Quarterly 2010 VOLUME 2 ISSUE 6

The CHALLENGER

Global quality and service system of metal working industry

"Ilha Formosa"

Global Outlook

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Mater--Portugal

Products

Innovative High Speed Machining Technology

The aboriginal boat of Orchid Island of Taiwan reveals the tradition and ancient spirit of Tao tribe

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DEAR READER,
The authors of "R&D zone" printed in 2010, Vol.2, Iss.5 is to be corrected as "JIN-JIA CHEN, KUANG-LUNG HUANG, JR-BIN JIANG and JIH-TAO HSU" .

Editor of "The Challenger"

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Welcome user's submission

of company profile, sharing Challengers' Products experience and pictures of people, products. Please send your story and pictures (images in high-resolution higher than 300 dpi) to your Challenger Factory Outlet or e-mail to t18@mail.buffalo.com.tw
Only English version is acceptable.

From the publisher

Recovery won't come to one who keeps waiting

I took two trips recently, one is to visit our subsidiary during the Chinese Lunar New Year and then I was talking with some major distributors of Microcut in European market. It's very easy to figure out the difference of their economic situation. Good news is that clients those who are still staying in the market. They have the job for 60%~70% of their productivity, although there are not many long term orders. The challenge looks more like the difficulty for client to get the loan. We hope that every government will recognize the importance of these industries in the long term and do some support to our field.

Microcut restarted the new plant project (No.8 factory) since second quarter of 2009. We are happy that we made the right decision as the big machines potential is the highest interest from the current market. We are pleased to see that the first building of No.8 factory is ready for production.
Buffalo used to produce 10~20 sets of the big machine such as HBM-5T, HBM-5TE, TT-40, VMC-2100, Twin spindle lathe T2/T3/T3.5 and BNC-5000/6500 series. We are proud to say that we are ready for double the quantity production when the economy recovers.

I was impressed with the topic from Mr. Peter F. Hartman of Holland Herald. He stated that the aviation industry has to adjust and develop at a high tempo. "Fast, faster and fastest" also seems to be bywords in the physical transportation these days. The speediest car can currently reach about 400 Km per hour, while the record for aircraft velocity is kept by a NASA research spacecraft, which achieved 7295 Km per hour 30 years ago. Jet fighters regularly break the speed of sound. So how can our industries only wait for the recovery of economy?

In a short time, an upgrade MCG-5X, V-20/26/30 VMC, TT-40 is going to be announced. These are going to be a group of smart machine range. A bed type borer and universal bed mills are coming to extend the range of these heavy duty machines. Microcut never sleeps, we are preparing our future!

Dr. Paul Chang
April, 2010

Welcome our new partner!

ITALMACC, started in machine tools business since 1999, first focused on second hand Italian and Europe machine tools. However, the market and clients change significantly after the increased prices of second hand machines from Europe and acceptance of China machine tools by many workshops, as well as free trade agreement between China-Chile, 0% tax for import duty the market in Chile. Though the price from China is competitive but their machines are still with some problems such as spare parts etc. So ITALMACC decided to introduce Taiwan machines with superior quality and service, also with competitive price.

ITALMACCs' most important supplier is Buffalo Machinery. Buffalo´s high quality heavy duty machine is perfect for Chile market. In Chile, as more south American countries are now switching from conventional machines to CNC machines, Buffalo´s has great potential for growth in Chile. ITALMACC is confident of developing its market with CNC machines from Buffalo machines in 2010. Also now the leasing companies are more flexible like 2009, then in 2010 many people have the chance to buy quality CNC machines from Taiwan at competitive price.
For more info, please visit the website http://www.italmacc.cl/

Spindle vibration monitoring and compensation on HBM series borer

Microcut introduced a new "Spindle Vibration Monitoring Technique" on HBM series with the advantage of longer spindle life and better machine performance.

The technique will be great benefit in shooting the typical spindle failure caused by a number of factors such as lack of lubrication, an inadequate cooling system, incorrect tool path programming, automatic tool change alignment, extended periods of running at high speeds or even a fatal crash of the machine. The improvement can prevent a poor surface finish, vibration or excessive heat built up within the spindle or a seizure of the spindle under extreme condition.

In this new function, a safety device is built in the spindle, it is designed in monitoring the vibration message to the CPU which operating the spindle of an impending failure based on normal spindle operating parameters. A piezo transducer generates a very small amount of voltage, and the output of the charging amplifier will be able to generate a readable value of voltage to CPU, which can be used to control the vibration to a safety level.

The resultant action of the CPU could either slow the spindle revolution or stop it completely. It depends on the severity of the known parameter deviation prior to work piece damage or catastrophic spindle failure. All of which would extend the life of spindle. A highly sensitive control with analysis technology has been developed. Once the spindle develops a problem, the CPU will be able to identify the problem, determining the severity of the problem, and output an appropriate action under the following conditions:

(1)Shut down the machine when the critical level of acceptable vibration is reached, this would be considered over-heat threshold of spindle.
(2)Give an alarm message if it is over acceptable level.
(3) Give an error message if it reaches warning level.

The spindle speed will be reduced if the above conditions (2) and (3) are reached, allowing extended production or spindle replacement prior to catastrophic damage. All of which would increase productivity and minimize the maintenance costs. Additionally, labor costs can be reduced by the monitoring time eliminated.

Smart machine technology is the recent process which Microcut RD team is working on. This is going to be the key to support higher speed machining technology. The first machine will be announced before summer, 2010.

Global Outlook
PORTUGAL

Portugal, a country with a rich history of seafaring and discovery, looks out from the Iberian Peninsula onto the Atlantic Ocean. Portugal became a member of the European Community, the EU, in 1986.

LOCATION

Standing at the crossroads of Europe, Africa and the Americas, Portugal enjoys privileged political, economic, diplomatic and commercial relations worldwide. It is a member of the Organization of Economic Cooperation and Development (OECD), the International Monetary Fund (IMF) and the North Atlantic Treaty Organization (NATO).

THE EUROPEAN UNION

Having been a full member of the European Union since 1986, Portugal is now one of 15 full-fledged members of the European Monetary Union (EU), which started operating in May 1998. On the heels of that, the Euro became its currency as of January 1, 1999. Moreover, as an EU member, it is also a full partner in the world's largest economic market. Portugal was a founding member of the European Free Trade Association (EFTA). Even now, it still counts its EFTA neighbors (alongside its EU ones) as major trading partners. There is no restriction on the free flow of goods, services, and capital between Portugal and its EU neighbors.

THE ECONOMY

In the wake of its accession to the European Community, and up until 1990, Portugal was Europe's fastest-growing economy, with an increase of 5.5% in GDP recorded in 1989. GDP rose an average of 4.4% between 1985 and 1989 - much more than for any other European country. More, in fact, than the US (3.4%) and Canada (4.1%), and nearly as much as Japan (4.5%). During that period Portugal rapidly brought its social and economic indicators closer to EU averages.GDP growth stood at 1.9% in 2007, and declined to 0% in 2008. In 2009, the rate of growth is expected to decline to -3.7%, and to stand at -0.8% in 2010.
Inflation stood at 2.4% in 2007 and 2.7% in 2008. That figure is forecast to be -0.3% for 2009, with it also being expected to grow to 1.7% in 2010.

THE POPULATION

With a population of 10.617 million, Portugal's unemployment rate stands at 9.8%. Although a medium-sized country by European standards, Portugal does, however, represent access to a free market of around 450 million consumers, in light of the free movement of goods, capital, enterprises, and people between all the 27 EU countries.

A MARKET-ORIENTED GOVERNMENT

Portugal has a democratically-elected parliamentary government, whose investment policies are pro-business and pro-foreign. The government assures the repatriation of profits and capital invested in Portugal. It also grants foreign investors equal access to all the country's economic sectors.

PRIVATIZATION AND DEREGULATION

Portugal is still finalizing the privatization of state-owned assets. This takes in banking, industry, insurance, and other types of companies nationalized following the 1974 change in the political regime. Deregulation of Portugal's monetary, capital, and foreign exchange markets has already been put in place.

