



# ACCESSORIES & OPTIONS

ENG

 **CYLASER®**

***IT ALL STARTED  
AS A CHALLENGE...***

***...IT HAS BECOME  
THE LEADING  
TECHNOLOGY  
FOR SHEET  
METAL  
CUTTING***





## CY2D SYSTEMS

Cy-Laser invests constantly in R&D to offer its customers, even the most demanding ones, customized and state-of-the-art fiber laser cutting systems able to optimize and increase efficiency in production processes and to satisfy the need of costs reduction.

04 **CYLASER CUTTING HEADS EVO III AND EVO V HP**  
The light of the future

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Vortex is the process feature that allows to obtain a higher cutting quality on .300" and thicker stainless steel

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The process feature that allows to automatically select the correct nozzle for each job

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# CYLASER CUTTING HEAD



## MAIN FEATURES OF CYLASER EVO III AND EVO V HP CUTTING HEADS

- » Optics configuration designed as per customer specifications
- » Maximum reliability guaranteed by the protection screens even during maintenance
- » Magnetic anti-collision system to minimize machine downtime
- » Integrated process monitor to continuously keep track of production
- » CYSP Servo-piercing for fast and clean piercing of very thick plates
- » Automatic nozzle cleaning and height control calibration
- » Designed to use compressed air for cutting as an alternative to technical gases
- » Flycut function for high-speed cutting of grids
- » Vortex cutting process for a better quality and a reduced gas consumption in stainless steel cutting
- » Marking, engraving and film-protected material cutting management

## EXCLUSIVELY FOR EVO V HP

- » Cutting process management for **8kW and above**

## HOW THE CYLASER CUTTING HEAD WAS CONCEIVED

Thanks to Cy-Laser and specifically to the company founder Mr. Livio Campana, it was possible to discover and introduce for the first time ever the fiber laser technology for sheet metal cutting. It's **2005** when Mr. Campana, at the time an active entrepreneur in the special welding machine sector, produces his **first fiber laser cutting head** for 1070 nm wavelengths obtaining surprising results. Thanks to this revolutionary discovery, Cy-Laser becomes pioneer in the market of laser cutting systems and, in a very short time, its name is on everyone's lips. Being the first to find out this extraordinary technology has represented a huge added value for the company which, over the years, has never stopped and has increased and refined its know-how by placing on the market a state-of-the-art and always in step with the times product. Therefore, the Cy-Laser cutting head has gradually evolved and keeps on evolving today, thanks also to the support of customers, who represent the most important source of inspiration for Cy-Laser.



# CYLASER CUTTING HEAD EVOLUTION

The first Cy-Laser cutting head had the manual focus adjustment and was called “double head” as it was equipped with a double focal length to make the most of the limited power of that time’s laser generators.

The second Cy-Laser cutting head, known as **EVO I**, was designed in 2009 with a single focal length and with automatic focus adjustment. In the double head the lens movements were all done manually, whereas with EVO I all motion parts were removed and the focal length became thus a single sealed block whose movements began to be controlled from the outside.

This represented a great step forward for Cy-Laser and for the entire market. Making the **head hermetic** was very helpful for the production process because this meant eliminating the occurrence of technical errors and the risk of incorporating dust or residues but, above all, it ensured lenses a longer life time.

With **EVO I** a **collision check system** was also introduced to preserve the head integrity. Unlike the heads on the market at that time as well as the current ones, equipped with a breaking organ, this system provided the magnetic release of the torch and the immediate lock of the system to avoid the possibility to damage the head in case of a collision. To date, we are still the only ones to offer this very useful solution and this represents one of the main added values that distinguishes us in the entire market.



*Example of collision check system function*



CYLASER SYSTEMS ARE COMPLYING WITH  
FDA'S CLASS IV LASER RADIATION SAFETY DIRECTIVE

# CYLASER CUTTING HEAD EVOLUTION

## The present and the future

Thanks to the very high know-how level, the continuous R&D and testing of Cy-Laser team, EVO I was followed by **EVO II** and subsequently by what are now considered the market's most advanced cutting heads: **EVO III** and **EVO V HP**.

It was with **EVO III**, in 2018, that Cy-Laser reached its peak by designing and manufacturing a **much faster** cutting head thanks to a **lighter and solid structure** able of improving all processes and taking advantage of generators laser power increase.

