



FAGOR AUTOMATION

CNC 8065

Easy as always, more power than ever



Y	134.666	T	1	D 1	Offset
Z	121.333	L	0.000		
B	13.533	R	3.000		
C	345.670	NoTool	0		
		Ftool	0 mm		
		Fprog	0 mm/min		
		Sfeed	100 %		
		Sprog	0 mm		
		Sfeed 1	0 mm		
		Sfeed 2	100 %		
		Sfeed 3	0.000		
		Sfeed 4	0.000		

CNC 8065

Easy as always, more power than ever





In the continued pursuit of improvement, Fagor Automation continues to evolve its products and now introduces the new 8065 CNC as an innovative and intuitive solution for the high performance machine tool world.

The 8065 CNC increases machine productivity in two key performance areas. The first being the reduction of programming time due to the 8065 CNC's intuitively focused operator interface. The second factor includes significant improvements in part finish resulting from incorporation of many high-speed machining features.

Ergonomic and Robust Design



A main characteristic of Fagor Automation's CNC products has always been the ability to focus on the actual needs of the machine operator.

The 8065 CNC offers an innovative and ergonomic design. This includes a complete new line of keyboards utilizing a touch screen, integrated mouse and USB connector plus a very visual browsing system with a friendly and intuitive user interface. A system utilizing Pop-up options provides immediate access to all features, thus eliminating the cumbersome multi sub-levels that could end up slowing down and confusing the user.

Its new mounting design and the new technology used in its components protects the 8065 CNC in harsh industrial environments, and comply with IP65 (NEMA12) sealing standards.

