Osai

OPEN Cut

Technology for Plasma Cutting

The OSAI solution for Plasma Cutting

The High Integration between the OSAI OPEN*Cut* modular system components for Plasma and Oxy-fuel cutting, guarantees high productivity and cutting performances, together with an ease of use that requires no training.

The new OSAI Hardware and Software modules, dedicated to 2D cutting and bevel cutting are the right answer for the most demanding production requirements.

The solutions offered by the new OPEN*Cut* systems, simplify installation and commissioning, optimizing the time-to-market thanks to the most advanced Software modules and Hardware components:

- Graphic, multi-touch SW oriented HMI, with 2D or 3D graphics for program execution control
- Technological offset management for the compensation of the Bevel cutting parameters
- Proprietary Plasma source interfaced via EtherCAT fieldbus with automatic gas console
- Cutting head height control in 3D
- Predefined and easy to customize machine logic, designed for Plasma/Oxy-fuel
- Different Operator Panel solutions
- Latest generation OPEN*control* CNC
- Drives connected via EtherCAT or proprietary fieldbuses
- Gantry axes management
- Bi-rotary heads control for Bevel cutting
- Remote I/O and Plasma source connected using EtherCAT fieldbus
- Multi-tool drilling/milling heads management
- Open solution offering the possibility to use the complete solution or integrate part of that with third parties modules:
  - Mechatrolink, analog and P&D drives
  - CANopen I/O fieldbus
  - Interface to the most common plasma sources

OPEN*Cut* Plasma Software

OPEN*Cut* Plasma is an advanced HMI and CAM application that guarantees both the execution of programs generated by external CAD systems and the graphic parametric programming of pre-defined profiles that do not require any knowledge of ISO language used in the CNC.

OPEN*Cut* is implemented according to the user requirements, from 2D cutting up to bevel applications. As well as the OSAI product family, OPEN*Cut* is organized in modular units, available in four technological levels.

The **"Standard"** level includes all the functions required to control the 2D machines:

- Management of Plasma and Oxy-fuel cutting machines
- DXF and DWG file import
- Library of 2D predefined shapes
- Double torch management (Plasma)
- Multiple torch management (Oxy-fuel)
- Profile matrix nesting
- Drilling and marking heads management
- Raw part definition
- Lead in/out manual editing and lead in manual definition for every part
- Post-processor with technological parameter wizard
- Cutting path check with graphic visualization
- 2D simulator
- Restart with manual or automatic repositioning after a stop
- Torch collision detection
- Manual cut
- Graphic preview of the profile and dynamic display of the torch position and path.
- Cutting technology database
- Consumables graphic display
- Automatic gas console

The **"Advanced"** level introduces:

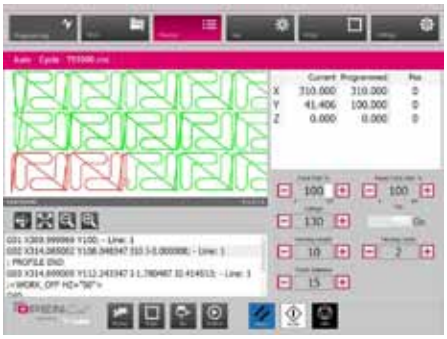
- Automatic nesting of different profiles
- 3D realistic simulator

The **"Automatic"** level adds:

- Automatic cutting parameters choice
- Automatic lead in/out
- Cutting path check and automatic correction of the collisions
- Cycle time calculation

The **"Automatic 3D"** level adds to the Automatic level

- Bevel cutting management
- Technological parameters for bevel cutting



SoftPLC program for Plasma / Oxy-fuel cutting

The machine logic designed for Plasma and Oxy-fuel cutting machines is flexible, scalable and perfectly coordinated with the integrated CAM SW and allows the rapid application of the CNC. Functions such as the automatic control of the torch height and the dynamic regulation of the Plasma power according to the speed are already integrated as well as a very quick I/O remapping method that allows the connection of the machine in very short time.

The real-time PLC, integrated in the Numerical Control, is open to any type of customization with more than 450 PLC predefined functions and with the possibility of integrating external software algorithms implemented with high-level languages. The PLC also controls the exhaust fume ports in the space surrounding the cutting area thanks to the real-time control of the torch position on the plane.

