P230
Rugged 3U Power Supply Board

- 3U Form Factor
- Suitable for VME, CompactPCI, and VPX Systems
- 150 Watts Total Rated Power
- 85% Typical Efficiency
- 18 - 36 Vdc Input Range
- Outputs: 5 V/20 A, 3.3 V/10 A, 12 V/8 A, -12 V/1 A
- EMI/RFI Input Filter
- Input Transient Protection
- Input Reverse Polarity Protection
- Output Over/Undervoltage and Short-Circuit Protections
- ACFAIL#, SYSFAIL#, SYSRST# Control Signals
- 4 ms Holdup Time
- Extended (50 ms) Holdup Time With Optional Capacitor Bank
- Input/Output and Chassis Isolation
- Thermal Shutdown
- External ON/OFF Control
- Internal BIT Status

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Overview

Designed for harsh environment applications, the Aitech P230 is a versatile and reliable modular 3U power supply. Its wide input voltage range (18 – 36 Vdc) assures excellent load and line regulation.

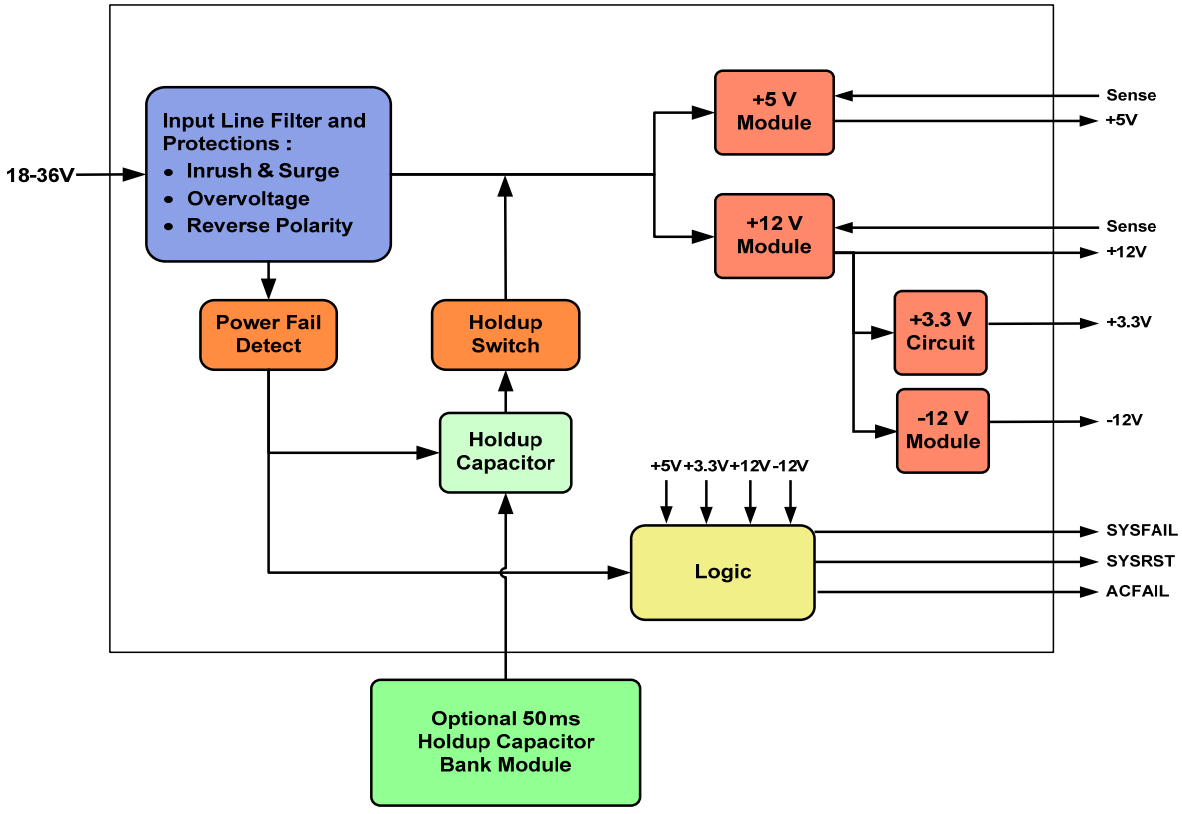
An integral input line filter is used to reduce the input reflected ripple.

The P230 has a total power output capacity of up to 150 W, providing four standard output voltages (5, 3.3, 12, -12 Vdc), making it ideal for use in VME, CompactPCI, and VPX systems. Input to output isolation is of 500 V minimum, thus eliminating any possibility of ground loops.

All outputs are individually protected against short circuit and overvoltage. The power supply asserts the three control signals: ACFAIL#, SYSFAIL#, and SYSRST#. The 5 Vdc and 12 Vdc outputs have sense lines to ensure voltage stability for high current loads.

A discrete input enables the power supply to be turned on and off remotely.