Machining

High speed machining

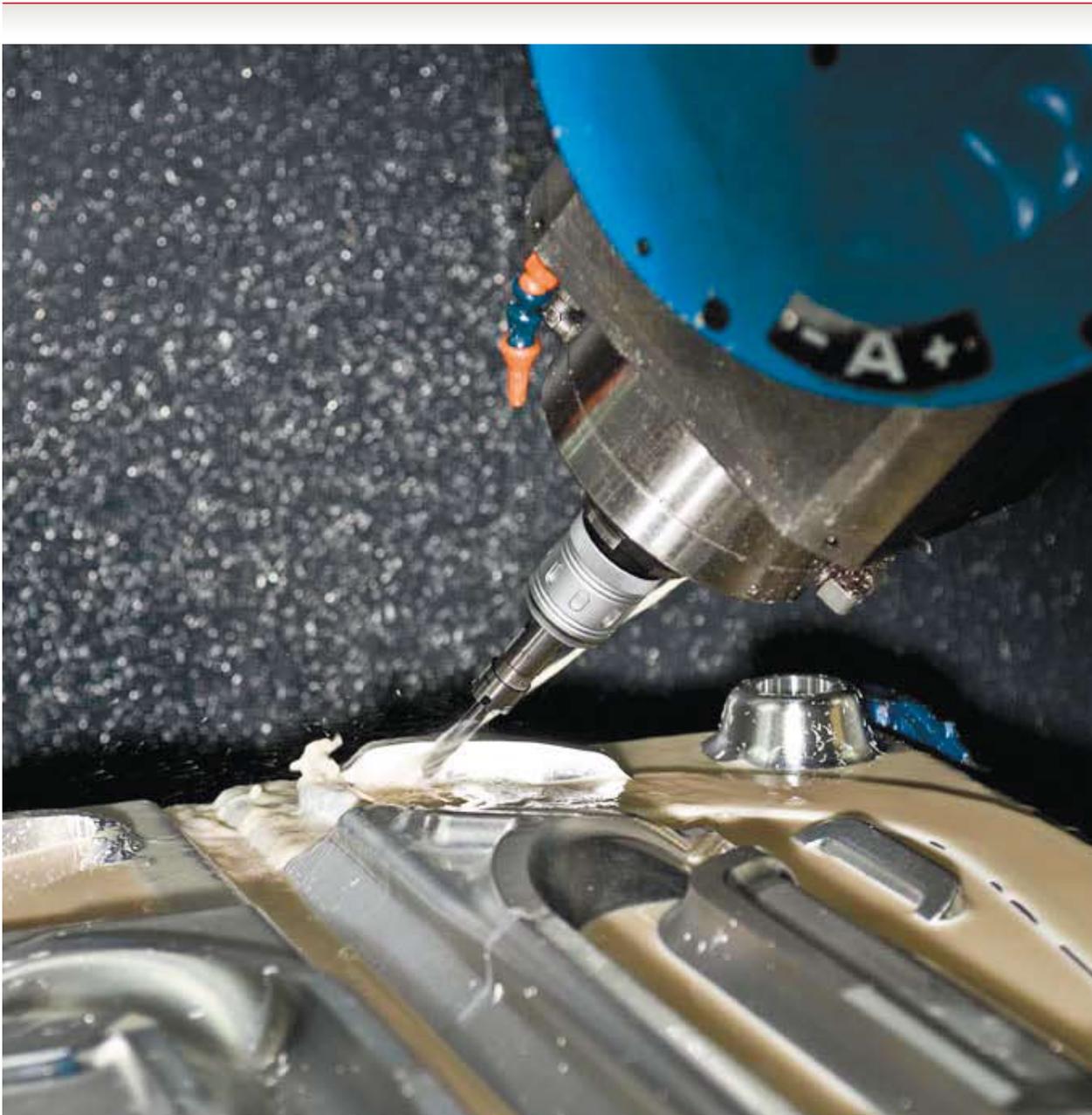
High speed machining

High speed part-programs are often generated utilizing Cad-Cam systems. The 8065 CNC optimizes the captured points by smoothening the tool paths through polynomials (Splines). This polynomial interpolation produces an excellent part surface finish at high machining speeds.

The complex tool paths are executed smoothly without abrupt accelerations or decelerations. The 8065 CNC analyzes in advance the tool path changes programmed for the part that is being executed. This allows for easier

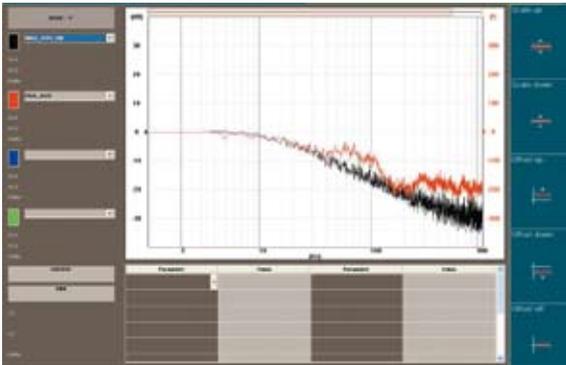
adaptation to the dynamics of the machine thus avoiding marks (ridges) while machining, corner rounding errors or jerky starts and stops of the machine.

The HSSA (High Speed Surface Accuracy) machining system of the 8065 CNC offers the user a double benefit: Moreover the mechanical stress on the machine is lower, thus the lifespan of its components is longer. Due to lower vibration, the movements are smoother allowing higher feed rates and less machining error.



Optimizes machine efficiency

Bode diagram

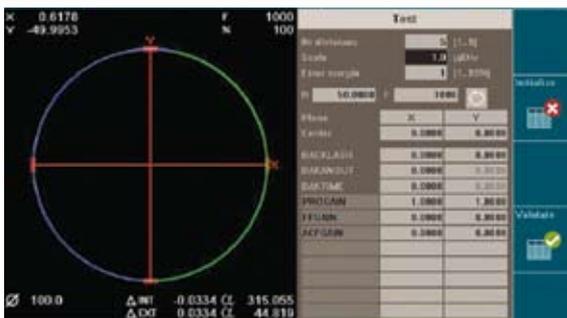


The 8065 CNC allows for easy set-up of all types of machines while offering various adjustment tools that create optimum efficiency.

The Bode diagram

Is a tool for determining the machine's frequency response. With this information, it becomes possible to filter vibrations produced from the resonance of mechanical design of the machine, thus allowing the machine builder/user to obtain best adjustment and stability.

Circularity (roundness) test



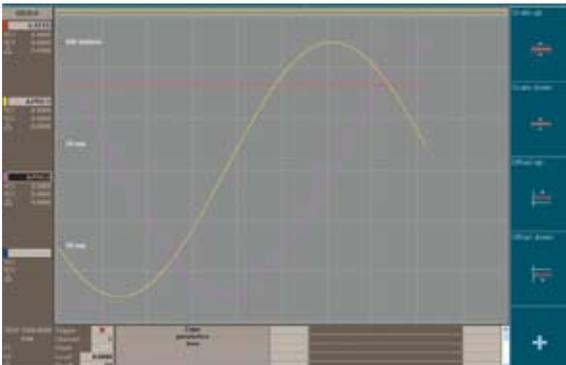
The circularity (roundness) test

Helps improve the behavior of the axes when reversing their moving direction. When executing a circle, the feature graphically compares the actual path with the theoretical path and then provides the necessary tools for the correct adjustment.

