

Built-In Solution

Alphacam Accuracy For Swiss Watches

Production engineering solutions required by many leading Swiss watch-makers are installed in their CNC machines when they buy them.

Bumotec, based in the tiny Swiss village of Sâles just a few miles from the Prealp mountains, pride themselves on not simply producing standard machines. Almost every one they supply has been trialled by manufacturing the customer's parts on it, and comes complete with the Alphacam CNC programs for those parts.

All Bumotec machines are adapted to provide specific solutions addressing the individual needs of each customer, ranging from 3-axes to 38-axes, using Fanuc controllers for machines with up to 25-axes and Num controllers for those above 25.

Around half the time in the factory is spent on making the machines; the other half on programming and trialling to ensure each machine leaves the factory with the optimised CNC code installed for accurately producing the individual customer's range of complex components in the shortest cycle time.

Application Engineer Pierre-André Brulhart says they devote around two weeks to programming each machine with Alphacam code and undertaking full working trials, so it is ready to start production as soon as it is installed at the watch-maker's premises. "We don't just sell a machine, we sell a complete production engineering process."

With a Swiss watch containing up to 300 tiny moving parts between 0.15mm and 50mm, Bumotec's turning/milling machines that cut them have to reach a precision of around 4 microns of millimetre and must constantly repeat that accuracy. He says Alphacam is perfect for the type of micro-machining required by leading watchmakers such as Audemars Piguet, or Romain Gauthier, for example.

"The toolpaths can be created in a matter of moments and its numerous features and functions ensure watch-makers can easily produce the complex components they need." He adds that Alphacam is equally at home working with 38-axes as it is with programming 5-axis simultaneous milling.

A number of specialist macros for the watch-making industry have been developed by Alphacam's Swiss reseller MW Programmation. They include machining perlage (aspects of decoration such as circles, spirals and linear patterns); sequential numbering to



About The Company :

Name : Bumotec

Business : Machine Tool
Manufacturer

Website : www.bumotec.ch

Benefits Achieved :

- Provide Swiss watchmakers with toolpaths pre-loaded into their CNC machines
- Help Bumotec sell a complete engineering process
- Specialist macros for the watch-making industry

Comments :

"The toolpaths are created in a matter of moments, and Alphacam's numerous features and functions ensure watch-makers can easily produce the complex components they need. We don't just sell a machine, we sell a complete engineering process"

Pierre-André Brulhart
Application Engineer

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automatically generate serial numbers of pieces without needing to change the NC program manually; palpate, which defines exact placement of the piece before machining; and diamond settings, allowing parameters of the amount, size, and space between stones to be input.

MW Programmation work closely with Bumotec on every aspect of their customers' needs, including the macros, post processors, training and a technical support hotline. While Bumotec provide their customers with initial training on Alphacam if they need it, MW have two training rooms at their headquarters in Malleray, in northern Switzerland, where they can tailor both basic and advanced courses to individual customers' requirements.

Director Marcel Weber gives an example of where they worked directly with a Bumotec customer to address their need for machining parts by following the profile with a specific tool to create a chamfer. "As the main spindle doesn't have a rotation frequency it had to be angular controlled, so we developed a macro to control this all the way along the part."

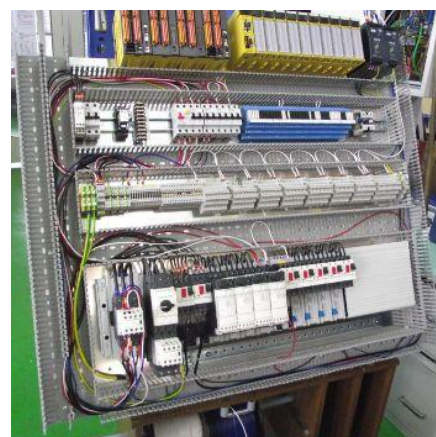
Not only are almost all Bumotec machines customised for their individual customers, but each post processor developed by MW for Bumotec is specific to the machine.

"As we use Alphacam to set the machines for creating the toolpaths for our customers' parts, we have four fully-trained users, and three other staff are now starting to work with it," says Pierre-André Brulhart. "Before the machine goes to the customer we work on finding the optimum way for them to produce their parts, and all the CNC programs are installed on it, and the post processor developed to be a unique driver specific to the CNC controller it's working with."

Bumotec Sales Manager Guy Ballif agrees with Pierre-André that post processors are especially important to prevent crashes. "The cost of repairs to such high tech machines would be extremely high. All our post processors are produced and checked by MW Programmation, and we always feel very confident about pressing the 'start' button, knowing the post processor will accurately translate the instructions from Alphacam into the specific requirements of our machines."

Alphacam is part of the Vero Software stable, and MW Programmation won the Alphacam Outstanding Achievement Award at Vero's 2012 Global Resellers Conference for their specialist vertical market dominance, 350 supported customers, and consistently gaining the highest revenue in the reseller channel.

A recent addition to Alphacam's functionality is a new Waveform 3D Roughing Strategy, which Marcel Weber says will be of particular benefit to the watch industry. "The new high speed machining



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technique maintains a constant tool cutting load by ensuring consistent tool engagement into the material. The tool moves in a smooth path to avoid sharp changes in direction, maintaining its velocity, dramatically decreasing the machining cycle time.”

This strategy, which is already proving popular with a number of MW's 1,000 clients across Switzerland, is superior to the traditional Roughing cycle where machinable geometry features are offset – inward or outward – by a stepover. Traditional tool paths have to run slower feeds and speeds because of the variable width-of-cut conditions encountered in corners. Tool load spikes as chip thickness increases in areas where the tool finds more material than it did while cutting in a straight line.

On the strength of their reputation in the watch industry, Bumotec have diversified into producing machines for other sectors requiring micro-machining, including medical, aerospace and jewellery. Currently operating with 160 employees out of 6,000 square-metre premises, there are plans to expand with a new modern factory nearby. Guy Ballif predicts a strong future for Swiss watches, thanks to their long-standing tradition. He says there will always be a market for fine, well-made watches which are accurate to within a second a month. And with such watches being fully mechanical and not electronic, there will always be a need for accurate micro-machining of the tiny complex parts, programmed with Alphacam – one of the most popular CAM systems in the industry.



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