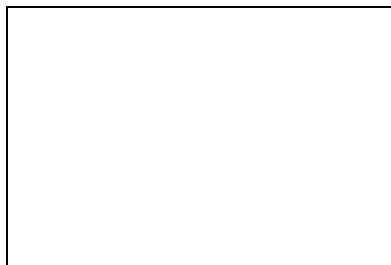
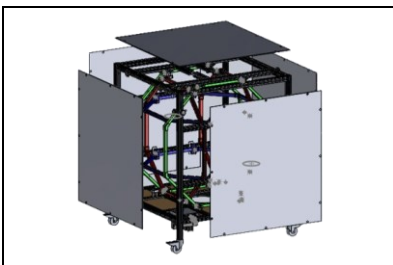
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size: Matches Helmholtz and Merrit cages

Weight:



SMT02C17 Controlled Merritt Cage, 60cm, 4G, WiFi



A Merritt Cage to generate a user-defined 3-D magnetic field for magnetic testing in physics and biology and STEM applications in educational laboratories.

The Merritt Cage creates a uniform magnetic field, either fixed or slowly rotating, inside a cube of 60x60x60 cm³.

The Merritt Cage can either:

- cancel the Earth's magnetic field, generating a volumen with a field close to zero;
- produce a magnetic field with user-defined intensity and oriented at will in space;
- produce a slowly rotating magnetic field.

Specifications

- Magnetic field generated: up to 4G with +/- 1% accuracy.
- Magnetic noise can be added with spectrum up to 10Hz;
- Spatial uniformity: +/-2%, in absence of perturbing magnetic objects (or better for smaller volumen);
- Field direction: any
- Rotation speed of magnetic field: up to 1 revolution per second;
- Zeroing external uniform and constant fields: up to +/- 0.01G, in absence of perturbing magnetic objects;
- The case can be opened and closed in a few minutes to fit large objects.

Typical applications

- Testing of 1D, 2D or 3D geomagnetic sensors;
- Testing the effects of magnetic field on animals or biological samples;
- Testing of magnetic-based modules or components for attitude determination and magnetic measurement of satellites spin.
- Testing of ADCS systems for satellites;

- Calibration of magnetic sensors;
- Educational STEM laboratories or labs on magnetic determination of the attitude;
- Educational laboratories on ADCS systems for satellites.

Integration and compatibility

The Merritt Cage can be easily combined and integrated with other SpaceMotionery products (e.g. the Solar Simulator; the Solar Sensor and Star Tracker test systems; the 3D Gimbal for satellite attitude control).

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

DC 20V, 9A.

The product also includes a commercial AC power supply 110-220V, 50-60Hz, 180W

Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: 100kPa +/-10%
- Protection: IP20

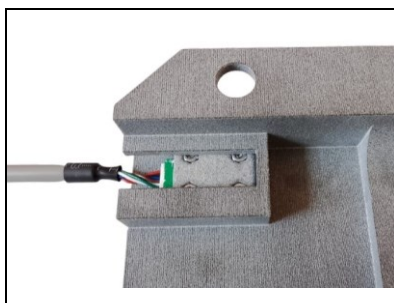
Size and Weight

Size: 81cm x 81cm x H103cm

Transportation packaging: 112cm x 89cm x H65cm

When folded: 82cm x 45cm x 104cm

Weight: 40kg



SMT02E22A Star Simulator, 20deg, 0.5min



A small and simple tester for Star Sensors with 0.5 minutes resolution and 20 deg Field Of View.

The Star Sensor tester is capable of projecting onto a Star Sensor or Star Tracker an image of a user-defined part of the sky with 0.5 minute resolution and 20 deg field of view. Position and magnitude of stars is stored in a sky map and the desired part of it is projected (focused at the infinity) onto the sensor opening.

When used with SpaceMotionery's Geomagnetic Attitude Software, it projects the sky based on the prediction of a given orbit and with time-varying spacecraft attitude, both in real time or accelerated, all synchronized with the magnetic field produced by SpaceMotionery's Helmholtz Cage (if available)

Specifications

- Field of View: 20 deg
- Resolution: 0.5'
- Magnitudo: 0 to 10
- Magnitudo accuracy: +/- 0.5
- Star sensor opening: up to 30mm

Typical applications

- Testing of 1D, 2D or 3D geomagnetic sensors;
- Testing of magnetic-based modules or components for attitude determination and magnetic measurement of satellites spin;

- Testing of ADCS systems for satellites;
- Educational STEM laboratories or labs on magnetic determination of the attitude;
- Educational laboratories on ADCS systems for satellites.

Integration and compatibility

Testing of Star Sensors and Star Trackers

User Interfaces and Control

USB-C for power supply

HDMI for video signal

Power Supply

USB 5V

Environmental

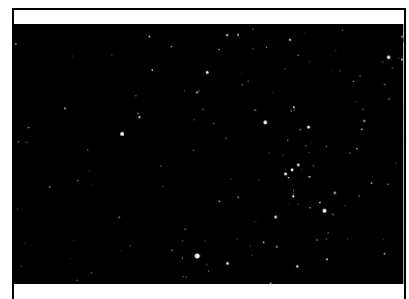
- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

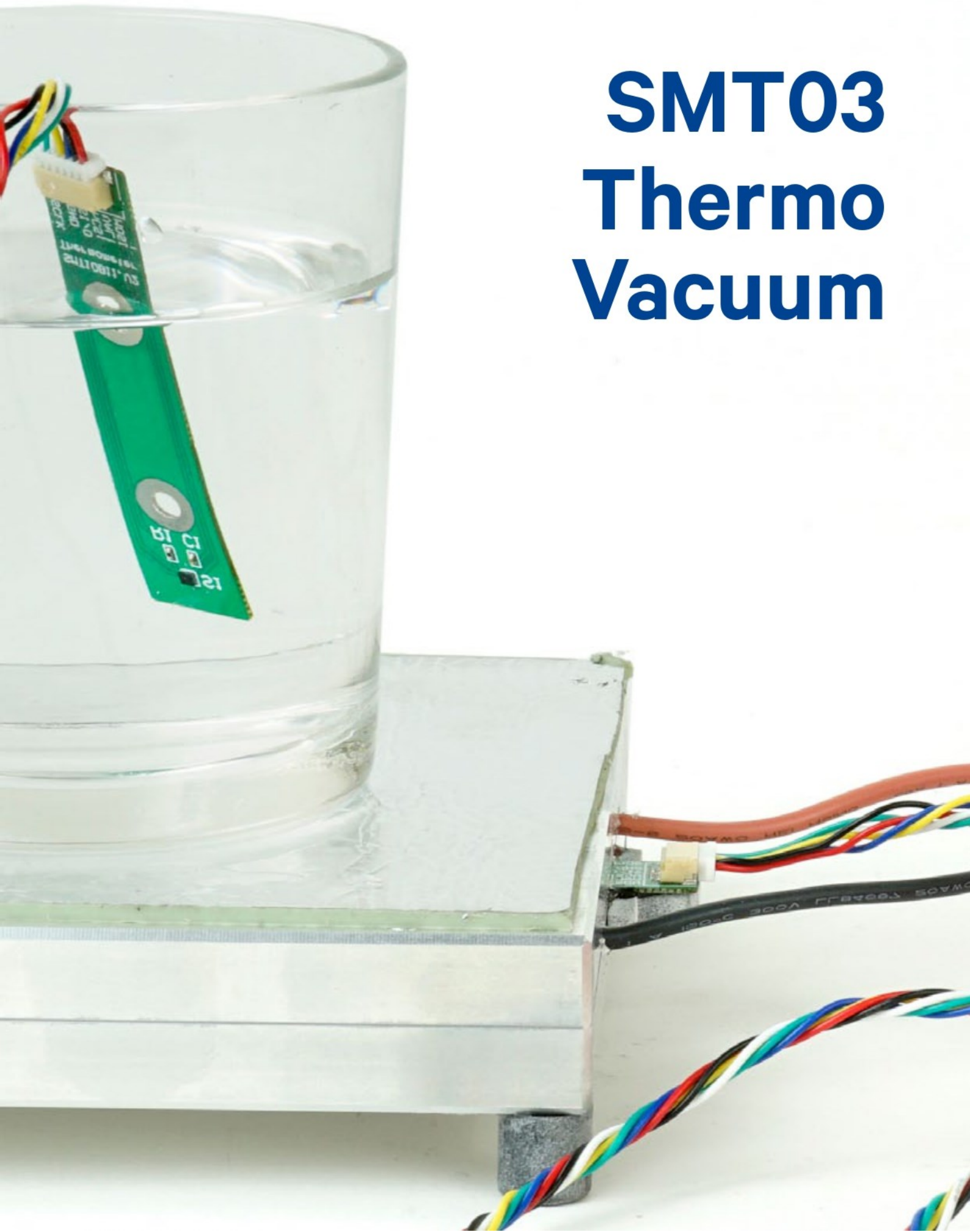
Size: cm x 11cm x H7cm

For transport: 82cm x 24cm x 104cm

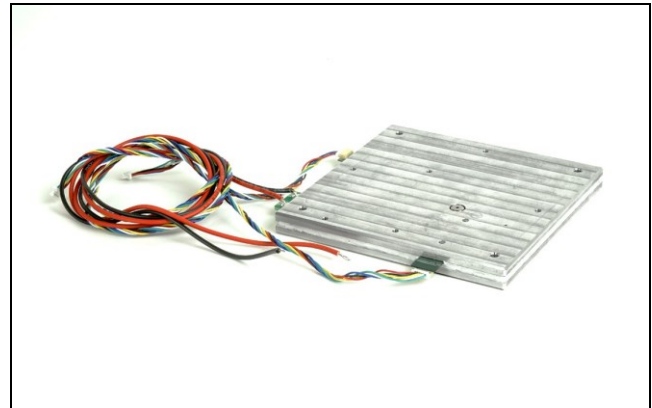
Weight: 400g



SMT03 Thermo Vacuum



SMT03A11 25W Peltier Module



An easy-to-use heat pump for various testing or teaching applications.

It can be placed safely on a flat surface or installed vertically, to pump heat between two flat surfaces.

It can be operated with a standard power supply or can be controlled via Space-Motionery's WiFi-enabled Acquisition and Control Module to obtain precise heat flows or to log various temperature of the system.

Specifications

- Supply: 0 to 12VDC (peak);
- Power: 0 to 30W continuous;
- Internal temperature safety switch (above 90°C)

Typical applications

- testing satellite subsystems in temperature
- laboratory experiments to teach STEM
- measuring thermal properties of objects

Integration and compatibility

The Peltier Module can be combined with SpaceMotionery's WiFi-enabled Acquisition and Control Module and controlled from a smartphone or a PC.

User Interfaces and Control

SPI interface.

When Connected to SpaceMotionery Acquisition and Control Modules, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

-3A to +3A DC

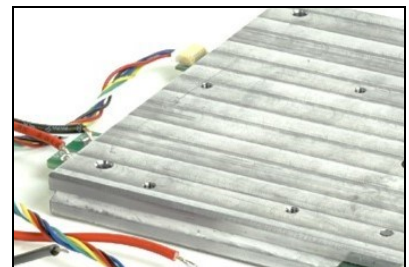
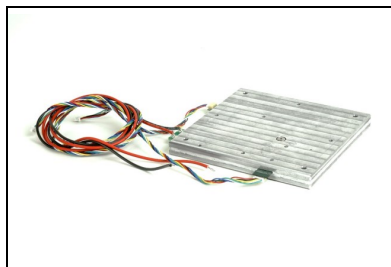
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum to 100kPa. In any case heat must be removed from hot side;
- Protection: IP20

Size and Weight

Size: 12cm x 12cm x H1.2cm

Weight: 380g



SMT03B12A Peltier Cooler



An easy-to-use cooler for various testing or teaching applications. It is made of a 25W Peltier Module plus a dedicated fan for heat dissipation in air.

It can be placed safely on a flat surface or installed vertically, to cool objects up to 0°C.

It can be operated with a standard power supply or can be controlled via Space-Motionery's WiFi-enabled Acquisition and Control Module to obtain precise temperatures or to log the temperature of the heater or the heated system.

Specifications

- Supply: 0 to 13VDC;
- Current: -2.5A to +2.5A continuous.

Typical applications

- testing satellite subsystems in temperature
- laboratory experiments to teach STEM
- measuring thermal properties of objects

Integration and compatibility

The Peltier Cooler can be combined with SpaceMotionery's WiFi-enabled Acquisition and Control Module and controlled from a smartphone or a PC.

User Interfaces and Control

SPI interface.