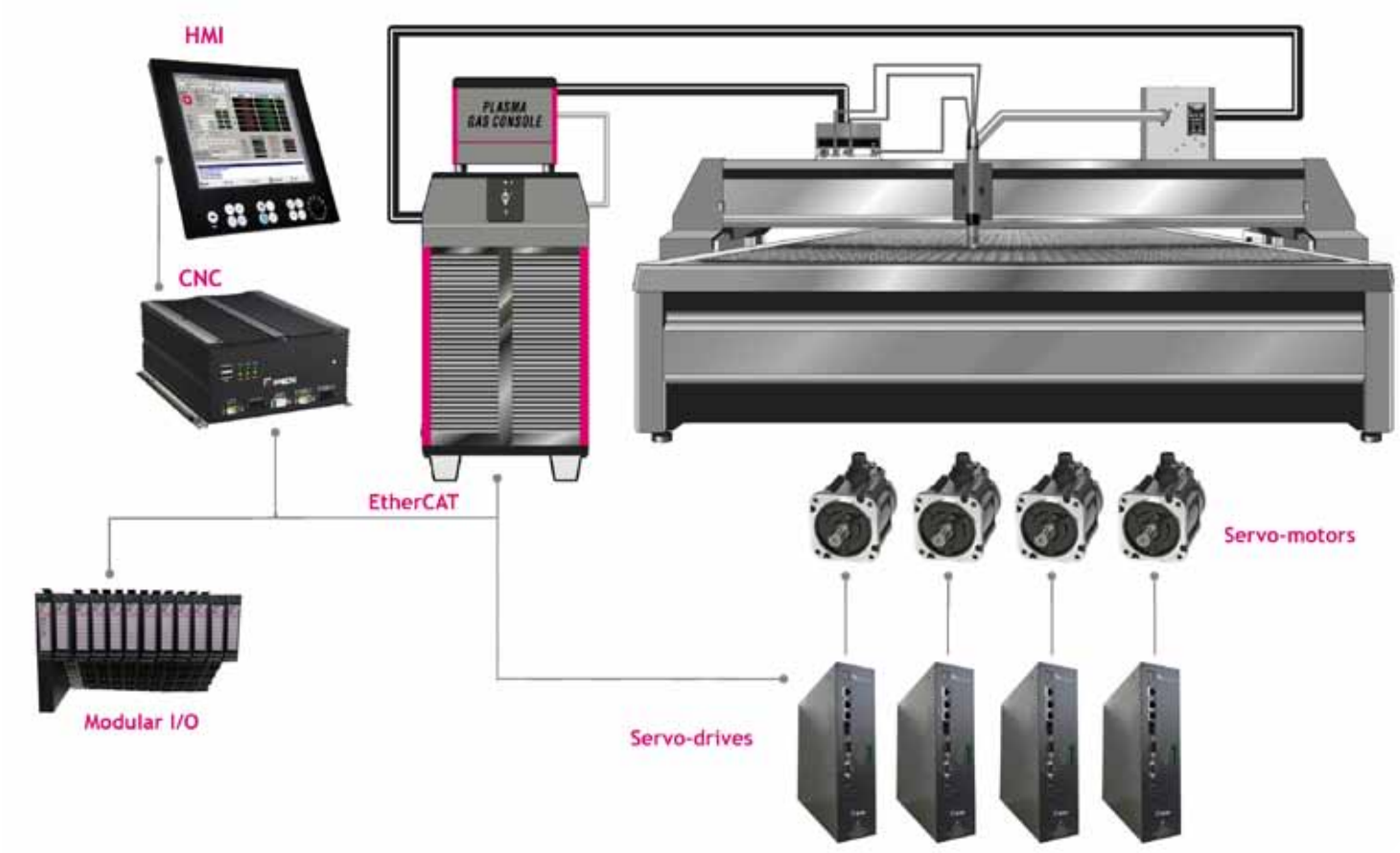
Numerical Control

The OPEN*control* CNC is a scalable platform that allows the selection of the computing power according to specific requirements (up to Intel® Core™ i5 CPU) without any change in the Software and in the application. OPEN*control* is PC based and offers an advanced technology with two Operating Systems in a single Hardware, a real-time O.S. (Windows CE) ghosted to the operator, that guarantees a perfect synchronization of the axis movements and an O.S. visible to the operator (Windows Embedded Standard 7) to manage both OPEN*Cut* software and customers' applications.

Operator Panels

For the Plasma machine market, OSAI offers different solutions from 15'' up to 19'' to use the OPEN*Cut* SW with the best performances, from the dedicated Operator Panel (with Multi-touch monitor and Joystick for manual movements, customizable buttons and Manual Feed selector) up to the easier touch-screen single-touch Monitor.

