



EOX 30W

USER'S MANUAL

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SYMBOLS

The symbols used in this manual along with their meaning are shown below. The symbols are repeated within the chapters and/or sections and have the following meaning:



Generic warning:

This symbol indicates the need to read the manual carefully or the necessity of an important maneuver or maintenance operation.



Electricity Warning:

This symbol indicates dangerous voltage associated with the laser, or powerful enough to constitute an electrical risk. This symbol may also appear on the marking system at the risk area.



Laser Warning:

This symbol indicates the danger of exposure to visible or invisible laser radiation. This symbol may also appear on the marking system at the risk area.



Fire warning:

This symbol indicates the danger of a fire when processing flammable materials. Because there is a danger of fire, it is indispensable to follow the instructions provided by the manufacturer when commissioning the marking system.



Note:

First to use marking system must be read marking software user manual.

REVISION INDEX

Revision	Date	Number of added or edited pages
1.0	09/03/2011	Release
1.1	21/06/2011	Connections
2.0	20/10/2011	General review
821002060	10/02/2012	Appendix A
821002061	05/09/2012	36
821002062	06/11/2012	20, 44, 47, 49
821002063	18/02/2015	General review


NOTE:

We sometimes update the documentation after original publication. Therefore, you should also review the documentation on www.datalogic.com for any updates.

FOREWORD

Information included in the following manual are indicated to a qualified installer able to integrate the marking system in a system, accomplishing with all the protection systems required from international rules and local legislations.

Following manual is referred to an Eox 630X-TLSV marking system in Class 4 configuration.

In addition to being professionally trained in their role, personnel assigned to work on the marking system must be informed and made acquainted with the risks inherent invisible and visible laser radiation. The operator is required to carefully read the section of the manual concerning safety instructions as well as the sections related to matters falling under his responsibility.

The workers assigned to the marking system can be identified as:

- **OPERATOR**
responsible for loading elements to be processed, visually checking the work cycle, removing the finished product and cleaning the marking system.
- **MAINTENANCE WORKER**
responsible for the electrical, mechanical and optical maintenance and adjustment of the marking system.



NOTE:

Datalogic Automation S.r.l. shall not be held responsible for any non conforming use of marking system of its manufacture.



NOTE:

BEFORE INSTALLING AND USING THE LASER, READ CAREFULLY THE APPENDICES.

OVERVIEW

The CO₂ laser marking system developed and manufactured by Datalogic Automation employs the most advanced technologies with regards to the mechanical-optical part, the electronic control of laser beam power, communication and the overall safety of the entire system.

OPERATION OF A LASER SYSTEM WITH GALVANOMETRIC SCANNING

In pulsed or continuous operation mode, the CO₂ generates an invisible, high-energy infrared beam. In order to obtain a more accurate focus, the laser beam is first enlarged by using an optical expansion system and then focused, after being deflected by a scanning system consisting of two mirrors mounted on galvanometric motors. These mirrors deflect the beam in a controlled fashion along the X and Y axes; etching of the product surface occurs by coordinating the movement of the two motors with the turning on/off of the laser beam.

The deflected laser beam is focused by an F-Theta lens before it hits the surface of the product. Generally speaking, the marking is carried out within the focus of the beam.

LASER SOURCE

A sealed gas laser tube is used in the marking system. The tube contains a gas mixture (usually CO₂, N₂ and He) which is excited by a radiofrequency generator to bring it to a plasma state. The produced radiations are reflected back and forth between the mirrors, which represent the “resonant laser cavity”; the laser beam is amplified with each reflection. While one of the two mirrors (rear) is 100% reflectant, the output mirror (front) reflects only 95%; this slight loss of 5% represents the laser radiation used for etching purposes.

GALVANOMETRIC SCANNING HEAD

The scanning head features two deflection mirrors that deflect the beam in an X and Y direction, depending on the graphics to be reproduced.

MARKING SOFTWARE

The marking software Lighter is preinstalled on the system.



NOTE:

Consult Lighter software user's manual for a proper use of the same.



NOTE:

Marking system installation in secure environment is responsibility of the system integrator!

OVERVIEW

The marking system features a control rack unit whose size is compatible with the standard 19" 2U in varnished steel, and a laser scan head with resonator whose dimensions make it easy to integrate into a system that comprises safety systems required, the management of marking signals and the customer's complementary modules, if any.

All marking system connections are found on the rear of the rack: power supply, safety, signals, patch cord to the laser head, while the front features the indicator led and key and enable command devices, in addition to connectors for the internal embedded controller. Moreover is available an inlet air to use to maintain clean the marking area thanks to holes around the focal lens.

Two side cooling fans are provided for cooling out the resonator; their flow must never be obstructed.



Figure 1: Control Rack and Resonator.

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1 TECHNICAL SPECIFICATIONS AND ACCESSORIES


NOTE:

BEFORE INSTALLING AND USING THE LASER, **READ CAREFULLY** THE APPENDIXES.

1.1 TECHNICAL CHARACTERISTICS

CONTROL RACK MECHANICAL CHARACTERISTICS

Weight	9 Kg
Height	88,5 mm
Width	430 mm
Depth	335 mm
IP Degree	IP21

RESONATOR MECHANICAL CHARACTERISTICS

Weight	17 Kg
Height	185 mm *
Width	180 mm
Depth	634 mm
IP Degree	IP21

* without F-Theta scan lens


NOTE:

Please refer to Datalogic website for detailed drawings.

SPECIFICATIONS (@25°C)

Laser Source	CLASS 4, CO ₂ sealed laser tube
Configuration	Resonator head + Control rack
Scanning Head	Straight, Left side, Right side
Average Power ¹	30W
Stability	± 5% (cold start); ± 3% (after 2 minutes works)
Wavelength	10.57-10.63 μm; Peak @10.6 μm
Range Frequency	10 – 25000 Hz; CW
Rise Time	< 100 μs
M2	≤ 1.2
Beam Ø ¹	~ 2.5 mm ± 0.5mm @ 1/e ²
Standard Bexp	2x
Ellipticity	< 1.2
Divergence ¹	< 7 mrad
Aiming Beam	Class 2 Red Diode Laser; λ=635nm ± 5nm; 1mW
Focusing Beam	Class 2 Diodo Laser Rosso; λ=635nm ± 5nm; 1mW
Marking Area	70x70 mm = [f = 100mm] 140x140 mm = [f = 200mm]
Marking Speed ²	2000 mm/sec, 500 chr/sec
Spot Size ³	270 μm [f = 100mm] 370 μm [f = 200mm]
Cooling	Integrated Fan-Cooled
Power Supply	100÷240 VAC – 50/60Hz
Absorption	Typical 600W, Maximum 800W
Marking on the Fly (MOF)	YES [constant speed or encoder]
MOF line speed ⁴	Up to 75 m/min – 4 pieces/sec
Temperature range	Operating: Min. +15°C (59°F) / Max +35°C (95°F) Storage: Min. -10°C (-14°F) / Max. +60°C (140°F)
Humidity	0 – 95%, non-condensing
Control	EMC embedded control
Control Software	Lighter Suite
Communication Interface	3x USB 2.0; Ethernet LAN (TCP/IP); and RS232 port
Input/Output	I/O signals; 4-axes interface; Encoder and photocell