A PRODUCTIVE, LOW-COST LABOR FORCE

Portugal boasts Europe's most cost-efficient workforce. In addition, it has one of the youngest populations in Europe. Productivity in industry and services is high and, as new technologies and management skills are introduced into the economy, that's steadily increasing. Highly educated, versatile, and skilled, the Portuguese workforce is also an internationally competitive one. Furthermore, Portugal enjoys a low private-sector strike rate.

INFRASTRUCTURES AND NATURAL RESOURCES

Portugal has been undergoing an extensive infrastructure-upgrade program, with major investments in communications and transportation facilities and networks. Taking advantage of EU funding, a broad range of infrastructures in rural and less developed areas of the country have been improved. Portugal is home to extensive natural assets, including Europe's largest lumber resources. These are being managed and environmentally developed for economic growth.

AN ATTRACTIVE PLACE TO LIVE AND WORK

Portugal offers the foreign investor a country with friendly, hospitable people, a moderate climate, a comfortable living environment, and one of Europe's lowest crime rates. A country with a rich historical and cultural background, not only does Portugal boast modern, cosmopolitan cities, but quaint fishing villages, beautiful beaches and resorts too. Lisbon is one of Europe's most beautiful cities.

Tower of Belem, Portugal

... AND 'FORMOSA', NAMED BY PORTUGUESE SAILORS ...

It was not until the 16th century when Taiwan, hidden for ages in the trackless sea, finally began to attract the attention of powers beyond her shores. A number of foreign forces, both European and Chinese, came and shaped Taiwan's destiny. The European Age of Exploration began in the late 15th century, and Portuguese explorers seized the initiative and explored down the coast of Africa to the Cape of Good Hope, thereby discovering a route to the East. In the 16th century, they extended their travels to the coasts of China, and on the peninsula of Macao founded a permanent settlement. Macao soon became an important international trading post, which the Portuguese used as a base for trading expeditions between India and Japan.
In 1542, Portuguese sailors on their way to Japan came across an island not identified on their maps. Amazed at the forest-cloaked land, they shouted, " Ilha Formosa," meaning "Beautiful Island." The island had thus come to be known as Formosa, which was to become what we know today as Taiwan.


Luis Moreira, MSc/CEO

MATER S.A. is a recognized company among the machine tools sector, and is established since 1995 in Portugal. It assumes a relevant market position as one of the biggest importers and distributors of industrial equipments for general production and mould makers companies. Its organization includes two locations with offices, wharehouses and show-rooms strategically distributed in the Portuguese country, in PORTO and LEIRIA cities, nearby the main industrial areas where mould makers customers are placed (Oliveira Azemeis and Marinha Grande).

As a partner for high-tech industries, MATER pursuits the goal of providing complete professional and technological solutions at the highest level to their customers, normally with high skills and very demanding and justified expectations, due to the quality and reliability required to their products, and also the technology.

MATER represents and distributes some of the well-known manufacturers worldwide. It has offered since the beginning the reliable and innovative support for the success of many companies that are standing at the highest European level.

MATER® TECNOLOGIA INDUSTRIAL

Distribution

MATER® TECNOLOGIA INDUSTRIAL

The global team of 20 highly skilled technicians is the base of success of MATER company. Customer satisfaction is the goal of all activities. Dedicated attention is paid to the quality and choice of products offered, as well as to the after sales support, that is normally leading to closest relationships with manufacturers in order to achieve the best performances of installed equipments.

A permanent stock of approx. 20 sets of Microcut – CHALLENGER machines of all types, is a clear and confident demonstration of this team to the convincing performances of these equipments, and it's a continuous commitment and cooperation, providing adequate equipments to meet market requirement.

The presence in all important exhibitions and open-house shows is always showing the wide range of products of MICROCUT – CHALLENGER.

MATER is proud to announce the success achieved with installations of MICROCUT / CHALLENGER high speed V-series, as well as with fantastic performances of 5 AXIS MCG-5X Gantry type machining centers, built for high level requirements and certified by the most quality demanding end-users.

The fast reaction to any problem reported by customer is a priority in After Sales team. The success key for a good response lies on the solution of some more complicated problem, good connection with manufacturer support and fixing any problem in the quickest time. The global service always attracts the customers when deciding new investments. That´s why we thrust in the future !

Achievement of best service begins indoors, equipments are rechecked before installation at end users. If necessary, specialized services of adjustment are realized (parameters, kinematics, etc.). All most advanced techniques for measurement and correction are available, such as ball-bar and laser interferometer.

All means for transport and installation of machines at customers are owned by MATER, including truck with crane, fork-lift and all other necessary materials.

Every installation is normally executed on a basis 'Key in hand', where the full responsibility for the good behavior of the machine must be taken by the selling representative company, as well as for the guaranty on the product.

Distribution

Rafael Ruivo, President, CEO ,
is the company's face near the customers since he took over management of Lismolde in 1980. He joined Lismolde in 1961, at the age of 14 years only. Today, at the age of 62, Rafael Ruivo associates his own route to the company's route, to which he devoted his life. He has overcame crises, difficult times, but has also celebrated victories. Never dropping his guard, always considering strategies and setting directions. Throughout his history, he reveals, "it was always necessary for the company to adapt and develop strategies to deal and overpass incoming obstacles."

Lismolde : 50 years history of innovation

With Half a century of activity, Lismolde always has the mission of providing all customers with excellent service, support in the priorities of the company: continuous improvement and concern for each employee.
The company's activities are driven by a set of values and success key factors: professionalism, teamwork, respect, ethics, commitment and innovation.

Lismolde found its way to grow, taking the right steps, without risky adventures until the present day and was able to establish itself as one of the greatest success example in a very competitive industry as the moulds sector.

The company was founded in 1959 in Leiria, Portugal. It had then five employees, and it was left in charge of Victor Alexander and Rafael Ruivo. It was by their hands that the company has figured out a strategy and carried on successfully through the decades.

The 70's was a difficult period, since there was a business reduction with the United States. But the early 80's marked a new direction, with the introduction of new products and markets. Lismolde had then 60 employees.

A focus on markets, quality and constant adaptation with technological development are the major factors of the company's success at present. Even at the time when the global financial crisis continues. Today, Lismolde is a group of companies, preparing to provide wider responses to their customers. And with its 86 employees and the new generation of managers starting to take over the command, Lismolde is preparing to embrace new areas and challenges.

Companies group provide an excellent service to the customer

The strategy of Lismolde passed, since the 80's, by extension of the services and, consequently, the creation of new units. Today there are five companies, providing completing services and thus avoiding to subcontract and, ensuring a better control of the products' quality manufactured there, improving their work flexibility and a faster response. In the point of view of the president and manager, Rafael Ruivo, this progress is part of the idea of ensuring an excellent service to the customer. Lismolde Group has now several units:

- Lismolde1: the mother company. It is a combination of know-how, efficiency and technology. Able to produce prototype molds and in series with the best quality, above five tons.
- Lismolde2 : It is the newest company of the group and the example of the new generation in the moulds production. It was founded in January 2005, emerging to join the know-how acquired over the years with a new capacity for human, physical and technological resources, with new processes and innovation in customer service. Preparing to enter into market niches with high technical complexity, such as aeronautics and medicine.
- Unitecmol: specialized in technical moulds of small size and high technical precision. It is equipped with high speed and high precision machines.
- Molfatec : making structures for moulds in order to create synergies and provide the group's partners a greater flexibility and responsiveness.
- Temoinplás : It is a mould producing and testing company, with the aim to provide the group a more complete service to the customer. Enables the quality of the final product production, improves delivery times, ensuring confidentiality and customer privacy.

Training is essential to increase productivity

The need for training staff has always been a concern of Lismolde group leaders. But the answers have substantially improved with the admission of C?tia, Marco and Sandra Ruivo. They have created hpla? working at the premises of Lismolde2 in Porto de M?s. In addition to meet the training needs within the group, the training and consultancy company have also attracted a large number of professionals from other industrial units in the region.
Sandra Ruivo explains that the creation of this small company meets two needs: on one side, it enables greater efficiency of Lismolde2 area that was not being used; on the other hand, it enables the creation of a set of training responses that were only available in cities such as Lisbon or Porto.

Two years after its creation, Ahpla has greatly evolved. And with visible results, especially for companies that use it for training. "It benefits the employee, which turns out to be advantageous in terms of performance, with productivity improvements" says the leader.

