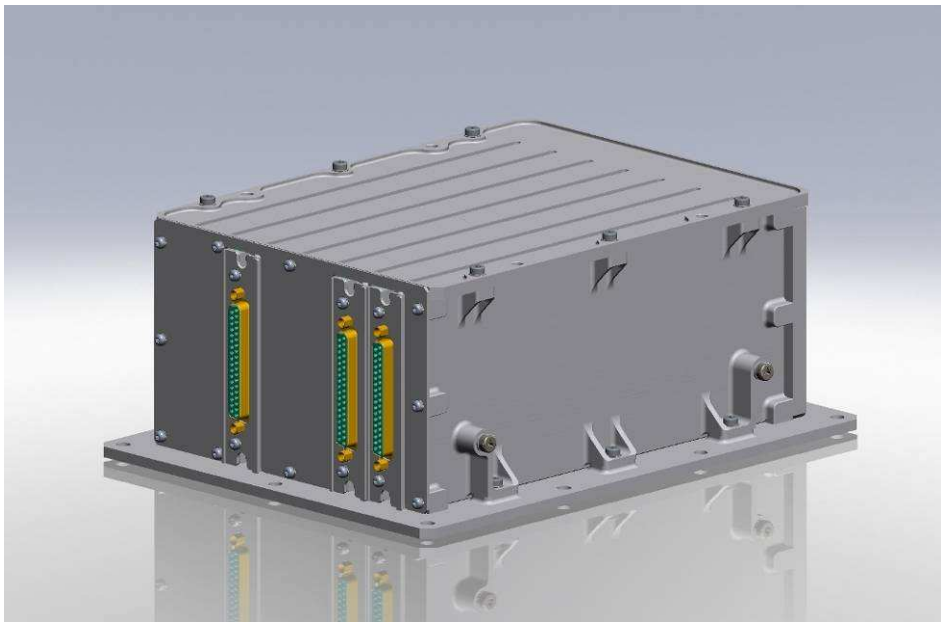
PDSU-08

Power Distribution and Separation Unit



Highlights

- 140W Power Distribution Unit (Baseline Configuration)
- 3 service equipment power outputs
- 28V power input
- 28V and 12V power output
- 9+9 event driven and/or timeline-aligned high energy pulse outputs
- Double fault tolerant architecture
- Safe/Arm control design with continuity check by safe energy mode
- Fully solid state construction
- Direct connection to battery packs
- Battery charging without disconnection from PDSU
- Optoisolated control I/F
- Optoisolated diagnostics and monitoring connections
- 2xRS232 lines
- Compact and ruggedized rack
- Slot-in modular architecture
- Conduction cooled subsystem
- From sea level up to vacuum space functionality
- Deep-level diagnostics for all function and I/Fs
- ITAR free

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Overview

The PDSU is a complete modular power distribution and separation control unit. It is developed to handle all the high power lines in an avionic installation: PDSU is the right way to connect a battery pack from one side and the power loads to the other.

The PDSU has 3 major function:

1. distribution of main battery power to 3 electronically controlled outputs;
2. perform event-driven, timeline-aligned high energy pulses to control pyrotechnics or other separation devices;
3. monitor all the internal functions to give information to an OBDH unit about power and separation status.

In the basic option of the PDSU a compact, ruggedized, 6 slots rack is populated with a Power Distribution Unit *PDU* board and two Separation Control Unit *SCU* boards.

