

COMPETENCE



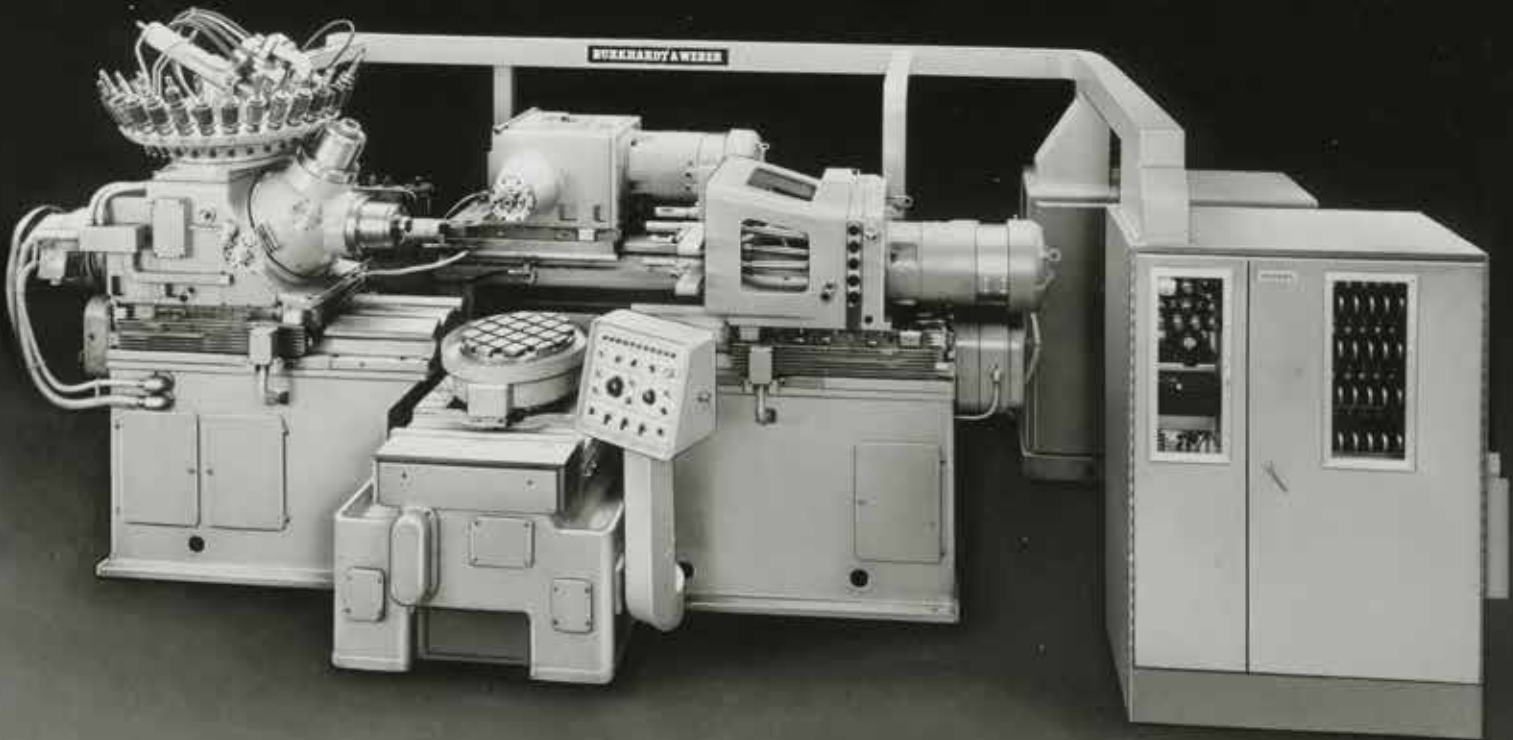
2024

65 YEARS NC MACHINING CENTRES

TECHNOLOGY OVER TIME

65 YEARS

NC machining centres



"As pioneers of NC-controlled machining centers, we revolutionized the manufacturing industry several decades ago. Ever since the technology has been steadily advancing and we are proud to be amongst the leaders of these developments. We invite you to explore the fascinating history of modern CNC machining technology and its progress."

strong. precise. customized.

65 YEARS NC MACHINING CENTRES

In 1959, BURKHARDT+WEBER built the first NC-controlled machining centre for the billionaire Howard Hughes and thus invented the first machining centre as we know it today.

THE MAN BEHIND THE SECRET MISSION



Dr. Göbel with Mr. Howard Hughes

Visionary, successful, maniac

Howard Hughes (1905 – 1976) wanted to be the best golfer, the best aviator, the most celebrated film producer and the wealthiest man in the world. The legacy of the Hughes Tool Company, with its monopoly on oil drilling heads, was an enormous source of capital which allowed Hughes to live out his passions. He produced expensive films, and built up the Hughes Aircraft Corporation in a hut in Burbank, where at times his staff included more than 3000 people holding PhD's in physics. In the post-war period the company had exclusive rights on defence electronics. It was during this time, that Hughes commissioned BURKHARDT+WEBER to develop the first NC controlled machining centre. The eccentric billionaire was later to spend his last years in darkened rooms in Las Vegas, a city he had previously bought from the Mafia.