Oscilloscope

The oscilloscope feature is a tool which provides assistance when adjusting the axes performance. It allows the ability to display and correct the machine performance and dynamic behavior with the help of 4 work channels which show both analog and digital variables.

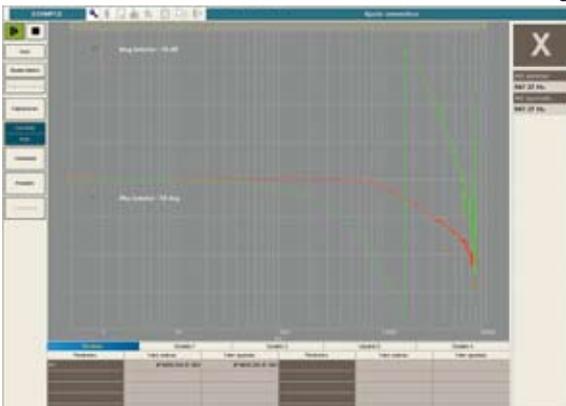
Oscilloscope



Auto-tuning

This feature is used for automatic adjustment of machine axes to obtain optimum and smooth performance. For complex and demanding machining environment this function may be further complimented with the features mentioned earlier.

Auto-tuning



Operation

Close to the User's needs

The 8065 CNC offers truly intuitive operation based on pop-up type browsing coupled with an interface that the operator can easily adapt to his work environment. Designed with the shop floor environment in mind, the 8065 CNC manuals can be readily accessed from within the CNC. Another added advantage is the quick access to information with an automatic search system that avoids the need to consult indexes or search through chapters.

Pop-up browsing

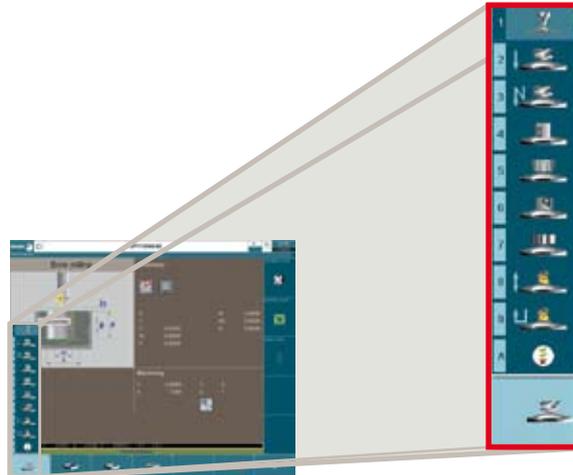
The 8065 CNC offers a pop-up type menu system for immediate access to all the features & options.

The pop-up is displayed via soft keys overlapping the new menus on the screen. The user can then select the desired feature in a very visual and interactive manner. This function eliminates the cumbersome sublevels that could confuse the operator. With a few machine operation basics, an operator who has never used a Fagor product will be capable of using the 8065 CNC with much ease and effectiveness.

