TIPO B

automatic cnc punching and thermal cutting system for large plates

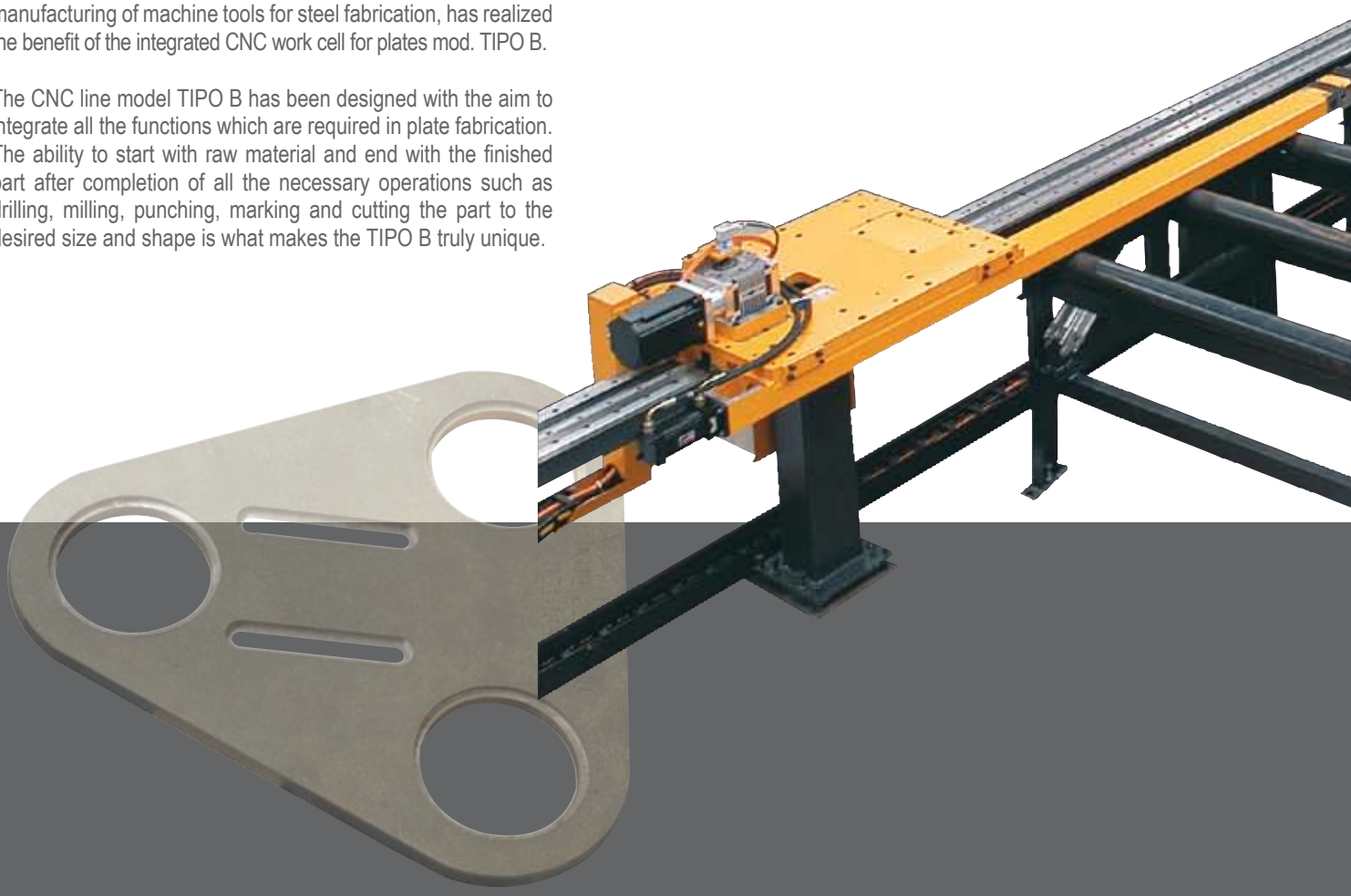
FICEP S.p.A.

Today the TIPO B system is the most innovative solution for the fabrication of plates for many varied industries.