Regarding the company's future, Sandra Ruivo says that Ahpla wants to evolve as the market requires. "The market is competitive, there are many companies that provide training. But not all with the same quality," she states, considering that this factor has always been the top priority of Ahpla.

Cátia Ruivo advocates, that "the idea is never stop. Always be on the recycling process, with new knowledge", considering that for the perfomance improvement of companies this is "fundamental. " This position is shared by Marco Ruivo. The manager believes that "a company must be, increasingly, a working group. And this group must be trained and motivated to keep the company forward."

Latest acquisition of Lismolde for new strategic and high-tech fields : The Challenger MCG-5X

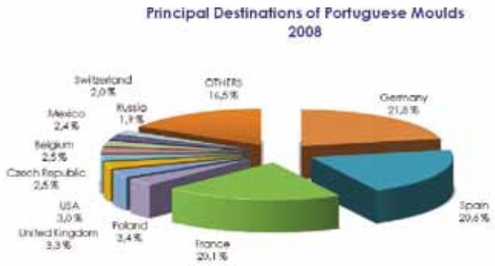
Pursuiting the policy of preparing the company to face new highly technological and demanding markets, such as aeronautics and medical fields, Limolde has chosen the Microcut/ Challenger MCG-5X Gantry Machining Center to materialize and enhance the 5 axis machining know-how of the company. Considering the high performances and dynamics of this 5 axis machining center(MCG-5X), built to provide a top level response to high quality requirements of precision and surface finishing. After a very dedicated process of selection among other top products in the market, Lismolde´s choice was made. As the executive manager Marco Ruivo said, "for the best ratio price/performances, always considering the uncompromising quality required by Lismolde, but also considering the assurance of qualified after sales support ".

THE PORTUGUESE MOULD MAKING INDUSTRY

The Portuguese Mould making Industry has grown and come to consolidate its good reputation in the international market, which was stimulated both by the external demand and by competitive prices, quality and delivery times.

Nowadays, the Portuguese Moulds Sector has about 600 mould making and special tooling SMEs which provide jobs for about 9,000 employees, and is geographically distributed between Marinha Grande (LEIRIA) and Oliveira Azemeis (PORTO).

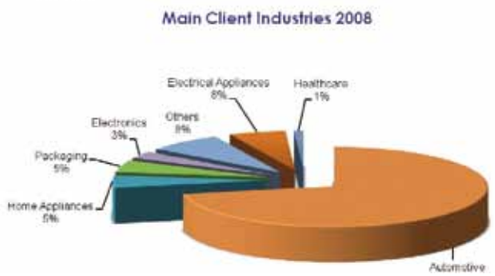
Portugal is among the world's largest mould makers, particularly when it comes to moulds for plastic injection, and it exports about 90% of the total output. The evolution analysis of the trade balance throughout the 90's and the first years of this decade show the Sector's strong vocation export.



In 2008, exports were as high as 343 million Euros out of a total moulds output value of 377 million Euros, what shows how Portugal has, throughout years, been able to adapt to its customers needs as well as to the markets and to the technological evolution.

Portugal is one of the main suppliers of precision moulds for the plastic industry, and in 2008 mainly exported to Germany, France, Spain, Poland, United Kingdom and USA.

When it comes to the importance of the economic regions, the EU market maintains its preponderance, representing in the latest years about 81% of all exports. It is important to underline the decrease of the USA/Canada block during the last years. This decrease is essentially explained by the delocalization of client-companies existing in this market and their re-localisation in countries with low labor costs. The depreciation of the US Dollar against Euro is also one of the causes of this fact.



The last statistic data concerning the main industries supplied by the mouldmaking sector highlight both idea that toys, electric material and office material have lost relative importance or almost disappeared as customer Sectors, and instead the automotive, aeronautics and energy are playing a big role as they increased from some mere 14% in 1991 to 72% in 2008.

Distribution

all-round solutions--

Braarup
Maskinfabrik AS

The 110 years company is highly respected in the market due to the fact that Braarup Machine Factory production facilities are under constant improvement and expansion, which enables the company to produce almost anything.

Braarup Maskinfabrik AS was founded in the year 1898 as a small blacksmith, by the Pedersen family, this family continued developing the company within welding, cutting, and bending steel products as a sub-supplier.

In 1996 the company was bought by the Thomasen family, and hereafter its development to a machinery sub-supplier speeded up.

Braarup Maskinfabrik AS, with more than 110 years history, skilling in engineering and all-round solutions - whether this is in connection with a turn-key, as a subcontractor or consultant. The company has participated in a wide range of projects both in and outside Denmark.

In 2005, this highly respected and 110 years history Braarup maskinfabrik AS chose their their first milling machine from Buffalo Machinery **(VM1300)** and then decided to continue their orders.

"This machine from Buffalo proved to be very accurate and reliable, and made our production of smaller parts even more effective. The high pressure internal cooling being one of many factors speeding up the productivity." *said Michael Thomasen, CEO of Braarup Maskinfabrik AS.*

all-round solutions--

Braarup
Maskinfabrik AS

In 2007 Braarup Maskinfabrik AS purchased the first **HBM 4 boring and milling machine**, with continuous running table, horizontal milling head and W-axis support sleeve from Buffalo.

"This machine had since been running in 2 shifts (8+8 hours from Monday to Friday). And have from day 1 produced 100 %. The product variety offered to our customers has since 2007 increased in the way of bigger and more complicated parts." *commented Michael.*

With its constant investment in the high quality CNC machines, today Braarup Maskinfabrik AS is a leading sub-supplier in Denmark, producing parts in stainless steel, steel, brass, copper, cast iron and aluminum.

"In the future, Braarup Maskinfabrik AS will continue to support customers with high quality products produced on high efficient CNC machines such as Milling machines from Buffalo Machinery." *said Michael.*

Marketing Zone--
Marketing Management

Paul Chang and Christine Chiu

Developing a winning go-to-market model isn't easy for manufacturers, because few are well positioned to provide what demanding customers want according to our 30 years marketing experience.

First, makers have to declare the market demand of the distributors and to decide the market position and specification. Then, an acceptable reasonable price and market share are to be determined.

The management department should decide the production procedures to be mass production or limit quantity and control percentage of its production share.

Where do you want to go?

To move closer to the future picture of the company's product line and set up the annual plan. The forecast of sales volume, the analysis of market and industries are very important for developing the production plan.

Makers need to analyze the potential market and industries to plan the production share of different types of machines and share of each market or area. Then the sales team makes the plan with the distributors.

After this planning, makers are able to set visions or targets for their products.

Market research and forecast

The source of sales forecast comes from the industrial public associations such as European CECIMO or American AMT (The Association For Manufacturing Technology), government database, and the front-line sources. Here makers will focus on the front-line forecast technique. Salespeople provide estimates by area, region or industry. Around one-quarter of every markets have to do with demand forecasting—for instance, "How many potential customer will buy BNC-5060 in the next three months?" An example of market analysis form is shown in Table.1. Table.2 and Table.3. (The Table.1 example can be applied on Table.2 and Table.3)

Table.1 Sales forecast form by area

Sales volumes($)	Product A		Product B		Product C	
Account	Sales	Target market share	Sales	Target market share	Sales	Target market share
Distributors A	$ 1,000	20%	$ 6,000	50%	$ 400	30%
Distributors B	$ 2,000	50%	$ 7,000	40%	$ 1,200	10%
Distributors C	$ 1,500	30%	$ 8,000	30%	$ 3,000	40%

In example of Table 1, the salespeople should work closely with distributors for each major area for selected products, with their best estimate of the target market share of closing the sale during the upcoming year/quarter. The form can be adapted to include volume rather than dollar revenue, annual rather than quarterly estimates, or other industry-specific variables. The sales manager can calculate the expected value by multiplying the sales estimates for each product by the relevant target market share. In the example, the expected sales of Product A would be $1,650 (the sum of the sales times the target market share for each customer, $1,000X 20%+ $2,000X 50%+ $1,500X 30%). Customers can also be surveyed directly to assess their probable purchases by product or the entire line.

This sales forecast is particularly useful for new products. Concept testing, in conjunction with purchase intention surveys, can be a reference for the new product development.

