

Fagor Automation **BIMU'12**

s p e c i a l

In this issue:



interview
New stage of
Fagor Automation Italy



stand
What you will see in
this BIMU



solutions
Measuring systems
projects and CNC



news
Belleli Energy



news
Pedrali Meccanica



innovation
CNC 8070 and
special machines



FAGOR AUTOMATION
www.fagorautomation.com



fieramilano
2-6 / 10 / 2012
Pab Hall 11
Stand H63

A new stage in the development of Fagor Automation in Italy: Ivrea technological center



Licia Lastella, Christian Kusterle, Ciro Annicchiarico, Davide Miniello, Guido Pigozzo, Gaspare Faraci, Olatz Gorritxo, Enza Bruno, Manuela Bai, Livia Bonfanti, Alberto Soda, Giuliano Oldani, Claudio Pozzi, Fulvio Bolzoni, Fabrizio Bettiol, Roberta Colla, Massimiliano Belluschi, Marco Sordi, Stefano Mantovan, Diego Perego, Alberto Fasana, Pierluigi Barbieri.

Fagor Automation is a co-operative which began in Mondragon, in the Basque Country in 1973, and today has around 650 people worldwide. Furthermore, it is part of the MONDRAGON Corporation founded in 1956, a corporation employing over 83.000 people and is the world's largest cooperative. It is a colossal global Corporation which includes companies operating in different economic and production sectors (Finance, Industry, retail and knowledge), not only in Spain but also Europe and the rest of the world.

We can find among the main areas of interest: industrial automation, large distribution, banks, insurance, television, agriculture, cattlefarming, pharmaceutical, domestic appliance production, buses, lifts, automobile components, scientific and technological research; not to mention university studies; these latter activities are carried out in their university, i.e. Mondragon Eskola Politeknikoa, known to be one of the best temples of learning in Spain. Fagor Automation is dedicated to the design and construction of automation systems for industry, especially Machine-Tool. The range of products designed and manufactured by the company consists of: CNCs for Machine-Tools and machines used in different sectors;

digital drives system for motor control; both absolute and incremental linear and angular measuring systems. Product simplicity and features plus service quality are essential elements of a success destined to expand towards different market segments. The international support network thanks to over 30 Fagor Automation own subsidiaries and more than 35 distributor all over the world, is of essential importance.

Thanks to the solidity of this group, Fagor Automation has provided direct technical support to its customers via their headquarters in Cassini de Pecchi, Ivrea and Noale since their Italian subsidiary was opened in 1990.

The Italian subsidiary has always been a group reference, thanks to the Italian market potentials and a highly specialized team, excellent collaboration has arisen with both the head company and Italian manufacturers enabling the development of numerous products. Since the famous conversational battle horse of Fagor Automation which began with the lathe sector to later expand to various kinds of milling and grinding machines, until the development of the constantly evolving new generation CNC 8065. In Italy there is always a technical-sales department dedicated to promoting Fagor products in sectors not expressly related to metal machining, like for example machinery for working with

marble, glass, wood and automation in general.

To manage this market more closely, Fagor Automation opened the Ivrea technological center at the beginning of 2012 to support the Milan subsidiary in product development activity, promotion, application support and customer training. In this context, the new resources contracted by Fagor Italy, i.e. people recognized and appreciated by numerous end customers and OEM, with large experience in the numerical control sector. Their purpose is to develop the Machine-Tool user and manufacturer market, while at the same time developing the CNC 8065 software and hardware configurations and enlargements. ■

We invest in Italy as a safe value

Two years have gone by since the previous BIMU edition and in spite of the complex present economic situation; we attend this 28th edition of BIMU with great enthusiasm to show you our new solutions for the highly demanding Italian market.

I invite you to visit our novelties for the CNC 8065, especially aimed at milling machine users and the great improvements we have developed for our feedback systems to make installation easier and reduce maintenance time considerably.

I would also like to point out that this year 2012 is very special to us because despite of the discouraging economic news we hear every day, we have decided to keep investing in Italy. We have reinforced our professional team by opening the new technological center located in Ivrea. This center will help us get even closer to our customers with our products, service, application support, etc. in other words, with the full, integral, attention that makes Fagor Automation different from the rest.

