AMERICAN POWER SYSTEMS, INC.

CASE STUDY: 28-VOLT POWER SOLUTION FOR SPECIAL OPERATIONS

CASE

28-Volt Power System

American Power Systems, Inc. provided a 28-Volt Secondary Alternator System for DAGOR®, an ultra-light tactical vehicle designed by Polaris Defense, a division of Polaris Industries.

AMERICAN POWER SYSTEMS, INC™

SUMMARY

Client: Polaris Industries, Defense Division

Application: DAGOR® (Deployable Advanced Ground Off-Road)

Solution: APS 28-Volt Secondary Alternator System

OVERVIEW

Polaris Industries is a US-based manufacturer of all-terrain vehicles, snowmobiles, and neighborhood electric vehicles.[1]

Polaris Defense, a division of Polaris Industries, in 2012 designed and built DAGOR® (Deployable Advanced Ground Off-Road), an ultra-light tactical vehicle, developed under contract with US Special Operations Command and international Special Operations Forces. The design uses commercial-off-the-shelf (COTS) components to allow for worldwide procurement of spares.[2] The vehicle is manufactured by Roush Industries[3].

American Power Systems, Inc. (APS) designs and manufactures advanced mobile power systems and auxiliary power units (portable generator sets) for armored, security, commercial, marine and purpose-built specialty vehicles. APS specializes in custom design and development of high-output alternators, dual alternator bracket kits, and power conversion and distribution systems from 12 VDC to 58 VDC, up to 10kW for diverse applications.

In November 2016 Polaris Defense approached APS for assistance with DAGOR® to meet confidential electrical system requirements.

Working together with Polaris, APS designed bracketry and a front-end accessory drive (FEAD) system capable of accepting an additional 28-volt alternator package. In addition, APS designed a custom high-idle controller to help the vehicle meet extreme power requirements while stationary for long periods. Working closely with Polaris, APS was able to provide a full production system within 12 weeks of project inception.

PROJECT TIMELINE

The APS team began development of the system for DAGOR® in December 2016 at APS company headquarters in Davenport, Iowa (USA) with a vehicle received on-site.

APS provided first articles to Polaris Defense for testing in February 2017.

With approval, APS began manufacturing for production in March 2017.

APPLICATION DESCRIPTION

DAGOR® Specifications[4]

Engine Type: Turbo Diesel/JP8 (jet fuel) Engine

Vehicle Specifications

- Gross Vehicle Weight 8,500 lb (3,856 kg)
- Overall Vehicle Length x Width: 178 in (452 cm) x 74 in (188 cm)
- Payload Capacity: 4,000 lb (1814 kg)

Electrical Specifications

- C4I Auxiliary Power: 24V Auxiliary power terminal provided
- Range: 500 MI / 805 KM @ GVW

SOLUTION DESCRIPTION

American Power Systems, Inc. 28-Volt Secondary Alternator System

System Components

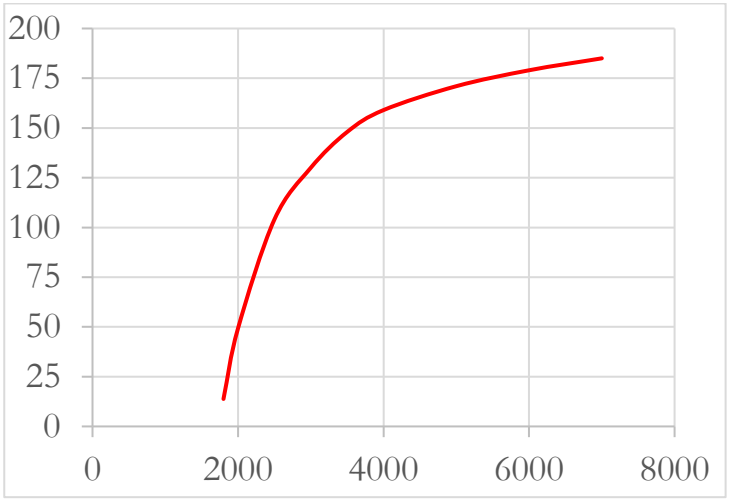
- APS 28-Volt, 185-Series HPI Alternator
- APS Dual-Alternator Bracket
- APS 28-Volt External Regulator
- APS High-Idle Controller

SPECIFICATIONS & PERFORMANCE

APS 185 HPI Series Alternators

Electrical specifications
Rated power: 5kW
Rated voltage: 28 VDC nominal
Charge set point: 28.2 or custom
Turn-on speed: 1800 shaft speed
Efficiency: 80% typical
Regulator type: External

Mechanical specifications
Mounting type: Tangent
Rotation: CW
Standard pulley: 51 mm
Cooling: Internal fans
Weight: 7.5 kg



Output Amperes at Alternator Shaft Speed

DOCUMENTATION

References

1. About Polaris. *polaris.com*. Retrieved 5 April 2018.

2. "Polaris DAGOR Ultra-Light Combat Vehicle." *Army Technology*. Retrieved 6 April 2018.

3. "Polaris Dagor, ready for action." *BBC*. Retrieved 6 April 2018.

4. DAGOR® A1 Specs. *military.polaris.com*. Retrieved 5 April 2018.

Notes

DAGOR® is a registered trademark of Polaris Industries.

Vehicle photos provided courtesy of Polaris Industries.

For more information about DAGOR®, please contact Polaris Defense by e-mail or phone: gov.info@polaris.com or (866) 468-7783.