Table.2 Sales forecast form by industry

Sales volumes($)	Product A		Product B		Product C	
Industry	Sales	Target market share	Sales	Target market share	Sales	Target market share
Automotive	$ 1,000	50%	$ 6,000	50%	$ 400	30%
Aerospace	$ 2,000	30%	$ 7,000	40%	$ 1,200	10%
Power generation	$ 1,500		$ 8,000	30%	$ 3,000	40%

Table.3 Sales forecast form by region

Sales volumes($)	Product A		Product B		Product C	
region	Sales	Target market share	Sales	Target market share	Sales	
North region	$ 1,000	20%	$ 6,000	50%	$ 400	30%
Mid region	$ 2,000	50%	$ 7,000	40%	$ 1,200	10%
South region	$ 1,500	30%	$ 8,000	30%	$ 3,000	40%

Reference:
- L. Gorchels, The Product Manager's Handbook: The Complete Product Management Resource (3nd edition)" NTC Business Books, 2005.
- https://www.mckinseyquarterly.com/ghost.aspx?ID=/The_promise_of_prediction_markets_2114

Innovative High Speed Machining Technology

Typical spindle failures are caused by numbers of factors such as lack of lubrication, an inadequate cooling system, incorrect tool path programming, automatic tool change alignment, extended periods of running at high speeds or even a fatal crash of the machine tool. Those failures could results in a poor surface finish, vibration or excessive heat build up within the spindle or a seizure of the spindel under extreme condition. In any event the exact cause of the failure is usually difficult to be detected and cause trouble between manufacturer and end users.

To solve the problem, a spindle vibration monitoring & thermal deformation compensation and control system are developed.

1. Spindle vibration monitoring

Spindle vibration control:

- First level shows the warning message when the vibration occurs and notifies the operator.
- Second level will show the warning message and shut down the machine after a setting time period set.
- Third level is when crash occurs, the machine will be shut down immediately. Further damage is prevented.

The benefits of this system are the assurance of fine finish of the workpiece and protection of the spindle lifetime endangered by vibration. The danger can be detected immediately once the tool is damaged or worn down. (Fig.1 shows the vibration monitoring report & Fig.2 shows the Vibration Control flow chart)

2.Thermal deformation compensation and control system

The control system are achieved by

- compensating the error occurred from temperature rise by axial displacement and preventing mechanical thermal deformation.
- The spindle speed and axial feed rate are reduced once the temperature increase is detected by the sensor, preventing the thermal deformation on machine.

3.The thermal growth compensastion on spindle

A displacement measurement meter is placed in front of the spindle, detecting the position of high speed spindle and feeding back to CPU, modifying the related axis.

The compensation of spindle thermal growth can reduce the thermal deformation resulting from heat under high speed, increasing the machining accuracy, reducing warm-up time, energy consumption and increasing the working efficiency of vertical machining center.(Fig.3 shows the Thermal compensation flow chart)

All inclusive in Microcut's "Smart machines" !!

The Smart Machine integrates the above three unique techniques. It also records the detailed data of operation situation such as the timing and the content of error message.

The benefits of the smart machine include:

- **Ensure the surface quality of workpiece.**
- **Optimize the cutting condition automatically and attain the accuracy of machining.**
- **Reduce possible tool worn-out.**
- **Ensure the lifetime of machine.**

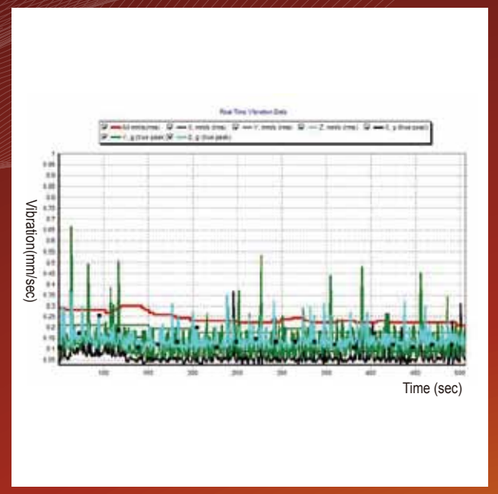


Figure 1. Vibration monitoring report

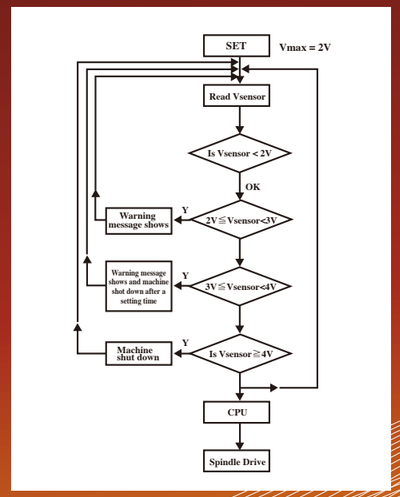


Figure 2. Thermal compensation flow chart

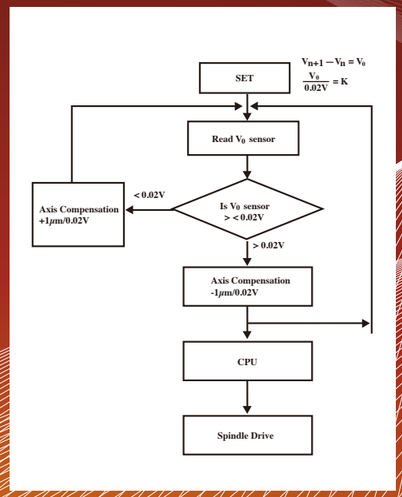
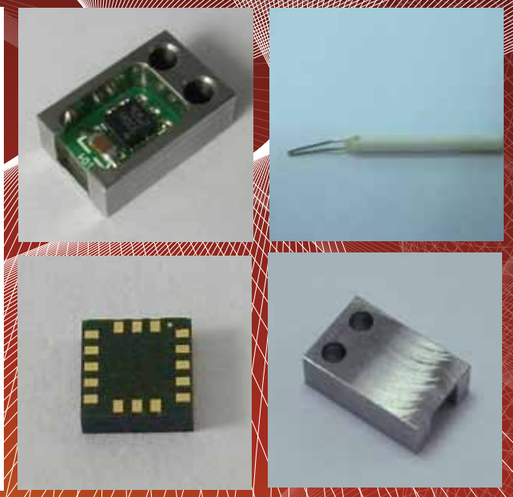


Figure 3. Vibration control flow report



▪ Sinumerik system platform

CNC Innovations for the 21st Century

The new Sinumerik 828D complements the unique, consistent Sinumerik CNC portfolio for every production-related task.

The financial crisis has left its mark on virtually all areas of the economy, and the machine tool market is no exception. The best opportunities for surviving the crisis relatively unscathed can be found in innovative concepts for the manufacturing industries – including shopfloor production, tool- and mold-making, the aerospace sector, power engineering as well as the automotive industry and medical part production. All these industries share a common trait: They have to utilize new and innovative machine tools to implement forward-looking projects, be it for machining processes, such as milling, turning and grinding, or for forming and laser cutting. Automation and drive technology is crucial in all of these processes.

Integrated technology for all machine tool applications

The unique CNC portfolio unveiled at this year's EMO in Milan features impressive universality, robustness, openness, modularity, scalability and ease-of-operation. Through integration into a continuous CAD-CAM-CNC chain, Sinumerik enables productivity gains right from product design and tool setup. Considerably shorter implementation times are another benefit, a great advantage especially with time-to-market becoming increasingly important in international competition.

The core components of the Sinumerik platform are the CNC controllers. Machine manufacturers can choose from three categories – entry-level, compact and premiums, so there is a matching Sinumerik machine tool control system for the specific requirements of the machine tool operator. All Sinumerik solutions are equipped with drives from the Sinamics S120 drive series and matching motors.

Even the entry-level CNC control system, the Sinumerik 802D sl, provides all functions necessary for the main applications in three-axis turning, milling, nibbling and grinding. The open and flexible Sinumerik 840D sl CNC system represents the high- ▸▸

performance or premium class of CNC systems from Siemens. It features a distributed, scalable, fully open and network-capable architecture. Its wide range of functions makes it suitable for use with virtually all kinds of technology, for up to 31 axes.