Thanks to this Italian team of professionals, the support from headquarters and from our worldwide network - 30 branch offices all over the world with over 30 years of experience and over 25 years of presence in Asia and America - I am convinced that we are the partner our demanding Italian customers need.

Thank you for trusting us and here is our support and commitment for the future. ■



Iñaki Sánchez
CNC Business Manager

WHAT YOU WILL SEE IN THIS BIMU:

In this issue of Bimu we will be presenting numerous novelties (you'll find all the details inside): Software and Hardware evolution of CNC 8065 with powerful features aimed at customers used to dealing with Selca CNCs, new generation of encoders with reading head from either end, the new PSED device to diagnose the connectivity of encoders produced by Fagor Automation and the longest absolute encoder in the world; not to mention the CNC 8065 dedicated to the world of turning and milling. Then last but not least, presentation of a range of motors and digital drive systems. Furthermore, as an example of their modernity regarding services and customer assistance, Fagor Automation has just launched their blog in Italy too; apart from their classic web: www.fagorautomation.com, they are now at: it.automationintheworld.com, where you can find all kinds of information on the product, news, novelties and events – there is also a link on the page to subscribe to the news service or follow on twitter, to be constantly up-to-date on the latest news from Fagor Automation.



ABSIND

Interface Inductosyn Fagor Interface – reduction of retrofit costs.

Now Fagor Automation can read all these measuring systems thanks to the ABSIND device enabling reading of Inductosyn Absolute, Selca measuring systems and data transmission to Fagor systems.

CNC

CNC 8065. Easy as always. More powerful than ever.

With CNC 8065 machine productivity increases thanks to 2 critical elements. Firstly programming times are reduced thanks to simplicity of use, and secondly, parts with excellent finish are obtained in really reduced time, thanks to the high speed machining features.

←→

Exceptional time saving with new generation of linear measuring systems up to 60 meters.

These improvements make installation easier and drastically reduce installation time by 10% and service time by up to 50%.

SZ-GZ

Nanometric Resolution

The S and G series linear encoder family is now extended to include all NEW 50 nanometer resolution scales with TTL interface.

**DRIVE
CLiQ®**

DRIVE CLiQ® protocol

Fagor absolute linear and angular encoders can be connected to Siemens DRIVE CLiQ® protocol using a signal adaptor.

PS_{ED}

PS_{ED}

A device designed and manufactured by Fagor Automation for the diagnosis, installation assistance and after sales service of the linear and angular encoders of Fagor Automation.

3A

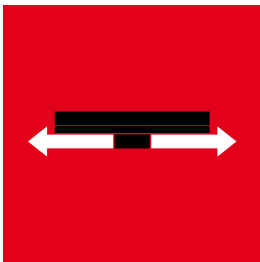
3 Absolute systems

Fagor Automation will show their full range of absolute encoders, the widest on the market with 3 solutions. Implemented communication protocols guarantee encoder connectivity with the systems of the main CNC manufacturers.



Pierluigi Barbieri
Director of the Italian Subsidiary

stand



Head reading head
from either end.
Global Solution

Outstanding time saving improvements with the new
generation steel-tape linear encoders up to 60 meters.

Fagor Automation's know-how, the analysis of the chain of value and the meticulous study of external contributions have resulted in a unique product that further strengthens Fagor Automation's leadership in feedback systems for long and extra long measuring lengths (from 3 m to 60 m).

BIMU visitors visitors will be able to see that these improvements make installation easier and drastically reduce installation time by 10% and maintenance/service time by up to 50% depending on type of machine and encoder length. Consequently, the new generation of F and L series linear encoders offers an unmatched saving opportunity.

Fagor Automation has introduced three great improvements that further strengthen our commitment to customers and add value to our end products: a new tape tensioning system that allows removing the reading head through either end of the encoder, reference points and ease of installation as described below. ■

Removing the reading head from either end reduces installation and maintenance times by up to 50%.

