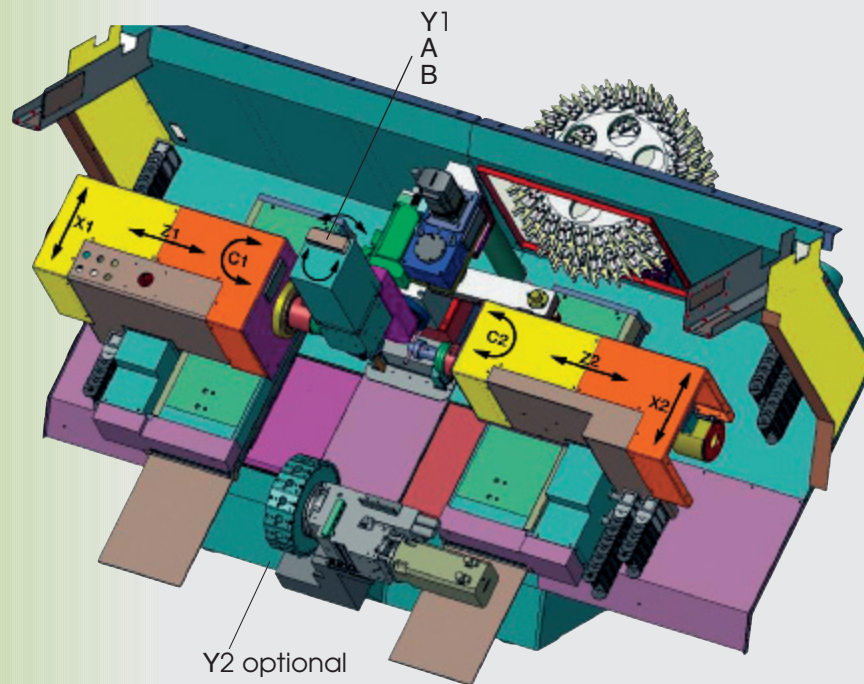


BENZINGER
obliged
to precision

BENZINGER
PRÄZISIONSMASCHINEN

Take5





Everything with the *Take5* machine series revolves around customer needs, complete machining, and solutions for your specific cases of application.

In order to also fulfil these requirements in the future, the *Take5* machine series combines high-performance, high-precision, modern technology into its compact installation surface. Specially-designed machine components like the machine string and the carriage, paired with high-precision-cut guide rails and circular racks give the machine optimal dampening qualities and superior machine rigidity. Combined with digital drives with the most modern control systems, the machine also fulfils the highest demands on precision and reliability.

Spindle bores are offered at 32 and 42 mm, whereas both the main and the opposed spindles are thermo-symmetrically integrated. Both spindles are designed as so-called motor spindles with their own cooling circuit.

For the complete machining of complex components, the *Take5* machine series is offered with an additional milling spindle that is built onto a Y / B axis unit. This milling unit works selectively on the main or opposed spindle. In combination with the amply-dimensioned tool changer for up to 52 tool holders and the additional 16-fold turret with individual position drive, complex tools can be machined simultaneously. An Y-axis is optionally also available for the 16-fold turret what allows simultaneous machining operations with both tool carriers in Y direction.

The design selected here has the advantage that only two axes must be built onto one another per machining unit (main and opposed spindle and the milling spindle). This leads to a very high overall rigidity of the total machine, ensures that all guides are very close to the machining point, and that force transmission points can be optimally designed in the guides.

In terms of precision, the machine corresponds to the very high demands placed upon us and our machines by our equally demanding clientele. Therefore the *Take5* falls seamlessly into the ranks of the existing Benzinger machine series, which is well-known for the highest precision and reliability on the market.

A very compact design of the machine is yielded, because the two working areas of the rotating spindles do not have to be arranged longitudinally behind one another. Thus the machine attains a length of only approx. 3 m at a depth of 2.2 m. The complete machine requires just 6.5 m² storage area, and that includes the tool magazine for the milling spindle.

The reduction in equipping times, the increase in flexibility and thus the increase in efficiency are the advantages of this machine solution.

As an automation solution, there is the possibility of equipping the machine with different automation solutions from Benzinger along with the use of short bar loaders. Of course the machine can also be automated through different robotic solutions.