The brand new Sinumerik 828D is positioned right between these two performance levels. With its compact, strong and simple design, it sets new standards in the compact category of CNC systems. The 828D has extremely small dimensions so it can be easily integrated into the most compact of machines without compromising usability and performance. 80-bit NANO[fp] precision enables maximum hardware performance and system functionality even in the compact CNC segment, thus allowing machine concepts with a degree of precision in the range of 0.1 µm. And high performance does not have to mean complexity; on the contrary, the new Sinumerik 828D is extremely simple, both to set-up and operate.

Milling expertise

Siemens has combined its wealth of milling expertise with powerful CNC hardware, intelligent CNC functions and the unique CAD-CAM-CNC process chain to create Sinumerik MDynamics. The MDynamics technology package provides the latest technology-oriented milling solutions for both the Sinumerik 828D and the Sinumerik 840D sl. For the Sinumerik 840D sl, Sinumerik MDynamics is available in both a five-axis and three-axis version. The new, compact Sinumerik 828D CNC already includes a technology package for three axes. All versions feature "Advanced Surface", an innovative function that enables users to achieve practically identical speed and contour profiles in milling free-formed surfaces. This results in extremely smooth workpiece surfaces and eliminates costly and time-consuming manual finishing work.

Integration in operation and programming

A further highlight of the Sinumerik 840D sl and Sinumerik 828D CNC control systems is Sinumerik Operate, the new, integrated operating and programming interface. Sinumerik Operate combines the existing user interfaces for shopfloor applications, HMI Advanced, ShopMill and ShopTurn into a single, inte-

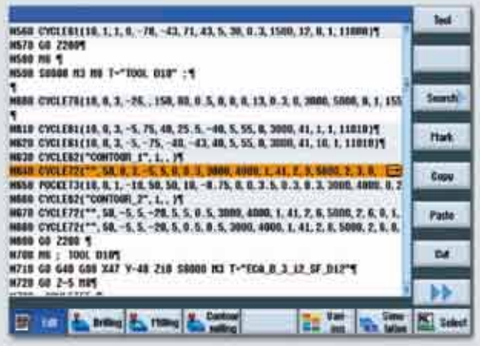
Compact, strong and simple – Sinumerik 828D

The new Sinumerik 828D is tailored to the requirements of sophisticated machine tools typically used in a modern job shop. The milling version is perfect for machining centers right up to machining operation with statically swiveled workpiece levels. Featuring Advanced Surface, an innovative method of controlling both path and speed, the Sinumerik 828D is also perfectly suited to machine challenging mold-making workpieces. The turning version is designed to meet the requirements of inclined-bed turning machines with a machining turret, and the range of functions even extends to machining with a Y-axis and counter spindle. An extensive CNC programming package makes the Sinumerik 828D perfectly ready for all global CNC consumption markets. During development, the key design requirements were compactness, optimum performance, extreme ease-of-use, and simple commissioning and service.

Highlights:

- Compact and robust control panel-based CNC in horizontal and vertical versions
- Maintenance-free design without a hard disk, fan or buffer battery
- Easy operation thanks to a high-resolution 10.4" color display and full QWERTY keyboard
- Maximum machining accuracy with 80-bit NANO[fp] precision
- Intelligent kinematic transformations for milling and drilling on the workpiece end- and lateral-faces, as well as in any swiveled level on milling machines
- ShopMill/ShopTurn: extremely short programming time when manufacturing individual parts and small batches
- programGuide: extremely short machining time and maximum flexibility for large-scale production runs

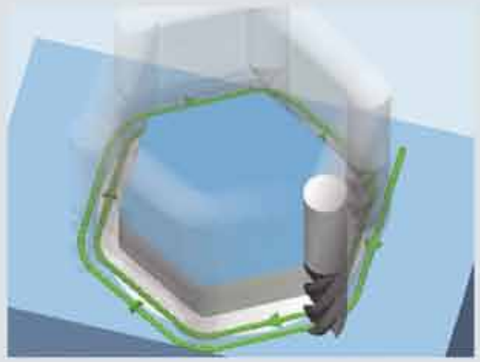
Easy Message: a SIM card and a user profile with his mobile phone number is all the user needs to receive the production status of his machine via text message (SMS)



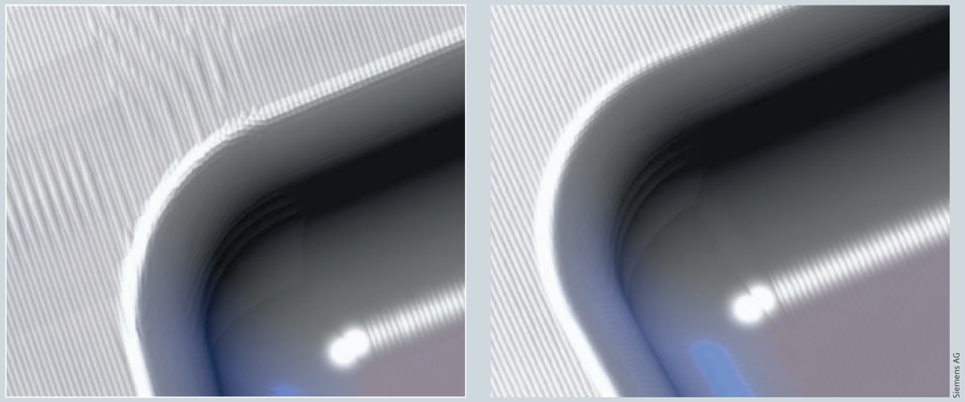
With programGuide, CNC programs can be generated quickly and easily – including the integration of the technology cycles

- Maximum compatibility thanks to an integrated online ISO dialect interpreter
- Unique range of technology cycles – from machining user-defined turning and milling contours with residual material detection right through to process measuring
- Animated Elements: unique operating and programming support with moving image sequences
- State-of-the-art data transfer via USB stick, Compact Flash (CF) card and factory network (Ethernet)
- Easy Message: maximum machine availability owing to production status monitoring by text message (SMS)
- Simple commissioning thanks to technology-specific system software with optimum pre-defined parameters
- Easy Extend: simple retrofitting of optional machine components without the need for specialist CNC knowledge

Together, these properties mean that the Sinumerik 828D is setting new standards in the category of compact CNC systems for the shopfloor.



With Animated Elements, the user can keep precise track of the motion path



Siemens AG

Without Advanced Surface (left) and with Advanced Surface (right):
the difference is startling – Advanced Surface produces surfaces that are as smooth as glass

Sinumerik MDynamics – milling expertise

Sinumerik MDynamics is available in combination with the Sinumerik 840D sl NCU 710, 720 and 730 variants as a technology package for three-axis milling machines and a technology package for five-axis milling machines. The new Sinumerik 828D is available in a version that features integrated Sinumerik MDynamics software.

The centerpiece of all versions is the new "Advanced Surface" intelligent path control.

Highlights:

- Optimized "look ahead" feature that ensures even greater speed and precision, enabling even higher surface quality
- Optimized online compressor in the control system that guarantees exact contour accuracy and ensures optimized behavior for "mixed" CNC programs with G1 and G2/G3 commands
- New, intelligent jerk limitation feature that gently accelerates/brakes the axes with all dynamics, thereby protecting the machine's mechanics and lengthening its service life
- Torque pre-control system fitted to the new movement control system that responds according to acceleration. This ensures that the machining quality remains high or is improved even in critical production situations
- Automatic harmonization of the speed profiles on adjacent milling paths by the CNC, effective even in forward/backward line-by-line milling of contours and free-formed surfaces

Additional innovative functions:

- New tool and program management system for machine tool setup
- New programming functions as well as ShopMill workstep programming, which make it even easier to program workpieces
- Innovative technology cycles, such as the new integrated HighSpeed Setting Cycle832, designed for trochoidal milling or plunge milling, and the Cycle800 swivel cycle
- Automatic measuring cycles, 3D simulation for programming and quotation costing support, plus efficient High-Speed Cutting (HSC) functions
- Additional Compact Flash (CF) memory card for simple data and program handling
- Spline interpolation and workpiece simulation for multilateral machining
- Five-axis package: Cycle996 kinematic measurement cycle, 3D radius compensation and other advanced five-axis functions, such as integrated kinematics and Transformation Tool Center Point Programming (TRAORI)
- Optional: Volumetric Compensation System (VCS) with the three-axis and five-axis technology package
- The "Milling specific system software" version includes both the new "Advanced Surface" intelligent path control feature and also simple data and program handling thanks to an additional CF memory card. All other functions in the technological package for three-axis machining are available as options.