	Others	FAGOR
installation		
Align modules	7 hrs 30 min	6 hrs 18 min
Insert tape	20 min	12 min
Secure tape	12 min	5 min
maintenance time		
	4 hrs 1 day 1 hr	2 hrs 2 hrs 1 hr



New tape tensioning system
that allows removing the reading head from either end



Reference alignment points
during installation for faster and more accurate alignment of the modules



Easy mounting of extra-long linear encoders
thanks to the multi-punched tape



Interface
Inductosyn Fagor
Interface – reduction
in retrofit costs

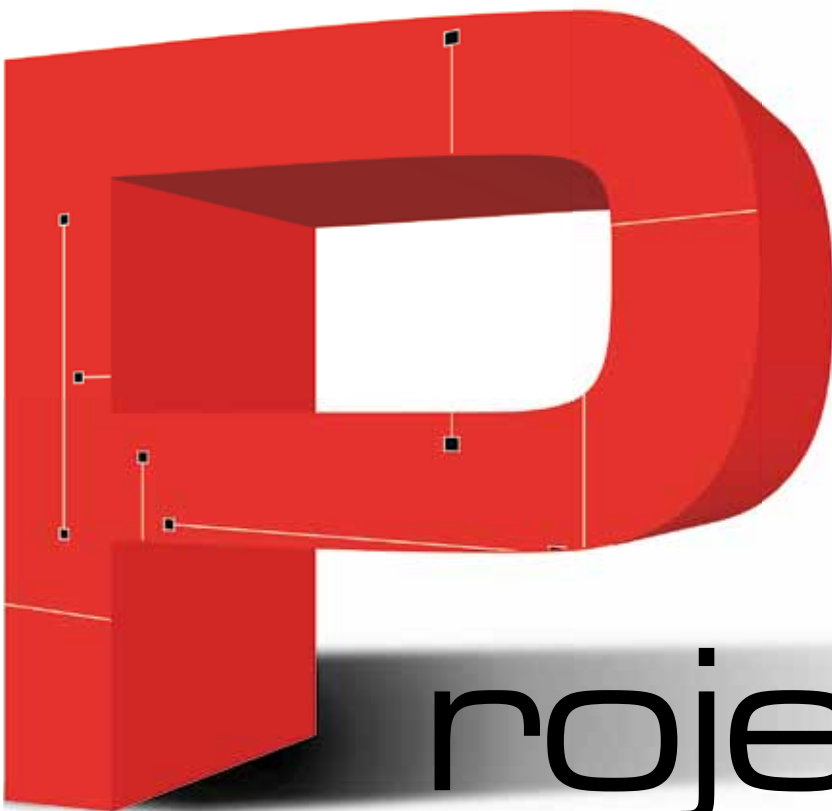
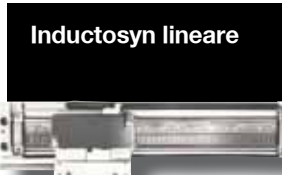
We often encounter customers requesting a retro-fit operation for their Machine-Tool. They're frequent machines of large dimensions or machinery fitted with special equipment, probably customized for the customer or for machining; or simply machines whose mechanics are still in excellent conditions and the customer wishes to replace the CNC for a more modern version.

It is known that Fagor has all the products necessary for a complete retrofit of any machine-tool; i.e. CNC, measuring systems, digital drives and motors.

Thanks to this highly varied range, CNC retrofit can be done at the same time as replacement of encoders, digital drives and motors. This enables complete electronic renovation; however, it involves modernization works in the electric cabin and machine wiring with addition costs to execute these works.

However, to complete this offer as of today, Fagor Automation is proud to offer an alternative solution too. A large number of operating Italian Machine-Tools are equipped with Inductosyn Absolute Selca measuring systems which enable new machine startup after switch off without returning to reference zero. Now Fagor can read these measuring systems thanks to new ABSIND device enabling reading of Inductosyn Absolutos Selca measuring systems and data transmission to Fagor systems via "full digital" protocol, which ensures maximum reliability of features and data transmission security.