When Connected to SpaceMotionery Acquisition and Control Modules, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

12V DC

-2.5A to +2.5A DC

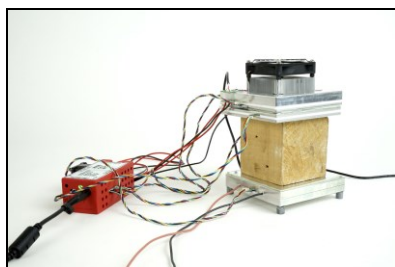
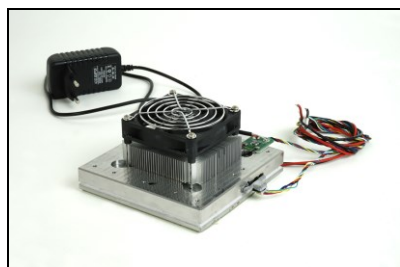
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: 100kPa with good ventilation to remove heat;
- Protection: IP20

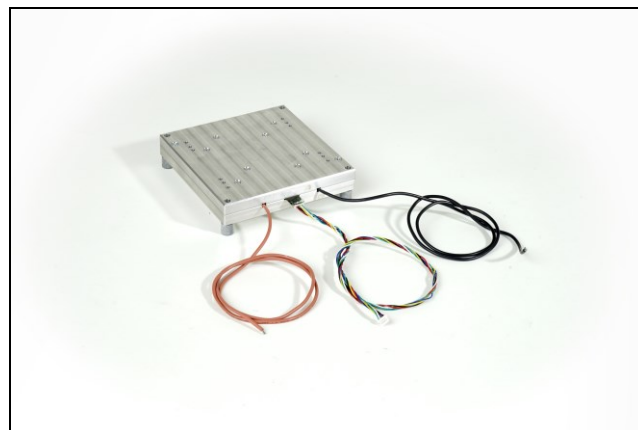
Size and Weight

Size: 12cm x 12cm x H8cm

Weight: 1kg



SMT03A20 Flat Heater 10x10cm



An easy-to-use heater for various testing or teaching applications.

It can be placed safely on a flat surface or installed vertically, to generate heat and heat objects up to 80°C (higher temperatures are possible on request).

It can be operated with a standard power supply or can be controlled via Space-Motionery's WiFi-enabled Acquisition and Control Module to obtain precise temperatures or powers or to log the temperature of the heater or the heated system. It can also be used in vacuum chambers.

Specifications

- Supply: 0 to 18VDC or 18VAC;
- Surface temperature -40°C to +80°C. Extendable to +130°C in the version without internal thermometer.
- Power: 0 to 100W continuous at 80°C; For options without internal thermometer: 0 to 80W continuous at 100°C; 0 to 30W at 130°C
- Internal temperature safety switch at 90°C (other temperatures on request)
- Internal thermometer up to 80°C

Typical applications

- testing satellite subsystems in temperature
- Thermal irradiation of satellites of subsystems
- laboratory experiments to teach STEM

- measuring thermal properties of objects

Integration and compatibility

The Flat Heater can be combined with SpaceMotionery's Thermographical Surfaces to increase irradiation, or the WiFi-enabled Acquisition and Control Module and controlled from a smartphone or a PC.

User Interfaces and Control

Two AWG16 cables for power supply.
SPI connector for the built-in thermometer.

Power Supply

Up to 18V DC or 18V AC

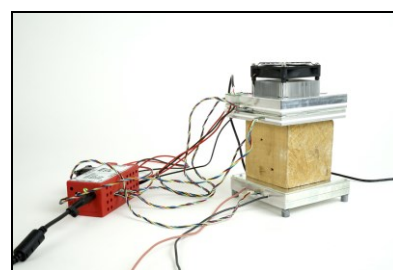
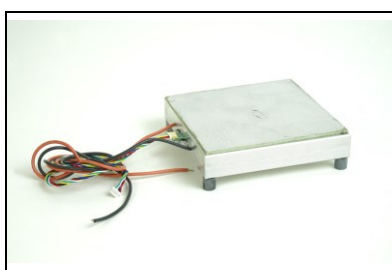
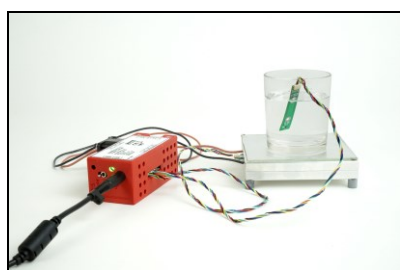
Environmental

- Temperature: -40°C to 80°C (or up to 130°C upon request but without internal thermometer)
- Humidity: 0% to 100%
- Air pressure: vacuum to 100kPa
- Protection: IP30

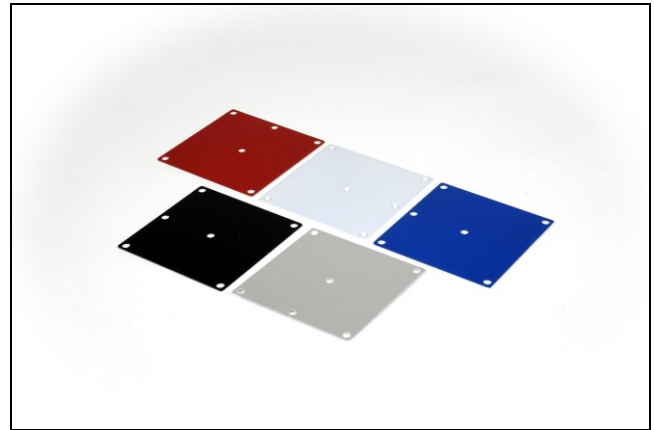
Size and Weight

Size: 12cm x 12cm x H3cm

Weight: 475g



SMT03A30B Thermographic Surface 10x10 cm



A set of five colored surfaces for experiments on colorimetry and thermal irradiation.

Contains five 100mm x 100mm surfacew with holes for fixing in different colors (one side only): black (RAL9005), red (RAL3001), blue (RAL 5010), white (RAL 9003), bare alluminum

Specifications

Typical applications

Experiments on thermal irradiation, light absorption.
Increasing irradiation of heater and irradiators

Integration and compatibility

Compatible with SpaceMotionery's Flat Heater

User Interfaces and Control

Power Supply

Environmental

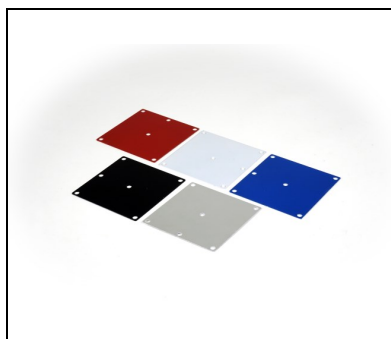
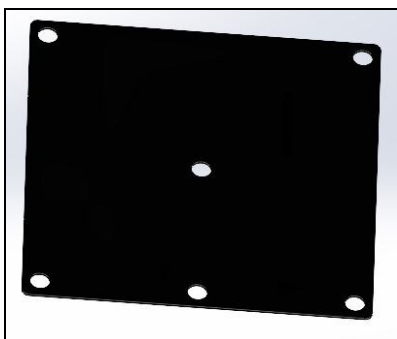
Max temperature: 80°C

Humidity: 0% to 100% RH

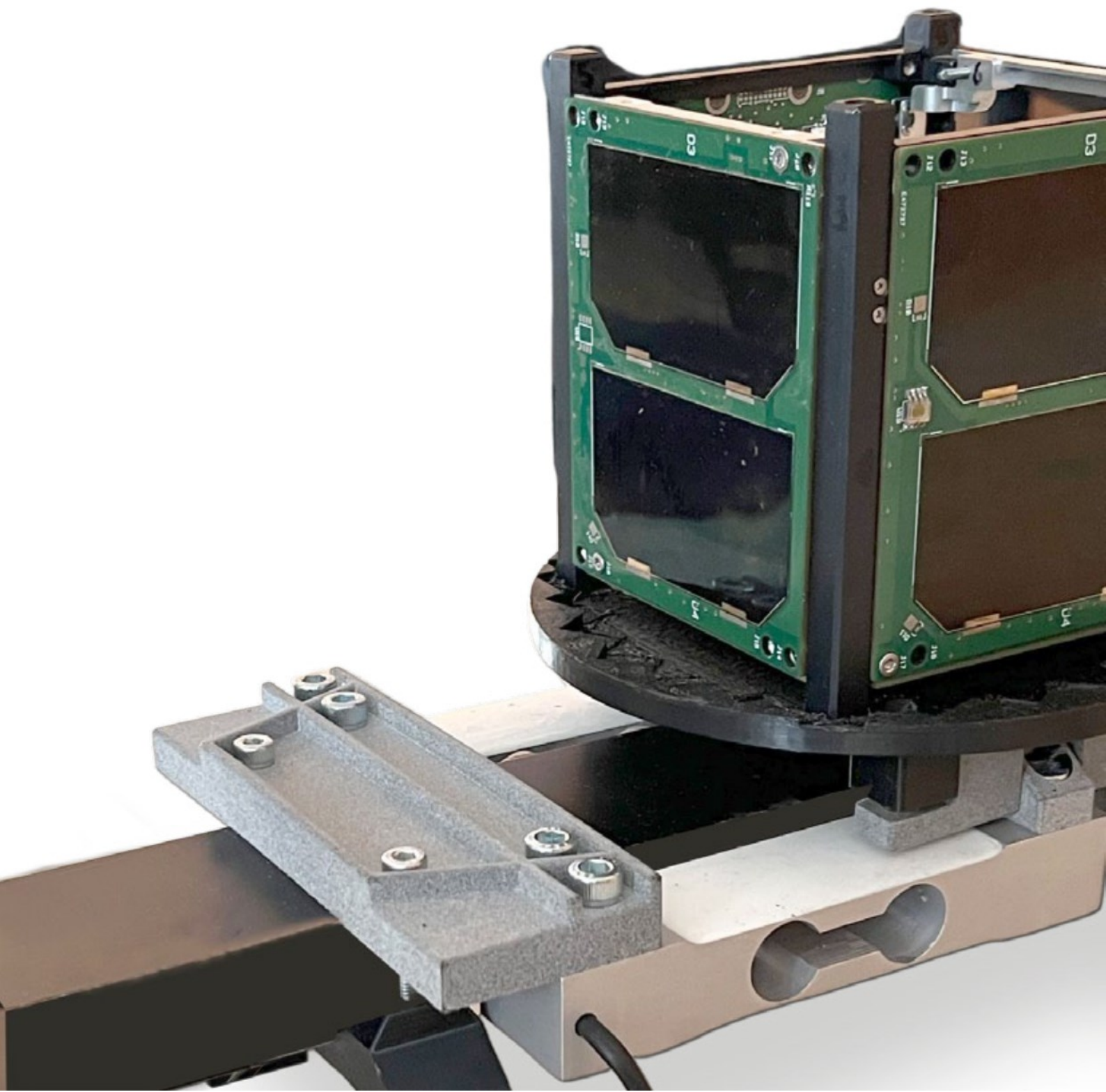
Size and Weight

Size: 10cm x 10cm x 0.1cm each

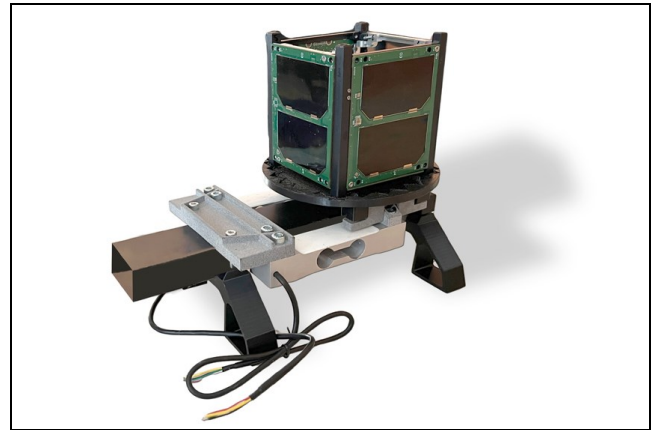
Weight: 5 x 25g



SMT06 Thermomechanical



SMT06B10 Center Of Gravity Scale, 5kg (or 25kg)



An easy-to-use instrument to measure the position of the Center Of Gravity of small objects, up to 10 x 10 x 35 cm³ like, for instance, 1U or 3U CubeSats.

The instrument measures the total mass and the position of the COG (Center Of Gravity) of up to 3U CubeSats. COG position is measured along one axis only, therefore the CubeSat has to be manually positioned along the three different geometrical axes of the CubeSat, in sequence, to obtain the 3D position of COG.

