

# Intelligent Power System

## iPS750



### Key Features



One primary output (28 V) and two adjustable secondary outputs (12 V-14 V and 5 V-8 V)



High efficiencies of up to 93.5%, load dependent



Overcurrent and short circuit protection



Onboard battery charging



Configurable EES parameters for different internal combustion engines



Real-time data monitoring for all voltages, currents, and temperatures



LED indicators provide status for each output voltage and current



Software and hardware alerts to system controller

### Fly Higher. Fly Longer. Fly Smarter.

Unmanned aerial vehicle (UAV) electronics continue to evolve as mission profiles become more demanding. System power designers are being challenged to provide more innovative power supply systems to improve efficiency, ensure reliability, reduce weight, minimize heat dissipation, and lower overall cost. New levels of energy and system-level efficiencies are also required to meet tomorrow's aviation needs.

### Intelligent Power Systems

ePropelled intelligent power systems (iPS) are a complete power management solution for aviation applications. They convert the 3-phase sinusoidal AC voltage produced by a starter generator to tightly regulated DC voltage that can be used to power onboard avionics, servos, and payloads.

Designed to operate over a wide input range that varies with the speed of the starter generator or alternator, the iPS uses active rectification and switching regulation to supply the required steady DC output voltages.

These smart power systems also provide a wide array of real-time performance and operational data for a range of useful applications and analytics. The iPS monitors all input and output voltage, as well as current levels, and collects and reports that data via an integrated controller area network (CAN) interface. Custom applications can be created via our open application programming interface (API) and thresholds can be set for alerts and alarms based on specific applications and mission profiles.

Additionally, the iPS provides onshore DC power for all features including EES function, output power, and onboard battery charging.

ePropelled electronic engine starter (EES) feature is optional and can be used to drive the starter generator during the engine start sequence. Once the engine is up to speed, the iPS delivers the regulated voltages. If, for any reason, the starter generator stops working, an onboard battery (if connected) automatically engages to provide the required voltage for a limited time, dependent on the onboard battery size.

## Battery Features

- ▶ Onboard battery can provide power to outputs if 3-phase generator power is lost
- ▶ Onboard battery is charged when the unit is connected to 3-phase power or onshore DC power
- ▶ Onboard battery can be used to power EES function
- ▶ Onshore DC power for all features including EES function, output power, and onboard battery charging

## Temperatures Monitored and Logged

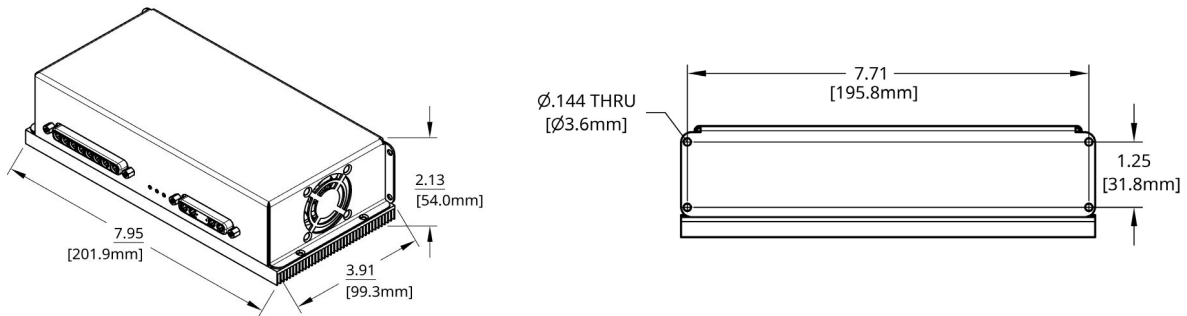
- ▶ Synchronous rectifier FETs
- ▶ DC converter FETs
- ▶ Output OR-ing FETs

## User-Configurable Parameters

- ▶ Conductor compensation voltage boost
- ▶ Alert and threshold settings
- ▶ RTDM settings
- ▶ CAN bus settings

## Mounting Instructions

The figure below depicts the overall dimensions of the iPS chassis. Four holes are used for mounting the unit. Please note that weight and other details are provided in the technical specification table.