Thanks to this new device Fagor can now offer CNC retrofit for any machine fitted with Encoder, Inductosyn linear and angular encoder and Resolver without additional costs for replacement of digital drives, motors and wiring without the need for other additional costs to adapt machine mechanics for the use of other encoders. Furthermore, when the future of the inductosyns are totally deteriorated, they can be replaced with a Fagor absolute encoder without losing functionality, using the same electronics at no extra cost, even an individual axis or all the axes together. ■



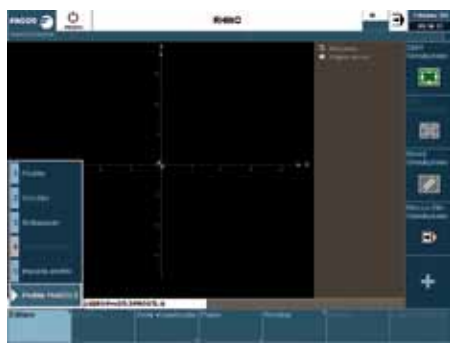
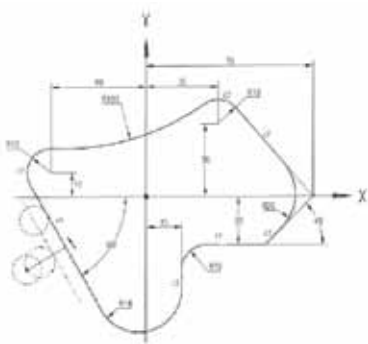
roject

**Pro
GTL3**

New ProGTL3 language of Fagor CNC 8065

Fagor Automation products are constantly evolving. One of the latest novelties introduced in the new CNC 8065 is the revolutionary geometric language ProGTL3.

Based on the geometry oriented paradigm, ProGTL3 (Professional Geometric & Technological Language – level 3), it can resolve any flat profile without mathematical calculations and additional trigonometry or use of outsourced software (CAD/CAM). Moreover, its name underlines the peculiarities of the new language, arising from the evolution of 2 important geometric languages based on analogous concepts, i.e. GTL developed by Olivetti Numerical Control at the beginning of the 70s and PROGET2 developed by Selca in Ivrea since the beginning of the 80s. It uses the best of both languages besides offering interesting new extensions. Analyzing a practical example of profile programming is useful for its comprehension.



To programme this profile on Fagor CNC 8065M just access the environment “Profile Editor”; apart from guided editing of profiles (rectangle, circle, straight line, free profiles, etc.), you can now edit the profile “ProGTL3”.

The profile is programmed using G codes dedicated to oriented geometry – let’s see how the ProGTL3 language program works ProGTL3:

G0 X50 Y-30 [fast positioning on profile hook-up point

G84 I K2 [circular hook with radius correction to profile left

G813 X-40 Y10 I-10 J120 [straight with known angle tangential to a circle

G820 [circle with known centre and radius programmed in previous block

G821 I100 [connector with known radius

G820 X30 Y30 I-10 [centre with known centre and radius

G810 [initial point of a straight tangential to previous circle

G811 X70 Y0 [arrival point of a straight tangential to previous circle

G821 I-20 [connector with known radius

G813 J-135 [straight passing through previous point forming a known angle

G813 Y-20 J180 [straight of known angle passing through a point

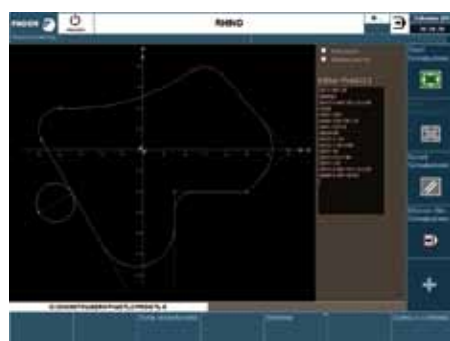
G821 I10 [connector

G813 X15 J-90 [straight of known angle passing through a point

G821 I-18 [connector

G813 X-40 Y10 I-10 J120 [straight with known angle tangential to a circle

During edition profile is created dynamically; with each introduction of a block via G code, the graph shows the geometric result as it’s created step by step, which allows correction of eventual errors during the profile programming phases. On completion of profile editing, the result is as follows:



And this is the part which comes from the profile machining, visualized thanks to CNC 8065 3D graphic power after being done on the machine. ■

**ISO
translator**

Selca ISO language translator to Fagor ISO language

Fagor Automation has always been committed to its own compatibility with other products. Our philosophy is based on maximum simplification of workshop operations, to increase portability of part programs in maximum number of machines.

