

ADVANTAGES OF LASER CUTTING TECHNOLOGY IN INDUSTRIAL APPLICATIONS

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Laser cutting technology is a comprehensive high-tech technology. It spans disciplines such as optics, material science and engineering, mechanical manufacturing, numerical control technology, and electronic technology. It is a hot spot in the domestic surgical technology and industry. Over the past 50 years, laser processing technology and applications have developed rapidly. It has been combined with many disciplines to form multiple technical application fields. The main processing technologies of laser include: laser cutting, laser welding, laser marking, laser drilling, laser heat treatment, laser rapid prototyping, laser coating, etc.

Laser cutting technology is the main application of laser technology in the industry. It has accelerated the transformation of traditional processing industries and provided new means for modern industrial processing. It has become the most widely used laser processing method in industrial processing. Currently, laser cutting technology has been widely used in machinery manufacturing, bridge construction, sheet metal processing, shipbuilding and automotive manufacturing, electronics and electrical, aerospace and other pillar industries of the national economy. With the continuous progress and application of science and technology, laser cutting technology is bound to further develop into other fields.

In the past few years, laser processing technology has developed rapidly and its application has become increasingly widespread. Therefore, lasers are known as "universal processing tools" and "universal processing methods for future manufacturing systems.". Due to the widespread use of laser processing technology, qualitative changes are taking place in enterprises in developed industrial countries. Laser cutting technology is the main application of laser technology in the industry. It has accelerated the transformation of traditional processing industries and provided new means for modern industrial processing. It has become the most widely used laser processing method in the field of industrial processing, and can solve the problems of the entire laser processing industry. More than 70%.

Laser cutting effectively uses focused high power density laser beams to irradiate the workpiece. Under the premise of exceeding the laser power density of the laser threshold, the energy of the laser beam and the chemical reaction heat added by the active gas assisted cutting process are all absorbed by the material, resulting in a sharp rise in temperature when reaching the effect of the laser. After reaching the boiling point, the material begins to evaporate and form a hole. As the light beam moves relative to the workpiece, the material is eventually cut open, and the sediment in the slit is blown away by some auxiliary gas.

Laser cutting has the characteristics of wide cutting range, fast cutting speed, narrow incision, good

cutting quality, small heat affected zone, and great flexibility. It has been widely used in modern industry. Laser cutting technology has also become a laser processing technology. One of the most mature technologies. Compared with other lights, lasers have the following characteristics: high brightness, high directionality, high monochromaticity, and high coherence. Due to the four major characteristics of laser, it is widely used, making laser processing have the following valuable features that are not available in traditional processing:

- (1) Because there is no contact processing, and the energy and movement speed of the laser beam are adjustable, various processing processes can be achieved.
- (2) It can be used to process various metals and non-metals, especially materials with high hardness, high brittleness, and high melting point.
- (3) During laser processing, there is no "tool" wear and no "cutting force" acting on the workpiece.
- (4) Laser processing of workpiece has small heat affected zone, small workpiece thermal deformation, and less subsequent processing.
- (5) Laser can perform various treatments on workpieces in closed containers through transparent media.
- (6) The laser is easy to guide. By focusing, it is possible to achieve conversion in various directions, and it is easy to work with CNC systems to handle complex workpieces. Therefore, laser cutting is a very flexible cutting method.
- (7) Laser processing has high production efficiency, stable and reliable processing quality, and significant economic and social benefits.