Specifications

- Mass: up to 5kg
- Accuracy +/- 1mm, if properly positioned.

Typical applications

- Measure Center Of Mass or Center of Gravity of small objects.
- Didactical experiments on mass distributions

Integration and compatibility

N/A

User Interfaces and Control

SPI interface.

When Connected to SpaceMotionery Acquisition and Control Modules, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

DC 5V, 100mA.

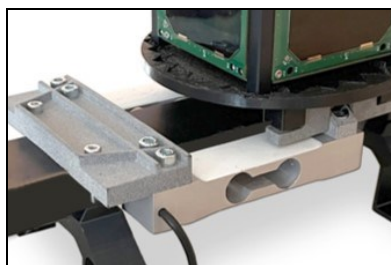
Environmental

- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

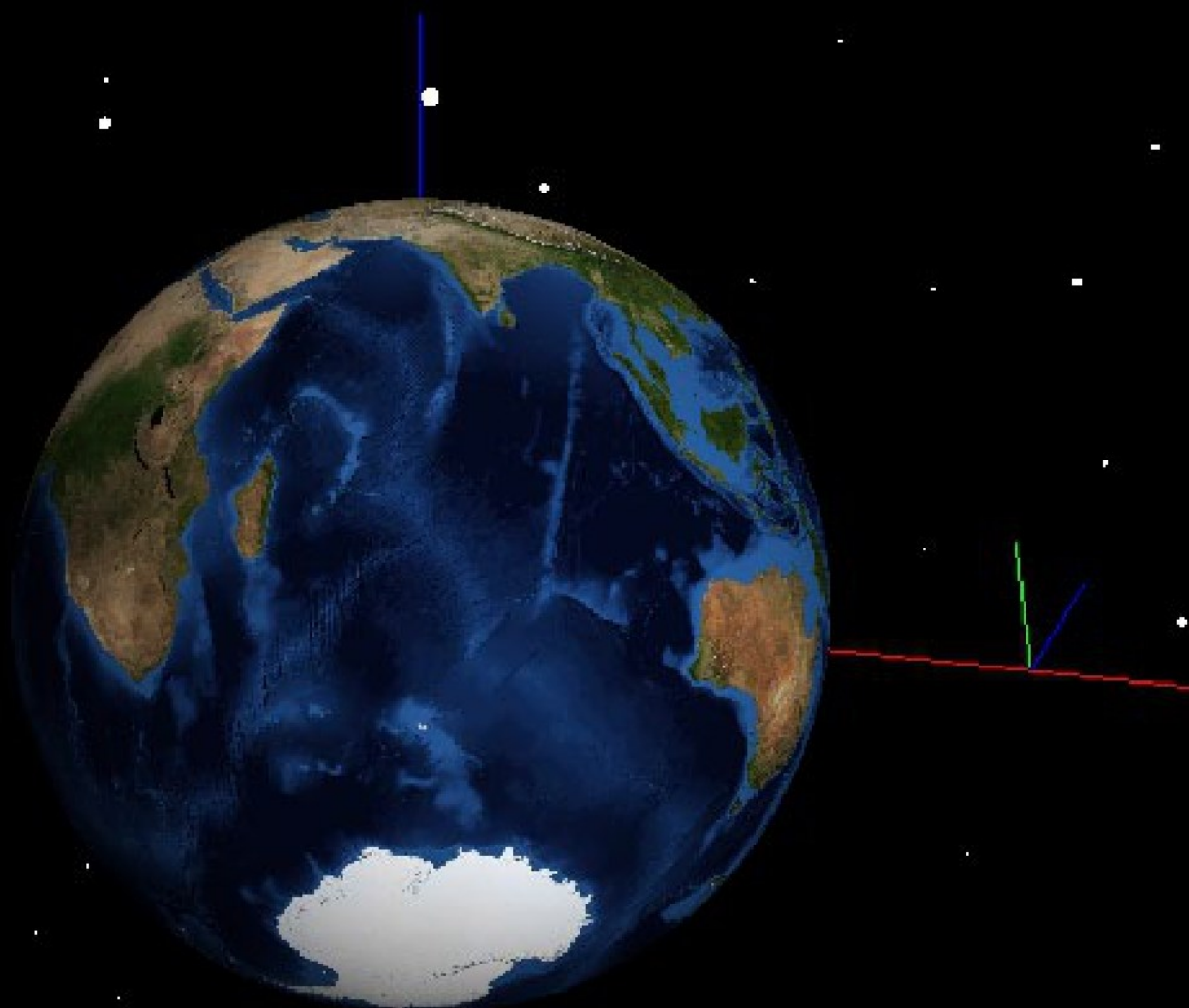
Size and Weight

Size:

Weight: 1kg



SMT07 Orbital



SMT07A Orbital Geomagnetic Attitude Software

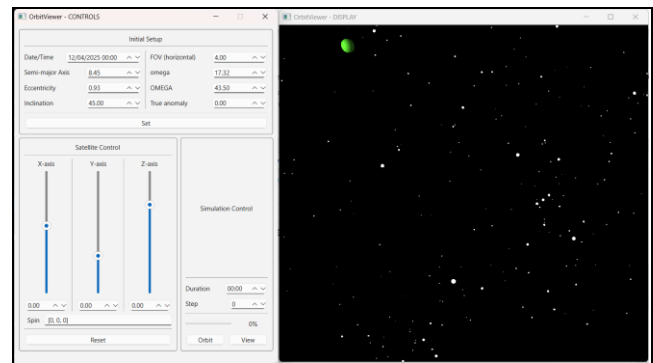
An easy to use testing and educational SW to simulate orbits around Earth (or any other planet) given spacecraft orbital parameters (Keplerians) and spacecraft attitude.

Specifications

- Operating system: windows 10 or later, Linux
- Connectivity with Helmholtz cage and/or Solar Simulator using WiFi
- Connectivity with Star Tracker Simulator and/or head-up displays via HDMI
- User interface: graphical interface with 3-D real-time visualization,

Typical applications

- Test equipment of ADCS
- Orbital simulation
- Space education



Integration and compatibility

Can interface with all SpaceMotionery's equipment for attitude testing

User Interfaces and Control

Monitor, mouse, head-up displays, Helmholtz Cage and Star Tracker test equipment

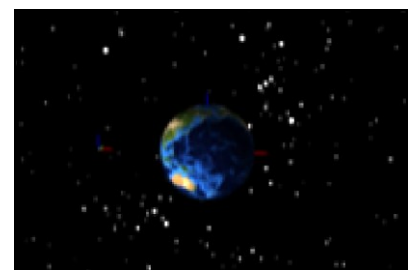
Power Supply

Environmental

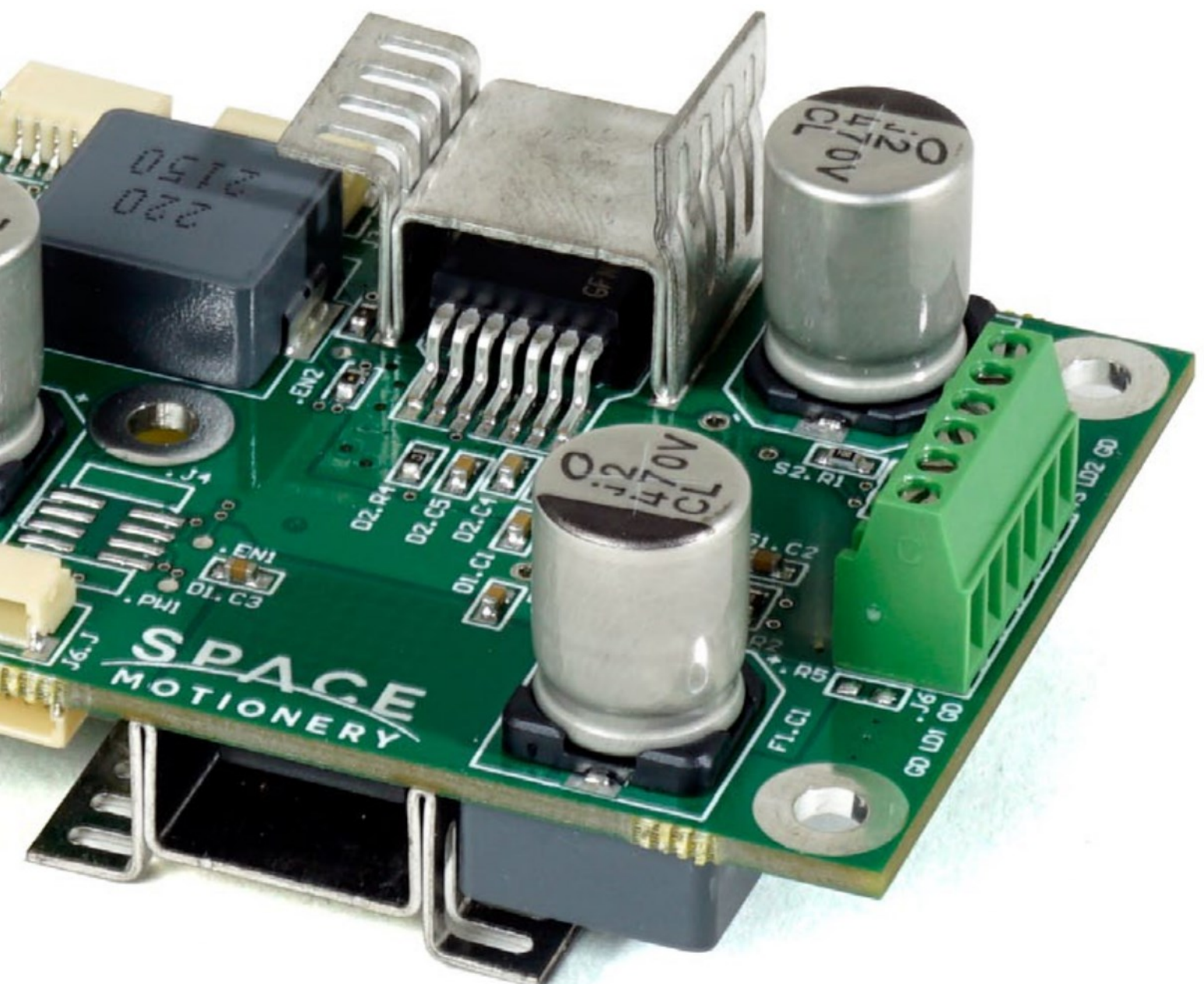
Size and Weight

Size: ---

Weight: ---



SMT10 Data Acquisition



SMT10B01 Multi Sensor (IMU)



An accurate 10-axis inertial measurement unit for measuring 3-D acceleration, 3-D rotation, 3-D magnetic field and temperature, compatible with all WiFi-enabled SpaceMotionery modules.

When interfaced with SpaceMotionery's Acquisition Modules, it allows fast and reliable measurements on small satellites during pre-flight testing or for several STEM experiments in high-school laboratories.

The sensor can be delivered with standard 40cm/1m/2m cable (sold separately). Other lengths can be requested.

Specifications

Ranges and accuracy:

- 3D acceleration up to $\pm 2g$, accuracy better than $\pm 1\%$;
- 3D spin, up to ± 260 deg/s, accuracy better than $\pm 2\%$;
- 3D magnetic field up to $\pm 1000\mu T$, with calibration-dependent accuracy;
- Temperature, range -40 to $+85^{\circ}C$.

Typical applications

It is primarily intended for testing small satellites (e.g. CubeSats) and performing various physics and STEM experiments, under the real-time control of a Smartphone or PC.

Integration and compatibility

The sensor has an SPI interface, but can be integrated with any WiFi-enabled SpaceMotionery module, including the WiFi-enabled Acquisition (and Control) Module, the 1U or Multi-U Solar Simulator, and the Helmholtz Cage.

User Interfaces and Control

Standard SPI interface with 6-pin JST-SH connector.

When connected to any SpaceMotionery WiFi-enabled module, it can be easily controlled via WiFi using a smartphone or PC and monitored via MATLAB or Octave.