Thus in the latest Software versions, CNC 8065 allows a new translation function of part programs. Plus the possibility of user friendly programs written for CNC 8055, it is now possible to import programs compatible with other CNCs. In fact there are different possibilities; and the translation function of ISO programs for Selca CNCs, models S1200, series S3000 and S4000.

All this is done very simply, i.e. in the edition-simulation environment of programs the new program translation function was introduced. This feature allows an ISO program used with other CNCs to be opened and translated for adaptation to the Fagor language.

The translator allows conversion of any program generated in ISO on a Selca CNC (via the compilation procedure of Selca programs present in all S1200 models, series S3000 and S4000). And in addition to this feature many other functions of the Selca control language can be translated.

An example can also explain this function. The original opens in edit, and can eventually be modified like a normal editor, e.g. to add a comment or auxiliary functions, or directly program in Selca language. The “translation” button then generates the correct program for Fagor CNC 8065. This program can also be modified or saved directly. In the quickest option, when no change is required, you need only open the original program and use the “translation” button to obtain a program ready for graphic simulation or execution on a machine for part milling.



Program translation includes the following functions:

ISO standards: G0, G1, G2, G3, G4

Work plan declaration: G17, G18, G19, G17 with axes triad declaration, G16 axes exchange function

Declaration of tools and origins: O... part origin, T..., G48, G49 for tool correctors

Technological and auxiliary functions: M, H, F, S possibility of customizing auxiliary functions M and H

R for fast displacements

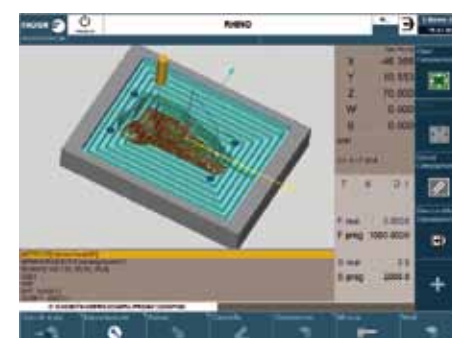
Permanent simple and complex cycles (perforation, threading, circular and rectangular grooves): G81, G82, G83, G84, G85, G86, G88, G77, G78, G79

Advance functions: rototranslation in space (G751), RTCP (G68, G69, G748, G749)

Parametric programming (parameters P)

Repetitive or label cycles (L functions)

Check generated program functions via Error or Warning check for non-translatable functions or containing syntax, geometric errors, etc. A user friendly interface indicates eventual errors found and by simply clicking you can place cursor on line to be modified, i.e. a rapid user friendly mode to use your library of programs already functioning in the Fagor CNC 8065. ■



3D representation with automatic scaling for fast analysis

PAOLO DANESE, BELLELI ENERGY MACHINING DEPARTMENT MANAGER

«CNC 8065, fast versatile programming, essential in our workshop»

Belleli Energy, with headquarter in Mantua - Italy, is a historical reality operating in the energy sector as a systems manufacturer for petrochemical and gas industries. They have consolidated their position over the years thanks to a strong presence in the Middle East, particularly in Persian Gulf countries, employing over 3000 people in this sector with a large network of subsidiaries, construction installations, workshops and activities on worksites.

Mantua plant is specialized in building large tanks for reactors, interchangers and equipment for fertilizer production. They create a turnkey product for different markets internationally.

To produce these systems, the company has purchased machine-tools with large dimensions, the latest vertical lather with CNC 8065T.

We interviewed Mr Paolo Danese, Belleli Energy machining department manager regarding the CNC 8065 and Fagor in general :

Mr Danese, what do you know about Fagor Automation?

