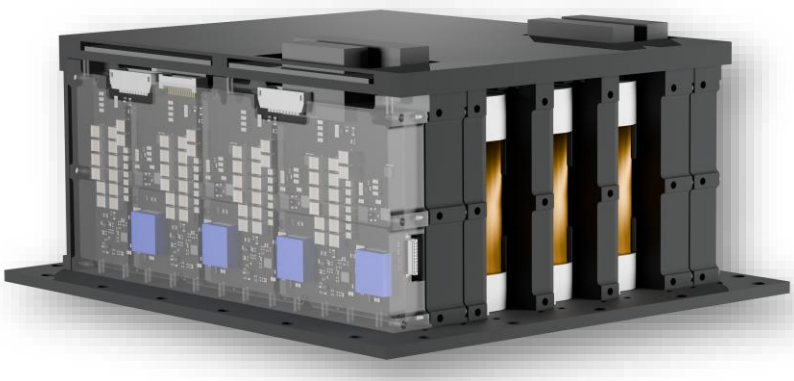
EPS2000

DATASHEET

2 kW

OF REDUNDANT POWER RIGHT AT THE HEART OF YOUR MISSION



DESCRIPTION

The EPS2000 from C3S is an all-in-one high-performance CubeSat and SmallSat power supply solution offering uncompromised customizability without sacrificing size, cost or reliability. With a total incoming solar power conditioning capability of up to **2 kW**, and a configurable, built-in battery pack, capable of storing up to **2 kWh** of energy the EPS2000 can satisfy the power demands of a wide range of missions.

The EPS2000 uses C3S' novel backplane-and-cards system, reducing integration effort, allowing a practically unlimited number of possible EPS configurations, and minimizing lead time.

The EPS2000 is designed with critical missions and payloads in mind. The modules inside the EPS are cold-redundant, and offer graceful degradation, including the MPPT channels, the output lines and even the entire battery pack.

The EPS2000 is compatible with standard CubeSat structures, or can be configured as a standalone unit with an included or separate battery pack

The EPS2000 utilizes state-of-the art Gallium Nitride (GaN) transistor technology in combination with flight-proven Si-based power semiconductors for peak efficiency. Thanks to the wide **6 – 70 V** solar input voltage range the EPS2000 is an ideal choice for missions with larger, and even fragmented solar arrays. The **28 V unregulated** main power distribution lines can support high-power subsystems, while the **5/12 V auxiliary output** lines allow for a direct connection of the platform subsystems.

The EPS2000 can be configured to have up to **20 independent MPPT channels**, a configurable battery pack and **up to 200 Class 3 LCL output channels**, which can be paralleled for higher power payloads.

The EPS2000 complies with the ECSS standards for power system stability and space debris mitigation.

EPS2000 is currently in TR4 and will reach TRL7 by Q3 2025 in one of our ongoing contracted projects.

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION OF C3S LLC AND SHALL NOT BE USED, DISCLOSED OR REPRODUCED, IN WHOLE OR IN PART, WITHOUT THE PRIOR WRITTEN CONSENT OF C3S LLC.

MODULES

MPPT_HP

- High-power solar array regulation modules with 35-70 V input voltage range
- GaN technology, up to 98% efficiency
- 4 channels per module (460 W / module)

MPPT_LP

- Low-power solar array regulation modules with 6-25 V input voltage range
- Si technology, up to 92% efficiency
- 5 channels per module (100 W / module)

BAT

- 8 series 21700-type high-capacity, carefully and individually selected cells
- Independent telemetry, balancing, thermal management and protection
- 115 Wh per module

PDU_MAIN

- Cold-redundant main control unit
- 5x 5 V and 3x 12 V regulated output lines with retriggering LCLs
- Redundant CAN platform communication interfaces with CAN-TS

PDU_EXT

- FPGA controlled, cold-redundant 28 V unregulated distribution units
- 15 independent channels per module up to Class 3
- Output channels can be paralleled for higher output current

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION OF C3S LLC AND SHALL NOT BE USED, DISCLOSED OR REPRODUCED, IN WHOLE OR IN PART, WITHOUT THE PRIOR WRITTEN CONSENT OF C3S LLC.

COMPLEX SYSTEMS & SMALL SATELLITES

SPECIFICATIONS

SOLAR CELL INPUTS	
Solar cell type	Triple junction solar cells, η≈30%
Total number of MPPT channels	20
Input voltage range	6 - 70 V
Low-power MPPT peak input power	12 W
Low-power MPPT series solar cells	3 to 7
High-power MPPT peak input power	115 W
High-power MPPT series solar cells	16 to 20
Peak solar input power	2 kW
Converter stability	According to ECSS-E-ST-20C
Peak efficiency	98%
ENERGY STORAGE	
Battery module	7 or 8 series 21700 cells, up to 16 parallel modules
Battery pack stored energy	345 Wh to 2 kWh
Battery balancing	Yes
Integrated battery heater	Yes
POWER DISTRIBUTION	
Main power distribution line voltage	23.1 - 33.6 V (28 V unregulated)
Number of 28 V LCL channels	Up to 200
Maximum 28 V LCL class	Class 3 (multiple 3 A channels can be paralleled for higher current)
Auxiliary power distribution line voltage	5 V; 12 V
Number of 5 V LCL channels	6 (2x 560 mA; 4x 1100 mA)
Number of 12 V LCL channels	4 (all 2 A)
Peak output power	2 kW*
COMMUNICATION	
Primary interface	Redundant CAN
Secondary interface	UART
MECHANICAL	
Mass	6500 g (560 W, 345 Wh, 15x 28 V output channels)
Dimensions	210 x 255 x 115 mm (560 W, 345 Wh, 15x 28 V output channels)
Material	Precision milled T-7070 aluminium
ENVIRONMENTAL	
Qualification temperature	-40°C to 60°C
Radiation tolerance	30 kRad TID (^{60}Co)
Shelf-life	up to 6 months
SPECIAL FEATURES	
SDM	End-of-life battery passivation
Soldering	Sn63Pb67 based soldering process
** if a sufficient number of batteries and/or solar array regulator modules are available*	

THIS DOCUMENT CONTAINS PROPRIETARY AND CONFIDENTIAL INFORMATION OF C3S LLC AND SHALL NOT BE USED, DISCLOSED OR REPRODUCED, IN WHOLE OR IN PART, WITHOUT THE PRIOR WRITTEN CONSENT OF C3S LLC.