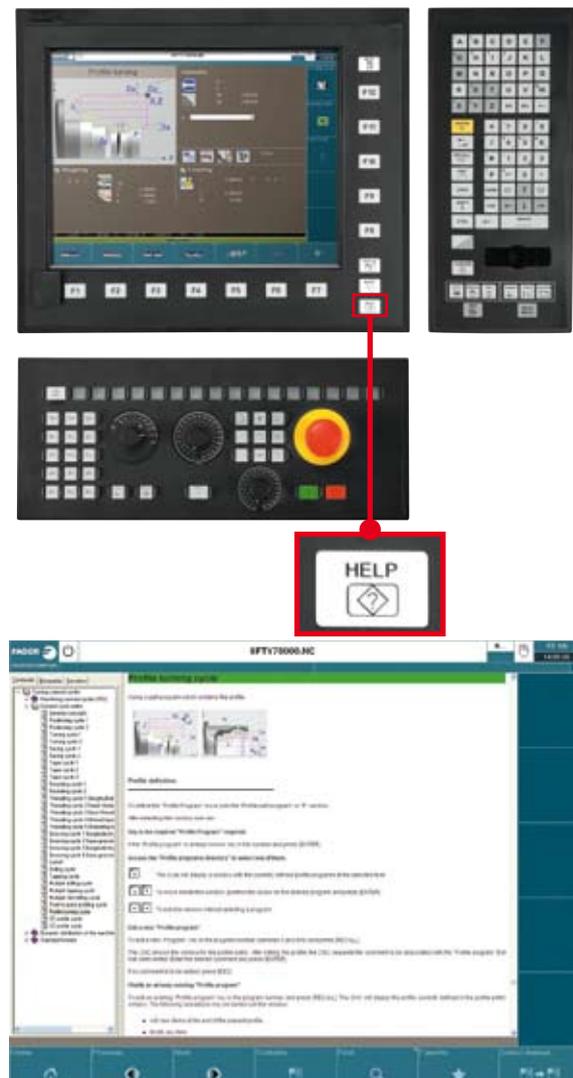
Integrated documentation

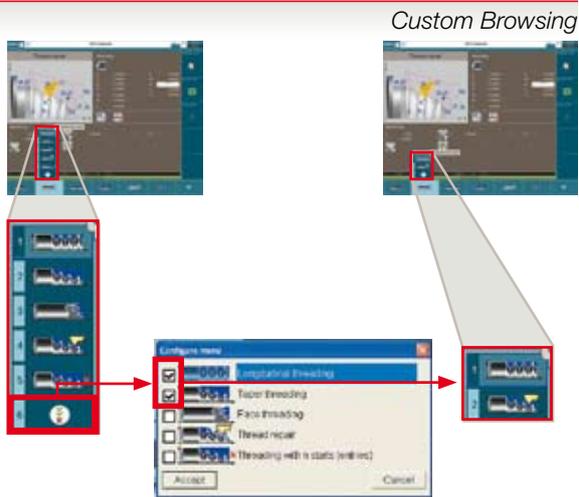
The 8065 CNC integrates the operating & programming manuals in the language selected by the user directly on the CNC. By simply pressing the HELP key, the CNC will display the chapter related to the operation being carried out at that time. Once inside the manuals, it is possible to consult any other information desired within any chapter. By having the manuals available at the CNC assures the operator has easy and faster access to information hence avoiding the use of paper documents at the machine. This information in computer format, besides being "ecologically friendly", also frees the working environment of hardcopy manuals that are only consulted occasionally.

Pop-up browsing



Integrated documentation





Custom browsing

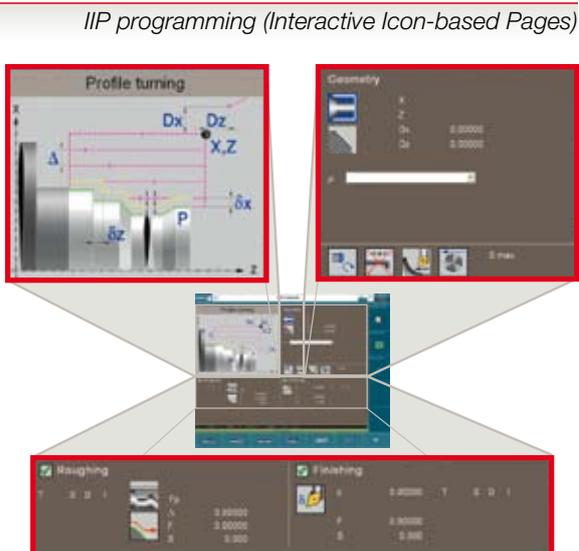
The user of the 8065 CNC can adapt the CNC browser very easily. Depending on the operator needs, there may be work modes or machining cycles that the user does not wish to use. The user then may select the work screens and cycles that he uses frequently and hide the rest, thus providing a simplified and personalized user interface that improves efficiency.

IIP programming (Interactive Icon-based Pages)

If desired by the operator, Fagor Automation offers ICON conversational programming cycles. The operator does not need to be proficient in ISO programming language, he only needs to define the geometry of the part utilizing the data directly off the blueprint including the tooling & machining conditions information..... the CNC will do the rest.

For machining single or prototype work pieces, the same philosophy as in a manual machine may be used without having to create a program or save it before. This operating and programming ease removes the need for specialized operators in a single CNC model or brand.

Our programming system (IIP), which is ICON based, is the best shop floor programming system available today.



Execution assistance

Helps the operator solve unforeseen situations

Program restart after unexpected stop

In long machining operations, if the machine stops unexpectedly due to external causes (a power outage, a machine error, etc), recovering the unfinished part may be cumbersome and difficult.

The 8065 CNC helps the operator solve these situations by taking advantage of the machining performed without having to rerun the whole program. It is enough to do an automatic block search to the exact interruption point and resume execution. When observing imperfections in the interruption area, the program may be simulated up to an area near or just before the interruption point and then resume normal machining operation through the damaged portion again.