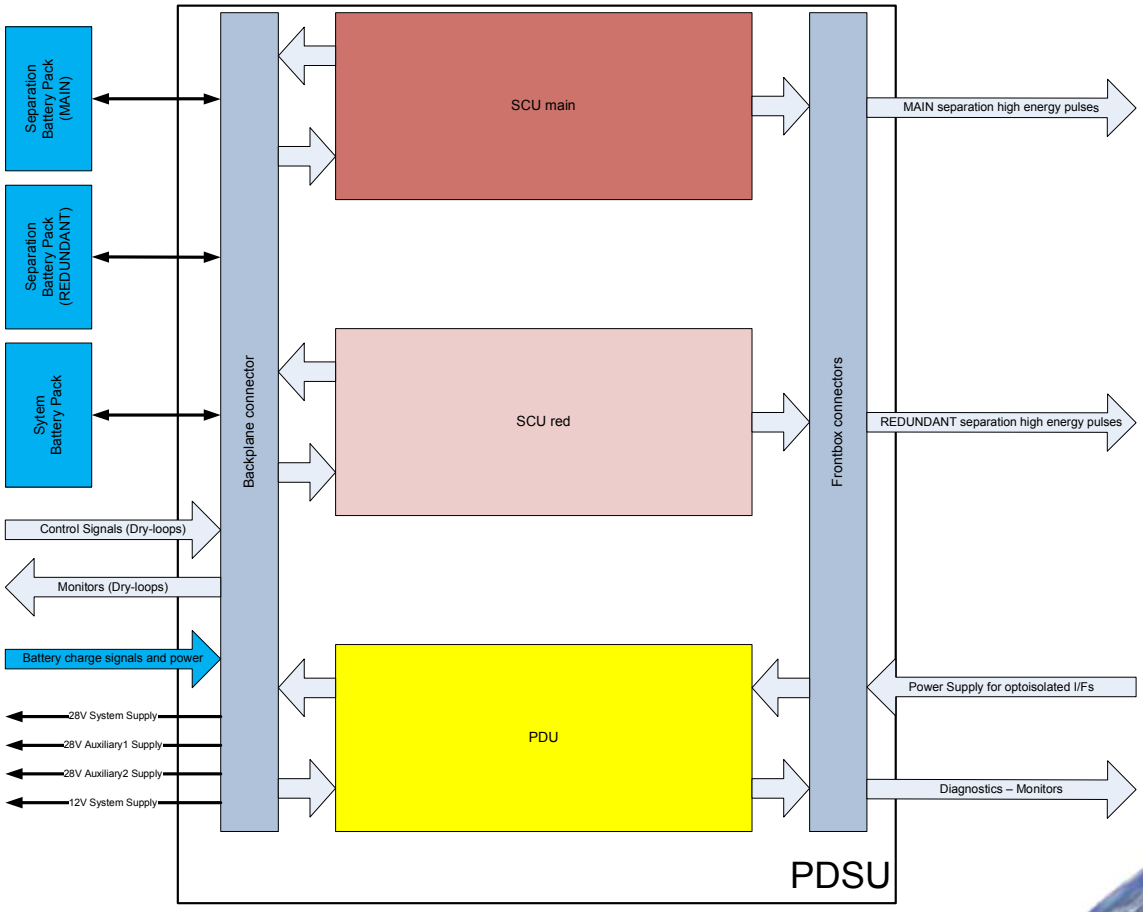
This small unit is able to handle up to 140W continuous power to service equipments and also up to 9+9 (main and redundant) pyrotechnics with 6J energy devices[1].

The PDSU is primarily controlled with dry-loop I/Fs and give major status information with output dry-loops too.

The diagnostic information is carried by two independent optoisolated RS232 lines: due to the safety critical operation of the PDSU the RS232 lines are used only in TX mode while the RX is inhibited[2].

Special Safe/Arm circuitry with double fault tolerance reaches the safety goal during integration, test and mission operation.

Typical PDSU application.



[1] 16 indipendent devices upon request
[2] Customizable FW could access to full-duplex RS232 line