Power Supply

3.3V DC - 6mA, 20mA peak

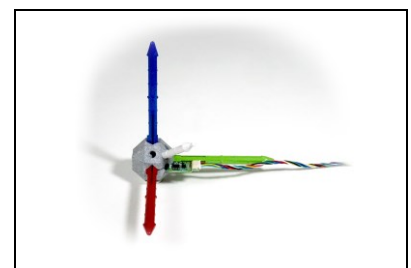
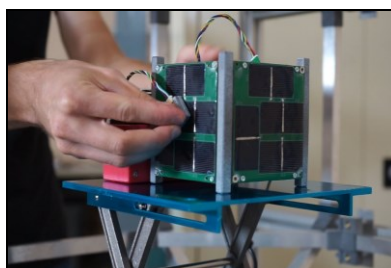
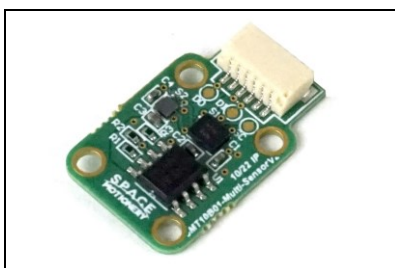
Environmental

- Temperature: $-55^{\circ}C$ to $85^{\circ}C$
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

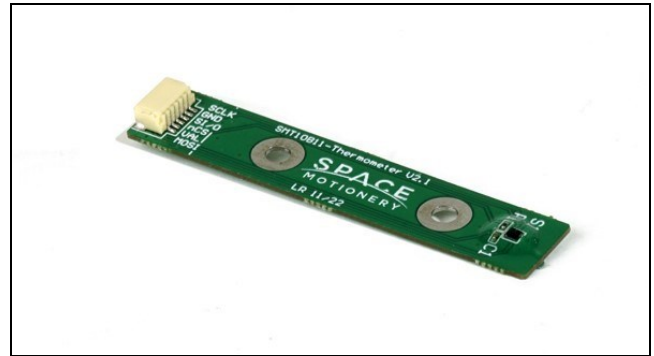
Size and Weight

Size: 19mm x 25mm x H8.5mm

Weight: 3.6g



SMT10B11 Thermometer



An accurate temperature sensor capable of measuring temperatures in the range of -55°C to $+150^{\circ}\text{C}$, compatible with all WiFi-enabled SpaceMotionery modules.

An accurate temperature sensor capable of measuring temperatures in the range of -55°C to $+150^{\circ}\text{C}$, compatible with all WiFi-enabled SpaceMotionery modules.

Its reduced thickness ($<1\text{mm}$) allows the sensors to be inserted even inside thin spaces.

It has two holes for stable mounting.

The sensor can be delivered with standard 40cm/1m/2m cable (sold separately). Other lengths can be requested.

Specifications

- Temperature range of sensor tip: -55°C to $+150^{\circ}\text{C}$;
- Accuracy: $\pm 1^{\circ}\text{C}$ between -10°C to 65°C ; $\pm 3^{\circ}\text{C}$ between -55°C to 125°C ;
- Connector and cables operate up to $+85^{\circ}\text{C}$.

Typical applications

It is primarily intended for testing small satellites (e.g. CubeSats) and performing various physical and STEM experiments, but also for automating electronic measurements and IoT applications.

Integration and compatibility

The sensor has an SPI interface, but can be integrated with any WiFi-enabled SpaceMotionery module, including the WiFi-enabled Acquisition (and Control) Module, the 1U or Multi-U Solar Simulator, and the Helmholtz Cage.

User Interfaces and Control

Standard SPI interface with 6-pin JST-SH connector.

When connected to any SpaceMotionery WiFi-enabled module, it can be easily controlled via WiFi using a smartphone or PC and monitored via MATLAB or Octave.

Power Supply

3.3V DC - 0.5mA

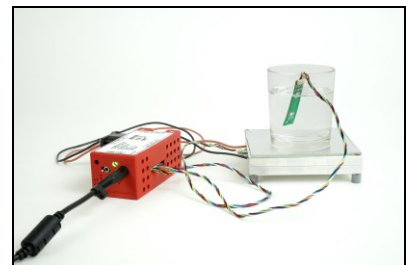
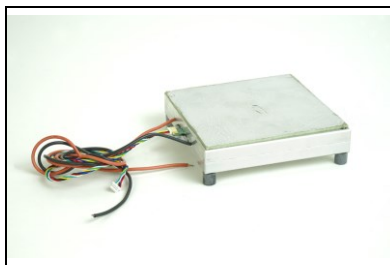
Environmental

- Temperature: -55°C to 85°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Can operate in clean water

Size and Weight

Size: 12mm x 60mm x H3.7mm

Weight: 1.7g



SMT10B31 Voltage, Current and Power Sensor



An accurate electrical sensor capable of measuring positive voltages up to 85V, positive and negative currents up to 4A, and positive and negative load powers up to 340W, compatible with all WiFi-enabled SpaceMotionery modules, for testing small satellites (such as example CubeSats) and for carrying out various physics and STEM experiments, but also for automating electronic measurements, under the real-time control of a Smartphone or PC.

Price is without cable. The sensor can be delivered with standard 40cm/1m/2m cable. Other lengths can be requested.

An accurate electrical sensor capable of measuring positive voltages, positive and negative currents, and positive and negative load powers, compatible with all WiFi-enabled SpaceMotionery modules.

The sensor can be delivered with standard 40cm/1m/2m cable (sold separately). Other lengths can be requested.

Specifications

Ranges and accuracy:

- positive voltages up to 85V, with +/-0.1% accuracy;
- positive and negative currents up to +/- 4A (extendable to 8A), with +/-0.1% accuracy;
- positive and negative load power up to 340 W.

Typical applications

It is primarily intended for testing small satellites (e.g. CubeSats) and performing various physics and STEM

experiments, but also for automating electronic measurements, under the real-time control of a Smartphone or PC.

Integration and compatibility

The sensor has an SPI interface, but can be integrated with any WiFi-enabled SpaceMotionery module, including the WiFi-enabled Acquisition (and Control) Module, the 1U or Multi-U Solar Simulator, and the Helmholtz Cage.

User Interfaces and Control

Standard SPI interface with 6-pin JST-SH connector.

When connected to any SpaceMotionery WiFi-enabled module, it can be easily controlled via WiFi using a smartphone or PC and monitored via MATLAB or Octave.

Power Supply

3.3V DC - 1 mA

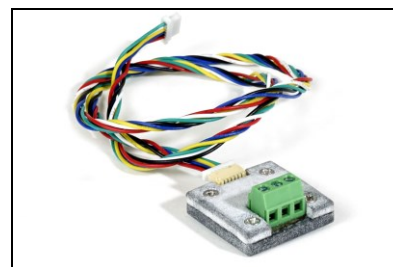
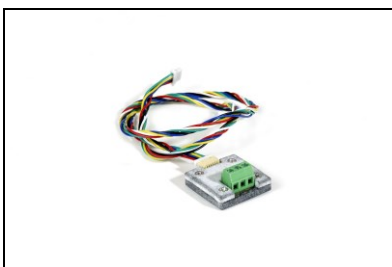
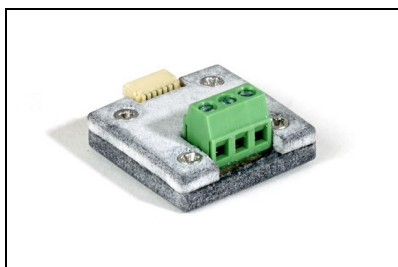
Environmental

- Temperature: -55°C to 85°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

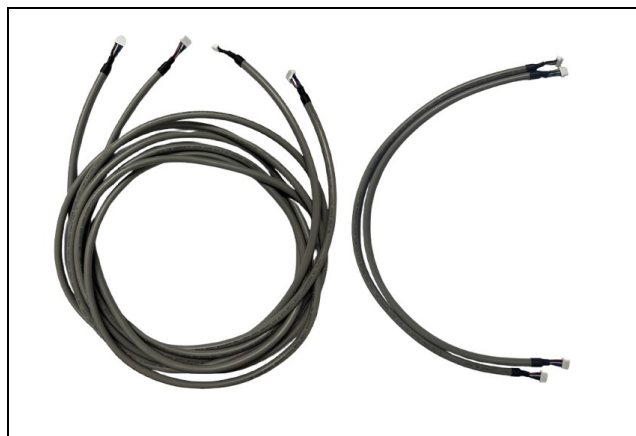
Size and Weight

Size: 25mm x 27mm x H13mm

Weight: 5.7g



SMT10C01x Sensor Cables, 40cm to 2m



Standard cable to connect any SpaceMotionery WiFi-enabled module to any SpaceMotionery sensor

Specifications

SPI cable with two JST 6-pin connectors, 40cm to 2m

Typical applications

Connection between any SpaceMotionery's sensors and any SpaceMotionery's WiFi-enabled module

Integration and compatibility

Compatible with most SpaceMotionery's equipments

User Interfaces and Control

SPI to SPI

Power Supply

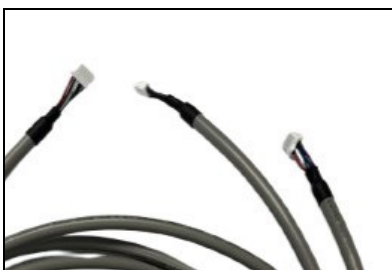
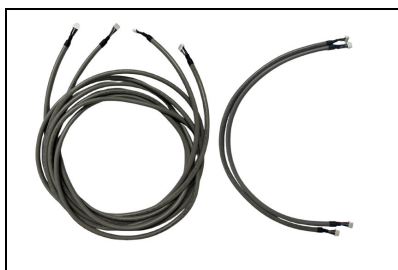
Environmental

- Temperature: -55°C to 85°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size: 40cm to 2m

Weight: depends on length



SMT10C03A

Banana to header cable, red+black



Standard cable to connect any single-pin 2.54mm header to a banana plug

Specifications

Single wire, 4mm banana to 1-pin header

Typical applications

Integration and compatibility

User Interfaces and Control

Power Supply

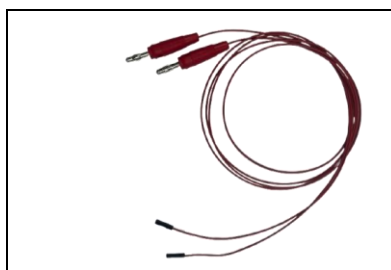
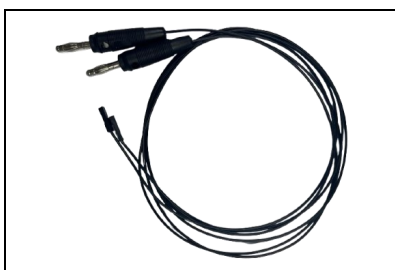
Environmental

- Temperature: -55°C to 85°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

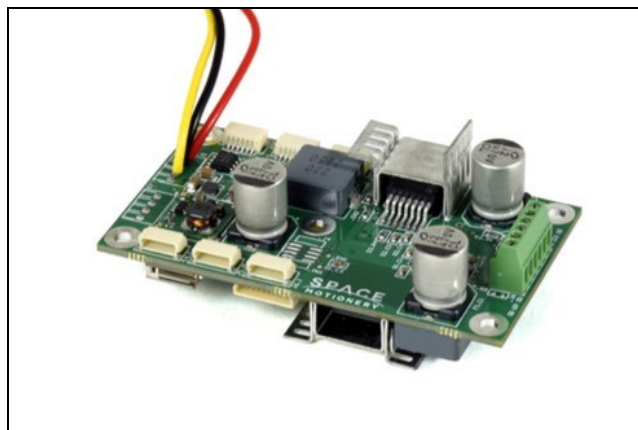
Size and Weight

Size: 1m

Weight:



SMT10D10B Bare WiFi- enabled Acquisition and Control Module



A WiFi-enabled 6-sensor data logger and integrated controller with two controllable power outputs, in an unboxed version, for embedding inside proprietary designs. It is able to simultaneously collect and process data from 6 different sensors via as many SPI interfaces or analog channels and control two power outputs, up to 30V, 150W total (if properly cooled). It is compatible with SpaceMotionery sensors and actuators. It can be provided with and without SW.

A module intended for integration into proprietary equipment. The user can monitor data and control outputs using a simple smartphone, tablet, PC or via the Internet, via web-based Android or IOS WiFi connectivity,

The module contains three sections:

- the acquisition section can acquire data from 6 SPI digital sensors or from as many analogue inputs;
- the power section operates from 10V to 30V to drive up to two power outputs that can independently generate either a programmable voltage, a programmable current or a programmable power or can control temperature of an external load (depending on the SW loaded);
- the communication section can communicate with both a PC and a smartphone via WiFi channel, both in a point-to-point connection and in a private network.

Specifications

- Data acquisition up to 100 samples/s (with proper SW);
- Analog input 0 to 3.3VDC, accuracy: +/- 0.1%;
- Digital input with SPI protocol at 3.3VDC;
- Power output up to 30V, 6A per channel.