¹ Measured @ resonator exit

² May vary: measured with f= 200mm

³ With Bexp 2x on 30W

⁴ Single line string, Roman-s font

1.2 SYSTEM'S DESCRIPTION

1.2.1 CONTROL RACK

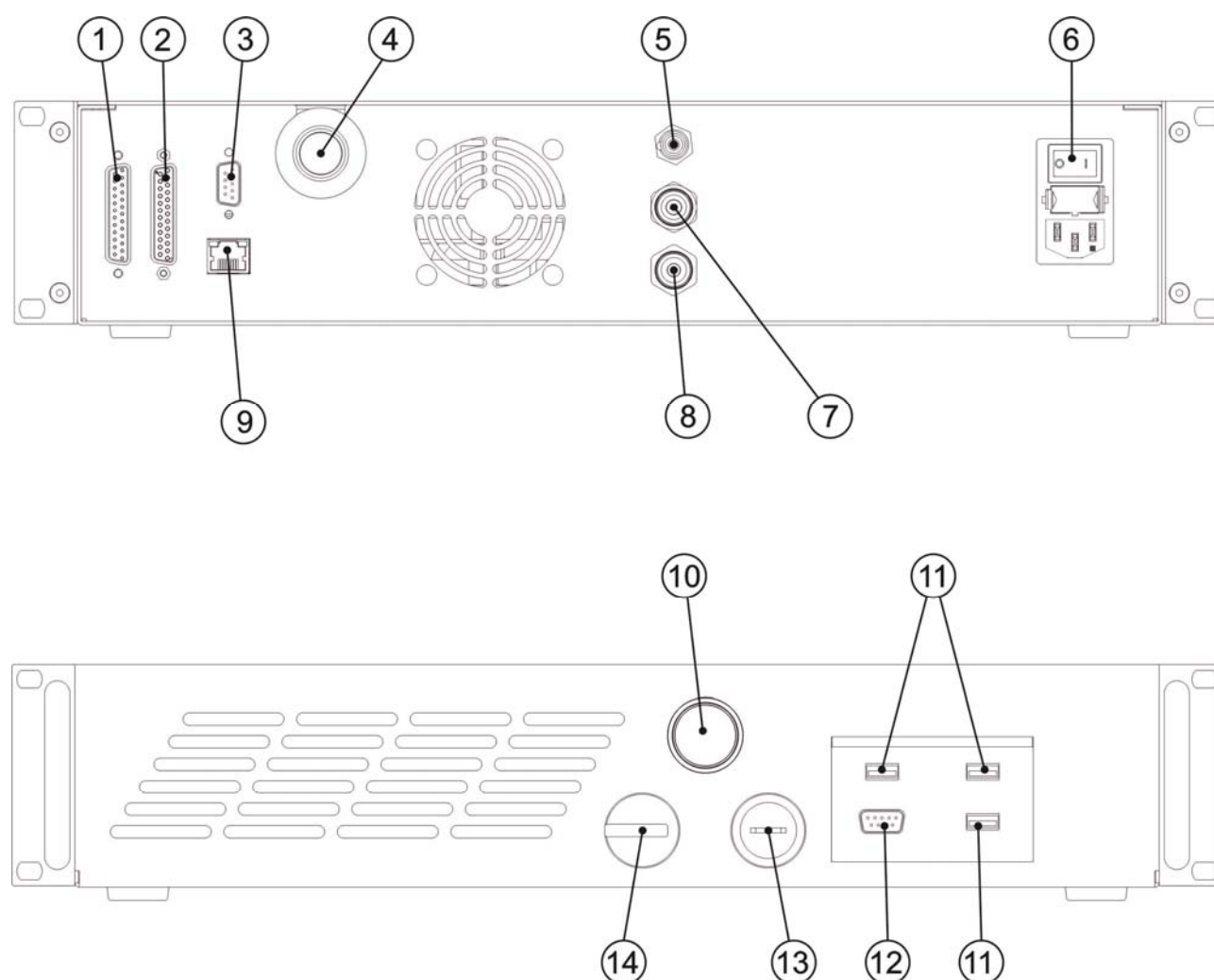


Figure 2: Control rack overview.

1) Command Box Connector (Laser Control)	8) Photocell connector
2) I/O connector (Axes control)	9) LAN port
3) RS232 connector	10) Status Led
4) Main connection to resonator	11) USB ports
5) Interlock connector	12) VGA port
6) Main power supply connection	13) Key selector
7) Encoder connector	14) Enable selector

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1.2.2 RESONATOR

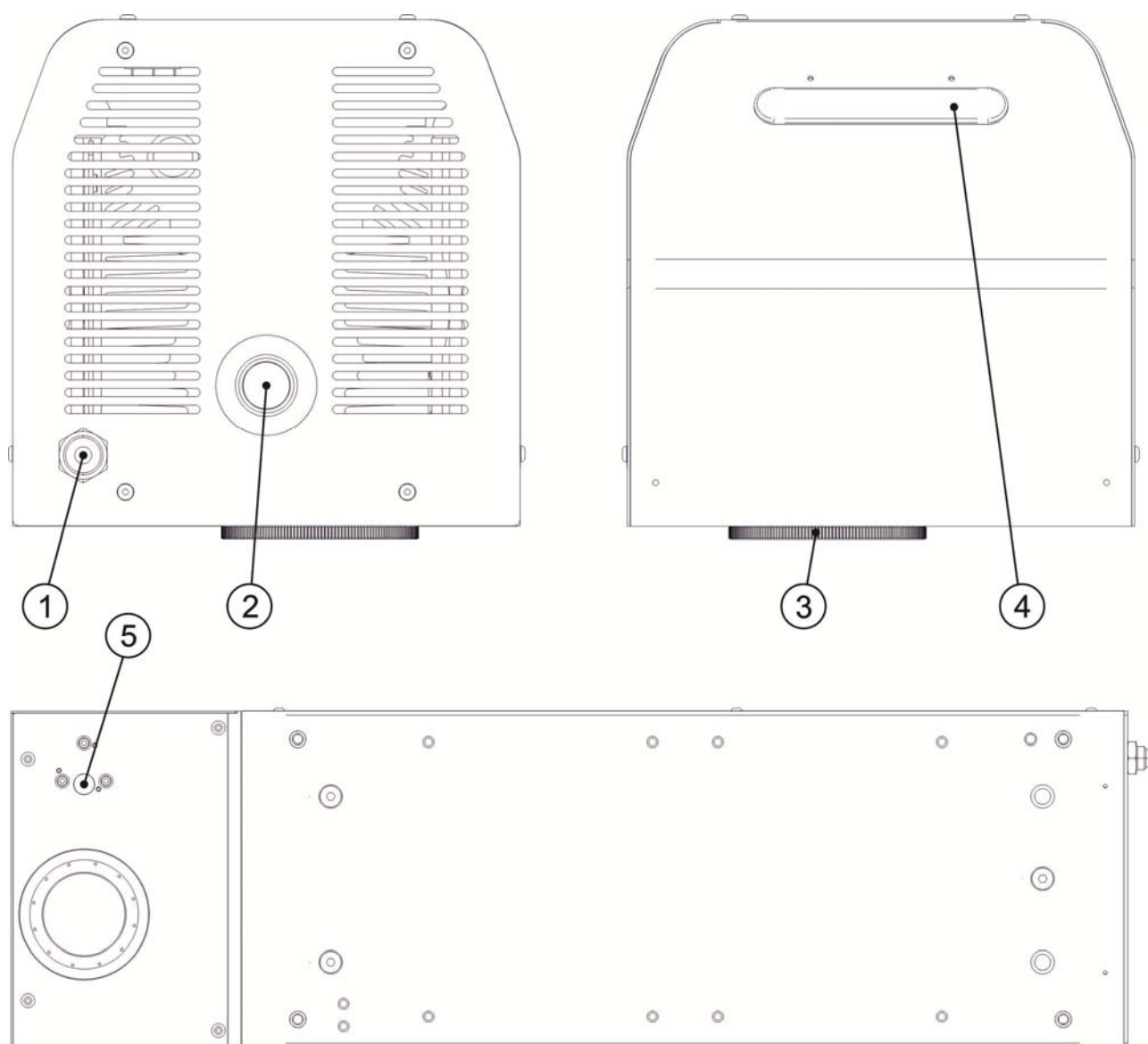


Figure 3: Resonator overview

1) Air inlet (max 1,5 bar)
2) Main connection to control rack
3) F-Theta Scan Lens with air compressed issue holes
4) Status led bar
5) Focusing Beam

1.3 MARKING AREA SPECIFICATION

DLA provides a wide range of F-Theta scan lenses to be applied to the scanning head to focus the laser beam in flat Marking Field, in order to achieve high-resolution marking results.

These F-Theta scan lenses are available to best-match the object (i.e.: logo; string; 2Dmatrix; etc.) to be marked with customer need, over the material processing, and fit the standard DLA Scanning Head; further solutions about different models of lenses and scanning heads will be considered upon request.