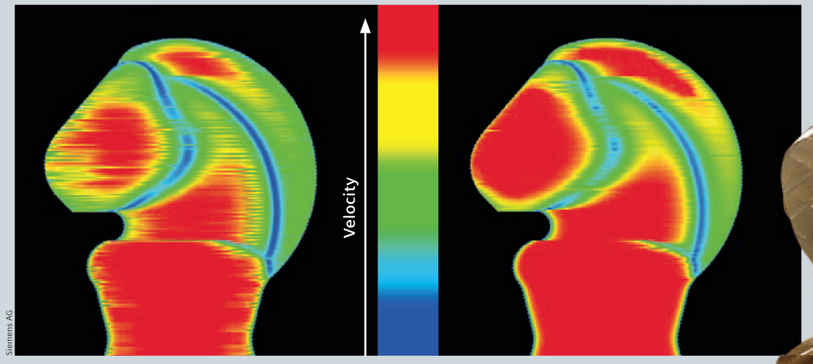
grated HMI system with configurable functions, thus bringing together the entire suite of operating and programming functions. The modern Windows-style display is clearly laid out and intuitive in terms of operation, thereby guaranteeing absolute user-friendliness. ShopMill or ShopTurn workstep programming, Sinumerik high-level language with programGuide or ISO code with cycle support – whatever programming type the operator chooses, Sinumerik Operate offers unique advantages such as short programming, setup and machining times, maximum flexibility and ISO code compatibility.

Unique system platform

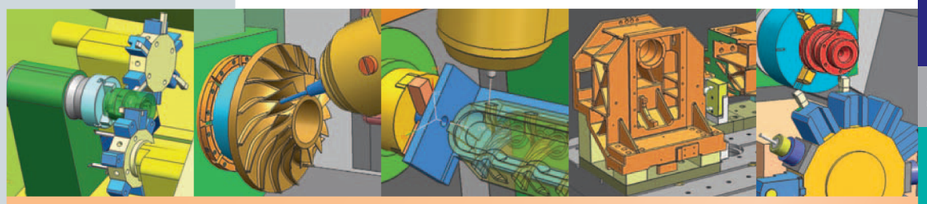
The new Sinumerik 828D from Siemens rounds off a unique, consistent system platform for machine tool automation, which can be used to implement cost-effective solutions for all production-oriented industries. Sinumerik covers all production tasks, from made-to-order pieces to mass production, and from very simple parts to highly complex workpieces requiring a high degree of precision. ■

info	www.siemens.com/sinumerik

Conventional CNC, machining time: 48 mins ... ... with Advanced Surface, machining time: 33 mins



Siemens AG



NX CAM voucher

Machine users purchasing the Sinumerik MDynamics technology package benefit from a complete, integrated CAD/CAM/CNC process chain with the NX CAM-Sinumerik Advantage Program software. Customers receive an NX CAM voucher with this program, entitling them to a free compatible NX CAM post-processor. This ensures perfect three- and five-axis machining from the blueprint to the finished part within the shortest time possible.

News update--- A brief view of CE regulation

In essence, standards relate to products, services or systems. Due to the complexity of the machinery, the globalization of market and the safety requirements, the integration of a common standard is essential for the unknown and difficult world of electrotechnical standards. Manufacturers who do not apply them may risk a difficult and slow acceptance by consumers.

Standardizing these products, processes and services is a quite time-consuming task but can offer great benefits to International trade and consumers. Having one common standard that guarantees access to over 32 European countries means a product can reach a much wider market at a cheaper development and testing cost. Standard products gain automatic acceptance by their target users as they can identify and consequently accept these products: standards mean recognition.

To eliminate the export barriers from different manufacturing and safety requirements in European countries.

Just like the unification of 12 European currencies into the euro, an electrotechnical standards is necessary to help develop the Single European Market/European Economic Area for electrical and electronic goods and services removing barriers to trade, creating new markets and cutting compliance costs. That's why the CE regulation is developed by CENELEC, achieving a coherent set of voluntary electrotechnical standards as a basis for the creation of the Single European Market/European Economic Area without internal frontiers for goods and services.

BUFFALO MACHINERY COMPANY LIMITED

CE DECLARATION OF CONFORMITY

THE MANUFACTURER BUFFALO MACHINERY CO., LTD

ADDRESS: 56, Lane 318, Der Sheng Road – Ta Ya - Taichung Country – TAIWAN, R.O.C.
P.O. BOX 320 Ta Ya, Taichung County, TAIWAN, R.O.C.

TEL.: +886-4-25603759 FAX: +886-4-25603769

DECLARES UNDER ITS RESPONSIBILITY THAT THE FOLLOWING MACHINE

MODEL: VERTICAL MACHINING CENTER
TYPE: VMC-1100 WITH FANUC 0iMD CONTROL UNIT
SERIAL NUMBER: 082302843
YEAR OF MANUFACTURE: 2008
MANUFACTURED IN TAIWAN

TO WHICH THIS DECLARATION REFERS TO, COMPLIES WITH THE FOLLOWING DIRECTIVES:

- MACHINERY DIRECTIVE 2006/42/EC
- DIRECTIVE RELATING TO ELECTROMAGNETIC COMPATIBILITY 2004/108/EC
- DIRECTIVE RELATING TO ELECTRICAL EQUIPMENT DESIGNED FOR USE WITHIN CERTAIN VOLTAGE LIMITS 2006/95/EC

THE CE MARK IS TO BE FOUND IN THE MACHINE PLATE

The company (company name and address) is the representative for the machine subject of this statement in (country).

The Technical construction file available at the representative's head office.

The manufacturer forbids the use of the machine subject to this declaration in any manner that deviates from the contents of the instructions for use handbook.
(The list of the reference directives and standards is contained in the instructions for use handbook).

Name Mr. Daven Chen Position Chief of Q.C. Dept

Place and date Taichung, MM/DD/YY Signature

■ What's CE

The CE marking (also known as CE mark) is a mandatory conformity mark on many products placed on the single market in the European Economic Area (EEA). The CE marking certifies that a product has met EU consumer safety, health or environmental requirements. CE stands for Conformité Européenne, "European conformity" in French.

The marking is mandatory for products sold not only within the 27 countries of the European Union (Austria, Belgium, Bulgaria, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, United Kingdom) but more generally within all countries of the European Economic Area (EEA) which also includes the 4 countries of the European Free Trade Area (EFTA: Iceland, Liechtenstein, Norway, including Switzerland although it is not a member of the EEA), as well as within Turkey.

■ About Europe's EN Standards committees

1. CEN:
The European Committee for Standardization (CEN) is a business facilitator in Europe, removing trade barriers for European industry and consumers. Its mission is to foster the European economy in global trading, the welfare of European citizens and the environment. Through its services it provides a platform for the development of European Standards and other technical specifications.

2. CENELEC:
The European Committee for Electrotechnical Standardization creates both standards requested by the market and harmonized standards in support of European legislation and which have helped to shape the European Internal Market. CENELEC works with 15,000 technical experts from 30 European countries. Its work directly increases market potential, encourages technological development and guarantees the safety and health of consumers and workers.

■ The importance of CE mark

The CE mark symbols the product is complied with the essential requirements of the European Directive and has passed the assessment procedure and manufacturer declaration of conformity. The CE marking, affixed by manufacturers to signify compliance with all relevant directives. Machinery bearing this marking may circulate freely within the European Economic Area.

■ The latest CE Directive version and the adoption date:

1. New Machinery directive: 2006/42/EC relating to machinery. It provides the harmonization of the essential health and safety requirements related to machinery for pesticide application was adopted on 29-12-2009
2. New Low voltage directive:2006/95/EC relating to electrical equipment designed for use within certain voltage limits was adopted on 01-16-2007
3. New Electromagnetic compatibility directive:2004/108 / EC EMC stands for "electromagnetic compatibility" was adopted on 20-07-2007. When measures have been taken for both electromagnetic interference (EMI) and electro magnetic susceptibility (EMS), the device is called electro magnetically compatible, which means that EMC measures have been successfully applied.

■ Safety standard for machinery: Type-A, B, C

The structure of safety standards in the field of machinery is as follows.