The user controls the process for resuming the machining operation. The CNC will provide the program resuming position and the conditions active at the time of the incident. The user will only have to take the tool up to the indicated interruption point and activate the devices in the desired order.

Tool change in long machining operations

Tool life monitoring is a very resourceful feature in long machining operations or on high repeat production processes. The 8065 CNC automatically checks whether the tool has finished its useful life (set by the user) or not and replaces it with a similar one.

It is also possible to check tool wear (deterioration) by monitoring the active spindle running time. The change to a new tool is managed automatically based on the criteria set by the operator. Such useful functions help avoid the need to interrupt the job during machining or the need to keep an operator in front of the machine.

The CNC will make the tool changes automatically maintaining the machining conditions and adapting to the dimensions of the new tool that does not have to have the same dimensions as the previous one.

Program restart after unexpected stop



during machining

Stop requested by the user



Stop requested by the user

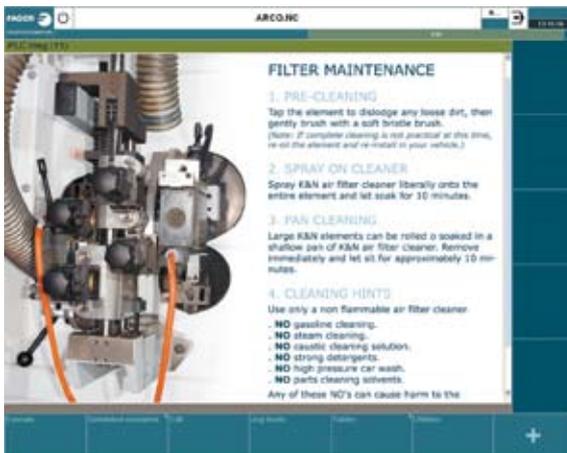
While machining a part, the 8065 CNC allows the user to interrupt execution of a program to check the machining status of the part and take the necessary actions.

After detecting and analyzing any imperfections, it will be possible to:

- . Change the machining conditions set in the program without having to edit it again.
- . Make a tool change if it is worn out or broken.
- . Activate non-programmed auxiliary devices like the coolant.

Once the necessary actions have been taken, the execution resumes with the operator changes now activated.

Troubleshooting manual



Troubleshooting manual adapted to the machine

The 8065 CNC allows downloading of the OEM associated text, image, web or movie type files with each message including PLC activated error messages.

This information will allow improved maintenance of the machine components and provides better access/autonomy to operator to quickly solve any machine-related problems.

In this manner, every time an incident is detected at the machine, the CNC screen will show the operator all the necessary information to solve the problem without having to call the machine manufacturer.

Power

In the vanguard of machine-tool technology

The 8065 CNC obtains the best machining quality possible thanks to its wide selection of tools that provide tighter tolerances and the best surface quality. Also by using the adaptive control feature AFRS, it ensure the same part finish with a considerable reduction of machining time.

5-axis machining, RTCP

The 8065 CNC manages standard kinematics (parallel kinematics, spherical spindles, rotary tables, etc.) and allows integration of specific kinematics for the OEM.

Managing these kinematics combined with RTCP (Rotation Tool Center Point) interpolation results in higher quality part finish. The user programs the actual part and the CNC adapts the movement of the articulations of the kinematics to continuously compensate the tool position while machining.

The 8065 CNC also permits machining in inclined planes without having to set up the part again. Once the tool has been manually or automatically oriented, it is enough to define the inclined plane and carry out all kinds of machining operations: pockets, rotations, etc.

Gantry / Tandem axes / Feedback combination

The 8065 CNC has been designed to easily adapt to all kinds of machine structures. When working with Gantry axes or pair of axes that must move at the same time and in synchronism, the operator must only program the movements of one of the axes and the CNC will manage the movement of the structure.

Tandem servo systems are structures that have two motors mechanically coupled (slaved) and making up a single transmission system (axis or spindle). They are used to move axes on large machines with the added benefit of reducing the effect of backlash when reversing the movement. As far as the user is concerned, the operation is the same as with a Gantry axis.

For large machine structures, the 8065 CNC allows mix of Tandem axes with Gantry axes. The feature of feedback combination is very useful in such type of structures.

Combining the accuracy of a linear encoder with the motor feedback reduces the effect of vibration when reversing the movement of the machine. The part finish is greatly improved.