Thanks to EVO III, it was possible to introduce two very important innovations: the bevel cut and the galvanometric marking head.

With **EVO V HP**, the new cutting head for high powers, Cy-Laser aims to improve the cutting process with **high power generators** (> 8kW), even for welding.



| <b>BENCHMARK</b>                                     | <b>CYLASER EVO III<br/>(from 1kW to 7kW)<br/>CYLASER EVO V HP<br/>(from 8kW to 20kW)</b> | <b>ANALISYS</b>   |
|--|--|---|
| Laser Light Cable Receiver QBH                       | <b>QBH connector interface on Collimator</b>   | QBH is IPG standard on stand-alone laser  |
| Laser Light Cable Receiver HP                        | <b>Not featured</b>  | Interface not diffused  |
| Laser Light Cable Receiver LLK-Auto                  | <b>LLK-D connector interface on Collimator</b>   | Interface used in robots and automotive industry  |
| Cover slide (connector)                              | <b>Protective screen on Collimator</b>   | Our design protects both Collimator lens and optic fiber quartz   |
| Collimator Module Manual                             | <b>Not featured</b>  | We abandoned manual focus adjustment in 2009  |
| Collimator Module Auto Focus                         | <b>AFR Auto Focus Regulation</b>   | Standard configuration of Cy-Laser cutting heads  |
| Collimator Module Auto Focus and beam diameter       | <b>Not featured</b>  | We determined that the advantages of modifying the diameter of the beam did not compensate for the disadvantages caused by the movements of additional optics. HIGHYAG adjustable collimation uses 3 dedicated lenses, which increases the cost of consumables and decreases MTBF                                       |
| 90° Beam Bending Module                              | <b>Not featured</b>  | Has no process advantages   |
| Process Monitoring Module 0° compact                 | <b>Not featured</b>  | Has no process advantages   |
| FJB Distance measuring module                        | <b>CHC capacitive height control</b>   | Standard configuration of Cy-Laser cutting heads  |
| Base Module with focusing system and X, Y adjustment | <b>Magnetic Break-away Torch</b>   | Our original laser torch design offers obvious advantages in terms of service. Our magnetic break-away concept allows for collision absorption and rapid recovery   |
| KSGM protective glass monitoring                     | <b>HRC High Back Reflection Control</b>  | The primary difference is that our system is designed to monitor the general conditions of the production process, not just one optic. This means we can also obtain feedback on the status of lenses. Our current aim is to refine this system to achieve a broader range of information regarding the cutting process |
| Cutting nozzle with adapter                          | <b>Nozzles or adapter</b>  | We feature standard nozzles easily available on the market  |
| Not featured   | <b>ABS air crossjet</b>  | Thanks to our experience with thick material processing, we developed this compressed air crossjet which blows melted material away during the piercing process   |
| Not featured   | <b>CySP Cy-Laser Servo Piercing</b>  | Our answer to productivity and reliability demands for on thick material piercing. This option allows easily drills up to 0.787", reducing piercing and cutting time with remarkable savings in spare parts and optics  |
| Not featured   | <b>VORTEX</b>  | Smoothing Process for cleaning the cut side of stainless steel ranging from 0.300" up to 1.0" (reduces gas consumption if using nitrogen)   |
| Not featured   | <b>VEGA</b>  | Smoothing process for the cutting edge cleaning on: <ul style="list-style-type: none"> <li>• 0.300" and thinner stainless steel</li> <li>• 0.300" and thicker carbon steel</li> </ul>   |