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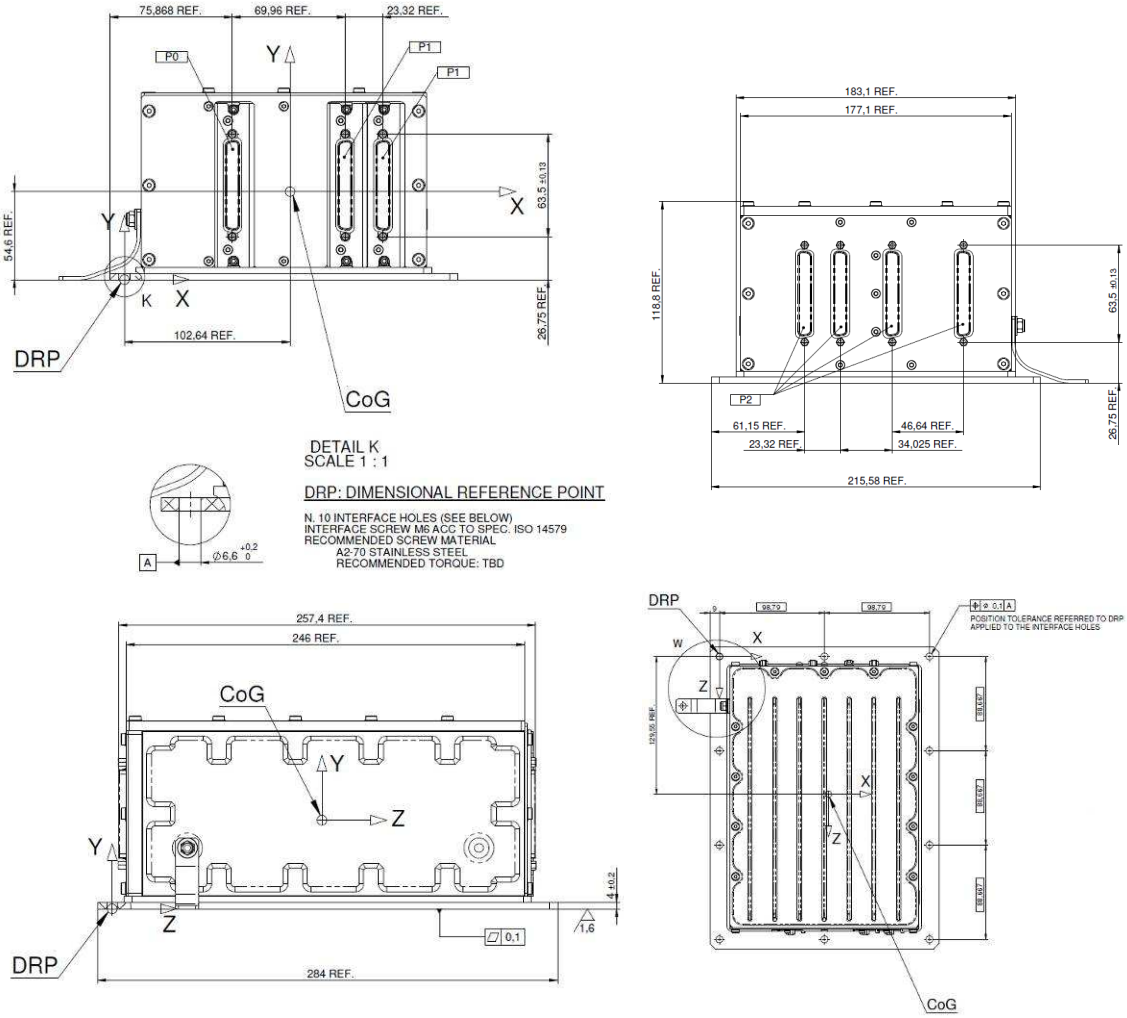
Environmental specifications

Unit dimension	284x215x119 mm
Board dimensions	standard single-size Eurocard
Backplane connectors	4xMIL standard DIN 96pin
Frontbox connector	MIL standard 37pin SUBD connector
Thermal exchange	conduction cooled construction
Thermal range	Operative: -20÷+60°C
	Storage: -55÷+85°C
Max depressurization rate	5kPa/s
Shock	0.5ms 200g
Vibration	15gRMS random profile 20Hz÷2KHz
Acoustic	138dB OASPL 20Hz÷3KHz
Weight	3.5Kg (Typ. with 2xSCU 1xPDU)
EMI/EMC	MIL-STD-461E RE-102 (10KHz to 18GHz)
	MIL-STD-461E RS-103 (10KHz to 480MHz, 35dBuV/m)
	MIL-STD-461E RS-103 (480MHz to 18GHz, 70dBuV/m)



PDSU drawings

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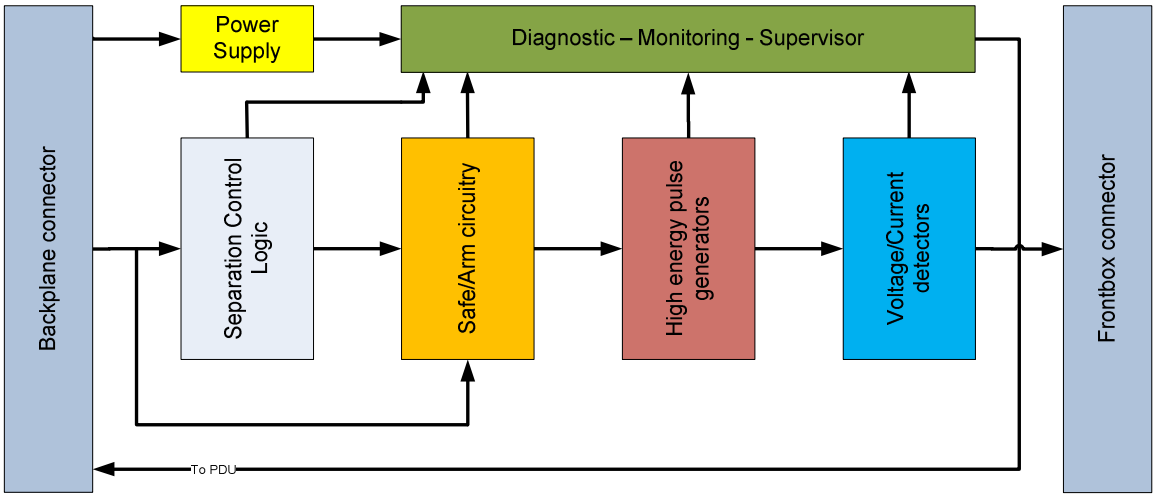
Separation Control Unit

Simplified block scheme.



