

Technical Review Special Edition: Machine Tools

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Welcome to this special edition of our technical review featuring machine tools.

It was in 1939 that we started producing lathes in Hiroshima, and last year saw us reach the milestone of 80 years in the machine tool business. In the intervening years, the merger between Ritto and Hiroshima districts took place, Mitsubishi Heavy Industries Machine Tool Co., Ltd. was founded in October 2015, and now we are here in 2020. We have always offered innovative products and solutions to a variety of customers and industries. With our 100th anniversary coming in 20 years' time, we look to further develop our businesses. Under the corporate philosophy of "We will create the future of 'Monozukuri,'" our extensive dedication is underpinned by the desire to provide attractive products and service solutions that can satisfy customers.

The machine tool market has been heavily impacted by the COVID-19 infection pandemic – suffering from its worst decline since the bankruptcy of Lehman Brothers, resulting in the sudden reduction or suspension of production activities across the world. However, if we try to see the big picture, we can perceive a trend of increasing demand for machine tools in the long run despite having ups and downs. Further growth is therefore expected once the COVID-19 pandemic settles down.

The requirements for production facilities have changed considerably, as exemplified by making factories smart using IoT and AI technologies whose applications have been introduced widely and rapidly along with Industry 4.0 and by undertaking environmental conservation efforts to realize a sustainable society. It is a must to provide solutions that enable us to solve the issues related to production activities together with customers (that is, co-creation).

To help customers find solutions to their problems, we not only refine the precision and efficiency of machine tools, but also take on the challenges to sophisticate production processes using IoT and AI technologies, strengthen the additive manufacturing (AM) business, whose market is expected to grow, and realize digital transformation (DX) to cope with the change in trading focus from "products" to "services."

Being compiled on the theme of "technologies that contribute to Monozukuri in the future," this special edition mainly introduces the latest machine tools and their machining technologies as well as IoT and AI applications.

Presented in relation to gears are the “GE15FR Plus,” which realizes the high-precision machining of small module gears incorporated in precision reduction gears that are used as joints of industrial robots, the latest gear grinder model “ZE16C/26C,” which realizes the highly accurate and efficient grinding of automobile transmission gears, and the rotational axis characteristics evaluation technology to improve machining accuracy.

Total solutions include the “three-dimensional spatial error correction system” enabling long-term maintenance of spatial accuracy in the processing area of vertical precision milling machines, vibration suppression technology using simulation to improve the surface quality of die/mold machining processes, and the “ μ V5” high-precision milling machine with workpiece sizes and rough-machining performance both of which were improved from the earlier μ V1 model, which has a proven track record.

When it comes to microfabrication, this special edition deals in the metal-based additive manufacturing machine “LAMDA” using the powder DED method that enables long-term stable additive manufacturing by employing the original AI-based monitoring feedback system, cutting-edge microfabrication technology using the “ABLASER” laser micromachining system with a short-pulse laser, and “room-temperature wafer bonders” with their applications extending to various semiconductor devices such as SAW devices and light-emitting devices.

Lastly, others include our approaches to manufacturing solutions through DX as the tide turns “from tangibles to intangibles,” the state-of-the-art material “GRANMAT” for precision cutting tools, which are the linchpin of high-speed gear processing, and the cutting-edge coating “Mighty Shield,” and “MPFA scale,” which is most suitable for linear motor position detection in which the highly accurate position detection technology refined through our work on machine tools is utilized.

Focusing on providing sophisticated total solutions that assist our clients in improving productivity and machine utilization, MHI continues to engage in the development of highly precise and efficient machine tools with better usability, easier set-up and maintenance, and superior reliability to meet our clients’ unique needs. We deeply appreciate your ongoing support and understanding in our quest.