Below the chart of the standard F-Theta scan lenses currently available:

F-Theta Scan Lens 10600nm		$f = 100$	$f = 200$
Lens diameter (mm)		M48 x 1	M48 x 1
Working Distance (WD)	mm	100*	200*
Fixing Distance (FD)	mm	100*	200*
Marking Area (MA)	mm ²	70 x 70	140 x 140

* Tolerance: ± 2 mm

Working Distance is defined as the distance between the centre of the working area (defined in the focal plane) and the base of the resonator:

WD: Working Distance

FD: Fixing Distance

MA: Marking Area

WA: Working Area

AB: Aiming beam

FB: Focusing beam

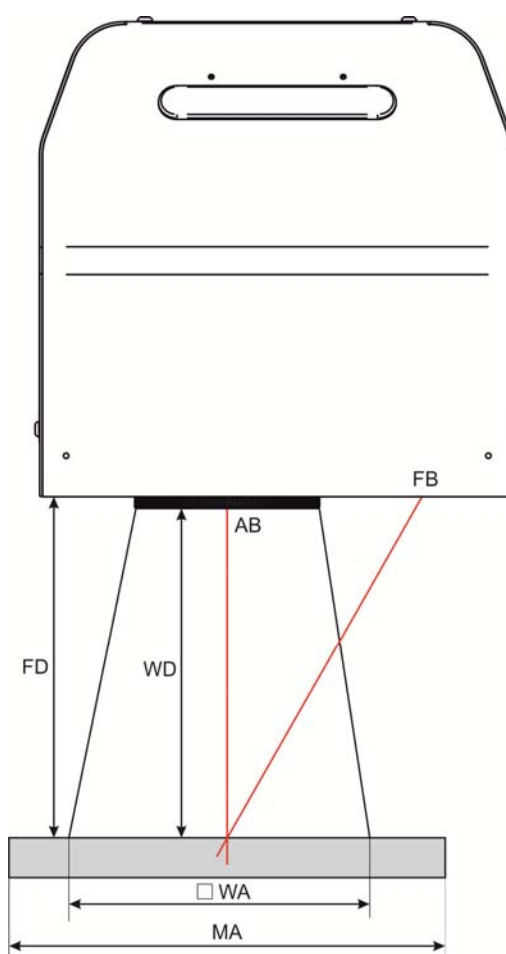


Figure 4: Working distance.

For systems equipped with standard F-Theta Scan Lens (100 or 200) the focus condition is obtained by matching the Aiming Beam with the Focusing beam.

1.4 CONNECTORS SPECIFICATIONS

1.4.1 INTERLOCK CONNECTOR

The interlock **disable** laser emission. To restore the marking system is necessary to repeat the turning on sequence.

PIN	SYMBOL	TYPE	DESCRIPTION
1	VCC_INT_A	OUTPUT	5V DC reference for interlock signal A
2	INTERLOCK_A	INPUT	Interlock signal A
3	GND_INT_B	GND	Ground reference for interlock signal B
4	INTERLOCK_B	INPUT	Interlock signal B

Table: Interlock plug Pin-out.

PANEL CONNECTOR

Type SWITCHCRAFT TB Series male Tini Q-G (Mini XLR) panel mount connector, 4 positions.

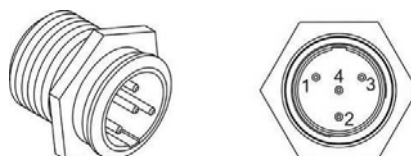


Figure 5: Male panel plug cod. TB4M (front view).

PLUG CONNECTOR

Connector type SWITCHCRAFT TA Series Tini Q-G (Mini XLR) female cable mount connectors, 4 positions.

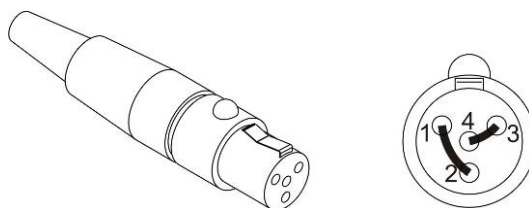


Figure 6: Female cable mount connector cod. TY4F (solder view).



NOTE:

To restore the marking system is necessary repeat the “Turning on sequence” without shutting down the system. See [Chapter 3.1](#) for more details.

1.4.2 COMMAND BOX CONNECTOR (LASER CONTROL)

Panel socket SUB-D, 25 positions, female.

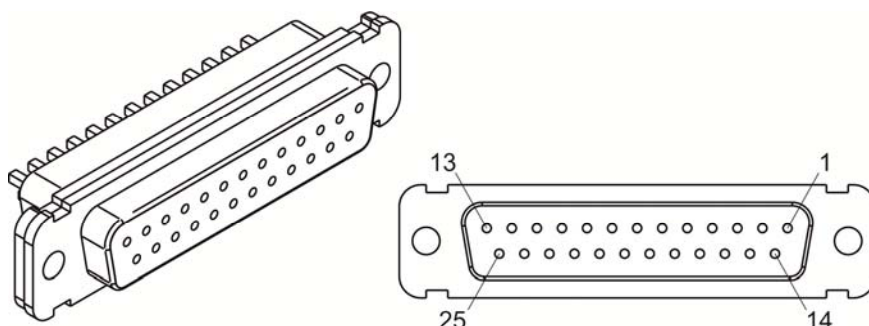


Figure 7: Female panel socket SUB-D 25 (frontal view).

PIN	SIGNAL	TYPE (***)	DESCRIPTION
1	EXT_12V	Output power supply	Auxiliary 12Vdc power supply available to drive input logical HIGH (max 250mA)
2	EXT_ENABLE_B	Digital Input	Secondary external enable signal (see paragraph 1.5). This signal is used to open the mechanical shutter and enable laser emission: - HIGH level: contact closed - LOW level or disconnected: contact opened
3	RESERVED	Digital Output	DO NOT CONNECT
4	EXT_12V	Output power supply	Auxiliary 12Vdc power supply available to drive input logical HIGH (max 250mA)
5	EXT_12V	Output power supply	Auxiliary 12Vdc power supply available to drive input logical HIGH (max 250mA)
6	EXT_12V	Output power supply	Auxiliary 12Vdc power supply available to drive input logical HIGH (max 250mA)
7	EXT_12V	Output power supply	Auxiliary 12Vdc power supply available to drive input logical HIGH (max 250mA)
8	EXT_ENABLE_A	Digital Input	Primary external enable signal (see paragraph 1.5). This signal is used to open the mechanical shutter and enable laser emission: - HIGH level: contact closed; - LOW level or disconnected: contact opened
9	BUSY (*)	Digital Output	This signal is used to know if the current spooler is executing (marking in progress). (paragraph 1.5.3) - ON: during limits or marking process
10	CONNECTOR PRESENCE	Digital Input	This signal is used to check the command box connector presence (see paragraph 1.6) - HIGH level: normal operation; - LOW level or disconnected: laser error
11	START_MARKING (*)	Digital Input	This signal is used to start to the marking process when a document or a sequence is running in AUTO MODE (**) or WORK MODE (**) (see paragraph 1.5.3): - HIGH level pulsed signal start the marking process
12	EXT_KEY	Digital Input	This signal is used to activate the laser source (see paragraph 1.5.2) - HIGH level: contact closed; - LOW level or disconnected: contact opened
13	STOP_MARKING (*)	Digital Input	This signal is used to stop the marking process (see paragraph 1.5.3) - HIGH level pulsed signal stop the marking process

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14	CODE3	Digital Input	Generic Input (INPUT 13)
15	CODE2	Digital Input	Generic Input (INPUT 12)
16	CODE1	Digital Input	Generic Input (INPUT 11)
17	END (*)	Digital Output	This signal is used to know if the marking process is finished: (see paragraph 1.5.3) - ON at the end of marking process
18	LASER_ACTIVE	Digital Output	This signal is used to know if the laser source is activated: (see paragraph 1.5.2) - ON when the laser is in STAND_BY or READY state
19	GND	Ground	Ground reference
20	SYSTEM_ALARM	Digital Output	This signal is used to know if the system is in error state: (see paragraph 1.5.2) - ON in case of system error
21	GND	Ground	Ground reference
22	SHUTTER_OPEN	Digital Output	This signal is used to know if the system is ready to emit laser radiation: (see paragraph 1.5.2) - ON when the system is in READY state and shutter is opened
23	SW_READY (*)	Digital Output	This signal is used to know if a document, sequence or script is loaded and ready to be executed: - ON when a document or a sequence is running in AUTO MODE (**) or WORK MODE (**) (SW_READY COMPATIBILITY (**) = true) - ON when a document or a sequence is running in AUTO MODE (**) and laser in READY state (SW_READY COMPATIBILITY (**) = false) - ON when a script is running in AUTO MODE (**) and "IoPort.setReady (true)" function is used
24	GND	Ground	Ground reference
25	GND	Ground	Ground reference

(*) refers to Lighter user's manual "Setting I/O parameters" paragraph to set the signals properties

(**) refers to Lighter user's manual

(***) refers to [paragraph 1.5.4](#)

NOTE: Connection example in [paragraph 1.6](#)

1.4.3 AXES CONNECTOR (I/O CONTROL)

Panel socket SUB-D, 25 positions, male.

