

Space Equipment Power



PSR 100V

A single integrated & modular unit to power your Satcom between 8kW and 23kW

The Power Supply Regulator (PSR), has been developed in the frame of the European high power initiative Alphabus telecommunication satellite development. It is in charge of powering the spacecraft from solar array panel in sunlight mode and from 1 or 2 batteries during eclipse.

Its power handling capacity ranges from 8kW to 22kW at 100V. The PSR design is based on a modular approach in order to cope with specific mission requirements by

minimizing the non-recurring costs. Its internal architecture is designed to comply with the reliability target with a single unit per spacecraft. It also provides an option for up to 2 fault tolerant 50V bus of 700W each.

PSR 100V takes benefits from PSR 50V legacy already selected by the major Telecom operators as Intelsat, Inmarsat, Eutelsat, Astra SES, Hispasat etc.

KEY FEATURES

- Provides a centralized low impedance point for power distribution (payload & platform)
- Provides an optional reliable & regulated 50V bus if requested for some equipment
- Combines power sources from the solar arrays (Si & AsGa technologies) and batteries in a controlled and high efficiency manner
- The PSR is directly plugged to solar generator and battery from one side and payload & platform from the other side, without any additional interface/management box
- Achieves the bus regulation under all spacecraft operating conditions
- Provide to the OBC the battery TM (voltage, current) necessary for charge management. Regulate the battery charge current according to OBC consign
- The design is fully segregated to guarantee the high reliability, robustness and design rules demanded by Telecom customers. Ps > 99% @ 15 years
- The PSR also provides relays TC, analogue telemetries and bilevel telemetries for equipment management

CUSTOMERS / APPLICATION

- The PSR 100V is the power conditioning unit of the Alphabus and E3000 100V family with customers as ESA, Inmarsat, RSCC and takes legacy from PSR 50V already selected by the majors operators like Eutelsat, Astra SES, Direct TV, Telesat and Energia

INTERFACES

- Power bus: 100V regulated $\pm 1V$
- Battery: Li-Ion
- Dialog: MIL STD 1553 Bus
- Relay TC: 87 internal, 169 external
- Analogue TM: 176 internal, 16 external
- Bi-level TM: 62 internal, 34 external

ENVIRONMENTS

- Thermal: -35°C to +70°C (operation and performance)
- Vibrations: 20g sine, 17g rms in plane and 13g rms out of plane random
- Shocks: 800 to 1100g over 1kHz to 10kHz
- Radiation: 15 years in GEO orbit, SEP tolerant, latchup immune
- EMI/EMC: MIL-STD-461

MAIN APPLICATION FIELDS

- Telecommunication satellites
- GEO Earth Observation satellites

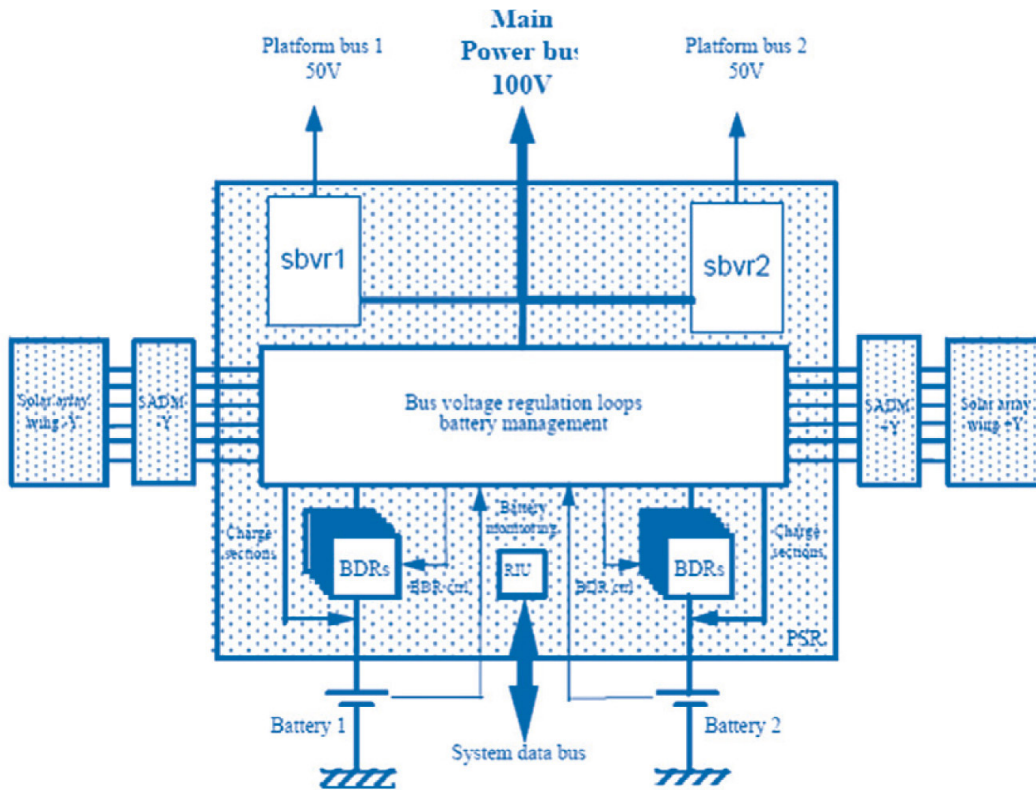
BUDGETS

- Mass: 54kg @ 23kW - 32kg @ 8kW
- Volume: 500 to 750 x 247 x 348mm³
- Power: 8kW to 23kW @ 100V

The PSR 100V in its environment: solar arrays, batteries, Satcom bus bar and OBC

Made-up with two main parts, the PSR is versatile and can be adapted to mission from 8kW to 23kW:

- A Central Module (CM), including MIL STD 1553B buses coupling (nominal & redundant), TM/TC management (nominal & redundant), batteries monitoring, external current telemetries, batteries charge and reconditioning circuits, self-healing bank of capacitors and reliable APS
- A set of Power Module (PM) up to 16 units depending of the required output power. Each PM can deliver up to 1.5kW
- A set of 2 optional modules can provide a 50V regulated bus of 1.4kW



Performances of the PSR 100V

- Power output: 8kW to 23kW, by step of 1.5kW
option 2 x 700W max under 50V
- Bus voltage: 100V ± 1V
- Bus impedance: 50mΩ up to 100kHz
- Bus voltage ripple: 600V pp
- Sun regulation: Between 5 to 15GS section
20A max per section
- Battery type: Li-Ion
- Battery voltage: 55V < V battery < 96V
- Battery charge current: 40A max, fault tolerant
- Battery charge mode: Continuous for 2 batteries simultaneous or sequenced
- Battery management: Autonomous charge current regulation
- Efficiency: Battery discharge 97%
Solar array 98.8%

