

hammond  
POWER SOLUTIONS



# ELECTRIC VEHICLE POWER SOLUTIONS



## Electric Vehicle Power Solutions

Transformers are increasingly being used to power electric vehicle (EV) charging stations. HPS offers a broad line of electric vehicle magnetic solutions to meet the needs of level 2 or 3 charging installations.

Several considerations apply when integrating transformers and EV chargers. EV chargers act as non-linear loads to the power grid which cause current and voltage harmonics and distortion. These harmonics make the proper selection of a transformer critical to the operation of both the transformer and the overall system.



### HPS EV Solutions by Station Type

	Level 2	Level 3
<b>Single Phase, Low Voltage</b>	<ul style="list-style-type: none"> <li>Encapsulated Transformers</li> <li>Mini Power Centers</li> <li>EV Charging Distribution Transformers (General Purpose)</li> </ul>	<ul style="list-style-type: none"> <li>EV Charging Distribution Transformers (General Purpose)</li> </ul>
<b>Three Phase, Low Voltage</b>	<ul style="list-style-type: none"> <li>EV Charging Distribution Transformers (General Purpose or K-Factor)</li> <li>Autotransformers</li> </ul>	<ul style="list-style-type: none"> <li>EV Charging Distribution Transformers (K-Factor)</li> <li>Autotransformers</li> </ul>
<b>Three Phase, Medium Voltage</b>		<ul style="list-style-type: none"> <li>Medium Voltage VPI Transformers</li> <li>Medium Voltage Cast Resin Transformers</li> </ul>

### EV Transformer Specification Considerations

This chart provides recommendations for a transformer's k-factor to overcome the extra heating from the EV charger's harmonic distortion. In addition, consider low temperature rise transformers if the ambient temperature regularly exceeds a 30°C average during a 24 hour period.

	Level 1	Level 2	Level 3
<b>Chargers per Transformer</b>	1 to 2	3+	1 or more
<b>Transformer</b>	Single Phase	Three Phase	Three Phase
<b>Allowance for Harmonic Distortion</b>	kVA increased for harmonic heating	K = 4 minimum K = 9 better Harmonic Mitigating better	K = 9 Consider Harmonic Mitigating if 2 or more
<b>Voltage Transient Damage</b>	Consider snubber protection		
<b>Inside Location</b>	150°C Temperature rise		
<b>Outside Location</b>	150°C Temperature rise if avg. <30°C Otherwise consider 130°C or 115°C Tamperproof Type 3RE enclosure		



## EV Charging Distribution Transformers

HPS offers general purpose and K-factor EV charging distribution transformers in a variety of configurations to suit a wide range of environments. These transformers can be specified with integral surge protection devices to help reduce the impact of damaging voltage spikes. K-factor transformers are designed to withstand the additional heating and elevated neutral currents commonly associated with EV charging. For added protection in harsh weather, HPS offers an optional 3RE+ enclosure that is UL-certified and tested in real-world conditions.



## Autotransformers

HPS three-phase autotransformers are designed for applications where voltage adjustments are needed within an electrical distribution system. They are frequently used as an economical alternative to three phase general purpose distribution transformers matching supply voltage to charger requirements when electrical isolation from the source is not necessary. Autotransformers can be used as either a step-up or step-down transformer.



## Mini Power Centers

The HPS mini power center can offer a securable power distribution point with a primary disconnect, single phase transformer and secondary panel to power one or more EV chargers.



## Encapsulated Transformers

For installations using single phase loads, HPS offers a broad line of solutions including our encapsulated transformers for commercial applications. For locations requiring a hazardous location rating, HPS offers encapsulated transformers for hazardous applications.



## Medium Voltage Transformers

For larger commercial scale charging systems where medium voltage power is required, HPS medium voltage VPI transformers and medium voltage cast resin transformers provide secure and safe solutions. Both transformers can be supplied with a wide variety of accessories including enclosures suitable for outdoor environments. Multiple secondary designs are also offered for OEMs with several fast DC chargers powered from a central system.





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