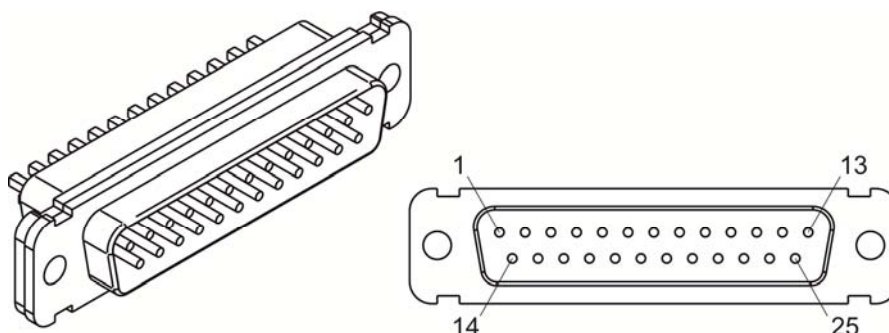


Figure 8: Male panel socket SUB-D 25 (frontal view).

PIN	SIGNAL	TYPE (**)	DESCRIPTION
1	EXT_12V	Output Power supply	Auxiliary 12Vdc power supply available for drive input logical HIGH (max 250mA)
2	OUTPUT_0 (*) or STEP_Y	Digital Output	Generic output or Y-Axis drive step signal (Clock) for axis control
3	OUTPUT_2 (*) or STEP_Z	Digital Output	Generic output or Z-Axis drive step signal (Clock) for axis control
4	OUTPUT_4 (*) or BRAKE X	Digital Output	Generic output or X-Axis electromechanical brake release signal. ON during drive motion
5	OUTPUT_6 (*) or BRAKE Y	Digital Output	Generic output or Y-Axis electromechanical brake release signal. ON during drive motion
6	OUTPUT_8 (*) or BRAKE Z	Digital Output	Generic output or Z-Axis electromechanical brake release signal. ON during drive motion
7	INPUT_0 (*) or ZERO X	Digital Input	Generic input or X-Axis home sensor input. The home search is stopped when this signal goes HIGH
8	INPUT_1 (*) or ZERO Y	Digital Input	Generic input or Y-Axis home sensor input. The home search is stopped when this signal goes HIGH
9	INPUT_2 (*) or ZERO Z	Digital Input	Generic input or Z-Axis home sensor input. The home search is stopped when this signal goes HIGH
10	INPUT_3 (*) or DISABLE X	Digital Input	Generic input or X-Axis disable signal. When HIGH, the corresponding step signal remains in the status prior to activation
11	INPUT_4 (*) or DISABLE Y	Digital Input	Generic input or Y-Axis disable signal. When HIGH, the corresponding step signal remains in the status prior to activation
12	INPUT_5 (*) or DISABLE Z	Digital Input	Generic input or Z-Axis disable signal. When HIGH, the corresponding step signal remains in the status prior to activation
13	GND	Ground	Ground reference
14	OUTPUT_12 (*) or STEP R	Digital Output	Generic output or R-Axis drive step signal (Clock) for axis control
15	OUTPUT_1 (*) or STEP X	Digital Output	Generic output or X-Axis drive step signal (Clock) for axis control

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16	OUTPUT_3 (*) or DIR Z	Digital Output	Generic output or Z-Axis drive direction signal
17	OUTPUT_5 (*) or DIR Y	Digital Output	Generic output or Y-Axis drive direction signal
18	OUTPUT_7 (*) or DIR X	Digital Output	Generic output or X-Axis drive direction signal
19	INPUT 9	Digital Input	Generic Input
20	INPUT 8	Digital Input	Generic Input
21	INPUT_7 (*) or ZERO R	Digital Input	Generic input or R-Axis home sensor input. The home search is stopped when this signal goes HIGH
22	INPUT_6 (*) or DISABLE R	Digital Input	Generic input or R-Axis disable signal. When HIGH, the corresponding step signal remains in the status prior to activation
23	OUTPUT_9 (*) or BRAKE R	Digital Output	Generic output or R-Axis electromechanical brake release signal. ON during drive motion
24	OUTPUT_11 (*) or DIR R	Digital Output	Generic output or R-Axis drive direction signal
25	GND	Ground	Ground reference

(*) enable an axis cause that the corresponding signals will no longer be available as generic inputs/output. Refers to Lighter user's manual, "Setting the X, Y, Z, and Rotor Axes parameters" to enable/disable Axes and set the Axes properties.

(**) refers to [paragraph 1.6](#)

1.4.4 RS232 CONNECTOR

Panel socket SUB-D, 9 positions, male, COM2.

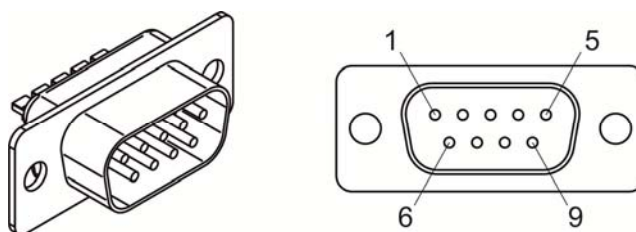


Figure 9: Male panel socket SUB-D 9 (frontal view).

PIN	SIGNAL	TYPE	DESCRIPTION
1	DCD	Input	Data Carrier Detect
2	RXD	Input	Receive Data
3	TXD	Output	Transmit Data
4	DTR	Output	Data Terminal Ready
5	GND	Ground	Ground reference
6	DSR	Input	Data Set Ready
7	RTS	Output	Request to Send
8	CTS	Input	Clear to Send
9	RI	Input	Ringing Indicator

1.4.5 ENCODER CONNECTOR

Panel socket BINDER, M12, 8 positions female, 763 series. Recommended encoder: Datalogic ENC58-S10-XXXX-M1 (ENC58-S10-5000-M12).

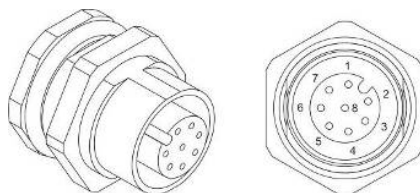


Figure 10: Female panel socket cod. 09-3482-87-08 (front view).

PIN	SYMBOL	TYPE	DESCRIPTION
1	GND	GND	Ground signal
2	VCC	POWER OUTPUT	12V DC power supply
3	ENC_A	DIGITAL INPUT	Encoder HTL A channel signal
4	GND	GND	Return signal for ENC_A
5	ENC_B	DIGITAL INPUT	Encoder HTL B channel signal
6	GND	GND	Return signal for ENC_B
7	NC	NC	NC
8	NC	NC	NC
BODY	SHIELD	SHIELD	SHIELD

1.4.6 PHOTOCELL CONNECTOR

Panel socket BINDER, M12, 4 positions female, 763 series. Recommended photocell: Datalogic S51-PA-5-B01-PK; Datalogic S15-PA-5-B01-PK or equivalent.

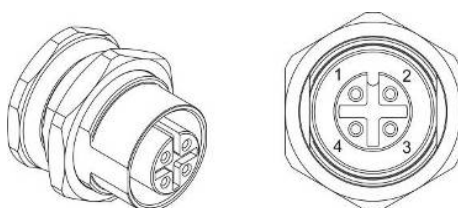


Figure 11: Female panel socket cod. 09-3482-87-04 (front view).