## iPS750 SPECIFICATIONS

Parameter	INPUT		
	Min	Max	Notes
Input voltage range	25 V @ no load 50 V @ full load	85 V	RMS line-to-line
Maximum total input power	831 W		50°C ambient, minimum recommended 4 m/s airflow across the heat sink
Onboard battery voltage range	24 V	28 V	Battery type: 8S LiFePo4 or 7S LiPo
Onshore DC voltage range	24 V	58 V	Input voltage below 33 V will not regulate the primary output
Engine starter voltage range*	24 V	58 V	Supplied from onshore DC or onboard battery
Engine starter current range	0 A	40 A	At 28 VDC, open loop 40 A peak /phase
Start trigger voltage	2.3 V	5 V	
Start duration	0.25 s	10 s	5 seconds between attempts
Parameter	OUTPUT		
	Value		Notes
Maximum total output power (continuous)	750 W		DC at 50°C ambient, minimum recommended 4m/s airflow across the heat sink
Primary output voltage	28 V		DC, max power = 750 W (26.8 A at 28 V)
Secondary output voltage 1	12 V	14 V	DC, max current = 12 A
Secondary output voltage 2	5 V	8 V	DC, max current = 10 A
Voltage regulation	±500 mV		
Voltage ripple P-P	500 mV		
Peak efficiency	93.5%		At 60% full load
Onboard battery charging voltage	29.2 V		Float voltage (8S LiFePo4)
Onboard battery charge current	1.67 A		Max
Protection	Input undervoltage warning Output overvoltage warning *Output short circuit protection Output overcurrent protection Over temperature warning Onboard battery switchover		
Parameter	MECHANICAL		
	Notes		
Dimensions	7.95" x 3.91" x 2.13" [201.9 mm x 99.3 mm x 54.0 mm]		
Weight	1.72 pounds (780g)		
Cooling	Fan cooled		
Ambient operating temperature	-26°F (-32°C) to 122°F (50°C) at 750 W. Cranking an engine that is cold (<20°C) may require additional torque that exceeds the capabilities of the iPS750.		
Storage temperature	-40°F (-40°C) to 185°F (85°C)		
Ingress protection	IP20		

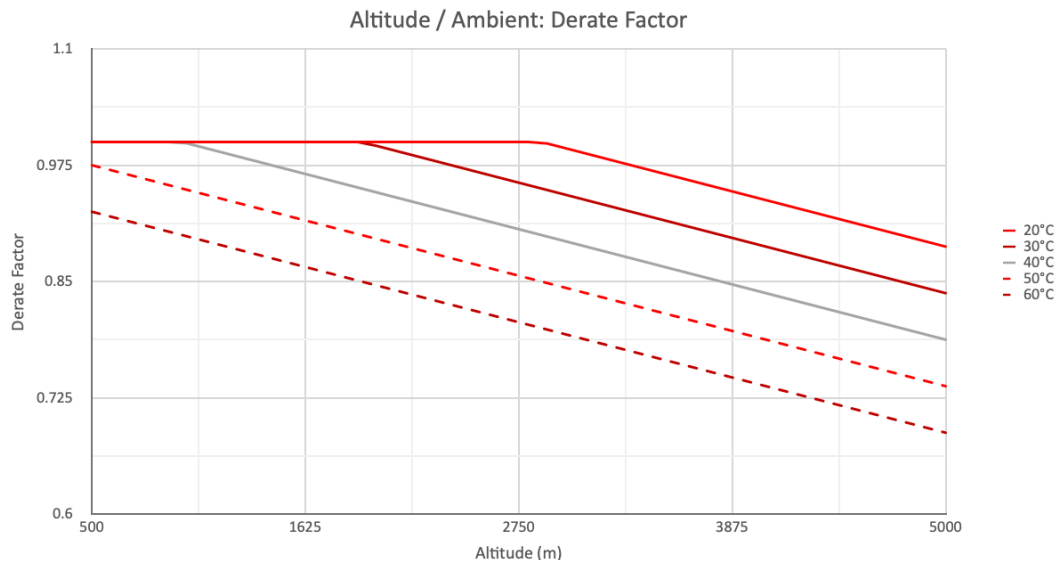
\*Depending on the characteristics of the engine, the effective engine starter voltage range may be in a narrower range than specified. This value is only provided as an indication of the range possible and will be dependent on the specific internal combustion engine (ICE) the customers has specified.

**⚠️ \*WARNING:** When operating without an onboard battery, the unit has output short circuit protection. However, if a battery or a power supply is connected to the onboard battery terminals, the short circuit protection will force the unit into a switchover state when the output is shorted. **This will cause damage to the circuit that is responsible for handling the switchover and it will void the warranty.**

**⚠️ \*WARNING** The onboard battery must be fused with a **30 A fast blow in-line fuse**. **Failure to add the specified in-line fuse will result in damage to the unit and void the warranty.**

## Derating with Increased Altitude

The derating factor for altitude is based on the loss of dielectric strength of the air as the density decrease with the altitude. The diagram below shows how the cooling efficiency changes with high altitude and ambient temperatures.



## iPS750 PINOUT

### INPUT CONNECTOR (mates with 681-00004)

Pin	Label
A1	NOT USED
A2	Onboard battery+
A3	GND
A4	U-LEG
A5	V-LEG
A6	W-LEG
A7	GND
A8	Onshore DC+

### OUTPUT/SIGNAL CONNECTOR (mates with 681-00005)

Name	Description
A1	+12 V
A2	GND
A3	+28 V
A4	GND
1-2	+5 V
3-4	GND
5	START, ENABLE*
6	START, INPUT
7	BB SIGNAL, OUTPUT
8	GND
9	BAT 10K NTC**
10	CAN+
11	CAN-

\*+3.3 V output used for triggering the EES

\*\*Not currently supported



## Recommended Applications

- ▶ Aircraft power systems
- ▶ Unmanned vehicle power systems
- ▶ Power conditioning
- ▶ Stand-alone power systems (SAPS) for remote area power supply
- ▶ Voltage regulation in the renewable power generation system

## Assembled in USA

Errors and omissions excepted. All specifications subject to change without notice. For more information, including ordering product, please contact us at [info@ePropelled.com](mailto:info@ePropelled.com).

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