

# Connections

## Everything you probably already knew about Ferrules but were afraid to ask.



This whitepaper reflects on something that has come to my attention numerous times, each time eliciting a different opinion. That particular product is a crimp on wire ferrule. We've all seen them.

**Quality comes not from inspection, but from improvement of the production process.**

— W. Edwards Deming

As New England Drives & Controls constantly strives to improve and become a better asset to our customers, our whitepaper series will feature new technologies or helpful insights that may be pertinent to the reader. It is our sincere hope that this information will be beneficial in both relating, and applying content to your industrial needs.

We hope you find this first whitepaper an enjoyable and informative read.

We always welcome your questions, and comments.

I think back to my previous job...

When designing control panels, ferrules were often considered “a nice to have” rather than “a need to have” item. Why bother using them when you can just strip the end of a wire, give it a twist, and insert it into a terminal block. This sounds like a good plan, until you begin. Stranded wire is as stranded wire does. Two or three wire strands (or “hairs,” as I like to call them) manage to escape the terminal, looking bad and potentially allowing it to short on another similarly prepared wire next to it. A lot of times the terminals were of the screw down type, and it worked very well. The problem would arise when we were using terminals with a spring clip.

When this became problematic, again I resisted ferrules. “Let’s simply tin the wires. We have solder and irons, and that is an inexpensive fix.” Yup! That’s what I used to say, but was it really right? From a material standpoint, it is less expensive,



but often the labor required is not taken into consideration. It takes some time to tin wires, and depending on who is doing them, sometimes they have unruly hairs as well. Still undaunted, I suggested getting a smelting pot, solder ingots, and simply dipping the wire ends into it. Fast, simple and the ends are relatively untouched by human hands.

Why was I so resistant? Perhaps it was based on my early experience with crimp on rabbit ear terminals that would slip into the screw terminals. I’m sure the fact that I would use the same crimp size for every wire gauge didn’t help. I’d give it the “pull test” and low and behold, the wire would pull out. “Stupid connector! Why am I paying extra for these?” I would say to myself. Then I’d shove the bare, twisted wire into the screw terminal and tighten it down without that dumb

crimp. It just proved my point, didn't it? Meanwhile, wire hairs still splayed everywhere, as the screw turned.

As I "matured" I realized that it was simply bad form to do this, so I began to crimp again. This time applying a bit of solder to the connect post crimp. Boy! That held really well. I'd solved it! But again, I'd spent much more time than needed, and admittedly, it was still bad form. I had always heard that it was a bad thing to do. Soldering wire ends, especially in an application that was flexible, would cause the wire strands to prematurely fatigue and cause intermittent connections. So why did I continue?

Perhaps it was the lack of proper crimping tools. Perhaps it was the perceived additional cost. I say perceived because after the initial investment of the "proper" tools, the ferrules themselves are fairly inexpensive. (Admit it, we all have a \$3 crimper in our home toolboxes, but the fact is they really don't work that well.) I also felt that ferrules were a saleable item looking for a sucker to buy them!

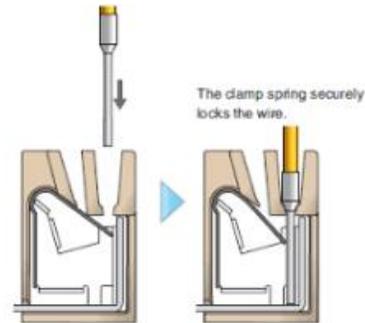
So why am I now changing my stripes and advocating the wire ferrule? Because I've seen how they can work really well, when matched up to the proper wire gauge, crimped with a proper tool, and they can easily withstand the "pull test," even when they are not soldered.

After crimping, the ferrules can even take on various shapes, depending on their particular application. See the examples outlined below:



Acceptance of these types of crimps also opens up a whole new world when it comes to terminal blocks and I/O. Where I would not even consider these types of

connections in the past, this type of ferrule, makes utilization of these terminal connections fast and easy! Even, dare I say it, desirable?



Try to do that with a piece of floppy stranded wire! They even have ferrules for doubling two wire connections. Even with a good twisted splice, you will never have a nicer connection than with a ferrule.

Anyway, that is why I now highly recommend the wire ferrule. If you have items hanging on DIN rail, you probably have a good application for some wire ferrules!



If your project requires UL Certification, ferrules are a must! The UL certification not only requires the use of ferrules, but compliance with the standard can only be achieved using the right tool.

Ask any friendly New England Drives and Controls associate about UL Certification requirements as well as about the many ferrule tool and part offerings we have to offer!

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