



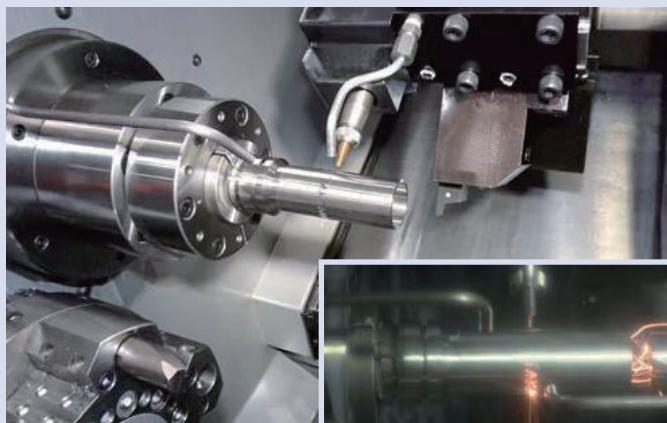
In recent years, “fiber lasers” have shown significant improvements in performance. As electronic devices are now more compact with higher performance, it has become possible to install laser attachments on CNC lathes. This volume of TAKAMAZ RYU GI introduces the laser integrated NC lathe now gaining attention.

TAKAMAZ laser integrated NC lathes

Taking up the challenge of machines equipped with laser attachments

Advances in optical fiber technology for data communications, which is represented by the Internet, have made it possible to now carry high-quality light over long distances, thereby also significantly improving the performance of fiber lasers. In tandem with the trend of making electronic devices more compact while also achieving higher performance, high-performance laser oscillators are now small enough to be installed in an NC lathe.

TAKAMAZ has been involved in the machining of automotive parts for many years, and we have experienced many deliveries for production lines consisting of a TAKAMAZ lathe, another company’s fusing/welding machine and then another TAKAMAZ lathe. Therefore, if we can incorporate a laser attachment in one of our products and accomplish the fusing/welding processes and turning processes in a single machine, substantial reductions in equipment costs can be expected through increased cutting accuracy, process integration, reduced floorspace requirements and so on. Currently, Takamaz is working on research and development of laser attachments with the support of Ryoden Corporation.



Laser cutting also possible in addition to turning and compound machining

Example of machining on a TAKAMAZ laser integrated NC lathe

Advantages and Disadvantages of Laser Attachments

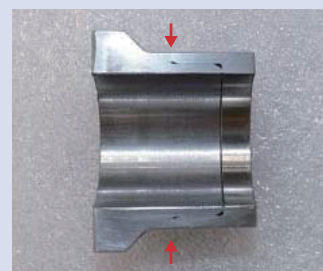
What kind of advantages and disadvantages does a laser integrated NC lathe have?

【Advantages】

1. Improved cutting accuracy

Parts can be machined and welded on a laser integrated NC lathe with two opposing spindles without having to dismount and remount

each part, which means that the parts can be welded with good coaxiality even with a comparatively rough fit tolerance. Also because this is fusion welding, dissimilar materials can be welded, and depending on the product, high quality welding with no need to remove any burrs can be achieved.



Section of welded part
Arrow indicates the weld

2.Reduced tooling costs

Laser attachments can be used for piercing (forming holes). Unlike the machining with conventional drills and end mills, tool wear and damage can be eliminated, which leads to reduced tooling costs while permitting stable processing.



Profile cutting of “TAKAMAZ” by piercing

3.Excels at micromachining

The laser attachment, depending on its performance, excels at micromachining of micro-holes of around $\phi 0.1$ mm and narrow grooves, which are not possible with drills and end mills.

【Disadvantages】

Because the laser attachments uses light, it is not possible to machine metals with high reflectivity such as gold and silver, or resins and other materials with high transmissivity. Also, since an assist gas such as nitrogen or argon is required in addition to coolant, a unit to collect the fumes* generated during fusion/welding (e.g. a fume collector) is necessary. Since laser attachments are dangerous due to the high energy density, sufficient safety measures are required.

* What are fumes?
Hazardous particles generated during metalworking and welding

Future possibilities for machines equipped with laser attachments

Due to the microminiaturization of holes in injector units and downsizing of turbo mechanisms in line with a drive toward increasingly higher energy efficiency in the automotive field in recent years, the number of parts comprising dissimilar materials has increased, and the advantages of machining by laser are becoming greater.

By incorporating a laser attachment into a CNC lathe, TAKAMAZ has added new functions and value, and will continue to provide machines with advantages for customers.