Typical applications

The module has several applications in all domains of satellite testing but also for STEM education and training. A few examples:

- data acquisition from temperature, vibration, voltage sensors, etc.
- temperature control of heaters or coolers
- stabilization of DC magnetic fields in clean rooms
- motor control

Integration and compatibility

The Module can be integrated with most SpaceMotionery's equipment and sensors.

User Interfaces and Control

- 6 SPI or analog channels
 - 2 power outputs
 - WiFi for interfacing with smartphone or PC; USB on request
- As with all other SpaceMotionery systems, the Acquisition Module can be controlled, via WiFi, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol. Interface to MATLAB/Octave/Python via WiFi.

Power Supply

The power section operates from an up to 30V DC power supply, while the acquisition and communication sections can either operate from the same power supply or from any micro-USB power bank, when no power output is required.

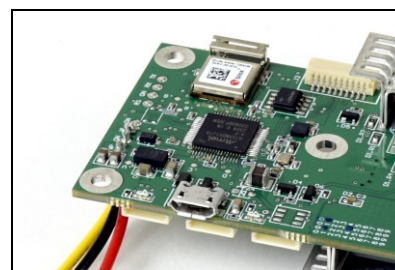
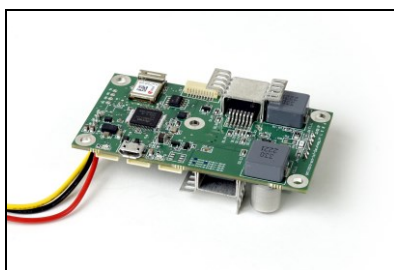
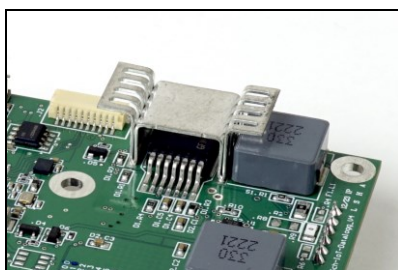
Environmental

- Temperature: -40°C to 40°C (at max output power, if properly ventilated) or 70°C (at no output power)
- Humidity: 0% to 95%
- Air pressure: vacuum to 100kPa

Size and Weight

Size: 8cm x 4.5cm x H3cm

Weight: 100g



SMT10D11S WiFi-enabled Acquisition and Control Module



A WiFi-enabled 6-sensor data logger and integrated controller with two controllable power outputs. It is able to simultaneously collect and process data from 6 different sensors via as many SPI interfaces or analog channels and control two power outputs, up to 20V, 150W (total). It is compatible with all SpaceMotionery sensors and actuators.

A module intended both for teaching scientific and technological subjects and for integration into test equipment. The user can monitor data and control outputs using a simple smartphone, tablet, PC or via the Internet, via web-based Android or IOS WiFi connectivity,

The module contains three sections:

- the acquisition section can acquire data from 6 SPI digital sensors or from as many analogue inputs;
- the power section operates from 10V to 30V to drive up to two power outputs that can independently generate either a programmable voltage, a programmable current or a programmable power or can control temperature of an external load;
- the communication section which can communicate with a PC or a smartphone via WiFi channel, both in a point-to-point connection and in a private network using an external router. USB connection is also available upon request.

Specifications

- Data acquisition up to 100 samples/s (with proper SW);
- Analog input 0 to 3.3VDC, accuracy: +/- 0.1%;
- Digital input with SPI protocol at 3.3VDC;
- Power output up to 30V, 6A per channel.

Typical applications

The module has several applications in all domains of satellite testing but also for STEM education and training. A few examples:

- data acquisition from temperature, vibration, voltage sensors, etc.

- temperature control of heaters or coolers
- stabilization of DC magnetic fields in clean rooms
- motor control

Integration and compatibility

The Module can be integrated with most SpaceMotionery's equipment and sensors.

User Interfaces and Control

- 6 SPI or analog channels
 - 2 power outputs
 - WiFi for interfacing with smartphone or PC; USB on request
- As with all other SpaceMotionery systems, the Acquisition Module can be controlled, via WiFi, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol. Interface to MATLAB/Octave/Python via WiFi.

Power Supply

The power section operates from a DC power supply (up to 30V), while the acquisition and communication sections can either operate from the same power supply or from any micro-USB power bank, when no power output is required.

Product package includes a co

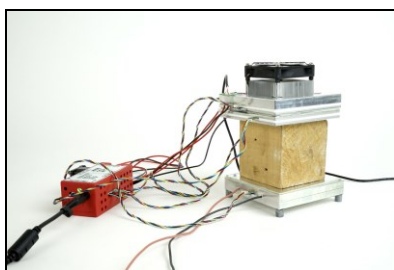
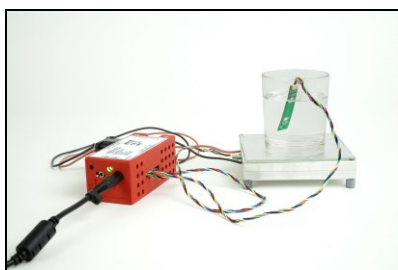
Environmental

- Temperature: -40°C to 40°C (at max output power) or 70°C (at no output power)
- Humidity: 0% to 95%
- Air pressure: vacuum (max 5 min or continuous if supplied only by power bank, no power output) to 100kPa
- Protection: IP20

Size and Weight

Size: 12cm x 8.5cm x H4.5cm

Weight: 250g



SMT10D15S WiFi-enabled Acquisition Module



A WiFi-enabled 6-sensor data logger. It is capable to simultaneously collect and process data from 6 different sensors via as many SPI interfaces or analog channels. It is compatible with all SpaceMotionery sensors.

A module intended both for teaching scientific and technological subjects and for integration into test equipment. The user can monitor data using a simple smartphone, tablet, PC or via the Internet, via web-based Android or IOS WiFi connectivity,

The module contains two sections:

- the acquisition section can acquire data from 6 SPI digital sensors or from as many analogue inputs;
- the communication section which can communicate with a PC or a smartphone via WiFi channel, both in a point-to-point connection and in a private network using an external router. USB connection is also available upon request.

Specifications

- Data acquisition up to 100 samples/s (with proper SW);
- Analog input 0 to 3.3VDC, accuracy: +/- 0.1%;
- Digital input with SPI protocol at 3.3VDC;

Typical applications

The module has several applications in all domains of satellite testing but also for STEM education and training. A few examples:

- data acquisition from temperature, vibration, voltage sensors, etc.

Integration and compatibility

The Module can be integrated with most SpaceMotionery's equipment and sensors.

User Interfaces and Control

- 6 SPI or analog channels
 - WiFi for interfacing with smartphone or PC; USB on request
- As with all other SpaceMotionery systems, the Acquisition Module can be controlled, via WiFi, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol. Interface to MATLAB/Octave/Python via WiFi.

Power Supply

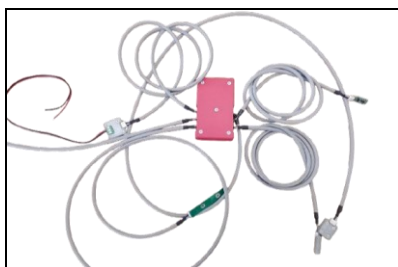
The unit operates from 5V DC supply from a micro USB port or power bank.

Environmental

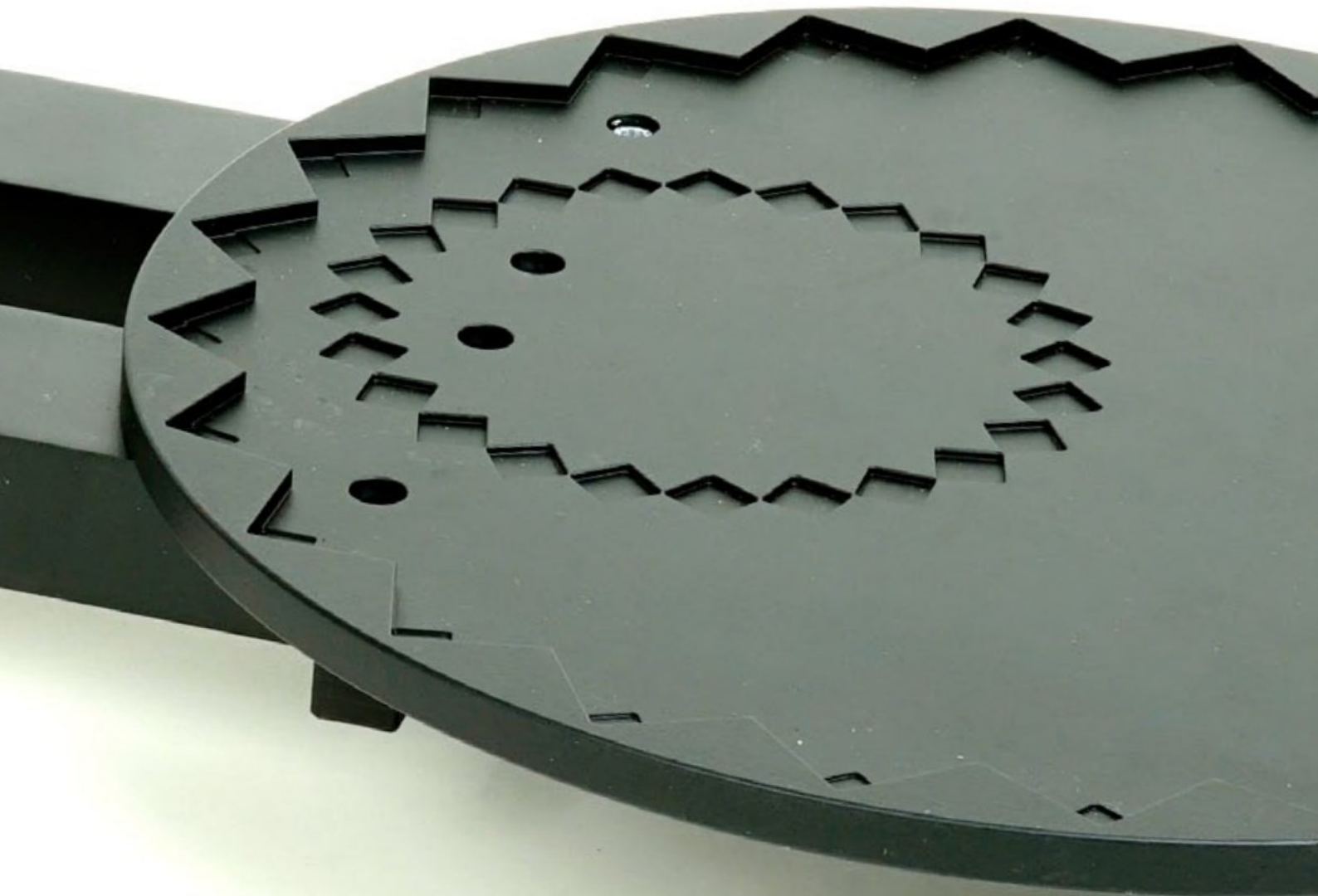
- Temperature: -40°C to 70°C
- Humidity: 0% to 95%
- Air pressure: vacuum to 100kPa
- Protection: IP20

Size and Weight

Size: 12cm x 8.5cm x H2.5cm
Weight: 100g



SMT11 Stands



SMT11B Fixed Stand 3U



A multifunctional support to be associated with SpaceMotionery's Solar Simulator for correct illumination of the device under test or for educational experiments on objects whose position and orientation must remain constant.

It can accommodate, on one side, SpaceMotionery's Solar Simulators of various sizes up to 3U and, on the other side, a small nanosatellite (typically, 1U to 3U CubeSats) or any object with a base area not exceeding to 10x10cm². The Fixed Stand keeps the Solar Simulator and the Satellite under testing at the right distance for optimal performance.

Thanks to its particular shape, the illuminated object can be rotated manually in multiples of 15° around vertical axis.

Specifications

Typical applications

- testing CubeSats up to 3U
- testing individual solar cells or solar panels
- teaching photoelectric conversion
- experiments on calorimetry

Integration and compatibility

The Fixed Stand can be easily combined and integrated with other SpaceMotionery products (mostly the Solar Simulator).

User Interfaces and Control

N/A

Power Supply

N/A

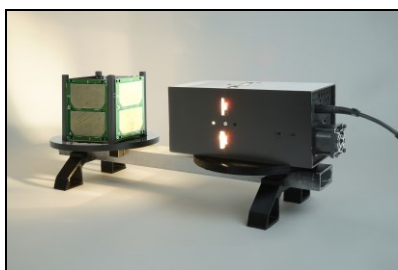
Environmental

- Temperature: -20°C to +50°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size: 18cm x 40cm x H9cm

Weight: 0.8kg



SMT11C Fixed Stand 12U



A multifunctional support to be associated with SpaceMotionery's Solar Simulator for correct illumination of the device under test or for educational experiments on objects whose position and orientation must remain constant.