The production of plates that are drilled, punched, marked, milled and cut in accordance with the required tolerances in one work cell is recognized as the most productive solution in today's manufacturing environment.
The reduction of the 'processing dead times', where no additional value is added, is becoming a 'must' in today's industry to increase a firm's competitiveness and to achieve the required quality control.

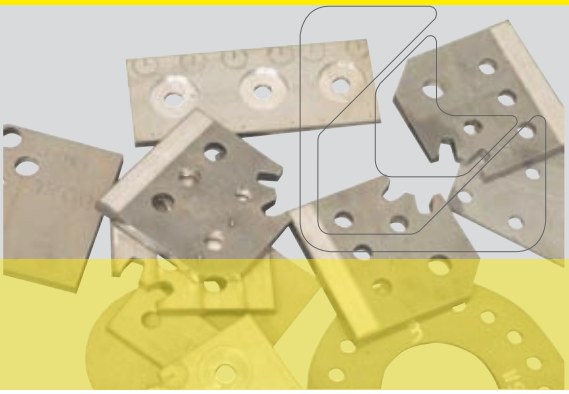
For these reasons, FICEP, the worldwide leader in the manufacturing of machine tools for steel fabrication, has realized the benefit of the integrated CNC work cell for plates mod. TIPO B.

The CNC line model TIPO B has been designed with the aim to integrate all the functions which are required in plate fabrication. The ability to start with raw material and end with the finished part after completion of all the necessary operations such as drilling, milling, punching, marking and cutting the part to the desired size and shape is what makes the TIPO B truly unique.



TIPO B 251

The CNC line model TIPO B consists of a bridge press frame that includes a punching head, drilling head, tool changer, marking unit, plasma cutting unit and an oxyfuel cutting unit that is capable of processing plates from 6 mm to 100 mm in thickness and 2540 mm in width.
The infeed and outfeed conveyor can be configured with additional sections of conveyor in order to achieve the desired length of plate to be processed starting from the standard length of 6 metres.
The plate positioning is accomplished with two powered material clamps that positions the material to precise tolerances regardless of any irregularities in the plate edge condition from the rolling process or from the removal of prior piece parts that were generated from the stock plate.
A system with a dual rack and pinion is used to position the plate and measure its actual location.



PIECE UNLOADING SYSTEM
The TIPO B can be programmed to reduce the material unloading time. In the case of geometrically similar pieces, it is possible to unload several pieces at once.
Finished parts up to 500 x 500 mm can be unloaded automatically from the outfeed side of the unit. The finished parts can be unloaded into a parts bin or onto an automated parts conveyor.
The FICEP TIPO B machine permits the unloading of the skeleton in small sections so that they can be easily removed, reducing the amount of shop space required to a minimum.

