

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



Status reporting via software API and CAN bus



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 output voltages and currents

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 on-board 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

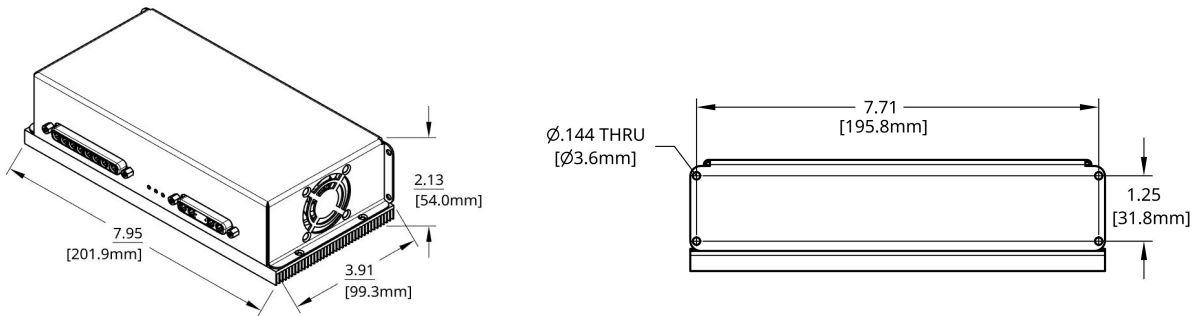
- ▶ Synchronous rectifier FETs
- ▶ DC converter FETs
- ▶ Output OR-ing FETs

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. The four holes marked with crosshairs 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 | 831W | | 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 below 68°F(20°C) may only be possible if the engine is warm. | | |
| Storage temperature | -40°F (-40°C) to 185°F (85°C) | | |
| Ingress protection | IP20 | | |

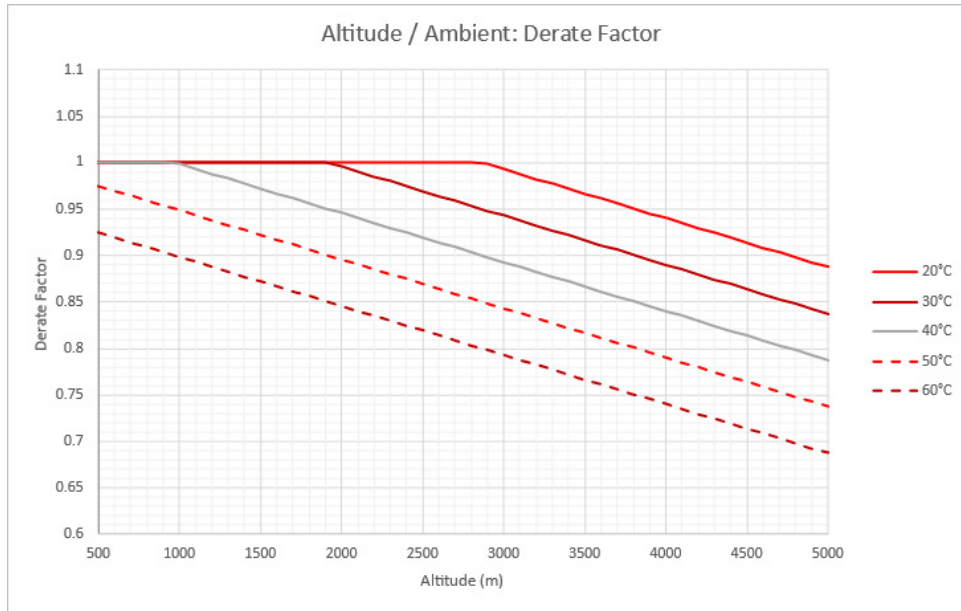
*Depending on the characteristics of the engine, the effective Engine Starter Voltage range may be in a narrower range than specified. This value is only provided as an indication of the range possible and will be dependent on the specific internal combustion engine (ICE) the customers has specified.

⚠️ *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 inline fuse**. **Failure to add the specified inline 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

One set of mating connectors (681-00004 & 681-00005)

* Mating connectors are sold separately.

| 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 681-00005 - Rev 1 (CONEC 3H15W4PAM99A10X)

| Name | Description |
|------|-------------------|
| A1 | +12 V |
| A2 | GND |
| A3 | +28 V |
| A4 | GND |
| 1-2 | +5 V |
| 3-4 | GND |
| 5 | STARTER 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.

Warnings and Labels



ePropelled © 2021. ePropelled designs intelligent motors, motor controllers, generators, and power management systems. Our technology helps reduce energy consumption and improve system efficiency at a lower cost in the aerospace, manned and unmanned aerial vehicles, electric vehicles, and pump markets. We are a leader in magnetics engineering, and our patented technology innovations are used in the air, on the road, and on water, defining the future of electric propulsion.

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