# THE CYLASER EVO CUTTING HEADS

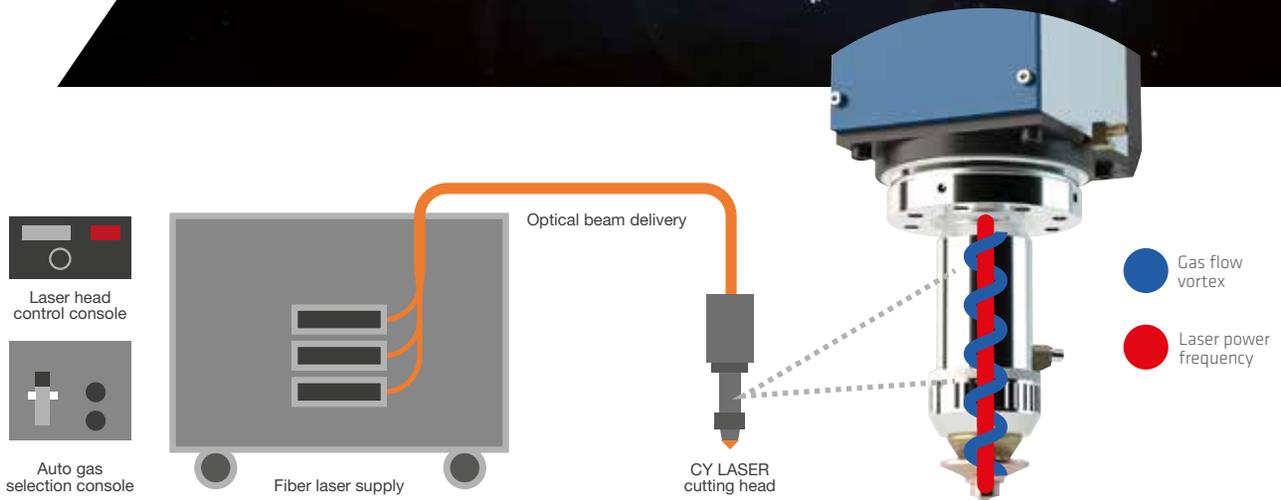
## THE *REVOLUTION*

### Technical data

|   |  |
|---|--|
| <b>Focusing system (focal length)</b>                               | 4.724", 5.906", 9.843"   |
| <b>Max. laser power</b>   | 20kW   |
| <b>Max. beam parameter acceptance (half angle)</b>                  | 99% power content within 125 mrad  |
| <b>Wavelength</b>   | $\lambda=1025 - 1080$ nm (e.g. for fiber and disc lasers)<br>$\lambda=940 - 11000$ nm (diode lasers) |
| <b>Transmission</b>   | > 97% @ $\lambda=1070$ nm  |
| <b>Fiber optic cable core diameter</b>                              | 10 - 1000 $\mu\text{m}$ (typical)  |
| <b>Fiber optic cable connector</b>                                  | QBH, HIGHYAG LLK-Auto (LLK-D)  |
| <b>Special Cutting Process</b>                                      |  |
| <b>Cutting edge smoothing on 0.300" and thinner stainless steel</b> | VEGA   |
| <b>Cutting edge smoothing on 0.300" and thicker carbon steel</b>    | VEGA   |
| <b>Cutting edge smoothing on 0.300" and thicker stainless steel</b> | VORTEX   |
| <b>Cutting Nozzle</b>   |  |
| <b>Nozzle types</b>   | Compatible with most common nozzle types   |
| <b>Focal Point to Nozzle Positioning Range</b>                      |  |
| <b>Motorized z-axis and diameter adjustment</b>                     | 0.393" in head direction<br>1.181" in work piece direction   |
| <b>Cutting Head Controller CHC</b>                                  |  |
| <b>Calibration range</b>  | 0.003" - 0.787"  |
| <b>Output signal</b>  | 0 - 10 V for distance  |
| <b>Response time</b>  | < 1 msec   |
| <b>Dimensions</b>   |  |
| <b>5 inch version</b>   | 522x106x160  |
| <b>7 inch version</b>   | 572x106x160  |
| <b>Weight</b>   | 14.33 (lb)   |
| <b>Requirements</b>   |  |
| <b>Electrical</b>   | DC 24 V, 8 A (with motorized z-axis and diameter adjustment)   |
| <b>Pneumatics</b>   | 0.2 MPa  |
| <b>Pressure cutting gas</b>   | Up to 2.5 MPa  |
| <b>Gas</b>  | Inert and active   |
| <b>Cooling</b>  | Flow rate 67.62 oz/min, temperature 59 °F - 95 °F  |
| <b>PLC / field bus system</b>                                       | EtherCAT, hardwired  |

# VORTEX

HASSLE-FREE PLATE  
PROCESSING



VORTEX  
FIBRA

**Vortex** (4kW and over) is the process feature that makes it possible to obtain a **higher cutting quality** on 3/8" to 1" stainless steel and to fully take advantage of the fiber laser potentials through the beam emission frequency modulation and in-kerf gas flow management.

