



Electric Vehicle Power Solutions

power to perform



Hammond
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 1, 2 or 3 charging installations (see table below).

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.

Types Of Electric Vehicle Chargers:

	Level 1	Level 2	Level 3
Typical Load Per Unit	1 to 2 kVA	3 to 8 kVA	200 to 500 kVA
Typical Feed Voltage	120 to 240	208, 240 to 480, 600	480, 600 or medium voltage
Phase	Single phase	Single or Three phase	Three phase



Typical HPS Electric Vehicle Charging Magnetic Products

	Level 1	Level 2	Level 3
Single Phase, Low Voltage	HPS Fortress HPS PowerPlus	HPS Fortress HPS PowerPlus HPS Sentinel G	HPS Sentinel G
Three Phase, Low Voltage	HPS Fortress HPS Sentinel G HPS Sentinel K	HPS Sentinel K HPS Sentinel H HPS Autotransformer	HPS Sentinel K HPS Sentinel H HPS Autotransformer
Three Phase, Medium Voltage	N/A	HPS Millennium Series HPS EnduraCoil	HPS Millennium Series HPS EnduraCoil



Encapsulated Transformers - HPS Fortress & HPS Titan

For smaller level 1 and 2 installations using single phase loads, HPS offers a broad line of solutions including our non-ventilated, encapsulated HPS Fortress Series. For locations requiring a hazardous location rating HPS offers the HPS Titan Series.



Mini Power Centers - HPS PowerPlus

The HPS PowerPlus 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 level 1 and 2 EV chargers.



Distribution Transformers - HPS Sentinel Series

HPS Sentinel Series offers general purpose, k-rated and harmonic mitigating transformers in a variety of configurations to handle many environments. They can be specified with integral surge protection devices to help mitigate damaging voltage spikes. K-rated transformers can overcome the extra heating and high neutral currents associated with EV charging. Harmonic mitigating transformers can provide improved power quality to meet IEEE 519 harmonic distortion levels by canceling harmonic currents.



Medium Voltage Transformers - HPS Millennium & HPS EnduraCoil

For larger commercial scale charging systems where medium voltage power is required, HPS Millennium Series (VPI) and HPS EnduraCoil Series (cast resin) transformers provide secure and safe solutions. Both HPS Millennium and HPS EnduraCoil 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.

EV Transformer Specification Considerations

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

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.





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