



SOLDERLESS MAGNET WIRE SOLUTIONS FOR POWER TOOL MOTORS

With increased focus on a more sustainable future, industries around the world are scaling up production of energy efficient, low carbon footprint technologies and they require electrical components that can keep pace with this growth. One bottleneck in the push for more efficient electric motor manufacturing is the limitation of magnet wire soldering and welding processes. These processes can be time-consuming, costly and difficult.

SOLDERING AND WELDING CHALLENGES

Workspace Constraints

Soldering or welding small diameter wire in tight spaces can make it difficult to avoid bridging connections or overheating sensitive components.

Insulation Removal

Removing the thin layer of enamel insulation without damaging the wire requires time-consuming precision and care.

Joint Reliability

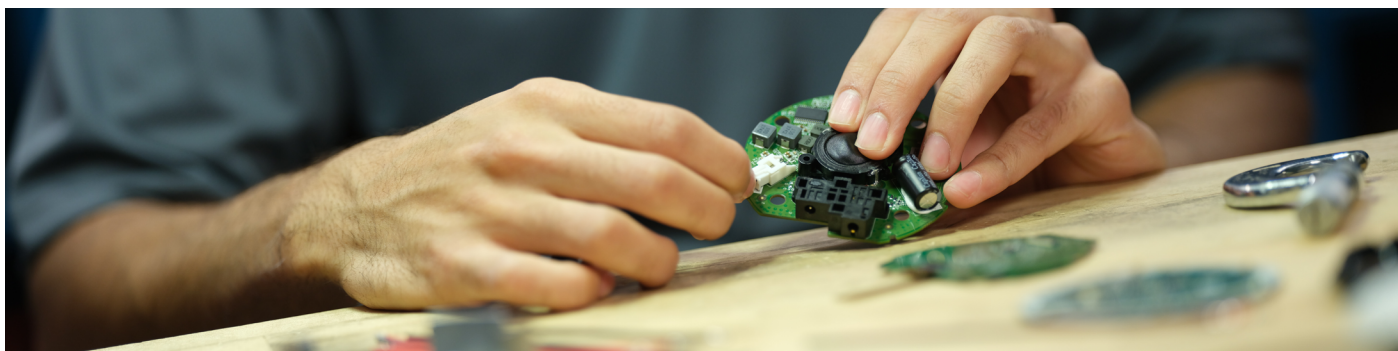
Strong and reliable joints may be challenging with thin diameter wire that has limited surface area. This can affect the reliability of motors.

Heat Sensitivity

Excessive heat may reduce insulation effectiveness near solder joints and may embrittle the copper or aluminum wire. This can reduce the life expectancy and performance of motors.

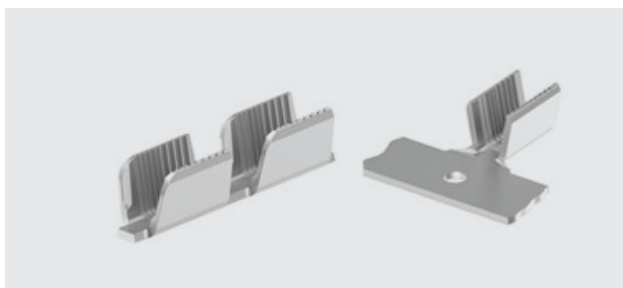
Flux Compatibility

Connection reliability challenges due to adhesion and conductivity issues may occur if flux is not properly matched with the magnet wire.



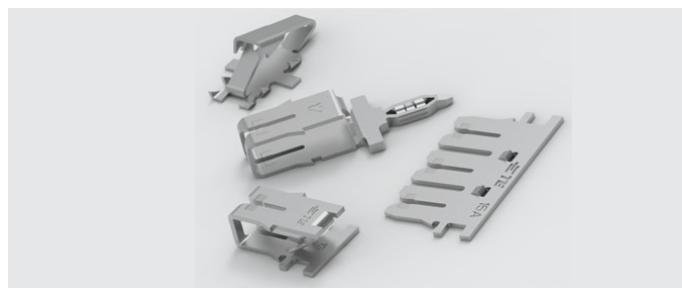
TE Solderless Solutions

For engineers working to streamline electric motor manufacturing processes, TE Connectivity (TE) offers a portfolio of solderless magnet wire solutions and low applied cost tooling options designed for copper and/or aluminum magnet wire. The products listed below are designed to help reduce cost while improving repeatability and manufacturability.