**Vortex main features:**

- » Lower roughness on stainless steel cutting edge
- » Reduced gas consumption in comparison to standard parameters
- » Lower material heating thus having the possibility to cut the most complicated patterns
- » Easier part extraction from the scrap

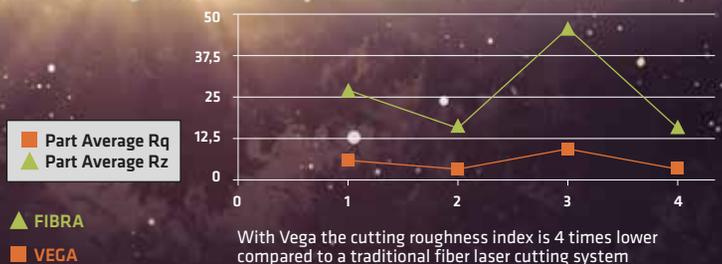
3/8" stainless steel cutting comparison between 4kW fiber laser with and without Vortex feature

# VEGA

LASER  
SMOOTHING  
PROCESS

# Vega

## THE NEW ERA OF FIBER-OPTIC LASER CUTTING



Cutting comparison on .400" stainless steel (left) and .600" carbon steel (right) with and without Vega feature

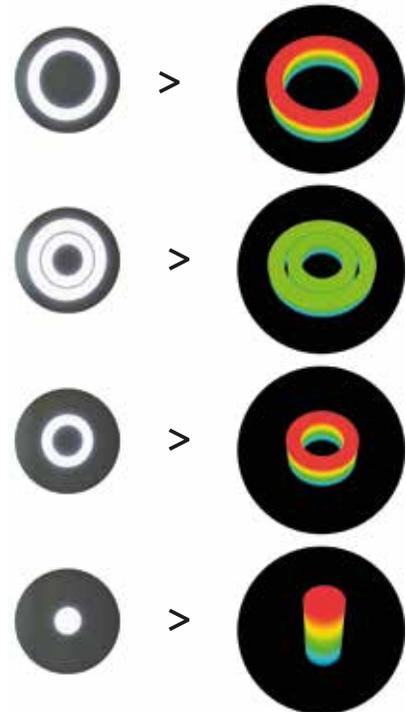
**Vega** is the process feature that makes it possible to obtain an **optimal finish on stainless steel and to cut any carbon steel grade and composition**. It also allows to automatically select the laser beam shape with the same optics set-up. All with just a single touch.

### Vega main features:

- » Laser beam diameter and shape modulation
- » Enhanced cut quality on any material
- » Remarkable edge roughness decreasing on both stainless steel and carbon steel
- » Perfect for high strength metals processing
- » Increase in cut thicknesses, compared to the standard process, with the same power output



Some examples of programmable shape laser beam



# AUTOMATIC NOZZLE CHANGER



Thanks to the successful integration of the automatic nozzle changer device in its fiber laser cutting systems equipped with automation, Cy-Laser has decided to extend this option to the entire product range. With the possibility of choosing between **6, 12 and 18 nozzles formats**, the overall performance of the system definitely increases. As materials and thicknesses may vary throughout the

day of production, this device is very useful as it selects automatically the correct nozzle for each process. Moreover, it does not require any operator input, **reduces downtime**, allows a quick change, a greater cleanliness, a specific nozzle positioning and a height calibration check. The automatic nozzle changer is available for all CY2D fiber laser cutting systems.

# CY-FAST MARK

## PARTS ARE NOT ALL THE SAME

The CYLASER revolutionary CY-FAST MARK



The installation of the **CY-FAST MARK**, standard accessory of the CY2DLM3015 series, allows a very high-speed marking execution; if compared to that of a traditional system, it allows more than 40% saving of the time required.

Moreover, the **customized marking levels** available and the possibility to adapt to each marking need, such as film-coated materials, makes it a very useful accessory that fits perfectly into the "Industry 4.0" context.

# MARKING HEAD WORKING AREA

The marker has a limited working area that depends on the type of focus lens installed.