Configuration scheme of the OPEN*control* systems using the OPEN*Cut* technology



Servo-drives and Servo motors

Available with different digital and analog connections, OPEN*control* is a CNC that offers several solutions for the machine axes. The new OPEN*drive* product line, based on EtherCAT fieldbus and including drives and motors, perfectly matches the system, improving dynamic performance, configurability and commissioning. The new drives with 230 up to 480V ± 10% supply, nominal current from 3 to 18A, integrated Safe Torque OFF are the perfect solution for Plasma and Oxy-fuel cutting machines.

HQC (High Quality Cutting) plasma technology

A "Made in Italy" complete system for Plasma High Quality Cutting, with a high operating inexpensiveness. The solution includes:

- Sophisticated electronic power sources with EtherCAT digital interface capable of supplying 120A, 250A or 420A
- Automatic Gas Console for the complete control and continuous adjustment of the cutting gas flow using OPEN*cut* Software
- High Frequency sources for quick and precise ignitions of the electric arc
- Gas Valves Unit controls the different gas flows to obtain the best quality from the start of the cut, even on thinner material
- OSAI torches for planar and bevel cutting, with their relevant consumables, for high quality cutting performances and long lifetime, ranking the solution at the top of the market.

Cutting and drilling heads

The complete OSAI OPEN*Cut* solution includes the Bevel Head BK300-3D and the Multi Spindle Drilling Head BK200-6 for sheet metal drilling and tapping operations. The BK300-3D is designed to avoid cable windup or torch reversing in full circle cutting operations and is equipped with collision avoidance mechanical system. Both the Bevel head and the Multi Tool Drilling head can be supplied with OSAI OPEN*Cut* Torch Height Control.

The Torch Height Control includes a Z axis with a stroke of 250 mm, sealed linear guides and a ball screw drive for accurate cutting. Each axis of the BK300-3D can rotate ±50° with a maximum speed of 60 rpm. The six tool turret configuration of the BK200-6 is designed to drill holes up to ø 24mm and to tap holes from M3 to M18. The head is completed by a pneumatic lock device plate and by a Z axis with a 300 mm stroke.

Retrofit Kit

OPEN*control* systems which are highly scalable and configurable, are available in several retrofit models to update or restore Plasma and Oxy-fuel cutting machines.

OPEN*control* modules allow the replacement of the CNC only or the complete system from HMI to Servo-motors. The two solutions offered for the standard retrofit include:

Retrofi Kit 1 - suitable for machines where the motors and drives (analog or pulse & direction) are re-useable.

- 15'' Touch Screen Monitor
- OPEN-M CNC
- Bridge module for I/O and drive interface
- OSAI Plasma source (optional)

Retrofit Kit 2 - complete solution

- 15'' Touch Screen Monitor
- OPEN-M CNC
- OPEN*rio* SL modular I/O system
- OD700 digital drives interfaced via EtherCAT fieldbus
- Brushless servo-motors
- OSAI Plasma source (optional)

Both solutions also include the OSAI OPEN*Cut* CAM SW to control and program the machine.

CNC

	OPEN-M	OPEN-XLi
CPU	Celeron® M 2 GHz	Intel® Core i5
Drive interfaces	EtherCAT, Mechatrolink I, II, III, Proprietary 90 MBit, P&D, Analog	
I/O interfaces	EtherCAT/ CANopen	
Axes n°	32	64
Parallel process n°	4	24
n° blocks/sec (5 axes)	>5200	>7000
Look ahead blocks n°	512	1024
Min. Interpolation time	0.5 mSec	0.25 mSec
Memory programs	Up to 8192 MB	
OPEN*Cut* Plasma CAM		
Standard	YES	
Advanced	Optional	Optional
Automatic	Optional	Optional
Automatic 3D	Optional	Optional

Operator Panels

	Monitor	OPEN*console* COMPACT	Multi-Touch Operator panel
Screen	15" - 17"	15"	19"
Resolution	1024x768 1280x1024	1024x768	1280x1024
Touch screen	5 wires resistive		Projected capacity 2 layer, up to 4 points multi-touch
Keyboard	NO	YES	NO
USB front port	NO	YES	
Buttons	NO	YES	
Feed rate	NO	YES	

