

## Industrial Applications – Automotive Applications without Wheels

Author: Kevin Parmenter, FAE Director, Taiwan Semiconductor NA  
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Our industry typically classifies power applications that we can't partition into any other segment as "industrial electronics." This includes everything from energy-harvesting sensors to monitoring industrial machinery or a pipeline along its complete route, to the power levels needed to weld steel in robotic motion control systems and process control or other automation systems.

I often say that industrial applications are automotive applications without wheels, since using components that can pass an automotive qualification means that it can survive in industrial conditions. When designing industrial systems and selecting components it's useful to ask your supplier if the parts have passed an AEC-Q qualification test. You don't need the PPAP process and paperwork yet having the qualification test showing that the component has passed this testing is key. Using this best practice testing on every device – automotive or not – results in no-compromise assurances.



Kevin Parmenter, FAE Director, Taiwan Semiconductor NA

Industrial applications must be able to survive abuse by end users, not to mention the environmental extremes of temperature, humidity, electrical overstress, shock and vibration, to name just a few. Thus, what is called for are designs backed by component selection and testing that goes beyond what is required. Designing industrial applications to meet not just environmental requirements, but those intended for automotive and medical – even if your application doesn't need it.

Many industrial applications are used in outdoor and -or harsh environmental conditions, such as an aluminum smelting plant and can be exposed to -55C to +71C ambient temperatures. Systems are subject to constant electrical onslaughts, including surges and transients affecting I/O systems and power input and output lines,

as well as back-EMF from motors or other inductive loads. Moreover, industrial applications must withstand unsophisticated users. A common mistake, for example, is accidentally wiring a 240 VAC line to the thermocouple input pin, fixing it, and then expecting it to work properly. Or accidentally wiring a 48-volt DC line backwards and, again, thinking it won't have issues.

When selecting a sub system, like a power supply, for your industrial application, ask if it can meet the MIL STD 810G environmental testing standard. Additionally, ask if it can meet the UL508A standard for industrial control panels. Perhaps in your application you don't *have* to meet this standard, but there are power supplies available that do. In the same way, make your power supply meets the new UL62368-1 for safety, even ask if it meets the medical safety standard UL60601 for good measure. After all, nobody ever got in trouble for too much safety. And for EMC, if it can meet the 60601-4th edition standard, you'll have even more low-cost insurance that the power supply likely will not interfere with, or be interfered by, something else in the system. Many commercial supplies offer these included and take advantage of them all if you can. My motto is too many certifications is just about right.

Going beyond the necessary requirements to meet automotive and other standards can offer cheap "insurance" when designing industrial applications. Often these systems must be supported for decades, so ask component and sub-assembly suppliers about the product lifecycle – 10 years of support for industrial is typically reasonable. It's a great market but it's not consumer electronics.

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