More specifically:

- » Area 3.1"x"3.1" (support in position 1 – Gantry LM Structure)
- » Area 4.4"x"4.4" (support in position 1 – Aeroplane Structure)
- » Area 6.8"x"6.8" (support in position 2 – Aeroplane Structure)

## CAD/CAM

Thanks to the CYCAMLAB software support, it is possible to manage:

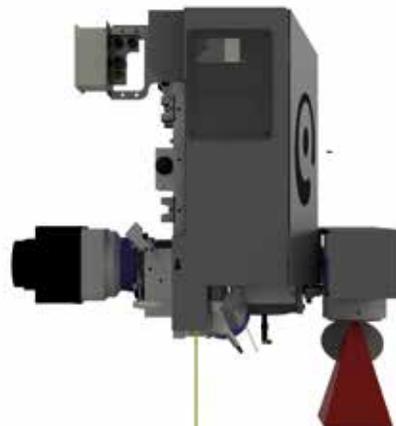
- » The marking areas (all the marks included in a zone, which dimensions are given by the head's working area, can be grouped together and carried out without further movements of the head one single passage)
- » The marking sequences
- » The marking parameters (four standard pens available or the possibility to customize them based on specific need)

## CY-FAST MARK SOFTWARE

Cy-Laser developed this software to pilot its laser marker separated from the cutting laser source but coordinated in its movements during post-processing. The CAM generates a second post-processor specifically for markings. The "marking service", carried out by the CNC PC, loads the path in the marking card. The "communication drivers" synchronise the information between the marking service, the CNC and the marking controller card during post-processing. The management is structured to function with both the CNCs (ESA and ECS). The marking service is a programme with no user interface that synchronizes the marking operations with the execution of the cutting post-processor, stores the marking part program, roto-translates it according to sheet orientation, and uploads it into the marker card. The low-level communication operations are requested to the drivers. For each of the two CNCs there is a driver that exchanges data via the libraries that manufacturers make available.

The following data are exchanged:

- » The name and the path of the existing post-processor (from which the name of the marking post-processor can be found)
- » The orientation of the sheet metal
- » The identification of the mark to be made
- » The consent to load the mark into the card
- » The loading of the mark into the card





# BEVEL



It is usually adopted to **increase the surface area of the edge for a stronger and consistent welding**. There are different types of bevelled edges which are indicated by the letter of the alphabet that mostly resembles the shape of the cut when seen in cross-section. The most common types of bevelled cuts include V, A, X, Y upwards, Y downward and K.

Although it is possible to cut a bevelled edge using a manual cutting tool, bevel edges are often cut using a torch, a specific cutting head mounted on a CNC cutting table or on a beam processing machine.

In the past, the bevelled edges required several trials due to the high number of existing bevelled cuts. The new technologies, such as **fiber laser, have improved remarkably speed, repeatability and precision of the bevel cuts** thanks to the inclusion of common parameters in the software used to control the movement of the cutting head or the laser head for bevel cutting. Cy-Laser software allows to create bevelled pieces or to import them automatically from the CAD.

Trends in bevelled edges:

- » Bevelled edges are necessary for the preparation of welding and other final assembly methods
- » The need to increase productivity along with constantly labour cost increase as well as the decrease of skilled workers, are pushing companies to adopt automated technologies for bevel cutting.

Automated technologies ensure improved accuracy and repeatability aimed at an increasing productivity.