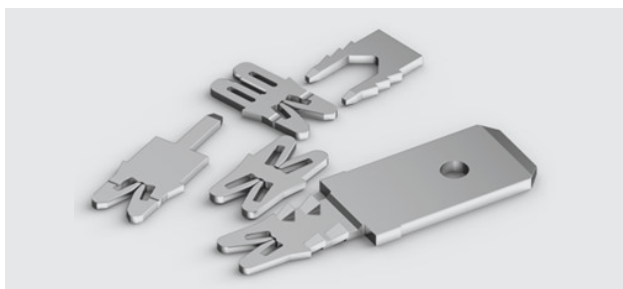
AMPLIVAR Terminals

Developed in 1953, these terminals and splices feature a serrated barrel design to pierce and displace magnet wire insulation, producing superior metal-to-metal compression crimp joints with excellent strength and reliability. With new application tooling, splices can be bussed together in virtually infinite combinations.



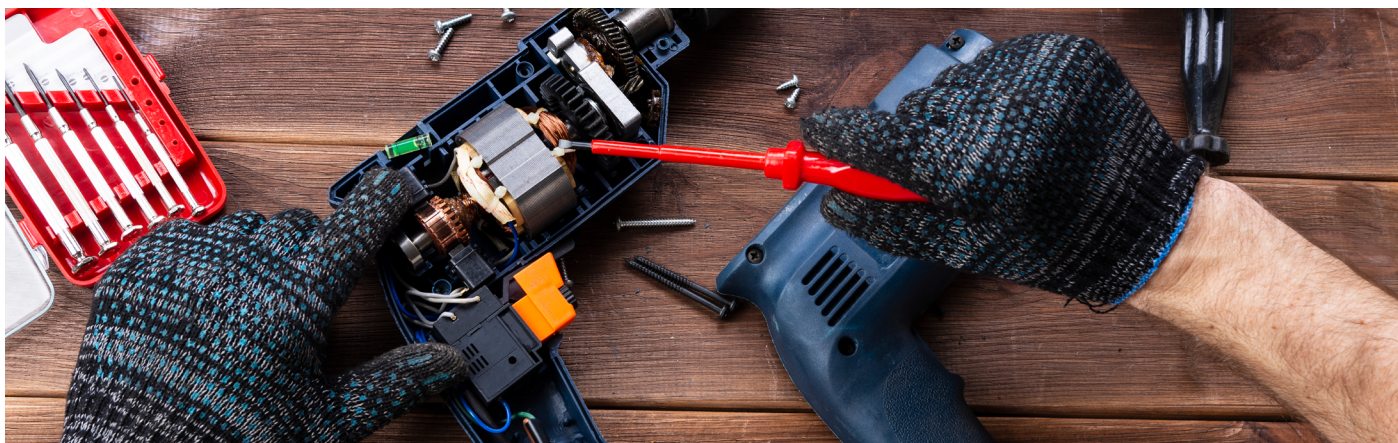
MAG-MATE Terminals

Introduced in 1975, these terminals feature an insulation displacement contact (IDC) that creates a gas-tight magnet wire termination. Standard MAG-MATE terminals support 34-12 AWG magnet wires and smaller versions are available for fine gauge wire. They are available in a variety of styles including poke-in, poke-in tab, splice, crimp wire barrel, solder post and others. TE provides specifications to incorporate cavities for these unique terminations into coil bodies or other custom housings.