PIN	SYMBOL	TYPE	DESCRIPTION
1	VCC	POWER OUTPUT	12V DC power supply
2	NC	NC	NC
3	GND	GND	Ground signal
4	PHOTOCELL	DIGITAL INPUT	PNP photocell signal

1.5 SIGNALS SPECIFICATIONS

1.5.1 KEY SIGNAL'S SCHEME (COMMAND BOX CONNECTOR)

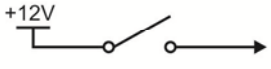
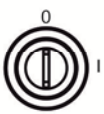
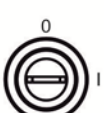
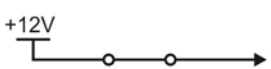
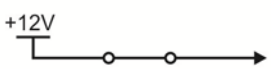
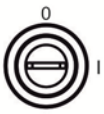
KEY		
EXT_KEY (PIN 12)	FRONT PANEL KEY	
		KEY CONTACT IS OFF
		KEY CONTACT IS OFF
		KEY CONTACT IS OFF
		KEY CONTACT IS ON

Figure 12: Key signal's scheme

1.5.2 ENABLE SIGNAL'S SCHEME (COMMAND BOX CONNECTOR)

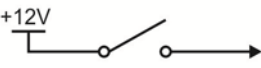
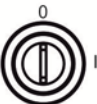
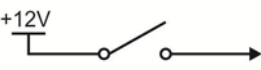
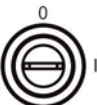
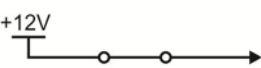
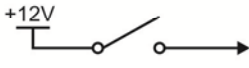
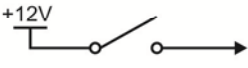
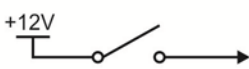
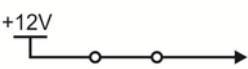
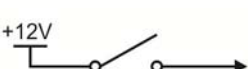
ENABLE		
EXT_ENABLE (A+B)*	FRONT PANEL ENABLE	
		ENABLE CONTACT IS OFF
		ENABLE CONTACT IS OFF
		ENABLE CONTACT IS OFF
		ENABLE CONTACT IS ON
* EXT_ENABLE_A	* EXT_ENABLE_B	DOUBLE ENABLE CONTACT (EN60825-1 COMPLIANT)
 PIN 8	 PIN 2	EXT_ENABLE CONTACT IS OFF
 PIN 8	 PIN 2	EXT_ENABLE CONTACT IS OFF
 PIN 8	 PIN 2	EXT_ENABLE CONTACT IS OFF
 PIN 8	 PIN 2	EXT_ENABLE CONTACT IS ON

Figure 13: Enable signal's scheme

1.5.3 LASER CONTROL SIGNALS TIMING

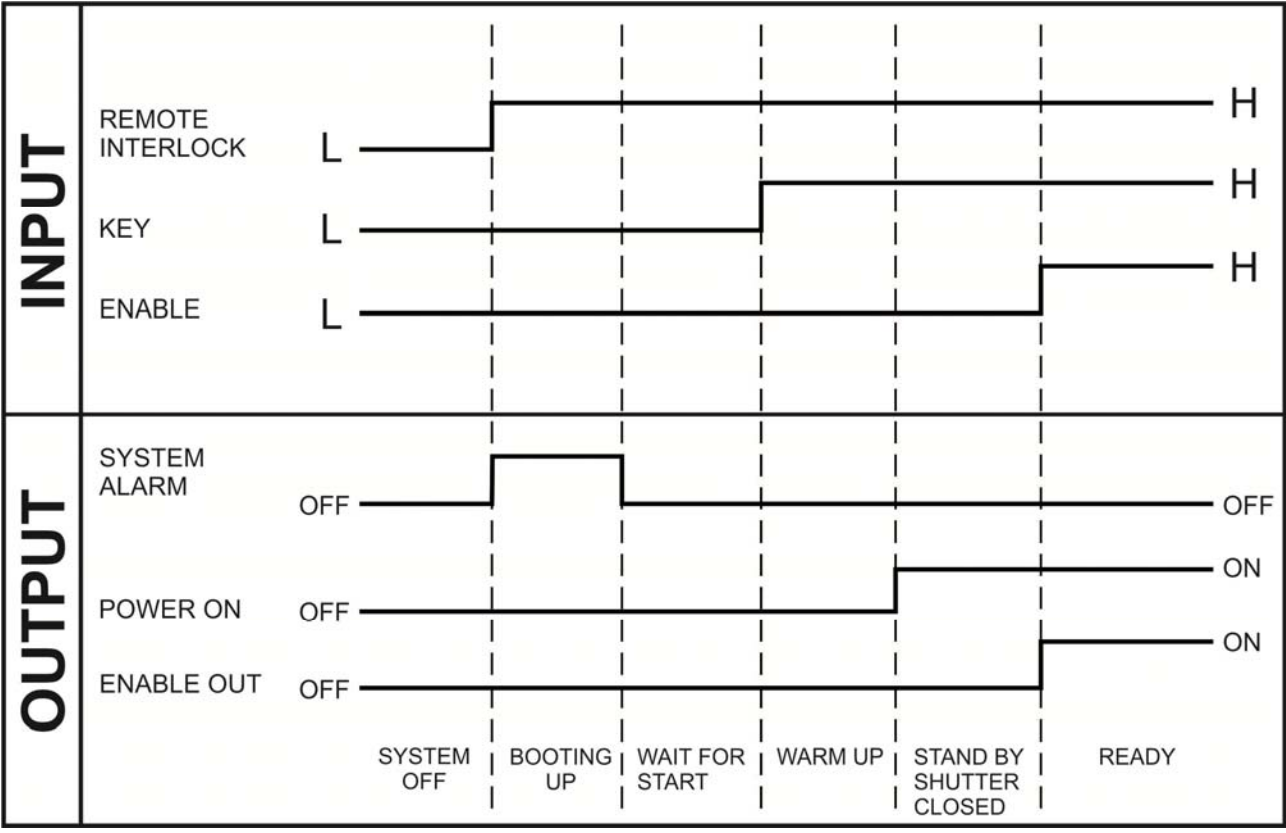


Figure 14: Timing control signals

1.5.4 MARKING PROCESS SIGNALS TIMING

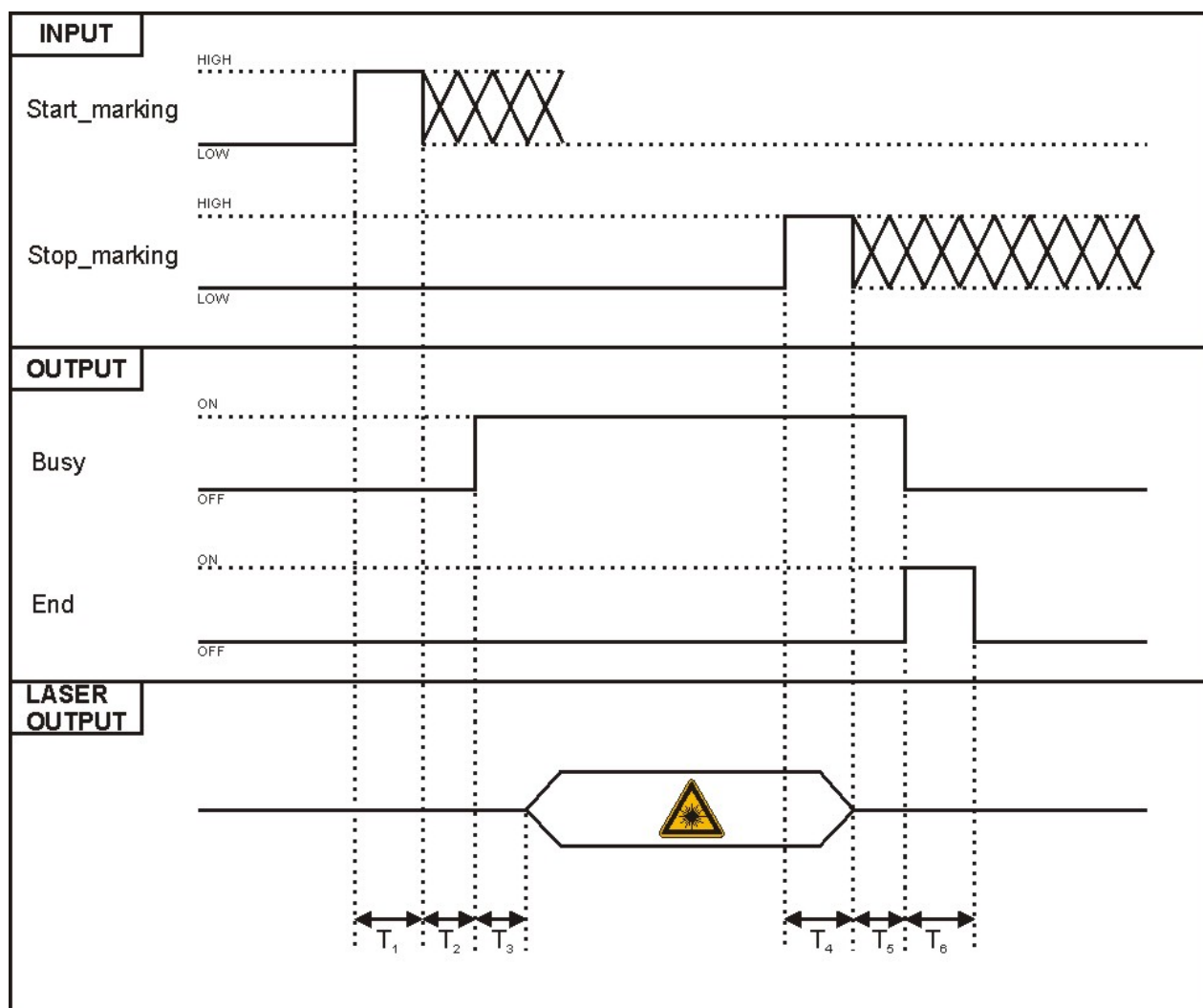


Figure 15: Timing signals (normal operation)