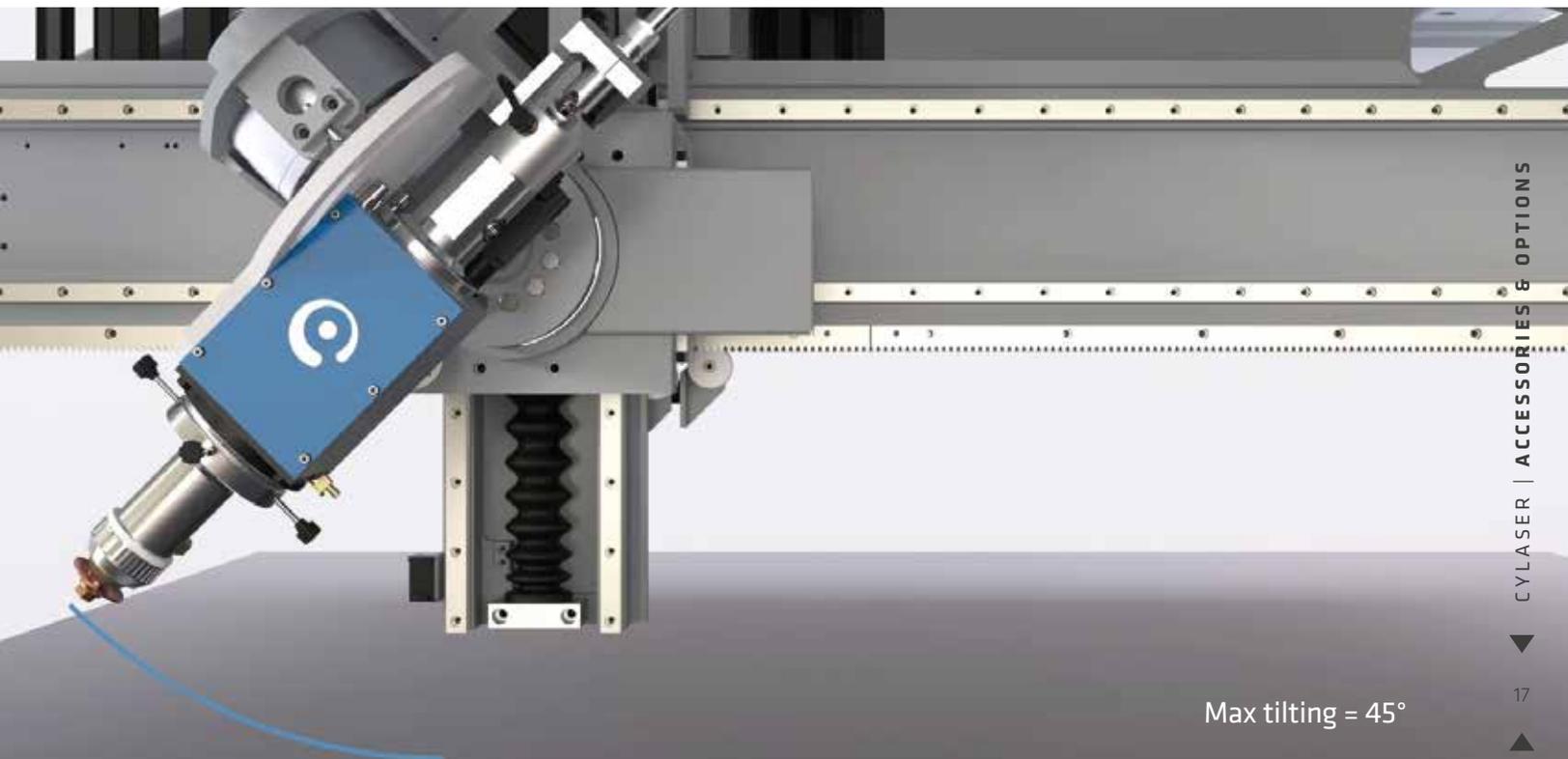
| MATERIAL        | 4KW<br>(TOP/BOTTOM<br>CUT THICKNESS) | 6KW<br>(TOP/BOTTOM<br>CUT THICKNESS) | BEVEL CUT<br>ANGLES<br>(+/-) | DYNAMIC DATA            |                 |
|-----------------|--------------------------------------|--------------------------------------|------------------------------|-------------------------|-----------------|
|                 |                                      |                                      |                              |                         |                 |
| STAINLESS STEEL | 0.250"(*4)(*1)(*3)                   | 0.400"(*4)(*1)(*3)                   | 45°                          | Z VERTICAL RUN          | 4.724"          |
| CARBON STEEL    | 0.314"(*2)                           | 0.600"(*2)                           | 45°                          | X-Y POSITIONING SPEED   | 2756 ipm        |
| ALUMINIUM       | 0.250"(*3)                           | 0.400"(*3)                           | 45°                          | HEAD INCLINATION A - B  | ±45°            |
| STAINLESS STEEL | 0.314"(*4)(*1)                       | 0.500"(*4)(*1)                       | 30°                          | MAX. ROTATION SPEED A-B | 100 °/sec.      |
| CARBON STEEL    | 0.500"(*2)                           | 0.600"(*2)                           | 30°                          | FREE ANGLE OF ROTATION  | 5 (X-Y-Z-W-A-B) |
| ALUMINIUM       | 0.314"(*3)                           | 0.500"(*3)                           | 30°                          | TYPE OF BEVEL CUT       | I, Y, V         |
| STAINLESS STEEL | 0.500"                               | 0.600"                               | VERTICAL                     |                         |                 |
| CARBON STEEL    | 0.787"                               | 1.0"                                 | VERTICAL                     |                         |                 |
| ALUMINIUM       | 0.500"                               | 0.600"                               | VERTICAL                     |                         |                 |