SIAMEZE Terminals

Like MAG-MATE terminals, the versatile SIAMEZE terminal system features IDC technology to achieve a secure metal-to-metal interface without stripping magnet wire. The SIAMEZE terminal has a compact design intended for more space constrained motor systems and features an optional Lead Lok to secure lead wires with high retention force.



Solderless Solutions for Power Tool Electric Motors

Power tools traditionally powered by gasoline, such as lawnmowers, string trimmers and pruning saws, are now widely available in battery powered electric versions. Battery life, high torque, and compact design are all crucial to market acceptance of these products. Below are two examples where solderless magnet wire terminals were used to provide reliability and low cost assembly to space-limited power tool systems. These products represent just a portion of TE's broad portfolio of solutions for such electric motor applications.

Stator Terminals with Receptacles: The AMPLIVAR terminals with FASTON stator receptacles provide a simple solderless solution to both terminate magnet wire and fit inside the power tool motor stator. The insulation piercing crimp barrel design assures a secure metal-to-metal crimp for rugged, long lasting tool life. The FASTON quick connect receptacle mates with FASTON tabs wired to the power source and includes retention barbs to secure the receptacle in the motor stator. TE automated application tooling with strip-fed terminals provides cost-effective termination with high processing rates.

MAG-MATE Terminals with Multispring Pin: Handheld power tools require efficient connections with minimal footprint. Traditionally, connecting magnet wires to printed circuit boards requires manufacturers to solder the wires to a pin then solder the pin to the PCB. MAG-MATE terminals with Multispring pin provide solderless connections to the motor magnet wire along with a solderless PCB termination that is press-fit into the board. The Multispring pins are well suited for multi-layer PCB's and feature a large, gas tight contact zone in addition to high reliability due to spring tension. Multispring pins allow larger PCB hole tolerances which translates to lower cost. As with most other TE terminations, high quality application tooling increases assembly efficiency in production environments.

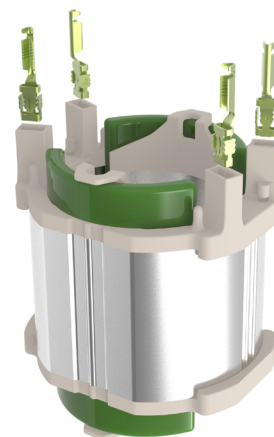


FIGURE 1 - STATOR TERMINALS WITH RECEPTACLES

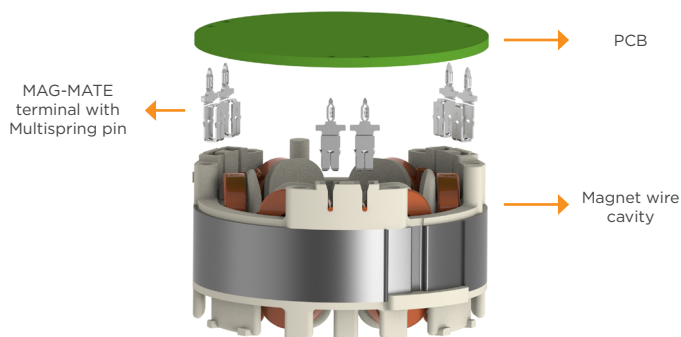


FIGURE 2 - MAG-MATE TERMINAL WITH MULTISPING PIN FOR PCB MATING AND A CUSTOM CAVITY FOR MAGNET WIRE TERMINATION

Find Your Solderless Solution with TE Connectivity

TE Connectivity remains committed to developing and improving magnet wire solderless solutions for our manufacturing partners. Providing cost effective, sustainable connection solutions with automated assembly tools allows our customers to reduce labor costs while increasing productivity and minimizing human error. Our broad portfolio of magnet wire solutions and ability to support custom connector development let these solderless solutions fit in almost any electric motor system.

Contact our team to learn how our magnet wire solutions can help you.

Connect With Us

We make it easy to connect with our experts and are ready to provide all the support you need.

Visit www.te.com/support to chat with a Product Information Specialist.



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Ugo Aime
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