The *Take5* brings you flexibility, efficiency, precision, and reduces your production costs, just as you would expect from Benzinger.



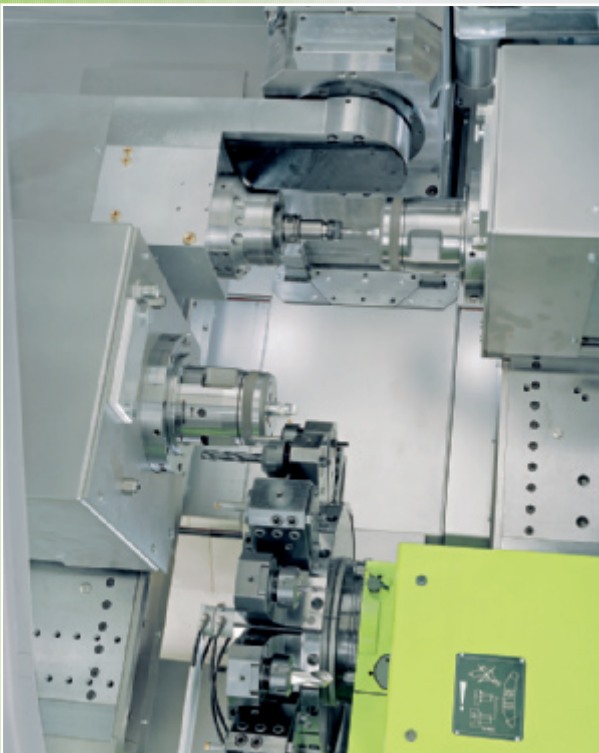
- While the milling spindle is machining on the main spindle, the opposed spindle moves downward in the X-direction and machines on the back side on the stationary turret. In this way the milling spindle can pivot above the opposed spindle collision-free for machining on the main spindle.

The machine is designed for simultaneous complete machining on the main and opposed spindles. The two rotating spindles are each designed on an X/Z cross table. The milling spindle, with a machining speed of up to 30,000 rpm, is mounted on a Y/B unit. The turret, designed as a star turret VDI 25 with 16 positions and individual position drive of all stations, is permanently mounted, centrally positioned below the two rotating spindles and can also be equipped with an Y-axis.

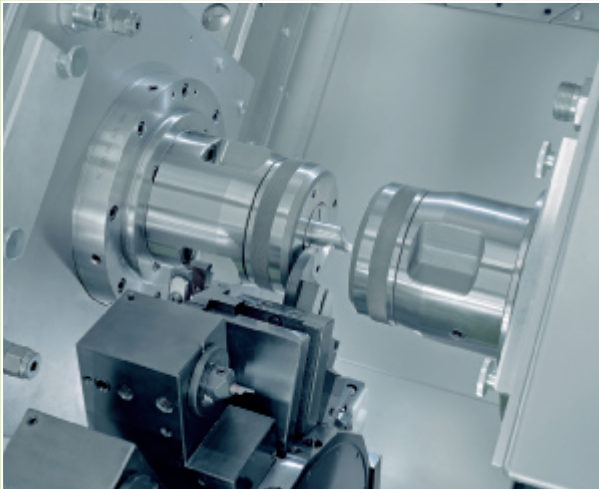
The milling spindle mounted on the Y/B unit, in combination with the cross carriage and the C-axis of the respective rotating spindle, enables the simultaneous machining of 5 axes per spindle. Depending on the design, the milling spindle can alternatively work on both the main and the opposed spindles. For each of the two rotating spindles a pivoting 90° angle of the milling spindle is available.

With the possibility of moving both rotating spindles cross-wise over the respective X-axis (stroke 370 mm) of the cross table in the working area, there are two work areas independent of one another for the machining. This facilitates the programming and setup of the machine considerably, because the machining progression of the other rotating spindle does not have to be borne in mind.

The workspaces of the main spindle and the sub spindle are arranged separately one after another in X direction so that collision risk during the machining is totally eliminated.



- While the milling spindle is machining on the opposed spindle, the main spindle moves downward in the X-direction and machines on the front side of the stationary turret. In this way the milling spindle can pivot above the main spindle collision-free for machining on the opposed spindle.