HYDRAULIC PINCHER
for plate transfer

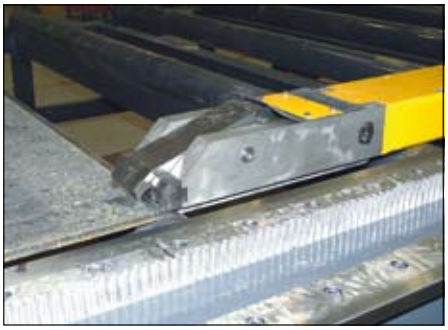
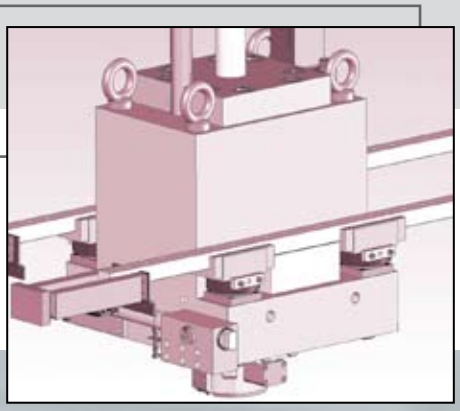
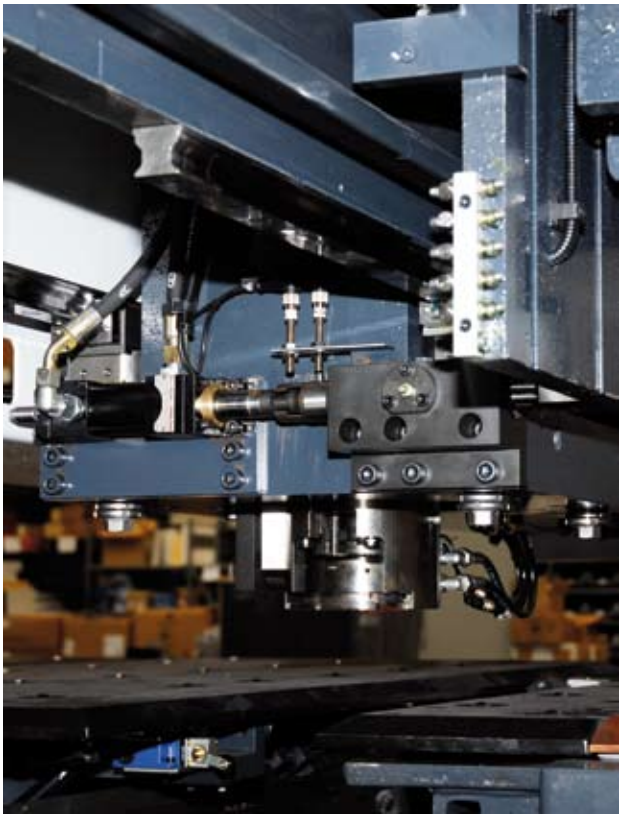


PLATE ALIGNMENT
The TIPO B is equipped with mobile datum stops to align the plates on the infeed table.

EXHAUST AND FILTRATION SYSTEM
The TIPO B can be provided with a dry exhaust and filtration system that efficiently removes any airborne particulate that are generated during the thermal cutting operation.

PUNCHING UNIT





TOOL-CHANGER
The punching head accepts tools automatically from the shuttle station.

PUNCH EXTRACTOR
The punch extractor is integrated into the cylinder and it's of co-axial type in order to grant punching quality and long tools life.

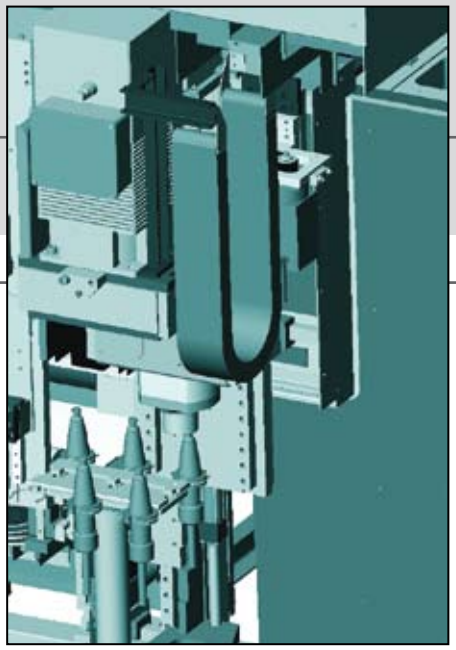
A 100 ton hydraulic punching head is typically utilized to generate holes in plates up to 25 mm thick.
Quick punching is perfectly integrated with the thermal cutting to grant maximum productivity.
The plate and the punching head are rapidly transferred to the programmed position through ball screws and brushless motors.

TOOL HOLDER
complete with punch
and die

SET OF ADAPTERS AND REDUCTIONS
for punches and dies

PUNCHING TOOL RACK
The tool rack can provide up to 14 different tools, automatically indexes by program command to provide the required tool to the shuttle. Each of the different tool stations can accept punches up to 100 mm in diameter.