1. Type-A Standards(Basic standards)It contains basic concepts, principles for design and general aspects that can be applied to all machinery.
   - ISO 12100-1: Safety of machinery — Basic concepts, general principles for design— Part 1: Basic terminology, methodology
   - ISO 12100-2: Safety of machinery — Basic concepts, general principlesfor design— Part 2: Technical principles
   - ISO 14121: Safety of machinery — Risk assessment
2. Type-B Standards(generic safety standards):
   It deals with one or more safety aspect(s), or one or more type(s) of safe guards that can be used across a wide range of machinery.
   - B1: includes standards on particular safety aspects such as safety distances, surface temperature, noise...etc.
   - B2: includes standards on safeguards such as two-hands controls, interlocking devices, pressure sensitive devices, guards.....etc..
3. Type-C Standards: (machinery safety standards)
   It deals with detailed safety requirements for a particular machine or group of machines. In machinery industry, the reference and title of the harmonized standard are as below:
   - EN 12415: is the harmonized standard for small numeri cally controlled Turning machines and turning canters
     note : EN12415 & EN12478 & EN13788 are replaced by EN23125
   - EN 12417: is the harmonized standard for Machining canters
   - EN 12478: is the harmonized standard for Large numeri cally controlled Turning machines and turning centers
   - EN 13128: is the harmonized standard for Milling machines (including boring machines)

■ The brief content of important revision

1. "EN954-1" is replaced by "ENISO 13849-1" (Safety of machinery- Safety- related parts of control systems-Part 1: General principles for design)

ISO 13849 provides safety requirements and guidance on the principles for the design and integration of safety-related parts of control systems (SRP/CS), including the design of software. For these parts of SRP/CS, it specifies characteristics that include the performance level required for carrying out safety functions. It applies to SRP/CS, regardless of the type of technology and energy used (electrical, hydraulic, pneumatic, mechanical, etc.), for all kinds of machinery.

The qualitative approach of the EN 954-1 is no longer sufficient for modern controls based on new technologies (Electronic and Programmable Electronic systems):

- insufficient requirements for programmable products,
- The reliability of the components is not taken into account.
- too deterministic orientation (designated architectures).

Some new standards are added, for example, the ability of safety-related parts of control systems to perform a safety function under foreseeable conditions is allocated one of five levels, called performance levels (PL). These performance levels are defined in terms of probability of dangerous failure per hour.

The probability of dangerous failure of the safety function

CE News update--- A brief view of CE regulation

depends on several factors, including hardware and software structure, the extent of fault detection mechanisms [diagnostic coverage (DC)], reliability of components [mean time to dangerous failure (MTTFd), common cause failure (CCF)], design process, operating stress, environmental conditions and operation procedures.

Therefore, "ENISO13849-1" upgrades the qualitative approach by the new quantitative (probabilistic) approach and is consistent with safety standards in general.

2. EN60204-1:2006

Standard EN/IEC 60204-1 completes the safety standards by giving setting-up rules for each component of a machine's electrical functions.

It specifies, amongst other things:

- the type of connection terminals and disconnection and breaking devices,
- the type of electric shock protection,
- the type of control circuits,
- the type of conductors and wiring rules,
- the type of motor protection.

For complex machines using programmable systems for safety-related control, the sector specific standard, the following new standard have to be considered:

EN62061 Safety of machinery–Functional safety of safety-related electrical, electronic and programmable electronic control systems

ENISO 13849-1 Safety of machinery-- Safety-related parts of control systems–Part 1: General principles for design

EN ISO 13849-2 Safety of machinery–Safety-related parts of control systems–Part 2: Validation

EN60204-1:2006

The contents added in 9.4.1 the General requirements are as below:

- Where memory retention is achieved for example, by battery power, measures shall be taken to prevent hazardous situations arising from failure or removal of the battery.
- Means shall be provided to prevent unauthorized or inadvertent memory alteration by, for example, requiring the use of a key, access code or tool.

3. Electromagnetic compatibility(EMC) directive:2004/108/EC

EMC includes both EMI(EN50370-1 for new EMC) and EMS (EN50370-2 for new EMC).

The main contents revised and characteristics in 2004/108/EC directive are as below:

- The new directives distinguish the requirement and assessment procedure of apparatus and fixed installation.
- The definition of "equipment", "apparatus" and "fixed installation".
- The assessment of equipment has been simplified. The verification of third party is not mandatory, but he manufacturer should interpret the assessment procedure by technical documents.
- When the harmonized standard is not applicable, the manufacturer should re-evaluate the EMC and offer the detail technical document and apparatus complied to the EMC directive.
- The fixed installations and apparatus which cannot be bought on the market can exempt from the conformity assessment procedure (e.g. EC self-declaration).
- The role of competent bodies has been cancelled.
- The EMC directive assessment should comply with methods the harmonized standard provided. If the assessment of manufacturer cannot follow the harmonized standard, the maker should prove its assessment method and result meet the requirement of EMC directive and verify it through the third body. (self-declaration is not applicable). The manufacturer should take the full responsibility of their products, including the product after assembly.
- EMC assessment is the sole responsibility of the manufacturer; it is never the responsibility of a third party such as a Notified Body or an EMC test laboratory.
- Where a manufacturer assembles a final apparatus using components from other manufacturers, the manufacturer must retain overall control and is responsible for the compliance of the final apparatus.
- The "Worst Case" approach is applied in EMC assessment procedure.
- Use of EMC European harmonised standards-The choice and use of harmonized standard is the manufacturer's responsibility.
- It is necessary to use many harmonized standards to meet the requirement of EMC directives, including the multi-functional equipments.
- The mandatory minimum content of EC' Declaration of Conformity (DoC)
- The risks for the manufacturer who didn't comply to the EMC standard are listed.
- The responsibilities of the manufacturer after their EMC assessment.

This is the brief info about CE regulation updated, more info will come soon in our next issue!

FAQ Trouble Shooting

Q: How can I update the CNC software version for my Microcut machine with Fagor controller (for 8055i/A, 8055/A, 8055 i plus, 8055A plus)?

Sincerely,
John

A: Dear John,
Please refer to following procedure make a backup for all PLC and parameters of the machine before updating the new software.
This is the most important process before moving to the next step.
P.S.: For old hardware version (8040, 8055i and 8055 CNC with PCMCIA card) please contact with us for detail information.


Eric Lin


Vincent

Fig. 1

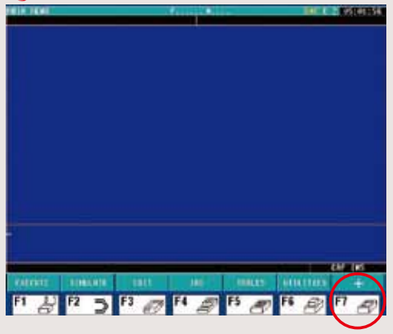
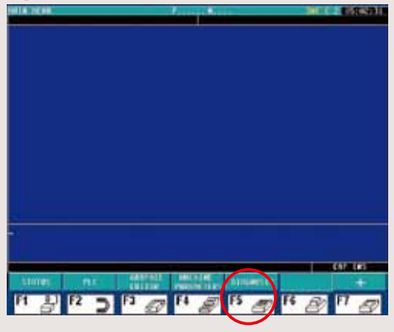


Fig. 2



STEP 1: Check current version of the CNC of the machine. You can do it by following steps.
1. Into T or M mode (press "SHIFT" then press "ESC") and the screen shown as Fig.1.
2. Press F7 "+" button (see Fig.1) Then the screen shown as Fig.2.

Fig. 3

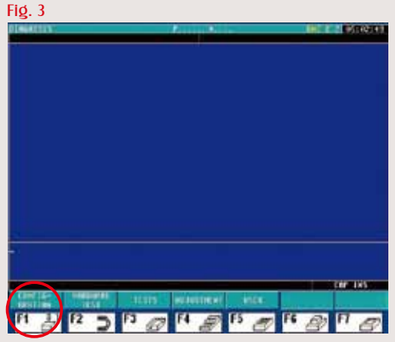


Fig. 4

3. Press F5 "DIAGNOSIS" button (as shown in Fig. 2)The screen will show as Fig.3.
4. Press F1 "CONFIGURATION" button (see Fig. 3) The screen will show as Fig.4.