It can accommodate, on one side, SpaceMotionery's Solar Simulators of various sizes up to 12U and, on the other side, a small nanosatellite (typically, 12U CubeSats) or any object with a base area not exceeding to 22x22cm². The Fixed Stand keeps the Solar Simulator and the Satellite under testing at the right distance for optimal performance.

Thanks to its particular shape, the illuminated object can be rotated manually in multiples of 15° around vertical axis.

Specifications

Typical applications

- testing CubeSats up to 12U
- testing individual solar cells or solar panels
- teaching photoelectric conversion
- experiments on calorimetry

Integration and compatibility

The Fixed Stand can be easily combined and integrated with other SpaceMotionery products (mostly the Solar Simulator).

User Interfaces and Control

N/A

Power Supply

N/A

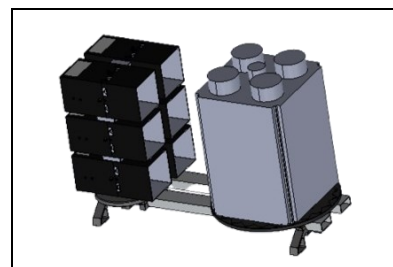
Environmental

- Temperature: -20°C to +50°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size: 33cm x 60cm x H9cm

Weight: 4.5kg



SMT11B02 Motorized Turn Table 3U (COMING SOON)

A multifunctional support for testing elements or systems or for educational experiments on objects which have to rotate around vertical axis at constant speed.

It can accommodate, on the one hand, SpaceMotionery's Solar Simulators of various sizes up to 3U and, on the other hand, a small nanosatellite (typically, 1U to 3U CubeSats) or any object with a base area not exceeding to 10x10x34cm³. The Turn Table keeps the Solar Simulator and the Satellite under testing at the right distance for optimal performance.

Specifications

- Max object size 10x10x35 cm³;
- Max spin: 4 seconds per revolution (15RPM);
- Max weight on plate: 200N.

Typical applications

- testing CubeSats up to 3U
- testing individual solar cells or solar panels
- experiments on calorimetry

Integration and compatibility

The Turn Table can be easily combined and integrated with other SpaceMotionery products (mostly the Solar Simulator). It can internally host, on the rotating platform, a bare SpaceMotionery WiFi-enabled Acquisition Module together



with its Power Bank, to ease acquisition of measurements onboard the rotating spacecraft.

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

DC 20V, 1A.

The product also includes one commercial AC power supply 110-220V, 50-60Hz, 150W

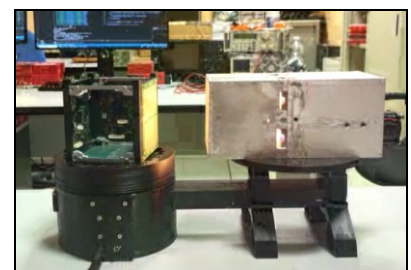
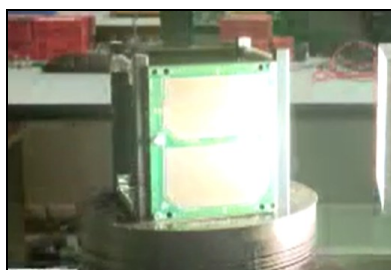
Environmental

- Temperature: -20°C to +50°C
- Humidity: 0% to 95%
- Air pressure: vacuum (0Pa) to 100kPa
- Protection: IP20

Size and Weight

Size: 18cm x 40cm x H12cm

Weight: 1.8kg



SMT3X Testing Labs



SMT31A01 Magnetic Solar Kit 12U



A ready-to-use kit composed of SpaceMotionery equipment for magnetic and solar test of Small Satellites

The kit is composed of the following SpaceMotionery equipment:

- 1 SMT02C13 – 3D Helmholtz Cage, 27U, 4G, WiFi;
- 1 SMT01A04 6U/12U Solar Simulator;
- 1 SMT11C11 6U/12U Fixed Stand;
- 1 Solar Simulator to Helmholtz Cage adapter;
- 4 SMT10B11 – Thermometer with SMT10C01B JST-SH Cable 1m;
- 2 SMT10B31 – Voltage, Current and Power Sensors with SMT10C01B JST-SH Cable 1m;
- 4 SMT10B01 – Multi Sensor (IMU) with SMT10C01C JST-SH Cable 2m;

Specifications

See specs of each individual item

Typical applications

Magnetic and solar tests of Small Satellites
Teaching STEM in physics and solar light conversion

Integration and compatibility

All items are delivered preconfigured for an easy integration among them and with other SpaceMotionery equipment.

All equipment are easily integrated with MATLAB/Octave/Python or Python scripts

User Interfaces and Control

As with all other SpaceMotionery systems, the system can be controlled, via WiFi or USB, from a smartphone, a PC or any other system that can interact via WiFi with an HTTP protocol or via USB and it easily interfaces with MATLAB/Octave/Python.

Power Supply

7 x DC 20V, 9A.

The product also includes as many commercial AC power supplies 110-220V, 50-60Hz, 180W

Environmental

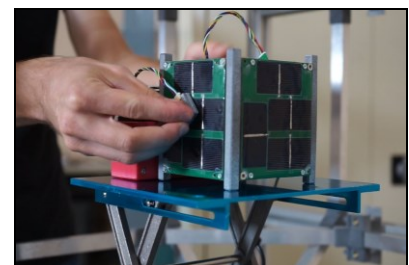
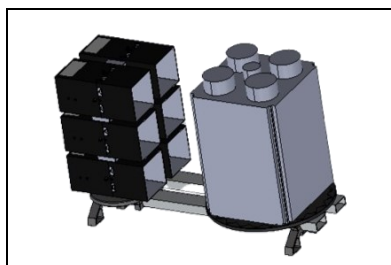
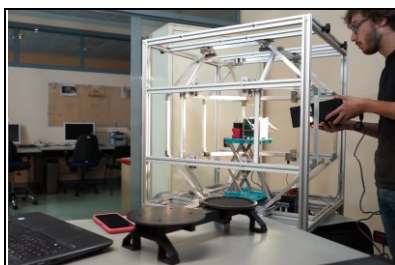
- Temperature: -20°C to 40°C
- Humidity: 0% to 95%
- Air pressure: vacuum (for max 5min) to 100kPa
- Protection: IP20

Size and Weight

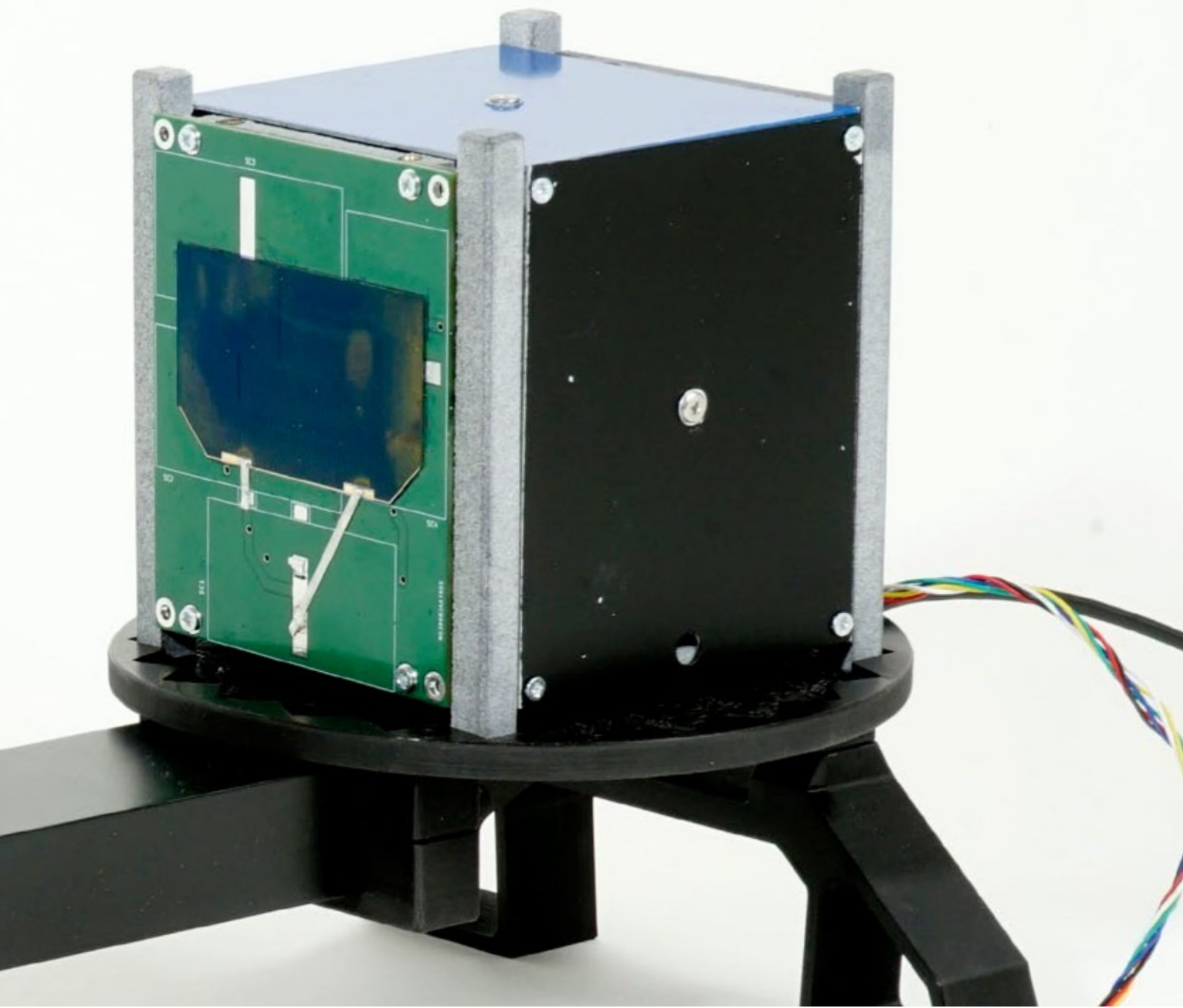
Size: Depends on specific assembly around satellite under test.

Refer to the sizes of the individual elements

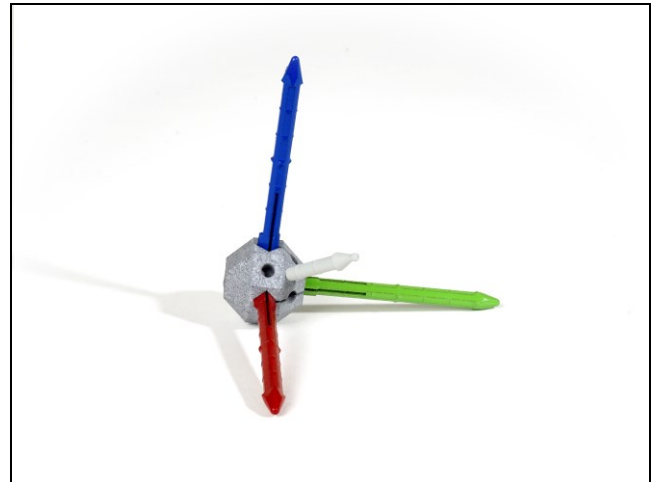
Weight: 50kg altogether



SME02 Teaching Aids for Space



SME02H10 Reference Frame for Teaching 3D Attitude



A set of three orthogonal axes (X-red, Y-green, Z-blue) which can be assembled either as a right-handed or a left-handed orthogonal frame.

It is a very simple yet fundamental tool for teaching and understanding rotations in 3D space, spacecraft attitude and manoeuvres, spin and the relevant mathematical concepts, like rotation matrices, quaternions and Euler angles.

Specifications

Can be assembled as either left-handed or right-handed frame.

Typical applications

Teaching 3D rotations in space; concepts of attitude and spin; experiments on attitude determination, Euler angles, attitude matrices, quaternions

Integration and compatibility

It can be coupled with SpaceMotionery's Multi Sensor (IMU) for remote monitoring of its 3D orientation in space via any SpaceMotionery's WiFi-enabled equipment.