DRILLING UNIT

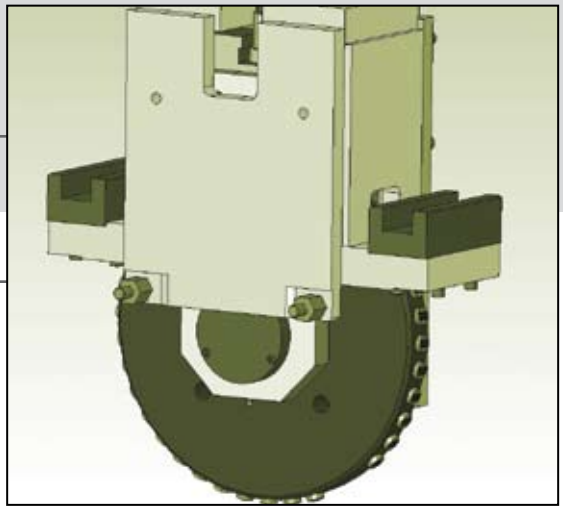


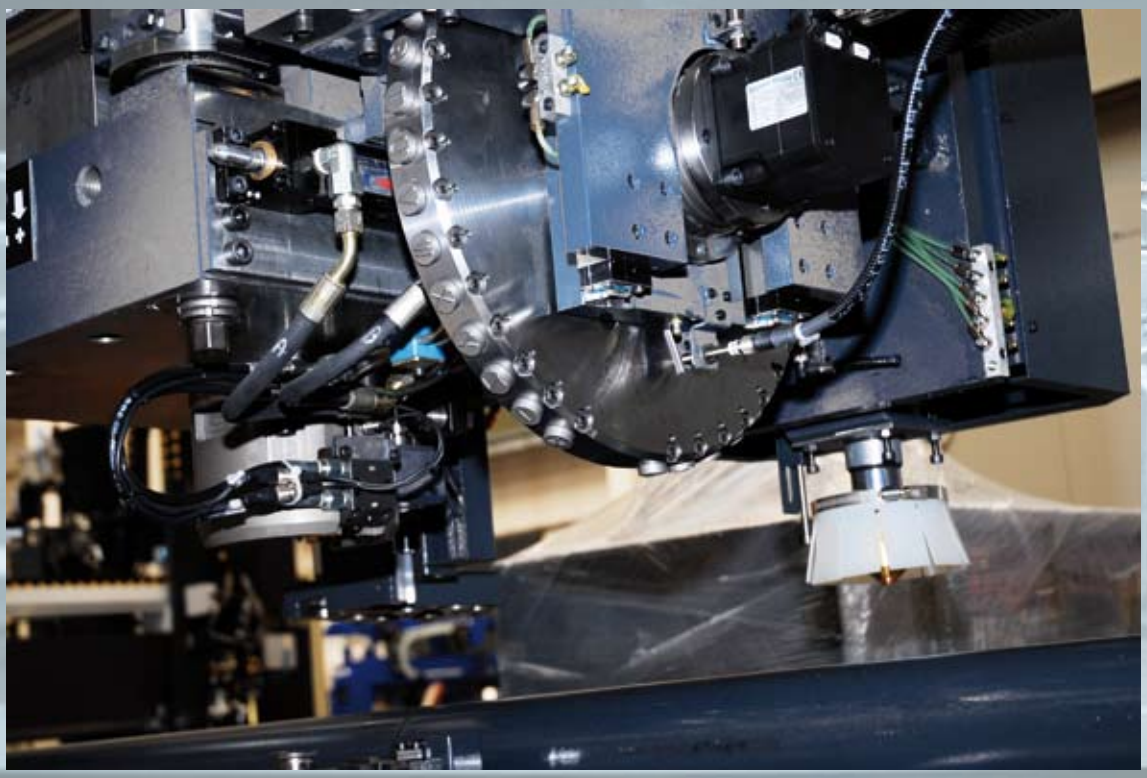
A high performance machining spindle capable of up to 3000 RPM with a ball screw feed can be furnished to add significantly to the capabilities of the TIPO B.
A tool-changer with 6 positions can be combined with the drilling head to allow the automatic processing of parts within a nest that requires the production of different operations or hole sizes.
The robust drill head of the TIPO B includes a spindle with an ISO 45 tool holder which is suitable for lateral and frontal milling operations and has a 19 kW motor.
This combination of power and speed takes full advantage of not only high speed steel drills with internal/external lubrication, but also high performance insert tools such as carbide.