\*1 Material: SS400 (Cy-Laser Specifications). Minimum piece: Square 27.75"x27.75" (cutting edge radius of 0.196")

\*2 Material S235J2C+N/ SSAB LASER 250C Minimum piece: Square 27.75"x27.75" (cutting edge radius of 0.196")

\*3 The figures in parentheses illustrate the specifications in the separating cut. Sometimes waste adheres to the surfaces. Control with a sample.

\*4 The Vortex process is necessary to obtain higher quality. Furthermore, the cut quality can be modified according to the producer or the rust-proof material (condition of the plate). Please control with a sample.

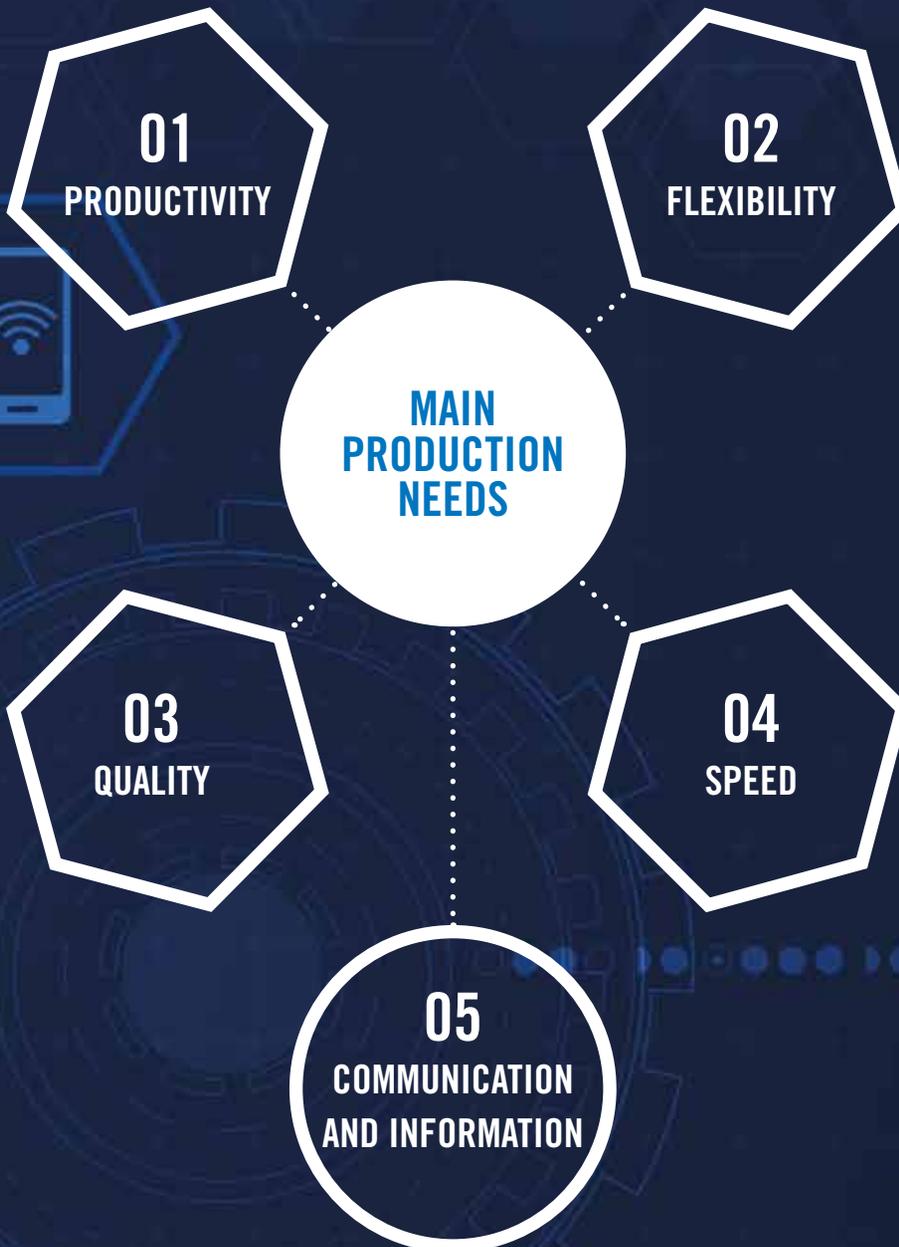


# INDUSTRY 4.0



## INDUSTRY 4.0 OFFERS MULTIPLE BENEFITS, INCLUDING PROCESSES PRODUCTION MONITORING AND COSTS CONTROL

- » Higher safety through increased automation
- » Better working condition through ergonomically adapted workstation
- » Increased collaboration in the production network through consistent data availability
- » Environment protection improvement thanks to optimized use of resources and consequent consumption reduction
- » Greater innovative capabilities thanks to the new technologies available



# 01 PRODUCTIVITY

Increased productivity through a higher level of automation that reduces production time and allows better asset utilization and inventory management.

More specifically:

- » Automatic table change
- » Scheduled working list
- » Load/Unload integration ready
- » Information exchange thanks to a greater data accessibility
- » Reduced Human errors
- » Reduced machine failure
- » Faster set-up

# 02 FLEXIBILITY

Manufacturing flexibility thanks to the versatility of the products feasible.

More specifically:

- » On-board database of cutting parameters
- » Quick machine set-up
- » Production of small batches at advantageous costs

# 03 QUALITY

Greater production quality thanks to specific sensors and actuators which monitor the production in real time and intervene promptly in the event of an error thus reducing production waste.

More specifically:

- » Reflection detection sensors
- » On board optic diagnostic
- » Gas (measurement) pressure sensors
- » On board IP camera

# 04 SPEED

Guaranteed speed from the first prototype to the finished product thanks to a greater quantity of data, simulation opportunities and new technologies.

# 05 COMUNICATION AND INFORMATION

Improved information through a machine interfaced with the internet of things (IOT) that provides a large quantity of information made available for ERPs.