At Belleli we have already some parallel lathes of large dimensions fitted with CNC 8055. A control which has always given us great satisfaction due to its intuitiveness and user friendly programming

even for complex details. The peculiarity of our workshop is non-mass production, thus it is essential to have a versatile quick to program CNC.

Why did you have the latest lathe fitted with CNC 8065T?

Our company always follows market evolution closely on a technological level, which is also applicable for choosing numerical controls. Since we had to purchase a new vertical lathe, we wanted it to have the latest generation of Fagor CNC 8065T.

What do you most value about this CNC?

Several features impacted us, from the very powerful realistic graphics thanks to a HD 15" screen enabling a really detailed simulation. There are other features, e.g. related to tool inspection and resuming



Paolo Danese
Belleli Energy Machining Department Manager

the cycle, essential for us considering the machining dimensions and duration of the parts we produce. Another interesting aspect going back to Fagor history is the user friendly control. We liked the pop-up menus very much enabling access to all options in every situation and new generation of a conversational program plus excellent parametrics.

Last but by no means least, the CNC 8065 simulator is very interesting, which we correctly installed in a PC and thanks to which we can make and simulate programs prior to loading them to the machine.

What do you think of the support offered by Fagor Italia?

With the introduction of a new CNC in the company, it was essential to have good training to know this product thoroughly.

We contacted the Fagor Italia programming department support, in particular Mr Fabrizio Bettiol, thanks to whom we quickly learnt everything we needed to move onto the production phase.

We also chose Fagor Automation as a global supplier as all our machinery is fitted not only with Fagor controls but also with their motors and measuring systems. Having a single interlocutor is essential for us. ■



MR LIZZADRO ANTONIO, COMPANY PRODUCTION MANAGER

Pedrali Meccanica chose Fagor to equip large prestigious Machine-Tool for integrated milling and turning works

Pedrali Meccanica S.r.l., located in Albino, Bergamo province with a registered office at Albano S. Alessandro was founded in 1973. It has evolved over the years specializing in turning, milling and precision mechanical boring of rolled, forged and stamped parts of medium and large dimensions. They work in different sectors ranging from oil to nuclear, chemical and energy in general, exporting their products virtually everywhere in the world.

The company has a leading technical office, likewise prestigious Machine-Tool universally fitted with very powerful based on Fagor CNC line. Regarding the latter point, the election of these for years is

based on Fagor numerical control line. We interviewed Mr Lizzadro Antonio, company production manager

In this Bimu, the Soraluze stand displays a boring machine equipped



with the Fagor CNC 8070 you purchased. Could you tell us why?

Modernization of our machinery is essential since new machinery enables machining time reduction, winning new orders and guaranteeing our company future. With this clearly in mind we decided to purchase the universal boring machine from the Spanish company Soraluze.

What are its characteristics?

This machine enables us to machine parts with dimensions of up to 6000 mm x 4500 mm and a depth of 3200 mm. Furthermore, thanks to the d'Andrea head turnings of up to 1800 mm can be achieved. The machine ram is prepared to carry several sleeves thus influencing total drilling depth. Last but not least there are 3 interchangeable heads according to machining type with a power of up to 71 kW.

Such a top notch machine must have to tackle serious difficulties?

True. Experience has taught us the CNC 8070 is high performance and can meet all our technical demands. Its peculiarities include milling/turning function management enabling programming of milling and turning cycles indistinctly;

kinematic management means head replacement can be done without problems modifying the different geometric data as we go; everything regarding sloping planes via rototranslation function in space and simple powerful management of RTCP; and finally high speed machining for CAD-CAM created moulds.

Besides CAD programming, do you also have to program next to the machine?

We sometimes need to program specific details or cycles directly in the CNC, so it's essential to have a simplified intuitive editor. With the CNC 8070 we normally use the powerful profile editor to design the part for machining associating its technological parameters. Regarding turning, when a part to be machined is forged we can design the profile gross and finished so the CNC can optimize the machining passes taking into account the initial shape.

What are the advantages of using the CNC 8070?

Undoubtedly the reduced machining times which have a positive impact at production cost level, reliability, simplicity and quality. We also greatly value the PC simulator which facilitates programming.