User Interfaces and Control

Manually operated tool

Power Supply

N/A

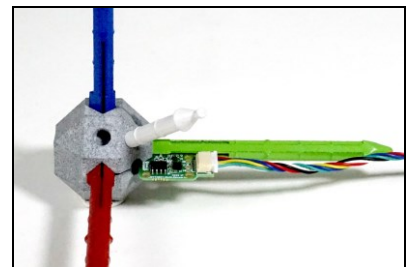
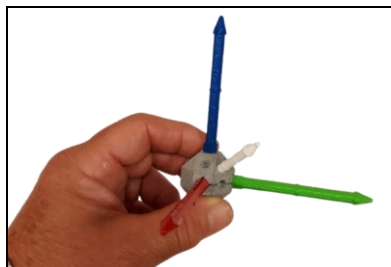
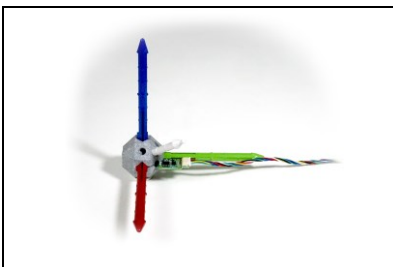
Environmental

Normal laboratory conditions

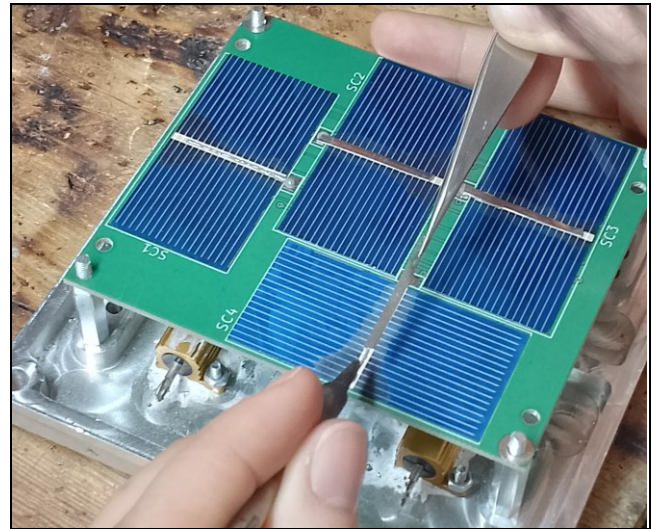
Size and Weight

Size: 10.5cm x 10.5cm x H10.5cm

Weight: 22g



SME02A01 Solar Panel + Converter Development Kit



A fully didactical board which can be developed, simulated, routed, assembled and tested by students to learn principles of photovoltaic conversion, switching regulators, PCB design and electronic assembly technologies.

Thanks to the teaching material provided, based on the free tool KiCad, students can understand step by step the concepts of photovoltaic conversion, energy conversion with switching techniques, battery charging and discharging; first in simulation and then in the laboratory.

First the students learn to enter an electrical diagram in the appropriate program, then move on to its circuit simulation, learn how to transform it into a layout and finally solder the components provided on the printed circuit board, also provided, which exactly reflects the diagrams previously developed.

In the final phase the student learns how to assemble the solar cells by gluing and soldering and finally how to test the panel in the laboratory, learning to characterize the individual solar cells and the converter as a whole.

Specifications

The package contains the teaching material, printed circuit board, solar cells, electronic components for primary converter, battery, EVA protection for the cells.

The package does not include the KiCad program (freely available from the web), the soldering iron, the tin and a hot air gun.

It also does not include the stencil for placing adhesive and for PCB assembly support, which can be purchased separately

(Tooling for Solar Panel Assembly) and shared among students.

Typical applications

- Teaching principles of photovoltaic conversion
- Hands-on study of power conversion
- Hands-on training on PCB development and assembly

Integration and compatibility

The Solar Panel can be used either alone or assembled together with all other didactical components of the SpaceMotionery catalog.

For example, it can be irradiated with the Solar Simulator, rotated with the Turn Table, heated with the Flat-Heater, measured with the Voltage-Current-Power Sensor in association with the WIFI-Enabled Acquisition Module.

User Interfaces and Control

- Sun light;
- Power supply (optional);
- Access to most internal signals for experiments.

Power Supply

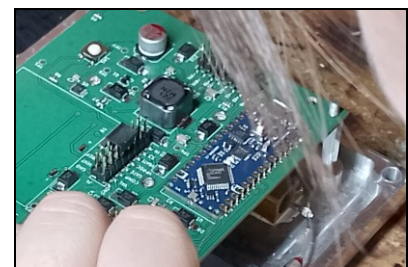
Solar Light
DC 5V (optional)

Environmental

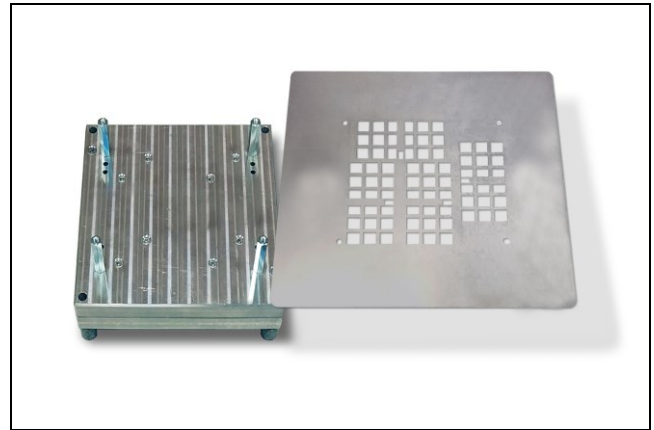
- Temperature: -20°C to 40°C

Size and Weight

Size: 100mm x 100mm x 20mm (including connectors)
Weight: 52g



SME02A01T Tooling for Solar Panel Assembly



A set of tools in support of the Solar Panel + Converter Development Kit for placing adhesives and to solder the solar cells and assemble the electronic components.

The package includes the KiCad libraries for the components used, the stencil for solar cell adhesive and the PCB assembly support, which are intended to be shared among students.

Specifications

N/A

Typical applications

Support material for SME02A01 - Solar Panel Development Kit.

Integration and compatibility

N/A

User Interfaces and Control

N/A

Power Supply

N/A

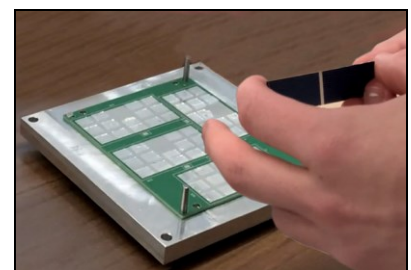
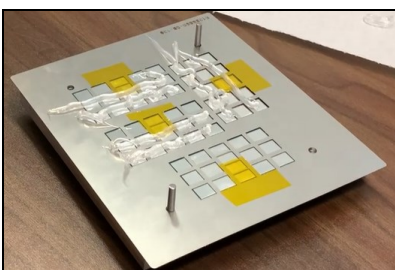
Environmental

N/A

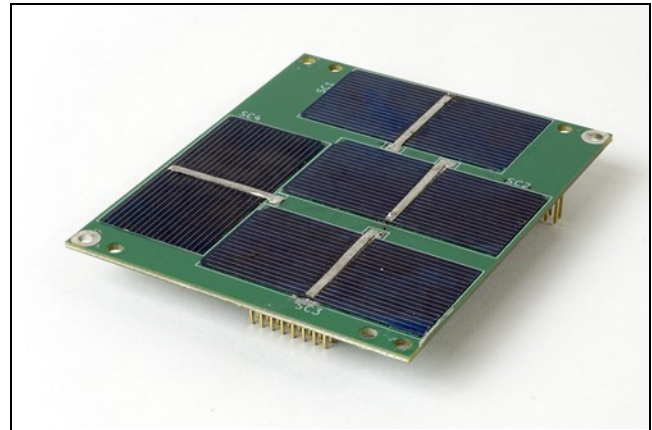
Size and Weight

Size: Support: 100mm x 100mm x 40mm

Weight: 100g



SME02A02 Educational Solar Panel for PV experiments



Didactical boards, preassembled, for teaching the principal satellite subsystems.

Thanks to the teaching material provided, based on the free tool KiCad, students can understand step by step the concepts of photovoltaic conversion, energy conversion with switching techniques, battery charging and discharging; first in simulation and then in the laboratory.

First the students learn to enter an electrical diagram in the appropriate program, then move on to its circuit simulation, learn how to transform it into a layout and finally solder the components provided on the printed circuit board, also provided, which exactly reflects the diagrams previously developed.

In the final phase the student learns how to assemble the solar cells by gluing and soldering and finally how to test the panel in the laboratory, learning to characterize the individual solar cells and the converter as a whole.

Specifications

- Solar Cells configurations: Serial, Parallel, mixed. Can emulate cells faults: broken and short
- Solar cells efficiency: 13%
- Converter efficiency: 85%
- Output voltage 4V to 25V unregulated
- Max output power in AM0: 0.65W
- Arduino uC on board
- Room for a LiPo battery

Typical applications

- Teaching principles of photovoltaic conversion
- Hands-on study of power conversion

Integration and compatibility

The boards can be used either alone or assembled together with all other didactical components of the SpaceMotionery catalog.

For example, it can be irradiated with the Solar Simulator, moved with the Turn Table, heated with the Flat-Heater, measured with the Voltage-Current-Power Sensor in association with the WIFI-Enabled Acquisition and Control Module.

User Interfaces and Control

- Sun light;
- Power supply (optional);
- Access to most internal signals for experiments.

Power Supply

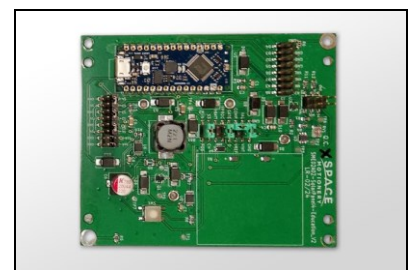
Solar Light
DC 5V (optional)

Environmental

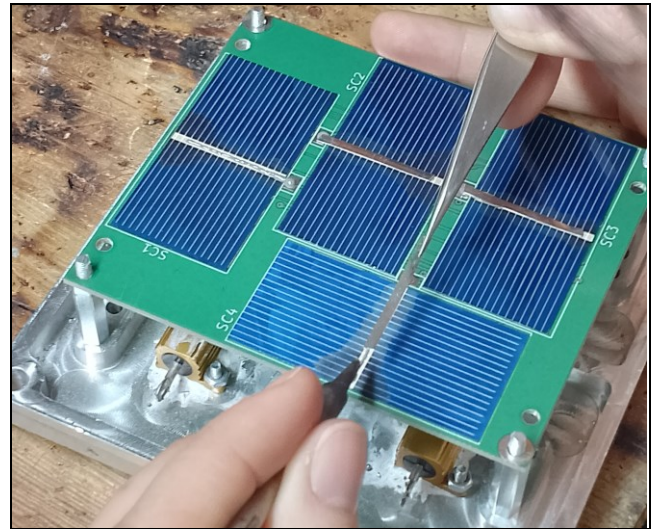
- Temperature: -20°C to 40°C

Size and Weight

Size: 100mm x 100mm x 20mm (including connectors)
Weight: 50g



SME02B01 Magnetometer + Magnetorquer Development Kit



A fully didactical board which can be developed, simulated, routed, assembled and tested by students to learn principles of magnetometers and magnetorquers, PCB design and electronic assembly technologies.

Thanks to the teaching material provided, based on the free tool KiCad, students can understand step by step the concepts of magnetometers and magnetorquers; first in simulation and then in the laboratory.

First the students learn to enter an electrical diagram in the appropriate program, then move on to its circuit simulation, learn how to transform it into a layout and finally solder the components provided on the printed circuit board also provided, which exactly reflects the diagrams previously studied and provided.

In the final phase the student learns how to assemble the components and finally how to test the subsystems in the laboratory.

Specifications

The package contains the teaching material, printed circuit board, solar cells, electronic components for 2-D magnetometer and 1-D magnetorquer.

The package does not include the KiCad program (that can be downloaded for free from the web), the soldering iron, the tin and a hot air gun. It also does not include the stencil for solar cell adhesive and the PCB assembly support, which can be purchased separately (Tools for Solar Panel Converter Study) and shared among students.

Typical applications

- Teaching principles of magnetometers and magnetorquers
- Hands-on study of magnetic systems
- Hands-on experience on PCB design, manufacturing and assembly

Integration and compatibility

The Magnetometer and Magnetorquer Study can be used either alone or assembled together with all other didactical components of the SpaceMotionery catalog.

For example, it can be irradiated with the Solar Simulator, moved with the Turn Table, heated with the Flat-Heater, measured with the Voltage-Current-Power Sensor in association with the WIFI-Enabled Acquisition and Control Module.

User Interfaces and Control

- Sun light;
- Power supply (optional);
- Access to most internal signals for experiments.