I/O Modules

	OPEN*rio* V-200			
Fieldbus	CANopen			
Assembling	DIN rail mounting - modules connected via modular backplane			
Dimensions (W x H x D)	25.4 x 76 x 74 mm			
I/O signals isolation	Optical for digital modules, galvanic for analog modules			
Digital modules	16 In	16 Out	8 In	8 In/Out
Number of I/O	16 Input	16 Output	8 Input	8 individually configurable as Input or Output
Current for each output	-	0.5 A	-	1 A
Low level input signal	0÷5 VDC	-	0÷5 VDC	0÷5 VDC
High level input signal	15÷28.8 VDC	-	15÷28.8 VDC	15÷28.8 VDC
Analog modules	2 In +2 Out		4 In	
Number of I/O	2 Input + 2 Output		4 Input	
Input/Output field	Configurable 10V, 1÷5V, 0÷10V, 20mA, 4÷20mA, 0÷20mA		-10÷10V	
Resolution	12 bit			

	OPENrio SL			
Fieldbus	EtherCAT			
Assembling	DIN rail mounting - modules connected with side contacts			
Dimensions (W x H x D)	15 x 109 x 76.5 mm			
I/O signals isolation	Electrically isolated			
Digital modules	8SMPM021-1BF00		8SMPM022-1BF00	
Number of I/O	8 Input		8 Output	
Current for each output	-		0.5A (max 4A per module)	
Low level input signal	0÷5 VDC		-	
High level input signal	15÷28.8 VDC		-	
Power modules	8SMPM022-1BD20		8SMPM022-1HB10	
Number of I/O	4 Output		4 Relay Output	
Current for each output	2A (max 4A per module)		3A 30 VDC / 230 VAC	
Analog modules	8SMPM031-1BB40	8SMPM031-1BB70	8SMPM031-1BD70	8SMPM032-1BB70
Number of I/O	2 Input	2 Input	4 Input	2 Output
Input/Output field	0/4....20mA	±10VDC	±10VDC	±10VDC
Resolution	12 bit	12 bit	12 bit	12 bit
PWM Module	8SMPM022-1BB90			
Number of I/O	2 Output			
Current for each output	0.5A			
Switching frequency	Max 40 kHz			
Encoder Input Module	8SMPM050-1BA10			
Input voltage for signal "0"	Differential signal RS422			
Input voltage for signal "1"	Differential signal RS422			
Maximum input frequency	500 kHz			
Input resistance	120 Ω			

Drives & Motors

	Drives											
Nominal/Peak current	3/9	6/12	12/18					18/36				
Three phase input	230VAC -10% ÷ 480VAC +10%, 50-60 Hz ±5%											
Auxiliary input	24Volt -15% +20%											
Communication bus	EtherCAT	EtherCAT (CoE profile), Proprietary 100Mbit										
Integrated Safety	STO											
Integrated Safety (optional)	SS1, SS2, SOS, SLS											
400V Motors												
Flange Dimensions (mm)	70	91.3		115					142			
Standby Torque (Nm)	1,2	2	3.2	4	6	8	10	12	16	20	24	
Power (kW)	0.6	0.7	1	1.3	2	2.7	2.8	3.3	4.4	5.5	6.6	
RPM	6000			4000				3000				
Transducer	SinCos Hiperface single/multi-turn											
Brake	Optional											

Plasma Beam Generator

	165 - HQC	254 - HQC	420 - HQC
Three phase input	220/230V - 380/400V - 415/440V ±10%		380/400V - 415/440V ±10%
Input power	20.7 KVA 100%	51 KVA 100%	90 KVA 100%
Current adjustment range	5A ÷ 120A	5A ÷ 250A	5A ÷ 420A
Max Pierce (mm)	25	40	50
Max cut (mm - edge start)	30	60	80
Cooling	Internal		External
CNC interface	EtherCAT		
Gas Console	Automatic		

Bevel Cutting Head and Multi Tool Drilling Head

	Bevel Head
BK300-3D	
A axis	Rotation axis parallel to "X" machine axis; maximum tilt ±50°
B axis	Rotation axis parallel to "Y" machine axis; maximum tilt ±50°
Max motor speed	6000rpm
Axes resolution	0,001 degrees
Max speed	1 degree/3 ms
Weight	17 Kg (37.8 lbs)
Dimensions (mm)	371 x 273 x 124
Material	Aluminium
OPEN*control* Servo Drives	
Power supply	100Vac three phase
Auxiliary power supply	24Vdc
Nominal current	0.5A
Peak current	1A
CNC interface	EtherCAT

	Multi Tool Drilling Head
BK200-6	
Number of tools	6
Spindle Motor	Brushless with Encoder feedback
Spindle Speed	100 rpm min, 2.000/2.500 rpm max
Spindle Power	4kW
Spindle Torque	27Nm a 2.500 rpm
Weight	55 Kg (121.4 lbs)
Dimension (mm)	250 x 305 x 690 (with motor)
Material	Aluminium and steel
OPEN*control* Servo Drives	
Power supply	230Vac - 480Vac three phase
Auxiliary power supply	24Vdc
Nominal current	18A
Peak current	36A
CNC interface	EtherCAT

