

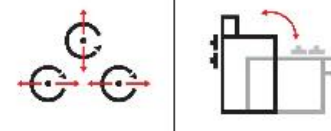


**CNC-I** is computerized numerical control with interpolated axes. Updated in its graphic and user-friendly interface. The system uses a state-of-the-art industrial computer for programs and storage management, and for axis and input/output management, as well. This control can manage all the axes at the same time, and is expandable to control up to 16 or more axes. The interpolation system automatically adapts the speed of each individual axis, without the intervention of the operator, so then desired shapes are easy to obtain with the best kind of link, each suited according to the type of profile to be bent. What the operator draw on the machine corresponds exactly to what appears on the simulation screen and to what is actually obtained by the bending machine. This feature, which gives extreme ease of programming that becomes even faster and allows the execution of perfectly symmetrical shapes.



## DELTA 60 CNCi-E

Full electric bending machine  
with 3 driving rolls



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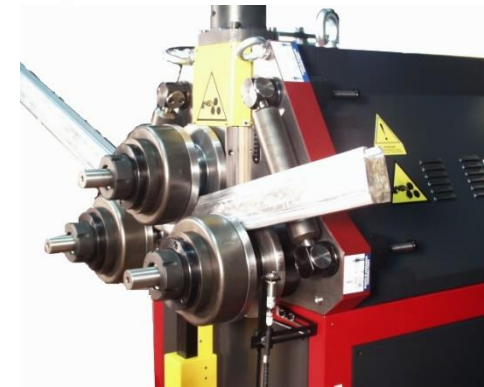
# DELTA 60 CNCi-E

The **DELTA 60** is characterized by two independent operable axes, also simultaneously, managed by a numerical control interpolated and driven by brushless servomotors and asynchronous motors with high performance. The asynchronous motor determines the progress of the material, transmitting the rotary motion through a kinematic chain, composed of an angular reducer, a gear reduction equipped with friction and three industrial cardan joints. In this way the dragging is carried out with all three rollers of the machine, guaranteeing a perfect transmission of movement to the work piece. The integrated clutch in the gear reduction allows the optimal management of the peripheral speed of the rollers; it is indeed evident that the roller inside the curvature must rotate at a lower speed compared to external ones, to ensure that all three dragging rollers transmit at all times the optimal torque to the profile being processed. Furthermore, the control of the material advancement is achieved applying an encoder directly in contact with the product in processing, so as to be able to "read" with the maximum precision the real displacement of the profile.

## The Full Electric DELTA 60

As similar to a traditional bending machine, the application of the brushless servomotor allows the new electric Delta 60 absolutely excellent performance:

- ▶ **greater precision and repeatability:** thanks to the high level dynamics on the control of brushless motors and the rigidity of an electro-mechanical system against a fluid system, the positioning accuracy of the Y-W axes can reach 0.005 mm (5 µm). Making a comparison with a hydraulic bending machine, it is twenty times more precise as the tolerance of positioning on traditional bending machines is 0.1 mm. This characteristic makes the bending machine ideal for all those processes where extreme positioning accuracy is required.
- ▶ **higher speed:** thanks to the high speed in quick approach during machine reset and during processing, the cycle time is considerably reduced. Adding the times of approaching acceleration and braking ramps fast of a classic hydraulic system and comparing them to those of an electrical system, a gain of about 60% is obtained on the bending cycle time. The time of realization of one coil, complete with counter-bend on the tangs and two technical spaces (blast chilling) for a total length of 12 meters tube, it is about 2 minutes.
- ▶ **operating economy:** thanks to the adoption of electric brushless motors, electricity consumption is optimized. The bending machine uses power only when it comes carried out the deformation, practically from the moment where the roller touches the profile, and the power used is only and only that necessary for the curvature. Furthermore, a machine stopped and during tooling, or machining changes, the absorption is practically nil as opposed to a machine hydraulic system that has the pump motor always running. It's evident the waste of energy of a hydraulic machine looking at the amount of heat dissipated in the environment through oil or various heat exchangers: all energy wasted. From surveys carried out, the energy saving is between 60% and 80%, depending on the condition of use. Also worth to mention that an electric bending machine does not require periodic maintenance except for the lubrication of the recirculated screws, unlike a hydraulic machine that requires periodically replacing the oil and its disposal as a special waste.
- ▶ **absolute stability as the thermal conditions variation:** unlike a fluid drive, the brushless motor guarantees the integrity of its electromechanical characteristics even after hours of continuous work, without affect the accuracy of placements or the speed of work.



▶ DELTA 60

Brushless servomotors are three-phase synchronous motors with permanent magnets which, together with their electronic converters, constitute the servosystems that allow the actuation of axes where are required the highest performances, both in torque and dynamic, especially when the priority is the speed and positioning control. Servomotors find application and maximum exaltation where may be required:

- ▶ **Maximum cycle speed:** a brushless servomotor can reverse the direction of rotation in a few thousandths of a second.
- ▶ **Excellent controllability** as they are equipped with sensors of positioning sophisticated and driven by adequate electronics that can get very high performance.
- ▶ **The great precision in positioning:** the application of modern position transducers, integrated and integral with the motor, allows these equipments to reach accuracies of almost absolute positioning and repetitiveness of results.
- ▶ **The smooth running at low speeds:** the axles equipped with brushless drives they can operate a very low speeds without modifying the conditions of torque and the regularity of the service (continuous or intermittent).
- ▶ **The very rapid accelerations or decelerations:** the time of Brushless motor reaction is less than half compared to the traditional asynchronous motors and does not find comparisons in the hydraulic systems.
- ▶ **Robustness:** the lack of sliding contacts is synonymous with long life and considerable savings in the costs of maintenance.
- ▶ **The capacity of overload:** the performance achievable in the field of overload toleration are absolutely striking: about three and a half times the nominal current of operation.
- ▶ **Torsional stiffness:** a brushless has a very high torsional rigidity.
- ▶ **The strong impulsive stress:** only a brushless motor perfectly supports intermittent cycles, with intervals time very reduced: more than 100 interventions per minute.
- ▶ **The possibility of operating in hostile environments:** a motor brushless can be operated in the presence of powders, calamine, vapors, humidity or in extreme thermal conditions.

The Delta 60 CNCi-E is also equipped with the new dynamic system detection of the bending load. During the deformation of the material a load cell appropriately positioned, it detects the load applied by the roller curvature and displays it on the operator panel in percent scale. This allows the verification, in real time, of the progress of the deformation of the material, thus providing the opportunity to analyze instantly any differences between the curved profiles.

Applying the technologies described above to the handling of the auxiliary axes it will be possible to obtain centesimal precision (0.01 mm) in all placements.

All rotating parts are mounted on high-load bearings radial, and are made of strongly alloyed, cemented steel hardened and ground.

The machine body consists of a solid monoblock steel.

A wide range of accessories is available on request, to make the machine suitable for the bending of any section.

The machine complies with the current product directives.