

# APS (Accessory Power System)

**More power, more savings, more options:**

Operating bus accessories on electric power rather than mechanically-driven accessories is more efficient, and saves fuel and emissions. And now, there are three power options to choose from: Accessory Power System 1, 2, or 3 (APS-1, APS-2, APS-3). Each will provide the right amount of power to meet your needs.

APS-1	APS-2	APS-3
<ul style="list-style-type: none"> <li>• 24/28-volt DC power</li> </ul>	<ul style="list-style-type: none"> <li>• 24/28-volt DC power</li> <li>• 208/230VAC 3-Phase power Variable Frequency Drive (VFD) with dv/dt limiting</li> </ul>	<ul style="list-style-type: none"> <li>• 24/28-volt DC power</li> <li>• 208/230VAC 3-phase power Variable Frequency Drive (VFD) with dv/dt limiting</li> <li>• 208/230VAC 3-phase power Variable Frequency Drive (VFD)</li> </ul>

**APS-1** delivers 24/28-volt DC electrical power to the entire vehicle. It converts power from the hybrid high-voltage DC system directly to 28-volt DC power. It functions as an electronic alternator, replacing the conventional belt-driven alternator, leading to less maintenance and an increase in efficiency and fuel economy.

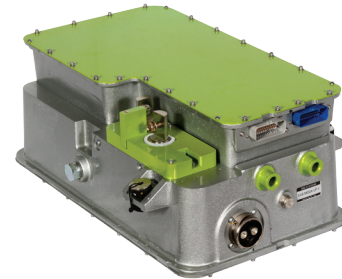
This compact unit provides more than double the power output of conventional alternators. This electronic alternator provides over 500amps of continuous output even at engine idle, more than enough capacity to power all conventional electric loads, such as engine cooling fans, pumps, lights, wipers, signage, communications, etc.—plus all hybrid system loads.

**APS-2** takes APS-1 a step further, providing variable frequency 3-Phase AC power for high power vehicle accessories, including air conditioning compressors, engine cooling fans, air compressors, and power steering, thus allowing for engine-off modes such as Stop/Start and Extended Range (ER). With all bus accessories powered electrically, the bus engine can be shut down, reducing idle time or enabling EV travel.

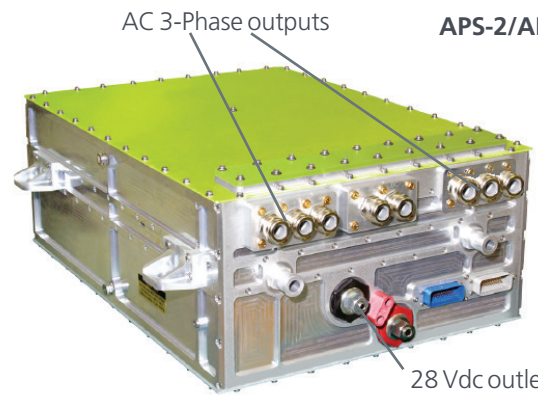
**APS-3** has all the benefits of APS-2 but now the operator has the ability to power two accessories or two groups of accessories independently from each other since the system has an additional and completely separate variable frequency 3-Phase output. Improved efficiency is possible with the APS-3, as each accessory can be operated at its optimal speed for the demand and adds fault

tolerance, as it permits continued operation if one accessory should experience a fault.

In certain accessory configurations, the APS-3 can also serve as a power distribution unit (PDU) to run accessories separately. This will provide independence, without the use of contactors, switches and controls, eliminating the need for an additional OEM-installed PDU.



APS-1



AC 3-Phase outputs

APS-2/APS-3

28 Vdc outlet

**Benefits**

**APS-1:**

- Improves life and reduces maintenance of 24/28 volt vehicle batteries
- More than double the output of conventional alternators
- Eliminates conventional belt-driven alternator (and associated belt), eliminating maintenance
- Low-voltage power available at any speed

**APS-2:**

- Powers higher voltage accessories than APS1

**APS3:**

- Provide independent output for accessory loads
- Eliminates the needs for a PDU (with some OEM platforms)

<b>APS-1</b>	<b>APS-2</b>	<b>APS-3</b>
<b>Ratings</b>	<b>Ratings</b>	<b>Ratings</b>
DC/DC Converter: 15kW at battery post 545 Amps @ 27.5 Vdc	DC/DC Converter: 14kW at battery post 510 Amps @ 27.5 Vdc  Auxiliary Power Inverter: #1: 30 kW 208/230 Vac, 3-phase, Variable Frequency Drive (VFD) with dv/dt limiting (compatible with general purpose motors)	DC/DC Converter: 14kW at battery post 510 Amps @ 27.5 Vdc  Auxiliary Power Inverter: #1: 30 kW 208/230 Vac, 3-phase, Variable Frequency Drive (VFD) with dv/dt limiting compatible with general purpose motors  Auxiliary Power Inverter: #2: 60kW 208/230 Vac, 3-phase, Variable Frequency Drive (VFD) (inverter duty motors required)
<b>Coolant</b>		
Coolant temperature for full performance: -40° to 149° F (-40°C to 65°C) 113°F (45°C) nominal External ambient: -40° to 167°F (-40° to 75°C) Coolant: water ethylene or propylene glycol 15 gpm (57 lpm)		
<b>Size (over chassis)</b>	<b>Size (over chassis)</b>	<b>Size (over chassis)</b>
Length: 22.9 in (582 mm) Width: 13.3 in (337 mm) Height: 9.3 in (236 mm) Weight: wet: 82 lbs. (37 kg)	Length: 27 in (686 mm) Width: 19.5 in (495 mm) Height: 10 in (254 mm) Weight: wet: 167 lbs (76 kg)	Length: 27 in (686 mm) Width: 19.5 in (495 mm) Height: 10 in (254 mm) Weight: wet: 175 lbs (79 kg)