

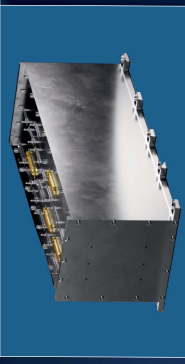
CRISA

Airbus Crisa

MEGA PCDU

The Power Conditioning and Distribution Unit (PCDU) is part of the Electrical Power Subsystem (EPS) of the Spacecraft. Its main function is the conditioning of the solar array power in order to charge the batteries during sunlight periods and supply platform and payload users. This unit is built around the same type of modules stacked in a vertical arrangement. Three module types are available, Conditioning Module (COND), Control Module (CTRL) and Distribution Modules (DIST). Different configurations are available to suit customer needs.

Key Features



- Flight proven reliable automotive-grade parts based design
- Modular design
- Competitive mass and volume
- Scalable up to 4 kW unregulated 28V platforms
- Solar array condition based on DET
- Lithium-ion battery management
- Scalable power distribution:
 - Safe-Open Latching Current Limiters
 - Fuses
 - Heater's drivers
- Stepper motor drivers
- Low voltage outlets
- Temperature range: from -25°C to +60°C
- Radiation tolerance compatible with LEO
- Life time: 9 years

Modules types and capabilities



COND Module
COND module, provides the electronics to condition the solar array sections by a solid switch Direct Energy Transfer (DET) approach. The following table shows the COND capabilities:

Type	Qty	Remarks
Solar Array sections	16	Direct Energy Transfer architecture $V_{bus} + 4V < V_{oc} < +75V$ $V_{bus} > +22V$ $I_{ss} < 6.2A$ Capacitance < 3 μF Inductance < 1 μH
Battery current	-	Charge current: 80A Discharge current: 90A

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Main Electronics for Global Access



CTRL Module
CTRL module provides the following functions: TM/TC via CAN Bus serial bus; Auxiliary Power Supply for internal electronics, distribution capabilities, telemetry acquisition and input/output telecommand management. The following table shows the CTRL capabilities:

Type	Qty	Remarks
Unswitched outlets	4	Nominal current 3A protected by fuses.
Switched outlets	10	Protected by LCLs: <ul style="list-style-type: none"> • x8 LCL Class 6A • x2 LCL Class 3A
Release powerlines	10	2 groups of 1 ARM LCL Class 6A + 5 FFE switches
Regulated switched lines	2	+5V non-isolated protected by LCL Class 1.5A: <ul style="list-style-type: none"> • Power capability: 5W • Current capability: 1.15A
TM/TC interface	1N+1R	CAN BUS 1 Prime + 1 Redundant
Battery current acquisition	2N+2R	Full scale current: <ul style="list-style-type: none"> - 135A $\pm 2.5\%$ to +75A $\pm 2.5\%$. Voltage conditioning range: -104mV @ -130A to +58mV @ 77A
Temperature acquisition	5N+5R	S-Temp type: <ul style="list-style-type: none"> • Betaform (10kOhm @ 25°C)
Temperature acquisition	3N+3R	X-Temp type: <ul style="list-style-type: none"> • PT-1000 (1000 Ohm @ 0°C)
Output telecommands	4N+4R	SPL received bi-level type: <ul style="list-style-type: none"> • Active level: 2.9V to 5.2V • Quiescent level: 0V to 0.4V when sinking a current up to 100μA • I_{ss} < I_{thermal} < 3ms
Input telecommands	1N+1R	SPL received bi-level type



DIST Module
DIST is a module that provides the following power distribution capabilities:

Type	Qty	Remarks
Temperature acquisition	5N+5R	S-Temp type: <ul style="list-style-type: none"> • Betaform (10kOhm @ 25°C)
Temperature acquisition	2N+2R	X-Temp type: <ul style="list-style-type: none"> • PT-1000 (1000 Ohm @ 0°C)
Switched outlets	16	Protected by LCLs: <ul style="list-style-type: none"> • x4 LCL Class 6A • x2 LCL Class 15A • x7 LCL Class 3A • x3 LCL Class 1A
Motor drivers	3	Stepper motor (2 coils): <ul style="list-style-type: none"> • $V_{ms} = 21V$ • $R_{ms} > 60\Omega$ • $80mH < L_{ms} < 220mH$ • C_{ms} (coil to structure) < 1nF Note: any Motor driver can be bypassed to generate a regulated outlet, for stepper motor Class 3A: <ul style="list-style-type: none"> • Power capability: 40W • Current capability: 2A
Position sensor signal	2N+1R	Dry contact acquisition (DCA): <ul style="list-style-type: none"> • Closed: I_R < 500μA • Open: I_R > 1mμA
Position sensor power supply	2N+1R	Current consumption < 4mA

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