TOP SECRET – HOW EVERYTHING STARTED

The mission was secret, top secret. In 1957 a discreet group of men from Los Angeles arrived in Geneva at the Société d'Instruments de Précision SA. The managers of the "Hughes Aircraft Company", a US electronics and aerospace company, entered the headquarters of the Swiss precision machine tool manufacturer with a briefing to develop a numerically controlled machine tool. The main task in this project was an absolute innovation: the tools had to be changed automatically from a tool magazine to the main spindle. It was a difficult problem which the Swiss engineers could not solve. They suggested, however, that the American team travel a couple of hundred kilometres northward to a company situated at the foot of the Swabian mountains. They were sure that the only team that could master this challenge were the ambitious engineers from BURKHARDT+WEBER in Reutlingen, Germany. The initial contact between the Hughes Group and BURKHARDT+WEBER took place in 1958. The Americans submitted a proposal to combine the NC control they had developed in co-operation with the renowned M.I.T. (Massachusetts Institute of Technology) with a machine tool and to launch this new machine on the American market. At that time, one of the key factors for the contract was the favourable exchange rate of more than four Deutsche Mark to one US Dollar.

CUSTOMIZED SINCE 1888

The initial situation was demanding: To simplify the sale of the „BW MT 3“ on the American market, installation supplies as well as electrical and hydraulic control elements had to be of US origin.

The technical requirements of the Hughes Group were extremely challenging: the new machine had to approach automatically preset positions and to adjust cutting speeds and feed rates to the needs of the

working process. Another required feature was the automatic tool change from the magazine to the work spindle. The specialists from Reutlingen were entrusted with the concept and design of the machine. The NC control, consisting of radio valves and other electrical and hydraulic equipment, was provided by the Americans, which was also a precondition.

At that time, BURKHARDT+WEBER had no experience with NC controls and binary numbers. The machine tool manufacturer, however, recognized the enormous potential of this completely new machine control: the machine tool – up to then rather “sluggish” – was now highly flexible. Furthermore, there was a possibility to considerably reduce cycle times. After having passed through several preliminary studies, the final contract for the production of the NC controlled machine type “BW MT 3” was signed in 1958.

The feed drives were equipped with hydraulic axial piston motors and servo valves. Using ball screws the drive power was transmitted to the slide units. The „BW MT 3“ had a rapid feed of 200 inch/min (5 m/min). The control unit for the three main axes with all auxiliary functions was the size of a large wardrobe. The incremental control could only perform parallel axial movements. The machine consisted of three units: the universal unit (with a tool magazine for 30 tools), the automatic tool changer, the joint-spindle unit and the milling unit for difficult milling operations. The central table assembly performed two linear movements: one horizontal movement in X and one vertical movement in Y direction. The machining unit was assigned to the Z axis. A rotary table with 24 indexing positions was fitted on the column of the Y axis. A NC axis for rotary motions, however, did not yet exist. The rotary table was positioned using binary coded cams.

The universal unit consisted of one 3-step gear box, and shifted via a multi-disc electric clutch

arrangement. The spindle speed was 4000 rpm, driven by a variable-speed D.C. motor. The unit was equipped with a swivel head with two machining spindles, each angled at 60°. While the horizontal spindle was working, the tool in the inclined spindle was changed by a gripper unit. A tool changing time of only three seconds and the fact that the tool magazine was already in a position to store milling and boring tools up to a weight of 35 kilograms were absolutely sensational at the time.

During the international Machine Tool Exhibition in Paris in 1959, the machine was presented to the general public. It was the world's first NC controlled machining centre and created a sensation. A small-series production was started, whereas in 1960 the second machine series „MT 3A“ was equipped with a NC control based on a faster and more compact transistor technology. However, the stroke was still measured indirectly via ball screw spindles. In 1966 BURKHARDT+WEBER launched a further development, the legendary “BW MC 4” and some of these machining centres are still in use to this day.

So what followed from there? In the mid-sixties, Howard Hughes sold the rights of the MT 3 A to Japan, and thanks to their innovative and ambitious engineers, BURKHARDT+WEBER has become one of the major global players in the field of large machining centres.

AND TODAY?

The journey of the machining centre still continues, and developments are increasingly picking up speed in line with digitalization. There have been many other technical highlights at BURKHARDT+WEBER since designing the first NC machining centre. Our heaviest interlinked machine, such as the MCR 8000 – weighs an impressive 182 tons and measures 18 m in length. Our largest tool magazine has a capacity for 800 tools and can be expanded to accommodate thousands of tools with a background magazine. Our most precise machine – the MC μ – achieves tolerances of less than 10 μ , even for large cubic components over four metres in length.

1888

Founded by Louis Burkhardt and Johannes Weber as a textile and machine tool factory.

1908

New building in the Northwest of the city on today's location.

1923

Production of gang drills, column drilling machines and joint-shaft drilling machines.

1947

First major order from the Manufacture d'Armes, Paris.

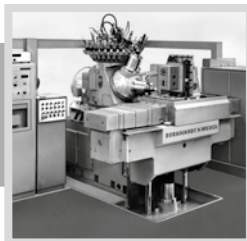
1951

Delivery of the first serial production transfer system.



1959

Presentation of the world's first numerically controlled machining centre.



1984

Market introduction of the MC series machining centres with variable matrix, rack type tool magazines.

2012

Acquisition by Indústrias Romi S.A. Brazil, on February 1, 2012.

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135 YEARS
BURKHARDT+WEBER

**strong.
precise.
customized.**

Publisher

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