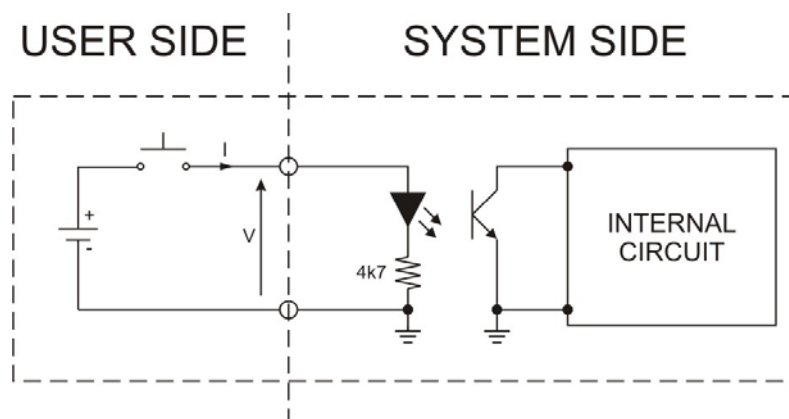
The time intervals in the diagram can all be programmed by a resolution of 1 ms (*).

T ₁	Start Time	For setting the minimum acceptable time for the start engraving signal
T ₂	Start Delay	For delaying engraving start
T ₃	Busy Advance	Busy signal corresponding to mark progress
T ₄	Stop Time	The minimum time for stop signal to stop the marking process
T ₅	End Delay	For delaying the Laser End signal with respect to laser emission
T ₆	End Time	For setting the Laser End activation time

(*) Refer to Lighter user's manual "Setting I/O parameters" to set the signal's properties.

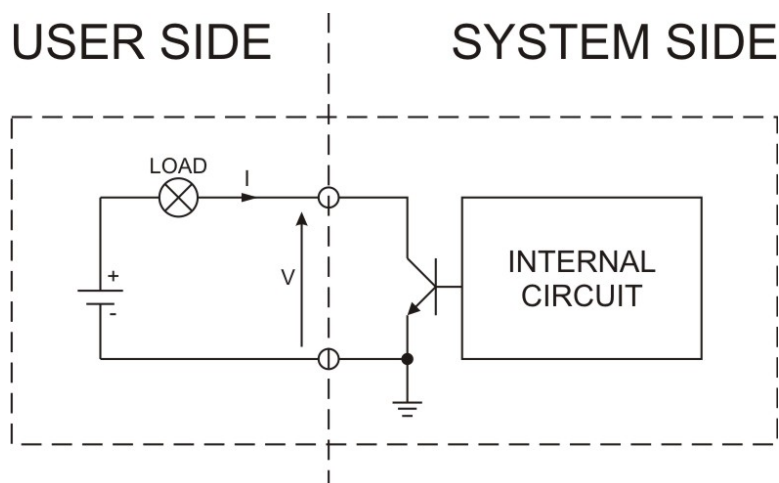
CHAPTER 1

1.5.5 INPUT/OUTPUT SIGNALS SPECIFICATIONS



DIGITAL INPUT:

Type	Optocoupler		
V_{max}	24Vdc		
I_{max}	5mA @ 24Vdc		
Pulse Width	≥ 1 ms (debounce)		
	MIN	TYP	MAX
INPUT Logic LOW	0.0 Vdc	0.0 Vdc	2.0 Vdc
INPUT Logic HIGH	5.0 Vdc	12.0 Vdc	24.0 Vdc



DIGITAL OUTPUT:

Type	Low side driver		
V_{max}	24Vdc		
I_{max}	250mA		
$V_{saturation}$	< 0.5 Vdc		
Leakage current	$< 5\mu A$		
OUTPUT State ON	$V \leq 0.5$ Vdc; $I \leq 250$ mA		
OUTPUT State OFF	$V \leq 24$ Vdc; $I \leq 5\mu A$		

1.6 CONNECTION EXAMPLES

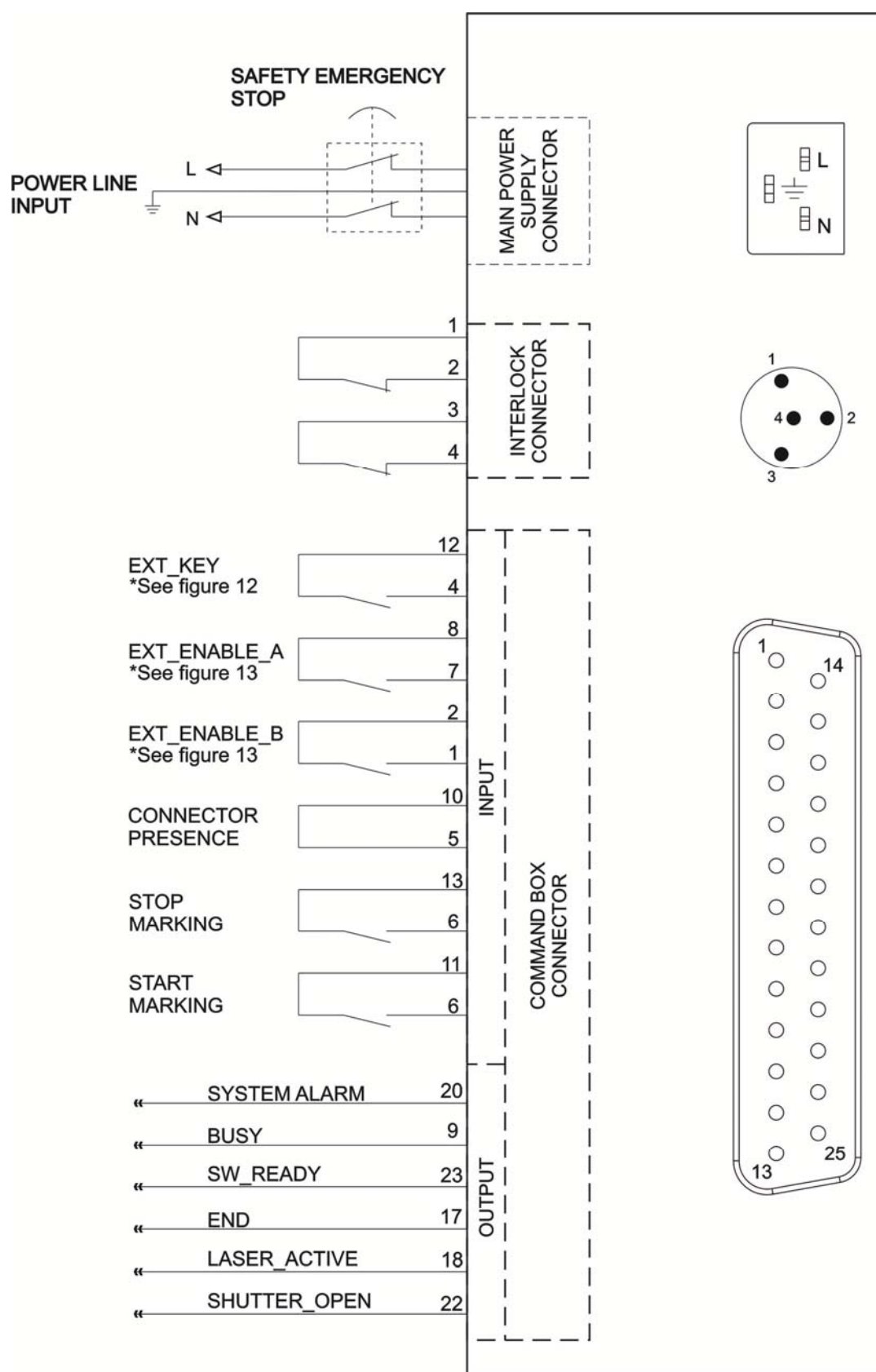


Figure 16: Connection examples.