Adaptive Real-time Feed & Speed control (ARFS)

The adaptive control feature optimizes machining speed, increases machine productivity, while maintaining mechanical integrity of the machine and that of the tools being utilized.

Machine productivity is affected when the part geometry is complex and has lot of variations or if the hardness or rigidity of the material to be machined varies a lot.

The CNC analyzes the machining conditions (power consumed, tool tip temperature, etc.) and adapts both the axis feed rate and the spindle speed for machining under the best conditions in order to achieve maximum productivity.

In the absence of this feature, there are two alternative ways to program the machining feed rate. But in both cases the machining quality is compromised:

- Emphasizing part surface finish, adapting the value to the most complex area of the part, but compromising on the execution time.
- Emphasizing machining time at the expense of lower quality part finish.

Thanks to ARFS, the machining time is reduced while maintaining optimum cutting conditions and resulting in a better part finish.

Volumetric compensation (FVC)

5-axis machines are used to make large parts. The accuracy of the parts is limited by the machine manufacturing tolerances and by the effect of temperature while machining.

In industries like aerospace, the machining demands render the conventional compensation tools insufficient. Volumetric compensation FVC comes in to complement the machine adjusting tools. By mapping the total work volume of the machine, the CNC knows the exact position of the tool at all times. After applying the necessary compensations, the resulting part has the desired accuracy and tolerance.

Integral solution

With our product range

Motors

Fagor Automation offers a wide range of motors for a broad list of application requirements.

Small compact motors balanced for high speed starting at 3.7 kW and expanded to large machine, high power applications for up to 130 kW. They are designed for low noise & vibration levels all the way up to 15,000 rpm.

Offered as an option, motors with dual winding (Y/Delta, star/triangle) and direct drive with a built-in hole in the shaft for automated tool cooling. (Coolant through the Spindle feature)

Axes motors range from 3000 rpm to 6000 rpm and a stall torque from 1.7 Nm up to 115 Nm.

Servo Drive Systems

The Fagor Automation's digital servo drive system is the perfect solution for the machine tool manufacturer who requires high performance machining. Fagor Automation drives are designed to obtain maximum efficiency from their motors thus offering a true high performance best solution for both spindle and axis control.

Feedback Systems

Fagor Automation offers optical linear and rotary/angular encoders for optimizing machine performance. The linear encoder report the real position data of the movement to the CNC, and thus the CNC minimizes the errors due to thermal behavior of the machine or ball screw errors.

Fagor Automation offers incremental and absolute solutions according to the requirements of the machine with measuring lengths between 0.070 m and 60 m, 0.1 μm resolution and 3 μm guaranteed accuracy. These solutions utilize TDMS[®] (Thermally determined mounting system) that prevents measuring errors due to temperature changes and have the ability to work at a feedrates up to 120 m/minute.

