

In Praise of Terminal Position Assurance (TPA) Plugs

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My customer, a manufacturer of welders, backs its tools with a strong warranty. If its product breaks down during the warranty period, the company quickly dispatches a technician to fix it. As a single repair incident can cost a thousand dollars or more, the goal is zero warranty claims. A while back though, after an uptick in claims, the company made a small design change to their product.

- **Problem** – Almost all of the warranty claims were because (a) terminals were not fully seated in the housing and/or (b) vibrating action from normal workday use of the welders caused the terminals to back out of the housing.
- **Solution** – The company switched from the standard Molex Mini-Fit® terminal to the Molex Mini-Fit® terminal with a terminal position assurance (TPA) plug. With the TPA plug, also referred to as a pin, inserted through the side of the terminal housing, my customer now had a “locked in,” assured connection. In fact, the only way the TPA plug will go all the way through is if the terminal is fully seated in the housing. Problem solved. Warranty claims are back down to nearly zero.

I'll admit it. I love this product! (TE Connectivity offers a similar solution: Mini Universal MATE-N-LOK 2.) Take the example above. Not only did the TPA plug solve the problem, it did so very economically (a few cents per unit) and required no retooling and no major redesign. All the customer had to do was change the housing and add the TPA pin. The interface with the mating half remained exactly the same.

Let's review:

- No new terminals
- No retooling
- No big investment in new components
- No need for a lot of engineering time
- No need to have the product requalified with UL.

Plus, the customer eliminated tens of thousands of dollars in associated warranty claims costs and improved the performance of the product – which, over time, will burnish the company's brand and reputation. Did I mention that I love this product? And by the way, all of the above bullet points hold true for the TE Mini Universal MATE-N-LOK 2 as well.

So I suppose the “moral” of this story is something like this: If your product is one that experiences medium to high vibration when operated, and you're not completely happy with your incidence of warranty claims, the solution could be as easy and economical as terminal position assurance plugs. At the very least, it's a product category worth looking into.