◀ **Transfer from the main to the opposed spindle, punching through the turret**

The work-piece finished on the main spindle is transferred by the clamp of the opposed spindle and then speed-synchronously punched by a punch tool in the turret. The transfer of profiled work-pieces is possible both angle- and speed-oriented. Concentricity deviations of $< 1/100$ mm arising with the transfer are possible.



◀ **Transfer from the main to the opposed spindle eccentrically, cutting off with the milling spindle**

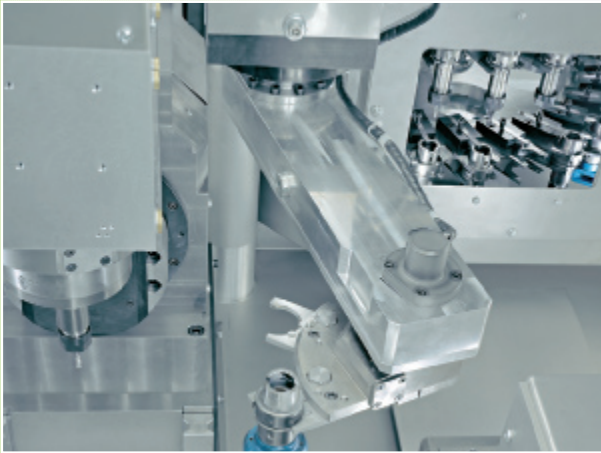
If a work-piece with an eccentrically-arranged gripping-possibility is finished on the main spindle, it cannot be punched between speed-synchronously rotating spindles. The work-piece is cut off of the remaining bar by a milling tool in the milling spindle. The radial runout of spindle 1 to spindle 2 is programmed through the two X-axes.



◀ **Bar feeder and part unloading**

Bar lengths of a maximum length of 1000 mm can be machined. These are fully-automatically finished through a short bar loading magazine, or also fed by a bar gripper in the turret. Depending on the work-piece geometry, the extraction to the necessary unclamping length is also possible through the opposed spindle. Therefore no additional application of other types of advancement is necessary.

Through a gripper on the turret, work-pieces can be removed from both the main and the opposed spindle in order to be placed on an unloading band that transports work-pieces out from the machine. The unloading gripper can be equipped with prism jaws or half-shells.



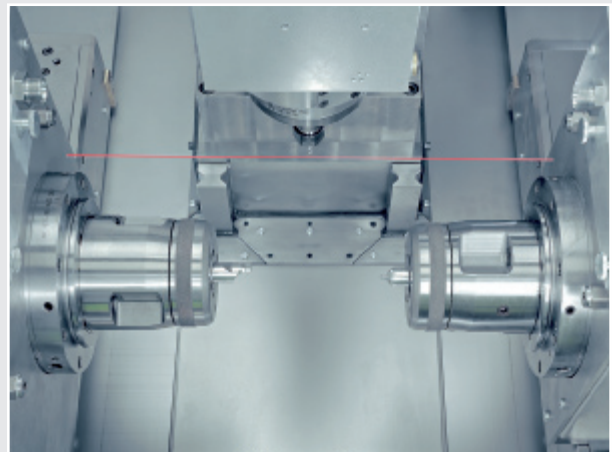
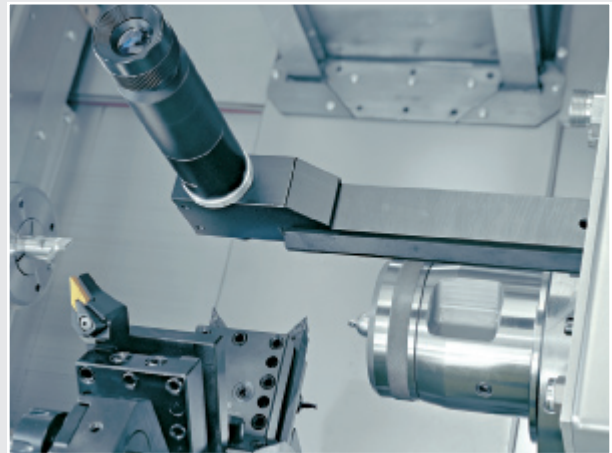
◀ Tool changer

The changing arm gets the next tool from the tool magazine production time-neutrally. During the tool change there is also the possibility of continuing work on the two rotating spindles with the turret that has been placed down. The tool magazine has space for 52 tool holders type HSK-40 for different milling and turning tools. The magazine capacity can optionally be expanded through the installation of an additional, external magazine.