Remote CAN I/O modules

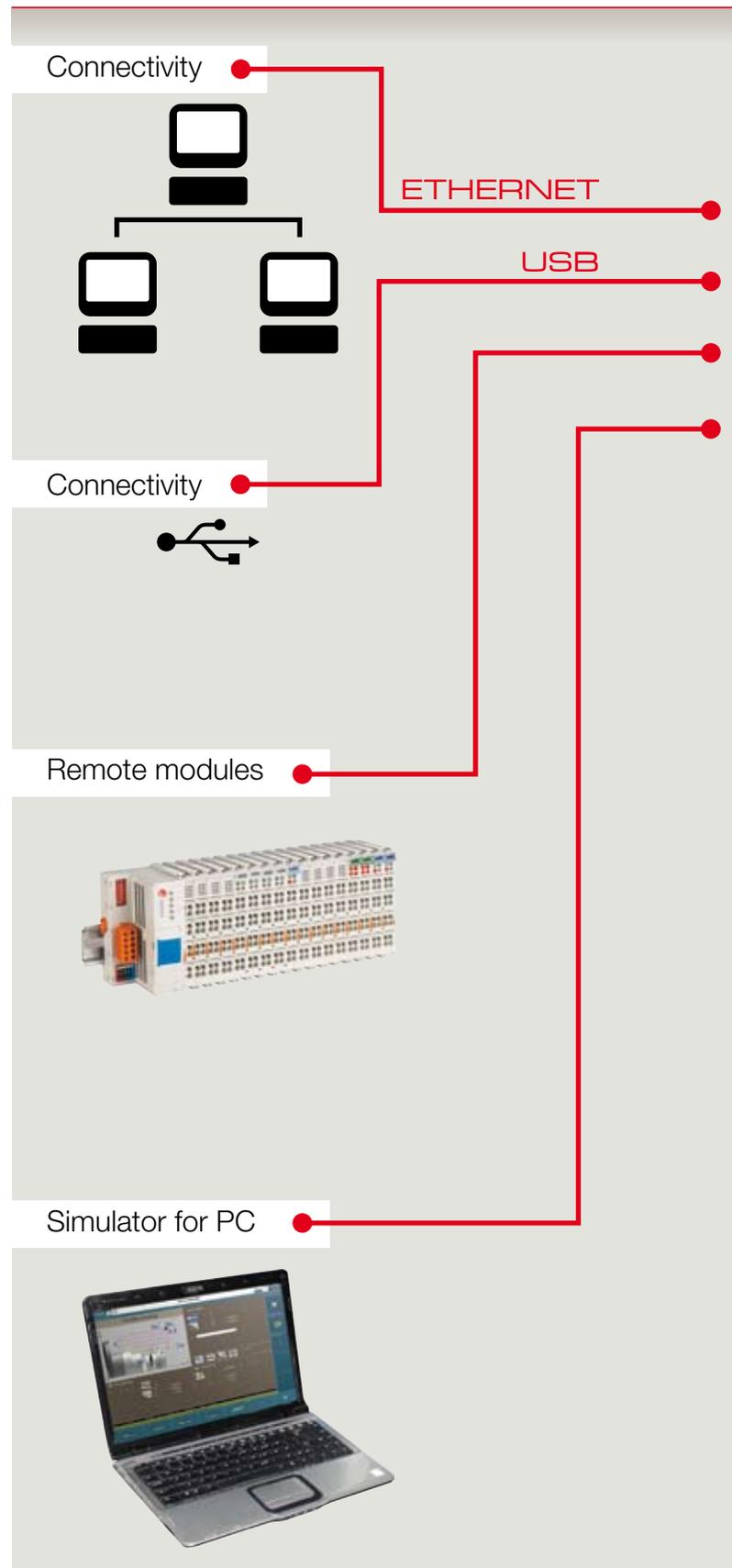
These modules are easy to install and can be mounted at strategic points of the machine, thus having extra logic inputs and outputs distributed next to devices that may be located far away from the CNC. Using these modules makes it easier to lay out the elements of the electrical cabinet and therefore translates into reduced costs due to fewer cable/wiring being utilized. The modules are distributed in groups and are connected to the central unit through the digital CAN Bus.

Connectivity

The 8065 CNC offers the capability of the following communication buses: Ethernet, USB or serial line. It is ready to be connected within the company network and may be managed remotely.

CNC Simulator for PC

This feature simulate the PC to operate like CNC 8065. It is an ideal training tool which compliments the design and programming department (CAD-CAM) as it allows editing/programming capability away from the noise and distractions of the manufacturing floor.