Electrical characteristics

Total high energy pulse outputs	9 (5 groups)
Number of outputs per group	group1, 4 outputs
	group2, 1 outputs
	group3, 1 outputs
	group4, 1 outputs
	group5, 2 outputs
Maximum energy	6J (6V, 5A, 200ms pulse)
Nominal power input	7.2V (6.0÷8.4V)
Maximum simultaneous current	20A
Fault tolerance	double fault tolerant architecture
Timeline precision	<100ms
Maximum timeline duration	>5000s
Separation chain diagnostics	full chain test with safe no-separation current (<100mA)
Separation detection	voltage and threshold current
Enable signals I/F	optoisolated dry-loops
Direct monitor signals I/F	optoisolated dry-loops
High datarate diagnostics	to backplane RS232

TRANSPORT ELECTRONIC MECHATRONIC INTEGRATED SYSTEMS

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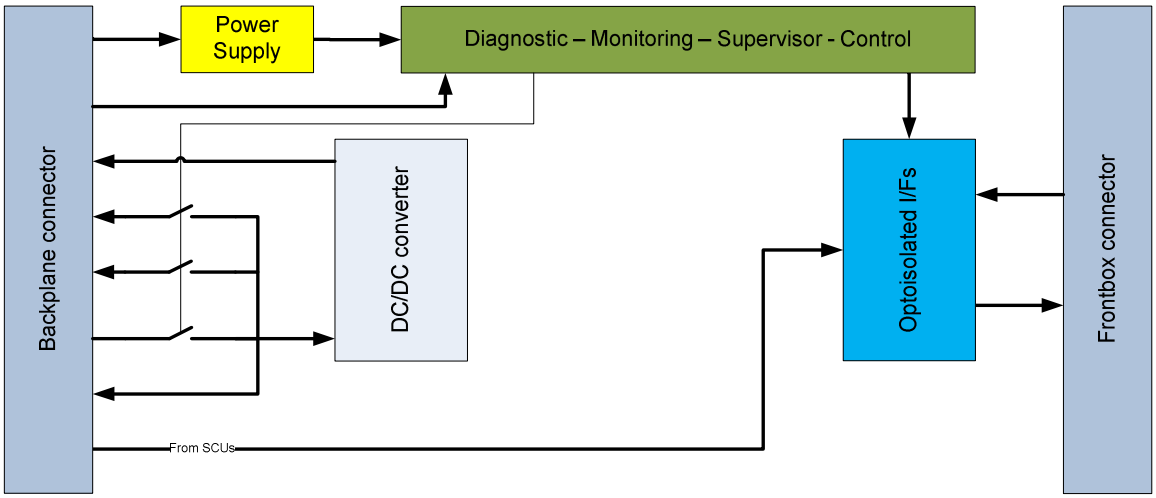
Power Distribution Unit

Simplified block scheme.



Electrical characteristics

Power input range..... 24V÷34V, 5A max
Main supply output ..... 28V[3] typ, 3A max
Auxiliary1 output ..... 28V[4] typ, 1A max
Auxiliary2 output ..... 28V[4] typ, 1A max
12V output..... 12V, 2A max
Enable signals I/F ..... optoisolated dry-loops
Direct monitor signals I/F ..... optoisolated dry-loops
Status information ..... galvanic isolated TTL signals
High datarate diagnostics..... 2xRS232 galvanic isolated I/F
Protection ..... short circuit, polarity inversion

[3] This is the nominal value, the output is non regulated and follow battery behaviour

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Options and customization

The PDSU could be modified upon request.

Some predefined modifications are:

- 8 totally independent high energy pulses outputs (16 with 2 SCUs)
- Timeline timings
- Safe/Arm and safety logic
- Different power input ranges for SCUs
- Bidirectional RS232 for serial control of SCUs
- Different power input ranges for PDU
- Different power output ranges for PDU
- Up to 6 boards in the rack (minimum 1 PDU and 2 SCUs)
- Customizable separation logic
- Other: please contact us

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