

Embedding Thermocouples in Solid Metal

Thermocouples are fairly simple devices used widely across every industry to measure temperature. Unfortunately, they often must be placed far away from the process they are observing to prevent damage like corrosion, wear, and oxidation.



LONGER LIFE

The surest way to protect sensitive electronic components and extend their life is to embed or encapsulate them in solid metal.



HIGHER PROTECTION

Housing components in solid metal not only offers the highest degree of protection from corrosion, wear, and damage, it also provides manufacturers with new levels of design flexibility.



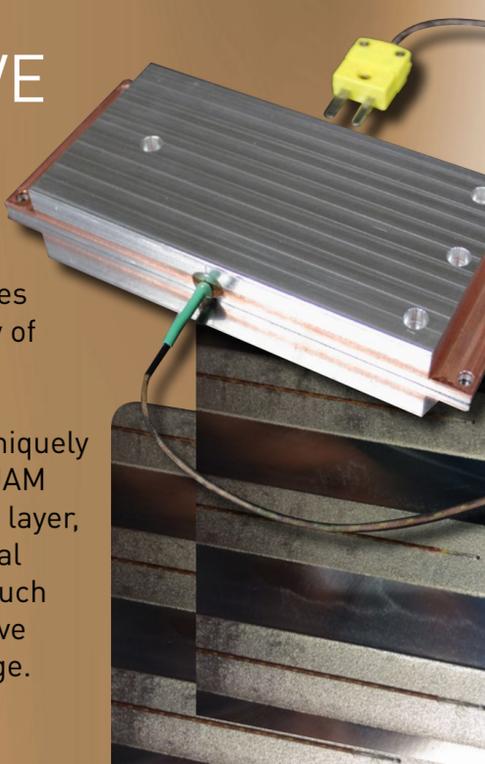
MORE FREEDOM

Embedding thermocouples in metal creates a functional structure that is capable of measuring and monitoring temperatures in places a thermocouple could not usually access.

ULTRASONIC ADDITIVE MANUFACTURING MAKES IT POSSIBLE

Fabrisonic has been embedding thermocouples in metal parts for many years for a wide array of engineering applications.

Ultrasonic additive manufacturing (UAM) is uniquely suited for embedding components in metal. UAM uses sound waves to weld metal foils layer by layer, applying CNC machining to produce a 3D metal structure. Because build temperatures are much lower than other metal AM processes, sensitive components can be embedded without damage.

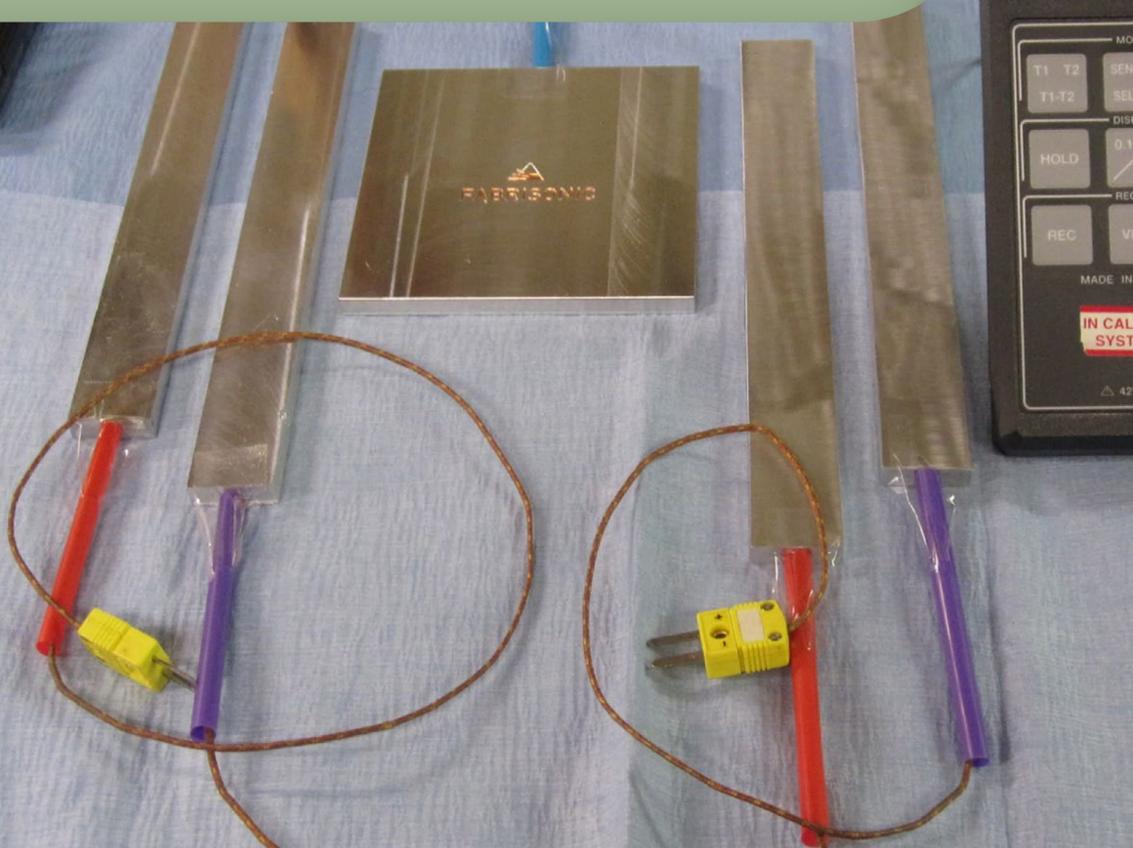


HOW IT'S DONE:

If the application only requires embedding the cold junction, the cold junction is simply laid in the right place and layers of metal are welded directly over the thermocouple

However, many customers want to bury the cold junction deep within a metal part. In this case, a small channel is milled to capture the insulated sheath. Again, the cold junction will be laid on flat material and then metal foils are welded over the entire part.

No matter what type of sensor is to be embedded, an important consideration is how to get the electrical signal out of the solid metal part. Typically at the exit point, the wires are transitioned to a connector that is similarly embedded at the edge of the structure.



FABRISONIC

Solid State Additive Manufacturer of Metals