CHAPTER 1

EXAMPLE OF APPLICATIONS AND EXTERNAL CONNECTIONS

Handy and simple installation of Eox allow to make it easy to use also in line production applications.

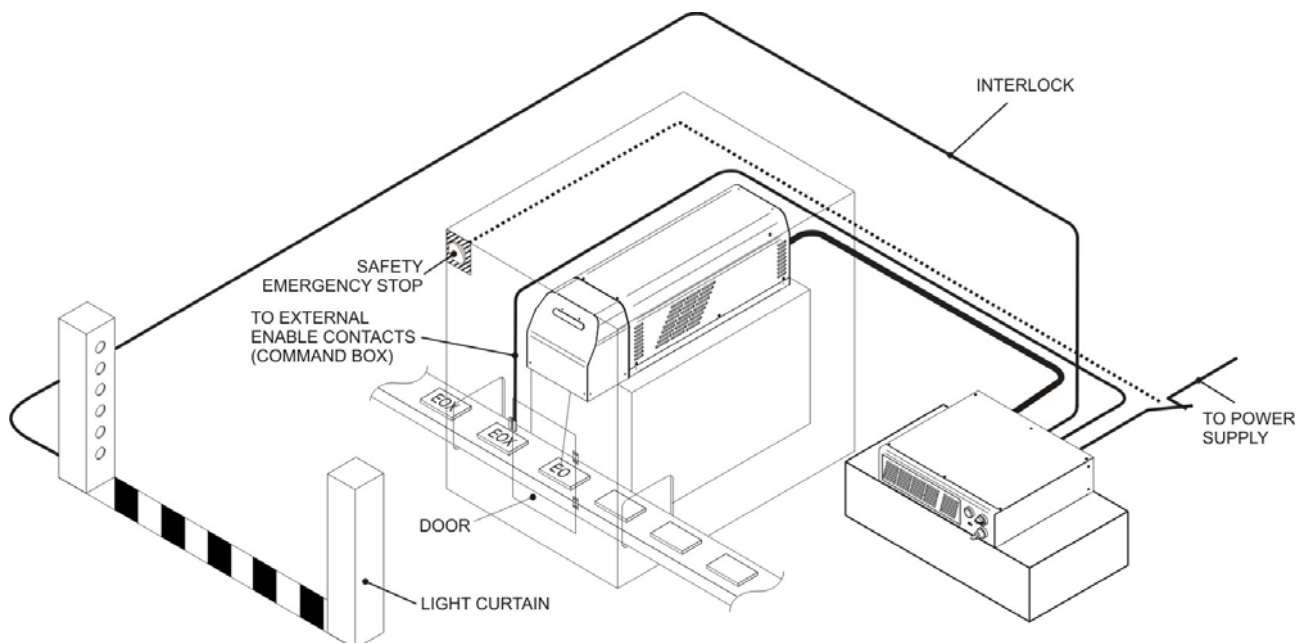


Figure 17: Example of static marking application.



NOTE:

It is important to install an **emergency circuit** able to cut input power supply (VAC) **switching off** the marking system entirely. This safety circuit needs to be installed from qualified personnel only.

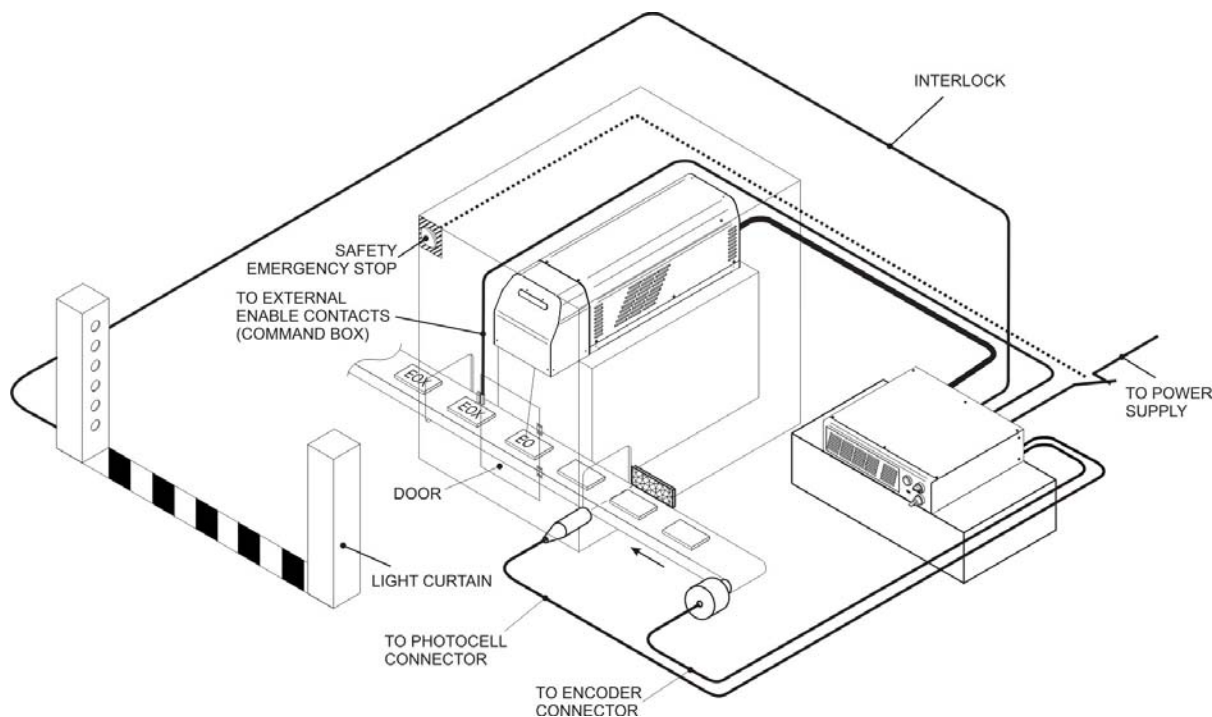


Figure 18: Example of Marking on Fly (MOF) application.

2 INSTALLATION AND SET UP



NOTE:

Eox is a **Class 4** laser source.

For proper use under conditions of safety they must be brought to **Class 1**.

2.1 UNPACKING

When unpacking the marking system from the shipping carton you should:

- Remove the documentation from the top of the marking system
- Remove the box containing the accessories
- Carefully remove the marking system from the packaging using both hands