Tool calibration ▶

The microscope serves for determining the tool correction data of the turret tools in the machine. For this, the microscope is placed in the protected holder on the respective spindle and the tool to be measured is positioned in the reticule of the lens. The correction data is now transmitted to the control at the touch of a button.

For calibration of the tools in the milling spindle, a laser sensor can be integrated into the machine. The tool lengths determined can be transferred to the correction memory at the push of a button. In addition, the laser can also be used for checking for tool breaks of the smallest tools.



◀ Control

With the Siemens Sinumerik 840D control, one of the most modern and high-performance controls comes into use with this machine. Filed multi-channel technology achieves the preconditions for clearly arranged program structures and thus for simple programming. Dynamic range limits reliably prevent collisions.

Tele-service and network connection are optionally available.

The control console is pivotable, positioned on a double-hinged carrier arm, and can therefore be turned for adjustment to an optimal position. In parked position it rests against the machine cladding to save space.

Technical data Take5

Travel path X-axes 370 mm	•
Travel path Z-axes 190 mm	•
Travel path Y1-axis 125 (-40/+85) mm	•
Travel path Y2-axis +/- 25 mm	•
Rapid-motion speeds X/Z/Y 45/45/5 m/min	•
Accelerations X/Z/Y 10/10/5 m/s ²	•
Feed force 3.500 N	•
Measuring systems X/Z/Y Glass scale	•

Main spindle

Motor spindles water-cooled, can be indexed for milling operation	•
Bar diameter 32 / 42 mm	•/o
Spindle speed 6.000 / 8.000 U/min	•/o
Power 15,5 kW (S1)	•
Spindle nose DIN 55026 A4	•
Clamping force pneum./hydr. 15 / 33 kN	•/o
Chuck size up to 160 mm	•
C-axes resolution 0,01° / 0,001°	•/o

Counter-spindle

Motor spindle water-cooled, can be indexed for milling operation	•
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Bar capacity 26 / 32 / 42 mm	•/o/o
Spindle speed 6.000 / 8.000 rpm	•/o
Power Starting from 12 kW (S1)	•
Spindle nose DIN 55026 A4	•
Pneum./hydr. clamping force 10 kN	•
Chuck size up to 130 mm	•
C-axes resolution 0,01° / 0,001°	•/o
Turret Star type tool turret VDI 25 DIN 69880	•
Number of tool positions 16	•

Individual drive of tools 6.000 rpm	•
Max. power 6 kW, max. 12,5 Nm	•
Measuring of tools Microscope	o
Milling spindle Milling spindle, water-cooled, can be indexed for turning operation	•

Spindle speed max. 30.000 rpm	•
Power 10 kW (S1)	•

Tool holder HKS-T40 DIN 69893	•
Tool changer Tool magazine for 52 tools inside / External expansion	•/o

Tool change time milling spindle approx. 5 s	•
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Measuring of tools Laser sensor	o
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Control Siemens Sinumerik 840D	•
Central lubrication Brease pulse lubrication	•

Coolant container 160 l	•
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Total connected load approx. 30 kVA	•
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Machine weight approx. 6 t	•
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Dimensions (LxBxH) 3.110 x 2.100 x 2.200 mm	•
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Pneumatic supply 6 bar	•
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Options: Coolant supply through the spindles	o
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High-pressure at the turret 30 bar	o
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High-pressure through the milling-spindle up to 80 bar	o
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Coolant filtraion 50 um / 30 um	o
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Coolant cooler Compressor / heat exchanger	o
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Chip conveyor Plate-/ drag-/ magnet belt	o
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Additional options: Tool monitoring Calliper Programmable pneum. clamping pressure Short bar feeder Pneum. operated bar feeder Bar gripper Teleservice Network connection Robot cells Automation solutions by Benzinger and much more	
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• Standard o Option	
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Modifications reserved, date 02/14

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