

Space Equipment Power



PSR 50V MKII

A single integrated & modular unit to power your Satcom between 3.7kW and 11.2kW

The Power Supply Regulator (PSR), has been developed in the frame of the Eurostar 3000 telecommunication satellite. 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 between 3.7kW to 11.2kW under 50V.

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.

KEY FEATURES

- Provides a centralized low impedance point for power distribution (payload & platform)
- 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
- Over 170 years cumulated in orbit operation
- The PSR also provides relays TC, analogue telemetries and bilevel telemetries for equipment management

CUSTOMERS / APPLICATION

- The PSR 50V is the power conditioning unit for the Eurostar 3000 satellite family with customers as CNES, Intelsat, Inmarsat, Eutelsat, Astra SES, Hispasat: Telesat, direct TV, Echostar, IAI, NASDA/JAXA. WINDS: an advanced Japanese spacecraft of 7kW

INTERFACES

- Power bus: 50V regulated $\pm 0.5V$
- Battery: NiH2 or Li-Ion
- Dialog: MIL STD 1553 Bus
- Relay TC: 88 internal, 168 external
- Analogue TM: 178 internal, 14 external
- Bi-level TM: 70 internal, 58 external

ENVIRONMENTS

- Thermal: $-35^{\circ}C$ to $+70^{\circ}C$ (operation and performance)
- Vibrations: 20g sine, 10g rms in plane and 16g rms out of plane random
- Shocks: 600g in plane and 900g out of plane, 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

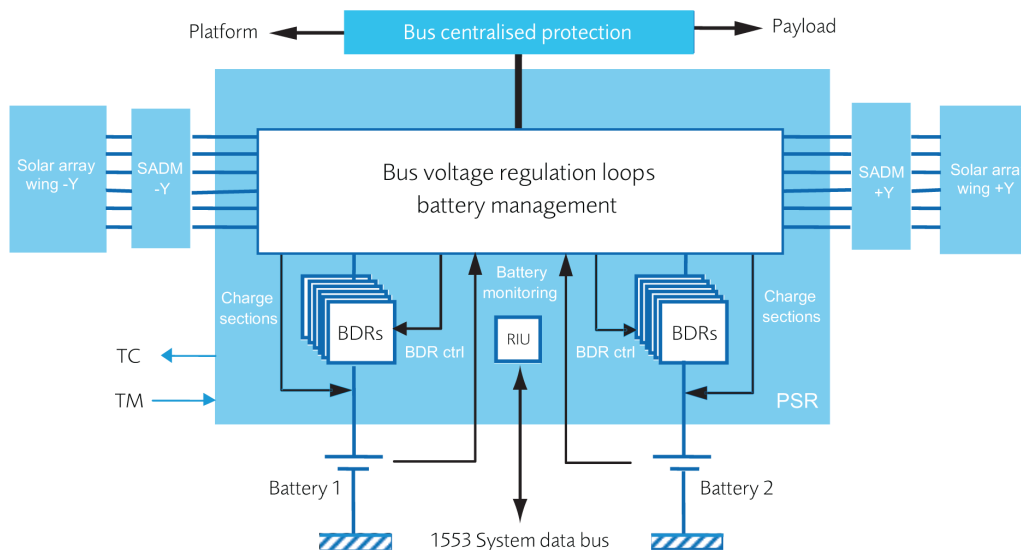
BUDGETS

- Mass: 22kg @ 3.7kW - 38.3kg @ 11.2kW
- Volume: 448 to 683 x 322 x 205mm³
- Power: 3.7kW to 11.2kW @ 50V

The PSR 50V in its environment: solar arrays, batteries, Satcom bus bar and OBC

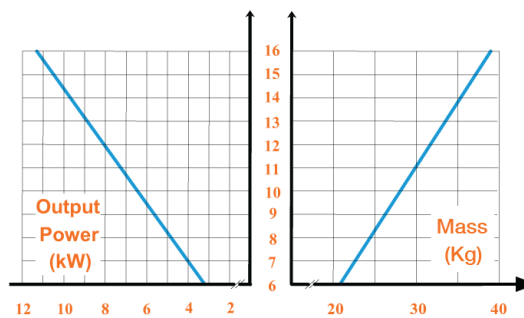
Made-up with two main parts, the PSR is versatile and can be adapted to mission from 3.7kW to 11.2kW:

- 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 750W



Performances of the PSR 100V

Power output:	3.7kW to 11.2kW, by step of 750W
Bus voltage:	50V ± 0.5V
Bus impedance:	< 35mΩ
Bus voltage ripple:	0.3Vrms
Sun regulation:	Between 5 to 15GS section 20.2A max per section
Battery type:	Li-Ion, NiH2
Battery voltage:	28V < V battery < 47V
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 94% Solar array 96.5%



Number of power modules