More specifically:

- » Remote assistance connectivity for service and diagnostic
- » Alarm sending module (e-mail, SMS, external sirens bells...)
- » Microsoft Windows based interface for higher Local Network integration

Machine provides a large quantity of information available for external access. Communication available via:

- » Log files (data/time of start-end of a single job)
- » Duration of the cut of every single piece or Job
- » Database accessibility with customization of the information available such as working hours, machine breakdown, laser emission hours, piece counter, etc.

## CUSTOM-MADE SOFTWARE FOR AUTOMATION

Cy-Laser aims to provide the most reliable and flexible solution to achieve the highest performance and provide a proper information flow to satisfy Industry 4.0 and customers' requirements.

In order to connect Cy-Laser's systems as well as various ERPs software, various information is made available for remote connections and its management.

Highlighted Features:

- » Alarm transmitting module (GSM, LAN or Phone Line) to send SMS, e-mail, emergency calls in case of an active alarm
- » On-Board High-Definition Camera with LAN interface and Secure Internet Access
- » Jobs queue manageable directly from external ERP software
- » Open-Source Database on customer's server to Log all the machine's operation (Alarm history, Jobs done, Gas consumption, etc.)

### CY-LASER LOCAL SERVER DATABASE PROVIDES TO ERPS VARIOUS INFORMATION SUCH AS:

- » Real-time machine status (loading, unloading, cutting, alarm, etc.)
- » JOBS history enriched with production details as Job's name, start date and time, end date and time
- » Part numbers production Log (single part number production history logged real time on the Database)
- » Process detail such as Gas used type, Gas pressure, power emitted, process speed, sensors feedback, axes positions are provided in real time
- » I/O status of machines' interface
- » Warehouse status and real time monitoring of the material stocked
- » Customizable information can be provided on request to fit customer's needs

### MAIN SOFTWARE SUPPORTED:

- » SAP
- » Epicor
- » Infor
- » Microsoft Dynamics
- » Oracle ERP
- » Zucchetti ERP

The open-source architecture of Cy-Laser's database allows to interface any other ERP software using the same information above. Interface Instructions can be provided by Cy-Laser.





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