Fig. 5

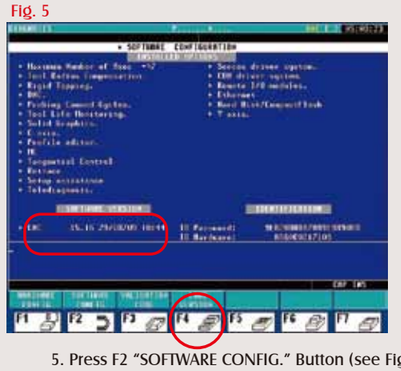
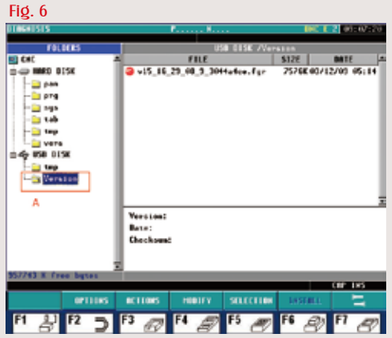


Fig. 6



5. Press F2 "SOFTWARE CONFIG." Button (see Fig. 4) The screen will show as Fig.5.
You will see the current version of CNC software(as Marked in red in Fig. 5)
6. Insert the USB memory stick with software version file on RS-232 communication box.
7. Press F4 "LOAD VERSION" button (in Fig. 5)
8. Copy the software file to CNC (from step (a) to (b))
(a) Move the cursor to the folder which is include the software file (Marked in red "A" in Fig. 6)
(b) Press F7 button (in Fig.6) to change work window to right side. The screen will show as Fig.7.

Fig. 7

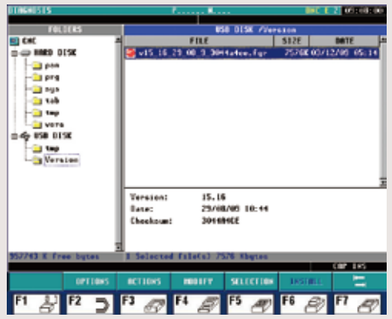
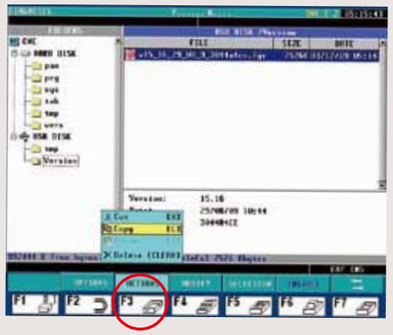


Fig. 8



(c) Press F3 "ACTION" then select "Copy" and press "ENTER" button (see Fig. 8)
(d) Move cursor to "vers" folder in HARD DISK, then press F3 "ACTION" and select "Paste" to copy the software file in this folder. (see Fig.9)

Fig. 9

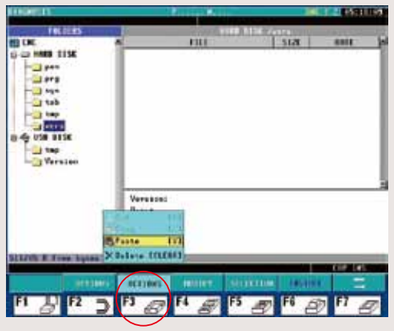
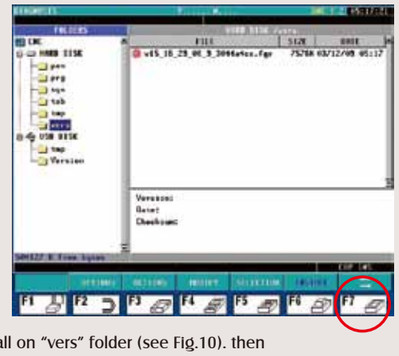


Fig. 10



9. Select the new version you are going to install on "vers" folder (see Fig.10). then press "F7"(in Fig.10) then the screen will show as Fig.12.

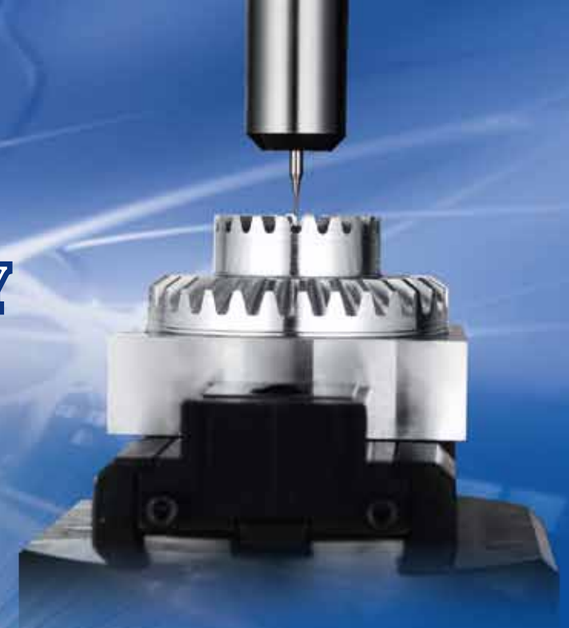
Fig. 11

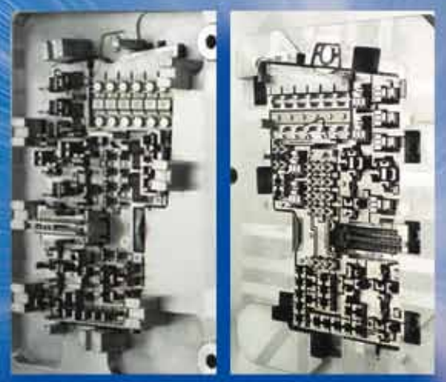
Fig. 12

10. Press F6 "INSTALL" button (in the screen of Fig. 11) Then the screen will show as Fig.12.Here is information to confirm this installation and press F4 "OK"to continue (see Fig. 12)
11. The CNC will restart automatically after updating.
12. Reload the backup data and enjoy the new version.

Sincerely,
Eric Lin / Vincent

CHALLENGER HIGH ACCURACY MACHINING





Various suitable applications

- Die and mold market
- Automobile industry
- Medical industry
- General workshop

High Productivity

- High speed processing time with Heidenhain iTNC 530
- Direct driven spindle 15,000 rpm (optional built-in spindle up to 24.000 rpm)
- 48 M/min rapid traverse (V-26, V-30 models)
- Refrigerated ballscrews for higher accuracy
- Fast tool to tool changes time (2 seconds)

High Reliability

- 45mm roller type linear guide way for V-26/30
- 35mm (Z axis), 30mm (X & Y axis) roller type linear guide way for V-20 and V-22
- 720mm Y axis guide ways distance for V-26/30, & 480mm for V-20 and V-22
- Precision ground class C3 ballscrew double nuts with oil cooler
- Rigid basement stress relieved for better performances
- Direct measuring in all axes

V SERIES HIGH SPEED VERTICAL MACHINING CENTERS

Exhibitions

2010 Q2/Q3	Period	Title of Exhibition / Country	Distribution company
April	2-7	EXPOMIN / Chile	Ittamacc
	12-16	Manjin CCMT 2010 / China	TERNA
	April or May	OPEN HOUSE / Lithuania	UAB FORMOSA CNC
May	NA	OPEN HOUSE / Vancouver Canada	Modern Tool
	4-7	INDUSTRIA / Hungary	NCT
	8-11	MOLDPLAS / Portugal	MATER
	11-15	MECANICA / Brazil	Meggaton
	13-16	KONMAK 2010 / Turkey	Celik
	24-28	Metalloobrabotka-2010 / Russia	TM-tech Bogorodsk Machine Building Plant
	25-27	EASTEC / USA	Milltronics CNC Machines
June	6-11	POZNAN / Poland	NCT
	14-18	Baijin CIMT 2010 / China	TERNA
	undecided	20th year of DIDELON / France	Didelon
July	8-11	Mach-Tool / Poland	IGO
	15-18	EASTPO 2010 / China	TERNA
August	9-13	FEBRAMEC / Brazil	Meggaton
September	9-14	Fimaqh exhibition / Agentina	DW
	13-17	MSV 2010 / Czech	Fermat
	13-18	IMTS / USA	Milltronics CNC machines
	29, Sep.-1, Oct.	Toolex / Poland	IGO