AC-150 Gen-2 EV Power System
Integrated Drive and Charging for Electric Vehicles

A Complete, Self-Contained Power Package
That Delivers Superior EV Performance

| **Output** | 150 kW @ 7,000 - 8,000 rpm  
220 Nm @ 0 - 5,000 rpm |
|-------------|--------------------------------------------------|
| **Efficiency** | 91% peak efficiency  
86% at road load |
| **Charger** | 200 to 20,000 Watt  
bi-directional Reductive™ |
| **Package** | 80 kg total including motor (not shown) and cooling system |

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SYSTEM DESCRIPTION

The AC-150 drive system includes a power electronics unit and AC-induction traction motor that combine to provide high performance, high efficiency, and rapid, convenient charging capabilities for electric vehicle applications. The system delivers up to 150 kW (200 hp) motor output, yet maximizes vehicle operating range with high efficiency over a broad operating range and comprehensive energy recovery through regenerative braking.

The AC-150 embodies patented control and construction techniques that allow the power electronics and motor windings to be re-configured as a high-rate Reductive™ battery charger. By using existing components, the Reductive™ Charger reduces vehicle cost and weight. By allowing safe charging from existing 110V to 240V outlets at rates as high as 20 kW, the Reductive™ Charger reduces infrastructure installation requirements and costs, and its innovative bi-directional power capability allows self contained vehicle battery diagnostics, standby power generation, and value-added grid power functions.

SYSTEM FEATURES

Advanced Drive Control Circuitry
- "Glass smooth" torque under all load and speed conditions
- Natural and transparent driving feel
- Driver adjustable regeneration
- Traction control
- Integral power distribution and fusing for battery optimizer, cabin PTC heater and hybrid / fuel cell APU.
- Speed control available

Integrated Bidirectional Reductive™ Charger
- Charge from any power source between 100 and 250 VAC
- Charge rate controllable from 200W up to 20kW (with 240 V line)
- Unity power factor, sine wave current draw
- GFI outlet compatible
- Automatic mode switching (recharge mode activated when charge power is connected)
- controlled battery discharge into power line for battery diagnostics and conditioning
- UPS mode for backup power and energy transfer to other electric vehicles.

Designed-in Safety
- Protection against over-current, over-voltage and over-temperature conditions.
- Battery floats with respect to vehicle chassis
- Double insulated motor
- Zero motor back-EMF when excitation removed
- Interlocks prevent accidental operation

OPERATING PERFORMANCE

<table>
<thead>
<tr>
<th>Voltage</th>
<th>336 – 360 V nominal 240 V min, 450 V max</th>
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<tbody>
<tr>
<td>Current</td>
<td>580 Adc max (drive) -200 Adc max (regeneration)</td>
</tr>
<tr>
<td>Torque</td>
<td>220 Nm max, 0-5,000 rpm (drive) 115 Nm max (regeneration)</td>
</tr>
<tr>
<td>Power</td>
<td>150 kW max, 7,000-8,000 rpm 50 kW continuous at 8,000 rpm (torque and power at 336V DC input)</td>
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<tr>
<td>Efficiency</td>
<td>91% peak (50 kW, 9000 rpm) 86% road load (8 kW, 8500 rpm) &gt;93% recharge (240V line, 10 kW)</td>
</tr>
</tbody>
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POWER ELECTRONICS UNIT

Pulse-width-modulated, voltage fed, IGBT inverter with current mode, sine-modulated controls; battery charging circuitry; auxiliary 13.5V power supply; and interfaces for control pedals and dash instruments. Environmentally rugged forced air-cooled design.

Dimensions*: 186 x 313 x 760 mm
Total weight: 30 kg (incl blower)
Cooling: Forced-air with pwm speed control
Power connectors: Aircraft-style circular
Control connectors: AMP waterproof automotive
Control inputs: Ground-referenced signals for key switch, accelerator pedal, regenerative sensitivity, forward, neutral, and reverse; and RS-232 for recharge/discharge control and cabin heat. Optional CAN bus.
Instrumentation outputs: RS-232 for battery voltage, Inverter, hybrid and acc. Current, inverter temp, motor temp, motor rpm, motor direction, line voltage, line current, battery isolation, and 12V bus voltage
Aux Power supply current rating**: 100 A @ 13.5 V

MOTOR

Four-pole induction, high frequency design with inverter-controlled magnetic flux.

Dimensions*: 245mm dia x 350 mm long
Total weight: 50 kg (incl blower)
Maximum rpm: 12,000
Insulation: Class H, double-insulated
Cooling: Forced-air with pwm speed control
Sensors: Winding temp, tachometer

* dimensions exclude blower and connectors
** up to 30 A allocated for cooling blowers

for more information, contact info@acpropulsion.com

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AC 150 Gen 2 Recharge Efficiency

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