Power Supply

Solar Light

DC 5V (optional)

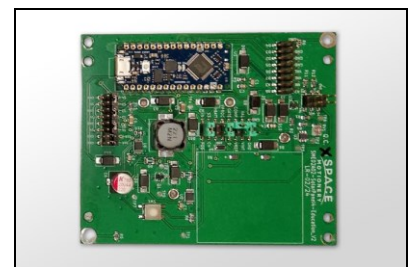
Environmental

- Temperature: 0°C to 40°C

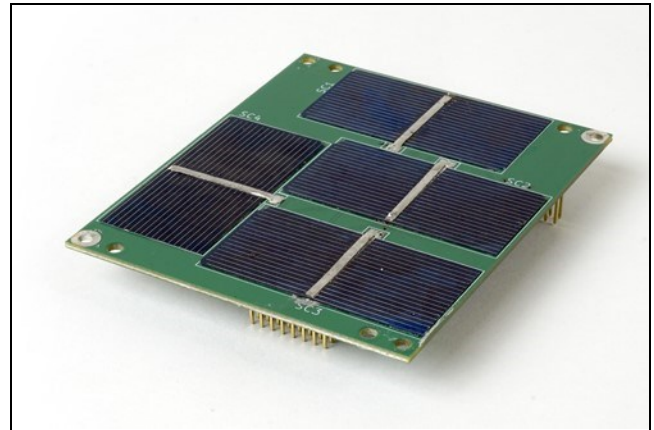
Size and Weight

Size: 100mm x 100mm x 20mm (including connectors)

Weight: 52g



SME02x Educational Boards: Solar Panel Converter / Magnetometer Magnetorquer / 437MHz TR-RX



Didactical boards, preassembled, for teaching the principal satellite subsystems.

Specifications

Refer to technical data of each board

Typical applications

- Teaching principles of photovoltaic conversion;
- Teaching principles of attitude determination and control;
- Teaching principles of satellite communication

Integration and compatibility

The boards can be used either alone or assembled together with all other didactical components of the SpaceMotionery catalog.

For example, it can be irradiated with the Solar Simulator, moved with the Turn Table, heated with the Flat-Heater, measured with the Voltage-Current-Power Sensor in

association with the WIFI-Enabled Acquisition and Control Module.

User Interfaces and Control

- Sun light;
- Power supply (optional);
- Access to most internal signals for experiments.

Power Supply

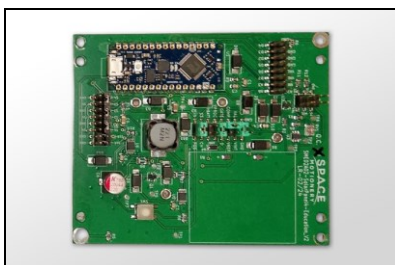
Solar Light
DC 5V

Environmental

- Temperature: 0°C to 40°C

Size and Weight

Size: 100mm x 100mm x 20mm (including connectors)
Weight: 50g



SME02F10 Educational Cubesat Frame, 1U



Low cost CubeSat Frame, 1U, for teaching the principal satellite subsystems.

Specifications

Size compatible with 1U CubeSat specifications.

Material: Nylon PA12, not to be used for flight models

Typical applications

- Teaching principles of CubeSat subsystems
- Assembly and testing of didactical boards
- Low-cost development of mock-ups
- Educational destructive tests

Integration and compatibility

The frame can be used either alone or assembled together with all other didactical components of the SpaceMotionery catalog.

For example, it can be irradiated with the Solar Simulator, moved with the Turn Table, heated with the Flat-Heater, measured with the Voltage-Current-Power Sensor in association with the WIFI-Enabled Acquisition and Control Module.

User Interfaces and Control

Attachment point for SpaceMotionery's Educational boards or for other commercial boards

Power Supply

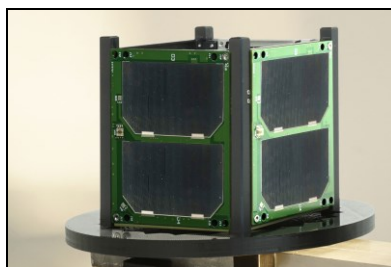
Environmental

- Temperature: -50°C to 50°C

Size and Weight

Size: 100mm x 100mm x 100mm

Weight: 100g



SME02F10 Educational Cubesat Frame, 1U



Low cost CubeSat Frame, 1U, for teaching the principal satellite subsystems.

Specifications

Size compatible with 1U CubeSat specifications.

Material: Nylon PA12, not to be used for flight models

Typical applications

- Teaching principles of CubeSat subsystems
- Assembly and testing of didactical boards
- Low-cost development of mock-ups
- Educational destructive tests

Integration and compatibility

The frame can be used either alone or assembled together with all other didactical components of the SpaceMotionery catalog.

For example, it can be irradiated with the Solar Simulator, moved with the Turn Table, heated with the Flat-Heater, measured with the Voltage-Current-Power Sensor in association with the WIFI-Enabled Acquisition and Control Module.

User Interfaces and Control

Attachment point for SpaceMotionery's Educational boards or for other commercial boards

Power Supply

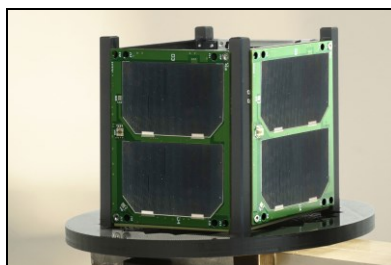
Environmental

- Temperature: -50°C to 50°C

Size and Weight

Size: 100mm x 100mm x 100mm

Weight: 100g



SME02F21A Bonding Surfaces 6+3mm for Gluing Experiments



An easy-to-use tool to teach bonding techniques and to test the performance of glues and adhesives in several environmental conditions and with different materials.

The kit is composed of three pairs of bonding surfaces, made of as many materials (Aluminum, Nylon PA12 and ABS), each one showing two flat surfaces of approximately 7mm² and 28mm².

Each surface has a ring to attach to a dynamometer to perform pull tests and measure the strength of the adhesive.

The tool also contains three supports to keep the surfaces in position and apply a pressure during curing.

We also propose the Bonding and Adhesives Kit, a set of commonly used adhesives for experiments and tests on bonding

Specifications

Two surface: 7mm² and 28mm²

Pull rings: up to 500N

Typical applications

Teaching principles of resins, glues and curing.

Measuring tensile strength of adhesives.

Measuring effect of low and high temperatures on adhesives.

Comparison among adhesives

Integration and compatibility

N /A

User Interfaces and Control

Two rings to connect to a dynamometer

Power Supply

N/A

Environmental

- Temperature: -70°C to 70°C
- Humidity: 0% to 100%
- Air pressure: vacuum to 500kPa

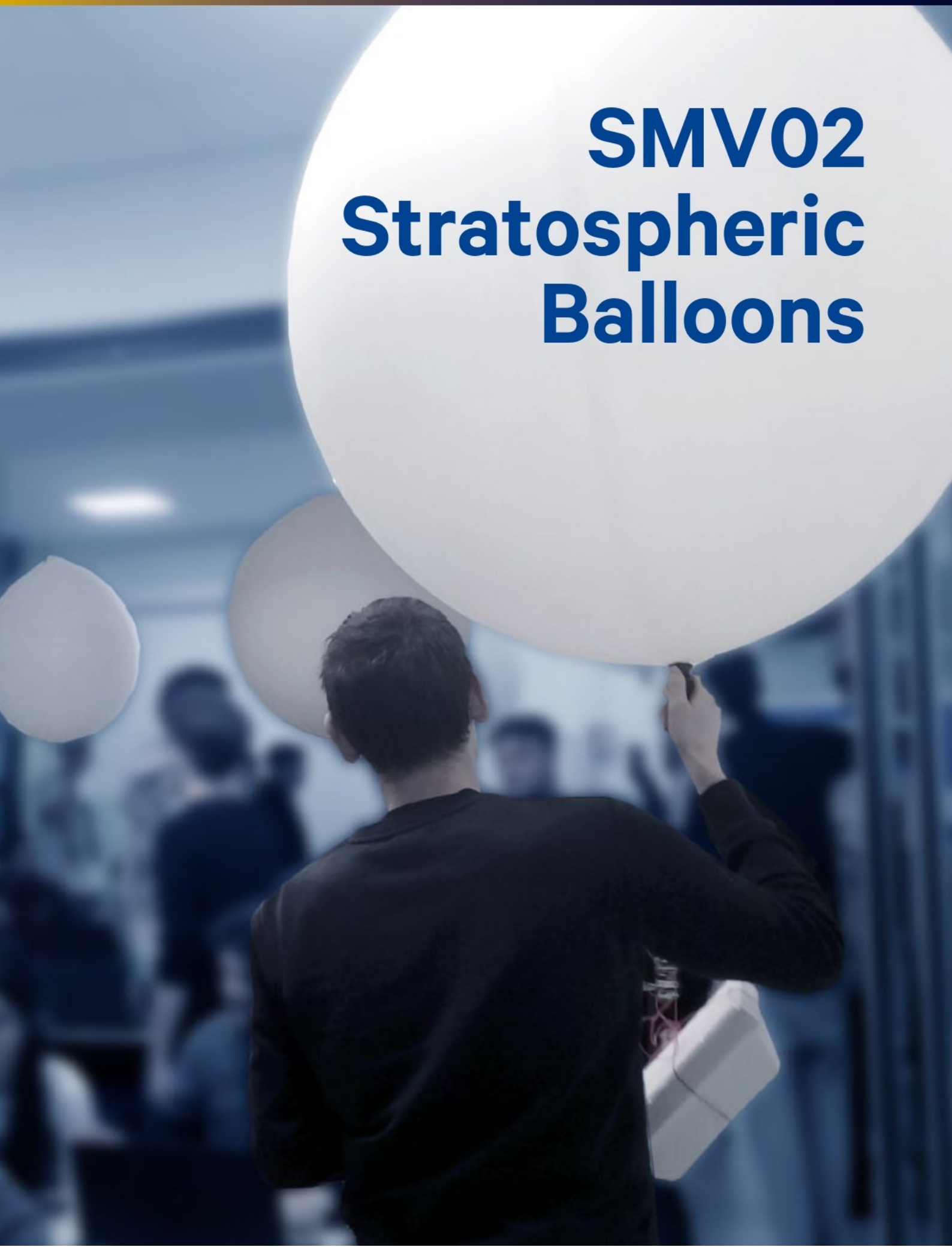
Size and Weight

Size: 70mm x 30mm x H15mm

Weight: 3 x 14g



SMV02 Stratospheric Balloons



SMV02A Educational Stratospheric Balloon Kit for Lab Experiments

A didactical balloon kit for teaching stratospheric balloon missions inside classroom or experimental labs.

The kit contains a balloon, a piece of compatible string and the material for experimenting with stratospheric balloons and measure lifts, vertical speed, and other parameters related with a stratospheric mission. The Helium must be purchased separately from a local provider. A dynamometer (not provided) is also required.

Specifications

Typical applications

- Teaching stratospheric missions
- Measuring flight parameters of balloons

Integration and compatibility

N/A



User Interfaces and Control

String to attach to a user-provided payload

Power Supply

He gas (to be purchased separately from a local provider).

Environmental

- Temperature: -60°C to 50°C
- Humidity: 0% to 100%
- Air pressure: vacuum to 100kPa

Size and Weight

Size: 50cm diameter when inflated

Weight: 100g



SMV02B Educational Stratospheric Balloon Kit for Field Experiments

A didactical balloon kit for teaching stratospheric balloon missions in the open air with a 100m tether to avoid interferences with aviations.

The kit contains a ballon, strings, a parachute, a timed separator, and the material for experimenting with stratospheric balloons and measure lifts, vertical speed, and other parameters related with a stratospheric mission and also to perform a simple outdoor flight with timed release of parachute and user payload, with a 100m tether to retrieve the balloon for repeating the experiment.

The Helium must be purchased separately from a local provider, while the payload must be manufactured by the students.

A dynamometer (not provided) is also useful.

Specifications

Typical applications

- Teaching stratospheric missions



- Measuring flight parameters of balloons
- Implementing an open-air tethered balloon flight

Integration and compatibility

N/A

User Interfaces and Control

String to attach to a user-provided payload

Power Supply

He gas (to be purchased separately from a local provider).

Environmental

- Temperature: -60°C to 50°C
- Humidity: 0% to 100%
- Air pressure: vacuum to 100kPa

Size and Weight

Size: 50cm diameter when inflated

Weight: 100g



SPACE MOTIONERY



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