This spindle is also equally suited for countersink, milling and drilling with large diameters.
The CNC automatically selects the type of lubrication according to the tool specifications that are established in the set-up table.

CLEANING
Before starting with the thermal cutting, the TIPO B carries out automatically a cycle that removes the drill chips from the plate to assure a clean surface that is required to achieve proper thermal cutting.

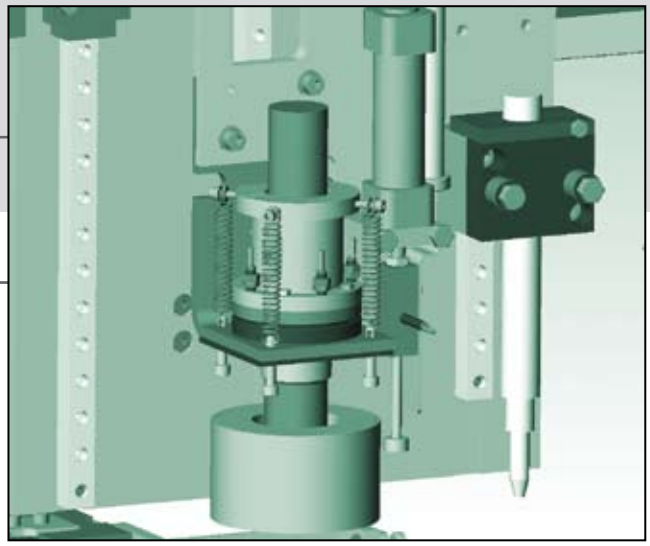
MARKING UNIT





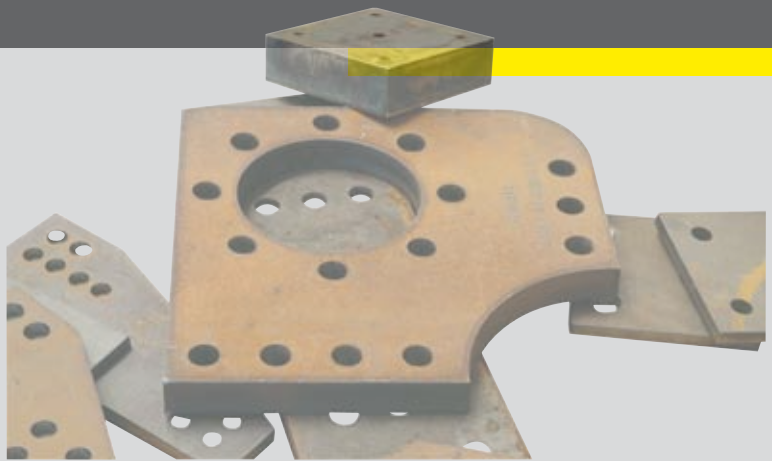
The TIPO B can be equipped with an 80 kN marking unit having a disc with 38 alphanumeric characters, whose selection is obtained thanks to the disc rotation through a CNC controlled servomotor.
The marking head can quickly generate part identification marks that are deep enough to remain readable, even after painting or galvanizing.
The approach of the marking disc to the plate takes advantage of the Y-axis.

THERMAL CUTTING UNIT



The system is provided with a Hypertherm 260A torch for processing plates up to 38 mm in thickness.
The plasma torch is utilized to contour the parts from the nested stock plate.
During the plasma cutting process algorithms in the Ficep proprietary software monitors the power to the torch and adjusts its height position accordingly to grant high performance.
By drilling a starter hole, it is possible to use the plasma to cut up to a thickness of 58 mm.

HP260
HYPERTHERM GROUP
For those applications that require a more precise edge condition, the system can be provided with a high definition plasma torch.



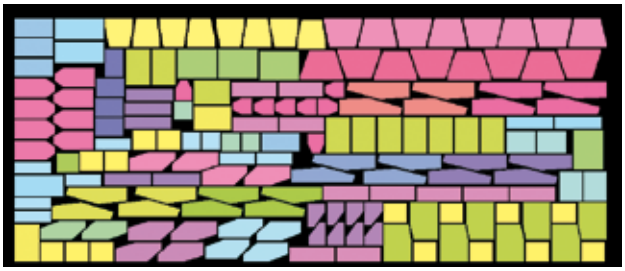
Besides the processing of plates, the TIPO B can also cut flats which utilize the rolled edge as part of the part geometry to eliminate the creation of a skeleton.