Indicator LEDs provide a convenient visual indication of output voltage status.



P230 Power Supply Block Diagram

Functional Description

Input Voltage Operation and Protection

The P230 power supply operates over a continuous DC input voltage range of 18 to 36 Vdc.

Input power protection circuitry protects the power supply from reverse input voltage up to 50 Vdc, and excessive inrush current.

The power supply provides full specification operation with input power compliant to MIL-STD-704A, D & E.

Output Voltage Operation and Protection

Four isolated outputs (+5, +3.3, +12, and –12 Vdc) with a total power rating of up to 150 W, are provided by a combination of DC-to-DC converter modules and discrete power conversion circuitry. These output voltages make the P230 suitable for use in many VME, CompactPCI, and VPX systems.

The DC-to-DC converters feature higher than 500 V input-to-output isolation, eliminating any possibility of ground loops. Furthermore the 5 and 12 Vdc DC-to-DC converters are equipped with internal thermal shutdown to protect them from damage due to overheating. As the 3.3 and –12 Vdc outputs are derived from the 12 Vdc, they are similarly protected.

The P230 implements independent current limiting for each output voltage.

Outputs are protected against short circuit, overcurrent, and overvoltage.

The 5 and 12 Vdc output voltages are equipped with sense lines that are routed to the power connector.

Hold-up Circuit

The P230 uses a holdup circuit that issues an ACFAIL# signal, and enables the board to maintain all outputs within specification limits for 4 ms after input voltage drops below 18 Vdc. This allows the system to take all necessary emergency actions before shutting down.

Extended holdup time is available through the P230 optional capacitor bank. The capacitor bank module provides high capacitive capabilities and directly connects to the P230 holdup circuit, extending the overall holdup time to 50 ms at maximum load.

External Remote ON/OFF

A discrete GND/OPEN input enables external power ON/OFF control of the P230.

Status LEDs

The power supply is equipped with an internal BIT mechanism that monitors the outputs at all times.

Four green LEDs indicate that the four output voltages are within the VME specification limits.

Power Monitor Circuit

The P230 incorporates input and output voltage monitoring circuitry, asserting the ACFAIL#, SYSFAIL#, and SYSRST# signals.

ACFAIL# is asserted in the event of an input power loss or failure of the 5 or 3.3 Vdc outputs. This also triggers the holdup circuit.

SYSFAIL# is asserted during any power-on event until the P230 reaches a fully operational mode. During normal operation SYSFAIL# is asserted to indicate a power supply (output) failure.

SYSRST# is asserted for at least 250 ms at any power-on event.

Mechanical and Thermal Construction

Height and depth of the P230 conform with standard conduction cooled 3U dimensions; it will fit into standard IEEE1101.2 card rails. Due to size of power components and the thickness of the heatsink, the P230 exceeds standard 3U width and will therefore require more than a single slot pitch. The conduction-cooled board is packaged in and protected by an aluminum housing for mechanical ruggedization, EMI/RFI shielding, and thermal conduction of the heat to the enclosure. It is equipped with wedgelocks to hold it in place and clamp it to the enclosure rails for heat transfer, and extractors for easy removal.

Thermal interface surfaces are chemical conversion coated for maximum heat transfer and corrosion resistance.

EMI/RFI Design

The power supply is equipped with an on-board input power EMI/RFI line filter to ensure compliance with the transient suppression requirements of MIL-STD-704.

All high power and noisy components are shielded by a monolithic heatsink that is connected to the enclosure chassis through the electrically conductive thermal interface.

Mechanical Specifications

Dimensions and Weight

	No capacitor bank	With capacitor bank
Height [mm]	100	100
Depth [mm]	168	168
Width [mm]	29	40
Weight [g]	<750	<900

Electrical Specifications

Input

Normal Steady State Operation [Vdc]	18 – 36
Turn-on [Vdc]	18 minimum
Overvoltage Protection [Vdc]	Up to 70
Reverse Polarity Protection [Vdc]	Up to 50
General Characteristics and transient suppression	Per MIL-STD 704A, D & E

Outputs

- 150 W Total Rated Power [1]

Output [Vdc]	Max Current [A]	Max Power [W]	
5	20	100	150 (combined)
3.3	10	100 (combined)	
12	8		
-12	1		

Parameter	5 Vdc	3.3 Vdc	12 Vdc	-12 Vdc
Voltage (Vdc) Min	+4.875	+3.2	+11.64	-11.64
Voltage (Vdc) Max	+5.25	+3.45	+12.6	-12.6
Current Limit (A)	22-25	11-13	10-11	2-3
Ripple/Noise (mV_{P-P})	<50	<50	<50	<50
Short circuit protection	✓	✓	✓	✓

Efficiency

- 85% Typical

Thermal Shutdown

- 125 °C with an hysteresis of 10 °C

Isolation Resistance

- >10 MΩ at 120 V input to chassis
- >10 MΩ at 100 V output to chassis
- >10 MΩ at 500 V input to output

