

Abstract

A hybrid laser processing apparatus 1 includes a laser oscillator 4 which oscillates a laser beam L, a high-pressure pump 5 which supplies liquid, wherein liquid supplied from the high-pressure pump 5 is injected from an injection nozzle 13 provided at a tip of a processing head 6 and becomes a liquid column W to reach an object to be processed 2.

A first inclined plane 13b which reduces the diameter toward the object to be processed 2 is formed in the injection nozzle 13, the condensing lens 12 which condenses the laser beam L is designed so that the focus of the laser beam L is positioned beyond the injection nozzle 13 and closer to the side of the object to be processed 2 and the laser beam L on the side outer than the minimum diameter part 13d is reflected on the first inclined plane 13b and thereafter guided to the liquid column W.

Positional matching of the condensing lens and the injection nozzle is simple and the guided laser beam does not pop out of the liquid column. Moreover, manufacturing costs and running costs can be reduced.