PROBING
Prior to starting the plasma cutting process, the actual top surface of the plate is probed to determine the optimum torch position for plunging or starting from an edge.

CNC HARDWARE e SOFTWARE

FICEP MINOSSE CONTROL UNIT

The new generation control unit, with controlled axes, is based on a fieldbus CANopen technology.
The CNC is lodged in a control panel that can be oriented to let the operator have a complete view of the machine.



All the input and output cards are connected to the bus and positioned on the machine, when possible.

The CNC is equipped with:
- digital inputs (24V – optoinsulated)
- digital outputs (24V – protected transistors)

The control panel is an industrial PC containing the CNC and having the following specifications:
- 600 Mhz CPU with L2 512 KB “cache”
- 512 MB RAM memory
- Touch screen colour video TFT 12.1’’
- Keyboard panel and auxiliary pushbutton panel
- 10/100 RJ45 Ethernet port
- USB modem
- 1 additional USB port
- WINDOWS XP Embedded operative system
- Teleservice software

Programming
- Simplified data input (with tables and workpiece on-screen graphics)
- Absolute and incremental values
- Diameters programming
- Linear, matrix and flange patterns

Processing
- Automatic tool assignment
- Unit offset sum
- Values ordering

Execution
- Automatic cycle stop for “setup” modification, and on-screen indication of the tools to be changed.
- Table with drilling parameters

All the indications are clearly displayed on the screen, and concern:

- Current program indication, with clear description of the program running at the moment
- CNC inside and outside alarms
- Registration of the date and time of the last 100 alarm messages
- Diagnostic messages to the operator.

Software Package “WIN-NEST”, specifically studied for nesting of the piece programs into the large plate after having imported them either from a CAD application, or from the software package “WIN-STEEL”. The package runs on an IBM PC or compatibles.

TECHNICAL SPECIFICATIONS

TIPO B161 TIPO B251

PLATE SPECIFICATIONS ON INFEED SIDE			
Length	max. mm	3000	6000
Length	min. mm	2000	2500
Width	max. mm	1600	2540
Width	min. mm	500	500
WORK PIECE SPECIFICATIONS ON OUTFEED SIDE			
Length	min. mm	200	200
Width.	min. mm	150	150
Thickness of the large plate	min. mm	6	6
Thickness of the large plate (punching operations)	max. mm	25	25
Thickness of the large plate (HPR 260 thermal cutting)	max. mm	25	25
Thickness of the large plate (drilling operations)	max. mm	100	100
Positioning weight	max. Kg	5000	5000
Linear weight of the large plate	max. Kg/m	750	750
Maximum vectorial traverse speed	m/min.	30	30
Cross positioning speed	m/min.	40	40
PUNCHING CAPACITIES (ON 400N/mm^2 PLATES)			
Punching force	kN	1000	1000
Maximum stripping force	kN	100	100
Maximum hole diameter in punching	mm	100	100
Maximum diameter on 20 mm thickness	mm	38	38
OPTIONS			
MARKING UNIT WITH 38 POSITIONS MOD. MKT 38N			
Marking stations	no.	38	38
Size of letter / number	mm	16x8	16x8
Marking strength (on every character)	kN	80	80
DRILLING UNIT			
Spindle dimension	ISO	45	45
Stroke to suit the gauge line	mm	from 10 to 1590	from 10 to 2530
Spindle motor power	kW	19	19
Spindle rotation speed that can be adjusted by the CNC	RPM	from 180 to 3000	from 180 to 3000
Drilling diameter	min. mm	5	5
	max. mm	40	40
Tapping operations		from M6 to M33	from M6 to M33
Boring operations	min. mm	5	5
	max. mm	40	40
Drilling tools change system		5 positions	6 positions
Tools to be inserted	no.	5	6
THERMAL CUTTING UNIT			
Cutting system with HT2000, HY Speed or HPR260 plasma or oxycutting			

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