



Fundamental Soldering Technologies Volume 2: Laser Soldering

Laser soldering is a quickly evolving and progressive new soldering technology

Often compared to iron soldering, laser soldering provides different benefits because its heating principles are different. This type of soldering is ideal for ultrafine parts and for use in narrow and intricate areas.

Laser soldering is gaining attention as a new soldering method. However, because this is a new industrial technique compared to iron tip soldering, the heating principles differ, and it cannot simply replace iron soldering. Without understanding and properly using the technical characteristics of both laser and iron soldering, soldering stability and quality are unattainable.

It is important to choose the most appropriate soldering method by understanding the thermal exchange theories and applicability for specific objects. Iron soldering is physically limited by the size of the iron tip as well as the structure of electronic components. This is not an issue for laser soldering because it is well-suited to narrow, intricate spaces, such as where parts are almost touching in highly dense circuit boards. In contrast, an iron tip may be more suitable for soldering operations that require high heat capacity with large components. Highly reflective materials make it difficult for the laser to heat up due to its technical attributions, so iron tip soldering is the most effective method in this case.

In the iron soldering method, heat is transferred through iron tips while laser soldering produces heat on the applied points. Based on these methods, iron soldering does not heat over a set temperature. However, if continued to apply the iron on land, the surrounding area will heat up. In contrast, laser soldering heats the applied area locally. Also, the absorbed energy instantaneously raises its heat level during laser soldering. Thus, when operating laser soldering, overheating can occur quickly. Therefore, expertise and experience in both soldering and laser technology are required to carry out proper laser soldering.

Laser Soldering Advantages

Laser soldering can complement operations that are difficult to solder with iron tip soldering, if carefully setting the heating conditions in advance for operation. Four key attributes include: contactless operation to circuit, reducing physical damages; stable soldering is possible with an efficient heating method and feeding solder; easy maintenance; and pinpoint soldering is possible.

The absolute advantage of laser soldering, however, is its “non-contact action”. It has no contact with a circuit board or electronic parts – soldering is accomplished without any physical damages. Efficient, pinpoint heating is an additional advantage for narrow and tight places. Furthermore, it needs fewer consumable materials, significantly reducing the daily maintenance workload.

Laser Expansion into Technical Industry

After successful laser soldering commercialization, this method has been adopted by electronic manufacturers of smart phones, medical devices and many others. At the same time, the JAPAN UNIX soldering lab is collecting data on safety, reliability and fusion strength through actual inspections and evaluations. Laser technology has demonstrated its value for use in soldering operations.

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