What do you think about the opening of a new Ivrea technological center expressly related to milling?

For us as an end customer, it is important to know Fagor has made a large investment regarding the milling sector. Knowing the numerical control we've chosen can be equipped with new features, to be avant-garde at all times, means we have made the right choice. ■

ews

BY MARCO SORDI, SALES MANAGER, SPECIAL PURPOSE MACHINES

CNC 8070, large scale automation and flexibility

Fagor Automation has always wanted to be more than just a product supplier, but also a partner capable of providing complete solutions for machine engineering, particularly in those sectors where they can benefit from experience acquired over the years in the Machine-Tool environment for chip removal.



New Champion



Fagor Automation has successfully proposed for several years now their own solutions for alternative markets to those of Machine-Tools for metal.

To meet the demands better of this type of customer, Fagor Italia has a department expressly dedicated to the applications in the machinery sector for working with marble, glass, wood and special high technology applications like laser cutting. All these sectors have high demands at technical/application level and CNC use has become an added value, essential reach high level precision and machining standards.

At the same time these sectors are expanding the market for Fagor products, while making use of it as well. In fact alternative markets to the metal chip are contributing to the internationalization of the brand, achieving good product sales and diffusion results worldwide, from Europe to Asia and the American continent. Moreover, for Fagor they are an alternative to Machine-Tool, as well as an important diversification in terms of market

and customers; which guarantees lesser awareness of results in relation to eventual swings, drops or crisis in the traditional Machine-Tool sector.

Market data for the marble, glass and wood sectors indicate many of the most prestigious brands active in these areas are Italian; thus Fagor Italia, in collaboration with the headquarter of the company, is proposed as the ideal partner for OEMs wishing to undertake new technological innovations in the Machine-Tool control area.

Fagor presents some of their "best cases" on this page.

These are advanced machines from the technological viewpoint, made thanks to the support and complete product portfolio of Fagor (CNC, digital drives, motors and measuring systems).

Prussiani Engineering which has leaded to market for years in the stone work machinery area has been using the Fagor CNC / digital drives, package for over 15 years.

Fagor technology associated with a great capacity to design and build innovative machinery, enabled the manufacturer to reach domestic and foreign market successes.

Almost all the machines use the Fagor CNC 8070 OL solution and AXD regulator to move a combination of 5 or more interpolated axes, from the **Champion 60** milling model to the **New Champion** bridge milling model passing through work centres with the **Diamante 18** model up



to the application for lathe with the **New Dorico** model.

Use of PC based on CNC 8070 technology has led to great evolution in machinery, since the open architecture system allows the use of external Hardware / Software programs and components which have

increased the machinery technological profile, i.e. use of photographic systems to monitorize parts, laser systems for dimensional testing, Software / CAD / CAM to generate part-program complexes interpreted by CNC thanks to powerful algorithms for high speed machining (HSC), Rtcp, Sloping Planes, Dynamic Compensation of grinding wheel wear.

Macotec srl. The multichannel/multi-process CNC 8070 OL was used on cutting tables for flat monolithic and rolled glass by Macotec de Rogolo in Valtellina. These are automatic lines for simultaneous cutting of two transversal joists.

Combined or solely for rolled glass, these lines are unique in the world, which with a single cutting bridge can cut two transversal joists simultaneously.



Macotec: automatic multi-process cutting line

This means very high productivity can be achieved in relation to traditional analogous lines without renouncing extreme flexibility of use and without the need for an additional operator.

In this case as with the previous, the use of a CNC 8070 OL has enabled the combination of different factors, i.e..

Productivity, because two pieces of glass can be cut simultaneously (16 brushless axis system enables simultaneous movements of rolled glass and their elaboration); automatic transport of glass to the end of the line; their vertical positioning

Thus it is an application which prioritizes the features of: speed, simultaneity, independent control of the interpolator, movement management via electronic levers according to trigonometric calculations and cutting with tangential control of the flywheel. These are functions which are therefore aimed towards different functions in relation to those used on a milling machine or lathe. ■