LASER CUTTING MACHINE ACCURACY, SPEED, EFFECT AND STABILITY COMPARISON

Posted on 2023-08-21 by redsail

Category: Laser Cutter News

Cutting accuracy of laser cutting machine

Laser cutting machine has the advantages of high cutting precision, fast speed, not limited by cutting patterns, and low processing cost, and is gradually replacing traditional metal cutting process equipment. At present, the application range of laser cutting machines is getting wider and wider, and the cutting accuracy of metal CNC laser cutting machines is related to the processing technology, so it is also one of the most concerned issues for buyers. For the understanding of laser cutting precision, many people have certain misunderstandings. In fact, the cutting accuracy of the laser cutting machine does not entirely depend on the equipment itself, but is affected by many factors. Next, let's take a brief look at which factors are most likely to affect the cutting accuracy of the laser cutting machine.

1. The spot size of the laser beam after it passes through the focus. The smaller the spot after the laser beam is gathered, the higher the cutting accuracy.

2. The positioning accuracy of the worktable determines the repeatability of cutting. The higher the precision of the table, the higher the precision of cutting.

3. The greater the thickness of the workpiece, the lower the accuracy and the larger the kerf. Since the laser beam is conical, the slit is also conical, and it is also stainless steel. The 0.3mm stainless steel is much smaller than the 2mm stainless steel slit.

4. The material of the workpiece has a certain influence on the accuracy of laser cutting. In the same situation, stainless steel can be cut with higher precision than aluminum, and the cut surface is smoother.

Cutting speed and cutting effect of laser cutting machine

Laser cutting has no burrs, wrinkles and high precision. For many mechanical and electrical manufacturing industries, because the modern CNC laser cutting system controlled by computer programs can easily cut workpieces of different shapes and sizes, it is often preferred over punching and molding processes; although the processing speed of laser cutting machines is still slow. It is better than punching, but it has no mold consumption, no need to repair the mold, and saves the

time to replace the mold, thereby saving processing costs and reducing production costs, so it is more cost-effective in general. In the metal processing industry where the industrial manufacturing system occupies a large part, many metal materials, no matter what kind of hardness it is, can be cut without deformation. However, for high reflectivity materials, such as gold, silver, copper and aluminum alloys, because they are also good heat conductors, laser cutting is difficult or even impossible.

During the laser cutting process, auxiliary gas suitable for the material to be cut is added. When cutting steel, oxygen is used as an auxiliary gas to generate exothermic chemical reaction with molten metal to oxidize the material, and at the same time help to blow away the slag in the kerf. Compressed air is used to cut plastics such as polypropylene, and inert gas is used to cut flammable materials such as cotton and paper. The auxiliary gas entering the nozzle can also cool the focusing lens, preventing smoke and dust from entering the lens holder to pollute the lens and cause the lens to overheat. The selection of the cutting speed of the laser cutting machine is actually very important when cutting. The optimal cutting speed range can be selected according to the equipment instructions or determined by experiments. Due to the thickness of the material, the different materials, the melting point, the thermal conductivity and the melting point After the surface tension and other factors, the cutting speed also changes accordingly.

Main performance:

1. A moderate increase in cutting speed can improve the quality of the incision, that is, the incision is slightly narrowed, the surface of the incision is smoother, and the deformation can be reduced at the same time.

2. The cutting speed is too fast so that the cutting line energy is lower than the required value, and the jet in the slit cannot quickly blow off the molten cutting melt immediately to form a large amount of drag, accompanied by slag hanging on the incision, the incision Decreased surface quality.

3. When the cutting speed is too low, since the cutting place is the anode of the plasma arc, in order to maintain the stability of the arc itself, the anode spot or anode area must find a place to conduct current near the slit closest to the arc, and at the same time, it will flow to the jet. More heat is transferred in the radial direction, thus widening the slit, and the molten material on both sides of the slit gathers and solidifies at the bottom edge, forming dross that is not easy to clean, and the upper edge of the slit is rounded due to excessive heating and melting.

4. When the speed is extremely low, the arc may even be extinguished because the cut is too wide. It can be seen that good cutting quality is inseparable from cutting speed.

Stability of laser cutting machine

How to measure whether the stability of a laser cutting machine is good or not is a question that many buyers are more concerned about. Now the common laser cutting machine on the market is mainly composed of main engine, guide rail, rack and pinion or ball screw, transmission mechanism and other components. Below we will make a simple analysis from these components.

The host is composed of beams and two longitudinal end frames. The mast of the machine is composed of an end frame and a crossbeam. The crossbeam adopts a rectangular square tube structure, tempered to remove internal stress, and has high strength and rigidity. Multiple mobile trolleys can be installed on the crossbeam. The lateral moving devices all adopt drag chains. The mechanical part realizes high-precision rack and pinion transmission. The guide rail is made of high-precision special imported guide rail. The precision-processed sliding guide rail is fastened on the concrete or steel frame foundation with support, and is equipped with adjusting bolts for easy installation and maintenance. Adjustment. The longitudinal drive system is installed in the longitudinal end frame, and the low position design makes the transmission more reasonable and stable.

There are two front and rear rolling wheels at the bottom of the longitudinal end frame, which can roll smoothly along the guide rail. The front and rear ends are equipped with guide rail scrapers to ensure that the surface of the guide rail is free of debris. The two sides of the bottom are equipped with guiding eccentric clamping wheels. The guide accuracy of the machine, the machine is equipped with high-strength linear guide rails in the horizontal transmission and cutting torch lifting (horizontal transmission or high-precision grinding guide rails. The precision-processed gears and racks ensure the vertical and horizontal transmission accuracy of the machine. and eliminated the gap.