ACFAIL# and SYSRST#

Input/Output Undervoltage Sensing

	Output [Vdc]		Input [Vdc]
ACFAIL# State	3.3	5	24
Decreasing Voltage	2.9	4.5	17.4 ± 0.4
Increasing Voltage	3.18	4.85	18 ± 0.4

SYSFAIL#

Output Undervoltage Sensing

SYSFAIL# State	+12 V	-12 V
Decreasing Voltage [Vdc]	11	-11.6
Increasing Voltage [Vdc]	11.64	-11

Output Overvoltage Sensing and Indication

SYSFAIL# State	5 V	3.3 V	12 V	-12 V
Decreasing Voltage [Vdc]	5.35	3.46	12.65	-13.7
Increasing Voltage [Vdc]	5.9	3.75	13.7	-12.65

Environmental

The P230 is available in two levels of ruggedization that differ mainly in operating temperature, and resistance to shock, vibration, and humidity.

Refer to the Aitech Ruggedization Levels datasheet for more information on selecting the ruggedization level that meets your specific needs.

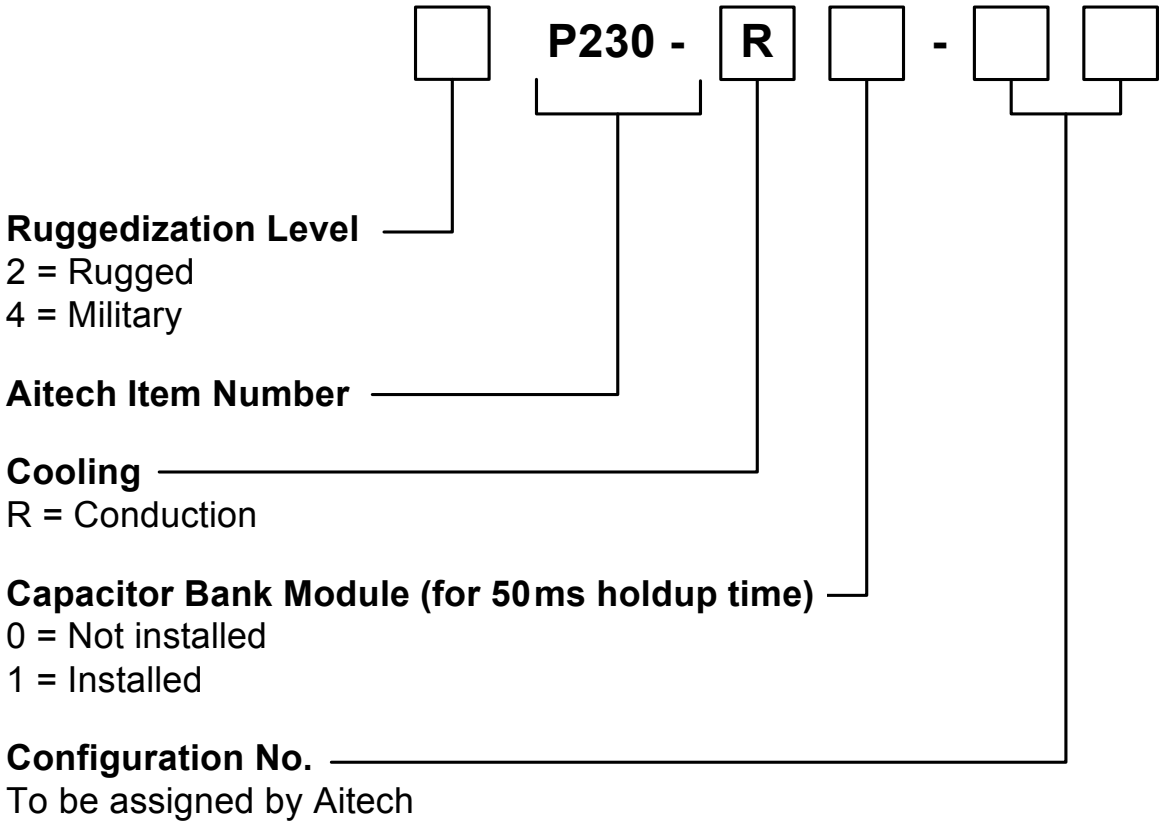
EMC Protection (MIL-STD-461D, Part IV) [2]

- CS101 (20 Hz - 50 kHz)
- CE102 (10 kHz - 10 MHz)
- CS114 (10 kHz - 400 MHz)
- RE102 (10 kHz - 10 GHz)

[1] Total combined output power is 150 W maximum due to thermal constraints.

[2] With external input power line filter.

Ordering Information for the P230



Example: 2P230-R0-00

For more information about the P230 or any Aitech product, please contact Aitech Defense Systems sales department at (888) Aitech-8 (248-3248).

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