	Z Axis for BK300-3D head
B250-P	
Axis stroke (mm)	250
Axis Motor	Brushless with Encoder feedback
Weight	30 kg (66.2 lbs)
Dimensions (mm)	360 x 113 x 765
Material	Aluminium
OPEN*control* Servo Drives	
Power Supply	230Vac - 480Vac three phase
Auxiliary power supply	24Vdc
Nominal current	6A
Peak current	12A
CNC interface	EtherCAT

	Z Axis for BK200-6 head
Axis stroke (mm)	300
Axis Motor	Brushless with Encoder feedback
Weight	85 Kg (187.6 lbs)
Dimensions (mm)	360 x 418 x 765
OPEN*control* Servo Drives	
Power Supply	230Vac - 480Vac three phase
Auxiliary power supply	24Vdc
Nominal current	6A
Peak current	12A
CNC interface	EtherCAT

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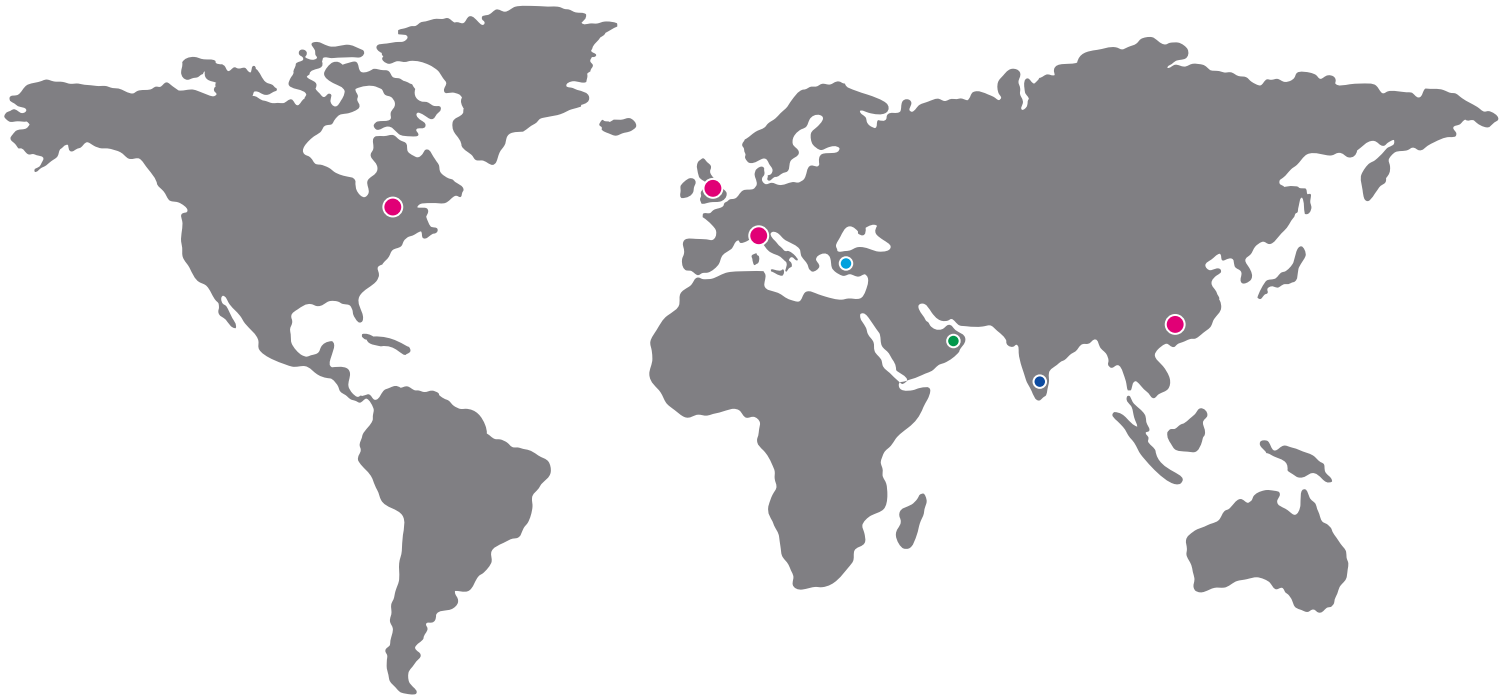
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