COMMUNICATION
DIGITAL/ANALOG

Tele-diagnosis

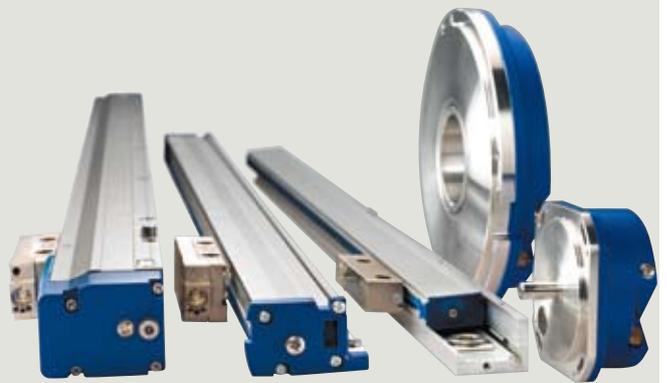


Feedback Systems

Servo Drive Systems



Motors



Technical specifications

CNC 8065		CNC 8065 POWER	
Lathe	Mill	Lathe	Mill

System configuration

High resolution color LCD monitor	10" and 15"	10" and 15"	10" and 15"	10" and 15"
15" LCD monitor with Touch screen	Optional	Optional	Optional	Optional
Touch pad Mouse integrated into the keyboard	Optional	Optional	Optional	Optional
Spindle override potentiometer	Optional	Optional	Optional	Optional
Basic axis configuration	3	3	5	5
Maximum axis configuration	Up to 7	Up to 8	Up to 28	Up to 28
Maximum configuration of spindles	2	1	Up to 4	Up to 4
Maximum configuration of execution channels	1	1	Up to 4	Up to 4
User memory	From 300 MB to 30 GB	From 300 MB to 30 GB	From 2,3 GB to 30 GB	From 2,3 GB to 30 GB
Microprocessor	Standard	Standard	Power	Power
Block processing time	0,5 ms	0,5 ms	0,25 ms	0,25 ms
Maximum local digital I/O	8/8 (*)	8/8 (*)	8/8 (*)	8/8 (*)
Maximum remote digital I/O expansion	1024/1024	1024/1024	1024/1024	1024/1024
Digital servo drives	Standard	Standard	Standard	Standard
Analog servo drives	Optional	Optional	Optional	Optional

General purpose features

Look-ahead blocks	300	300	1000	1000
Maximum number of tools	1000	1000	1000	1000
Ground tool management	Standard	Standard	Standard	Standard
Tool life monitoring	Standard	Standard	Standard	Standard
Ethernet	Standard	Standard	Standard	Standard
USB connections	3	3	3	3
Tele-diagnosis	Standard	Standard	Standard	Standard
Setup assistance	Standard	Standard	Standard	Standard
Bidirectional lead screw compensation	Standard	Standard	Standard	Standard
Cross compensation	Standard	Standard	Standard	Standard
Volumetric compensation FVC	-	-	Optional	Optional
Adaptive Real-time Feed & Speed control (ARFS)	Under development	Under development	Under development	Under development
Work in non-orthogonal planes	Standard	Standard	Standard	Standard
Languages supported	10 (**)	10 (**)	10 (**)	10 (**)
Customizable interface	Standard	Standard	Standard	Standard
Static RTCP	-	Optional	Standard	Standard
Dynamic RTCP (spindle, table, combined)	-	Optional	Optional	Optional
Third-party kinematics	Standard	Standard	Standard	Standard
Gantry axes	Standard	Standard	Standard	Standard
Tandem axes / spindles	Optional	Optional	Standard	Standard
Combined feedback	Standard	Standard	Standard	Standard
Independent channel axes	Standard	Standard	Standard	Standard
Multi-axis management	Standard	Standard	Standard	Standard
Feed hand wheel	Standard	Standard	Standard	Standard
Serial line that may be configured as RS232, RS422 or RS485	Standard	Standard	Standard	Standard
IEC-61131 programming language	-	-	Optional	Optional

(*) The 8 digital outputs may be configured as inputs via machine parameter.

(**) English, Spanish, Italian, German, French, Basque, Portuguese, Chinese, Russian and Czech.

CNC 8065		CNC 8065 POWER	
Lathe	Mill	Lathe	Mill

Programming and operation

	Lathe	Mill	Lathe	Mill
Pop-up browsing	Standard	Standard	Standard	Standard
Graphic simulation of a program while executing another program	Standard	Standard	Standard	Standard
Graphics with tool path lines	Standard	Standard	Standard	Standard
Solid graphics	Standard	Standard	Standard	Standard
High definition solid graphics (HD graphics)	Optional	Optional	Standard	Standard
Graphics for vertical lathes	Standard	Standard	Standard	Standard
ISO and parametric (macro) language	Standard	Standard	Standard	Standard
IIP programming (Interactive Icon-based Pages)	Optional	Optional	Standard	Standard
Profile editor (Mini-cad)	Standard	Standard	Standard	Standard
Machining canned cycles	Standard	Standard	Standard	Standard
Probing canned cycles	Optional	Optional	Standard	Standard
Spindle synchronization	-	-	Optional	Optional
C axis	Optional	Standard	Standard	Standard
Electronic threading	Standard	Standard	Standard	Standard
HSSA machining system (High Speed Surface Accuracy)	Optional	Standard	Standard	Standard
Interruption subroutines	Standard	Standard	Standard	Standard
Dynamic distribution of machining operations between channels	-	-	Optional	-
Coordinate system rotation	Standard	Standard	Standard	Standard
Manual intervention during machining	Standard	Standard	Standard	Standard
Selection of active kinematics by program	Standard	Standard	Standard	Standard
Tangential control	-	Optional	Optional	Standard
Feed rate as an inverted function of time	Standard	Standard	Standard	Standard
Helical interpolation / Rigid tapping	Standard	Standard	Standard	Standard



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Fagor Automation holds the ISO 9001 Quality System Certificate and the CE Certificate for all products manufactured.

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