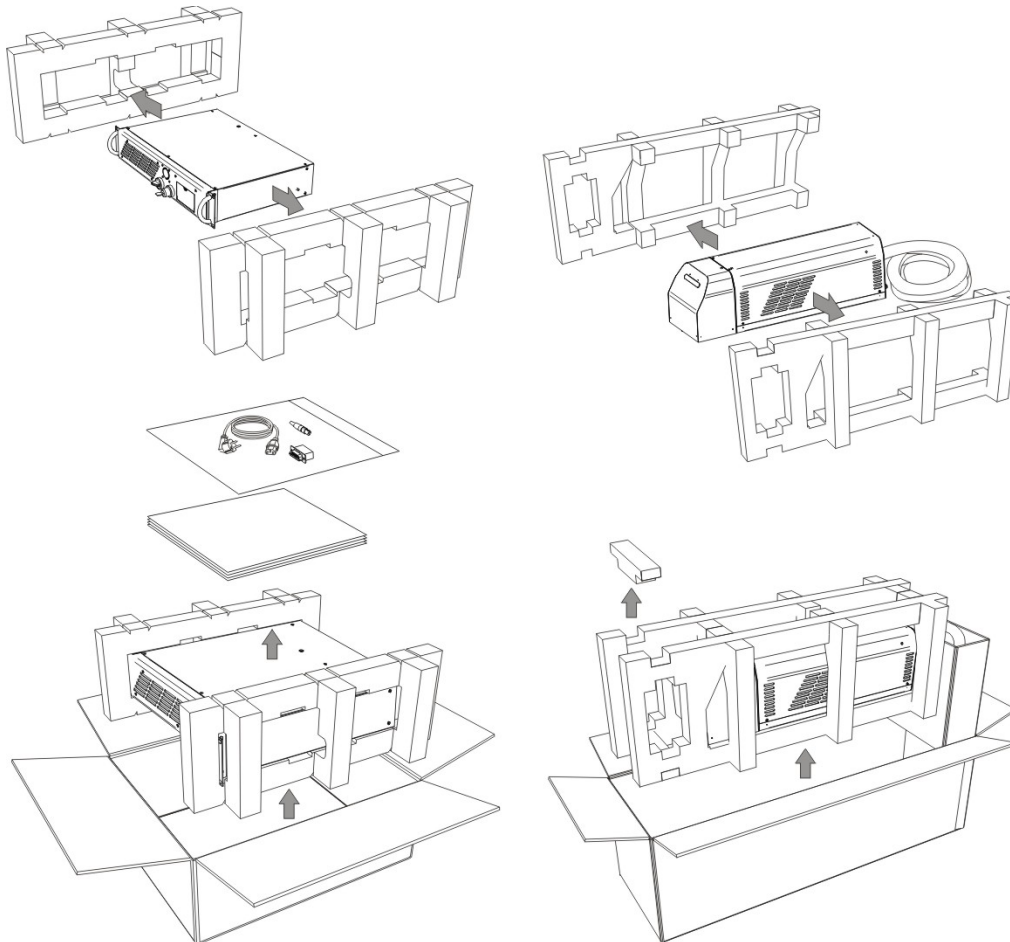


Figure 19: Unpacking.

Before installing or operating the marking system, you should:

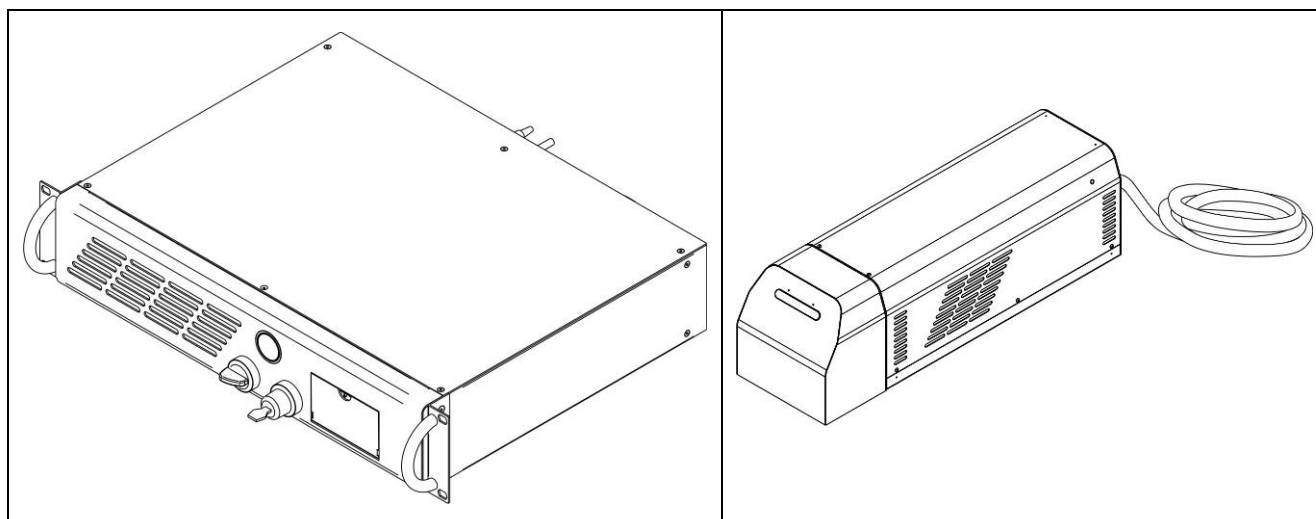
- Inspect the shipping container for damage
- Inspect the marking system for signs of damage
- Confirm that the shipping carton contains all items on the shipping inventory list including any accessories

Retain all packaging materials until the marking system has been inspected for completeness and damage, and you have checked the operating performance. If anything is missing or defective, see [technical support section](#) for contact details.

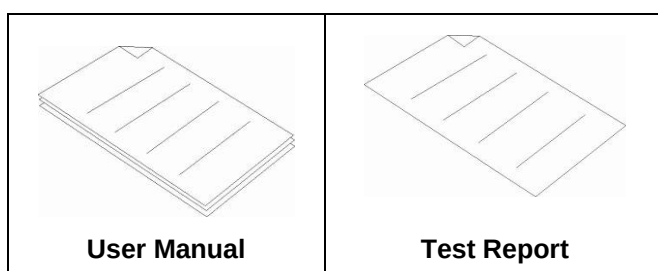
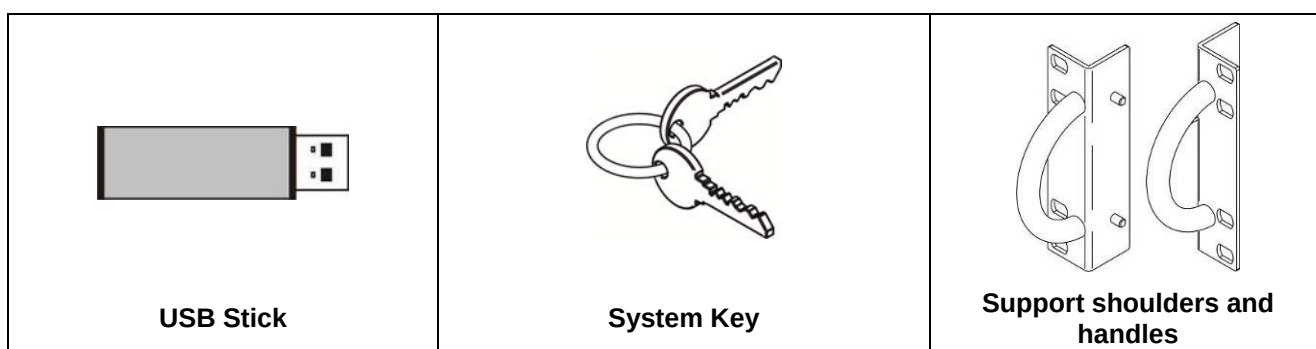
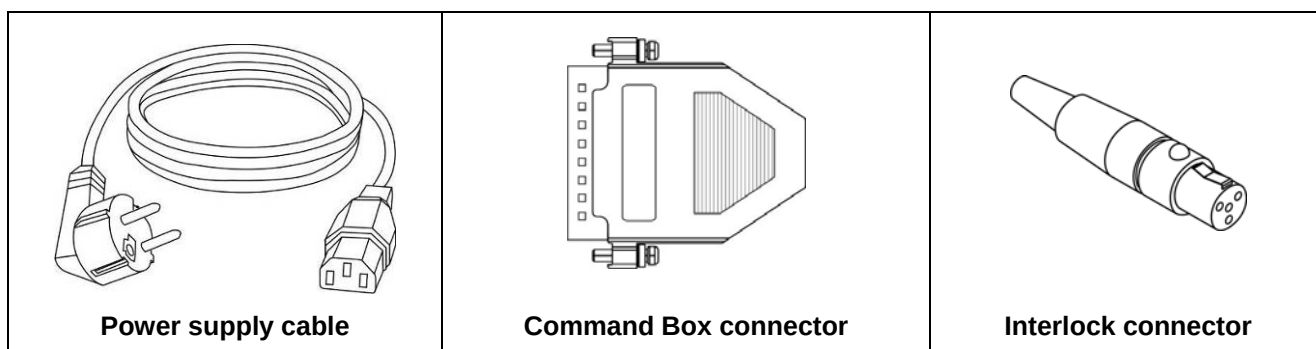
CHAPTER 2

2.2 CONTENTS OF THE PACKAGING

2.2.1 MAIN HARDWARE



2.2.2 CABLES AND OTHER COMPONENTS



2.3 TRANSPORT

The marking system needs to be moved in order to proceed to its positioning and wiring. The marking system can be easily lifted up and moved by a single person thanks to its compact size and reduced weight. A practical handle makes the rack easy to carry.

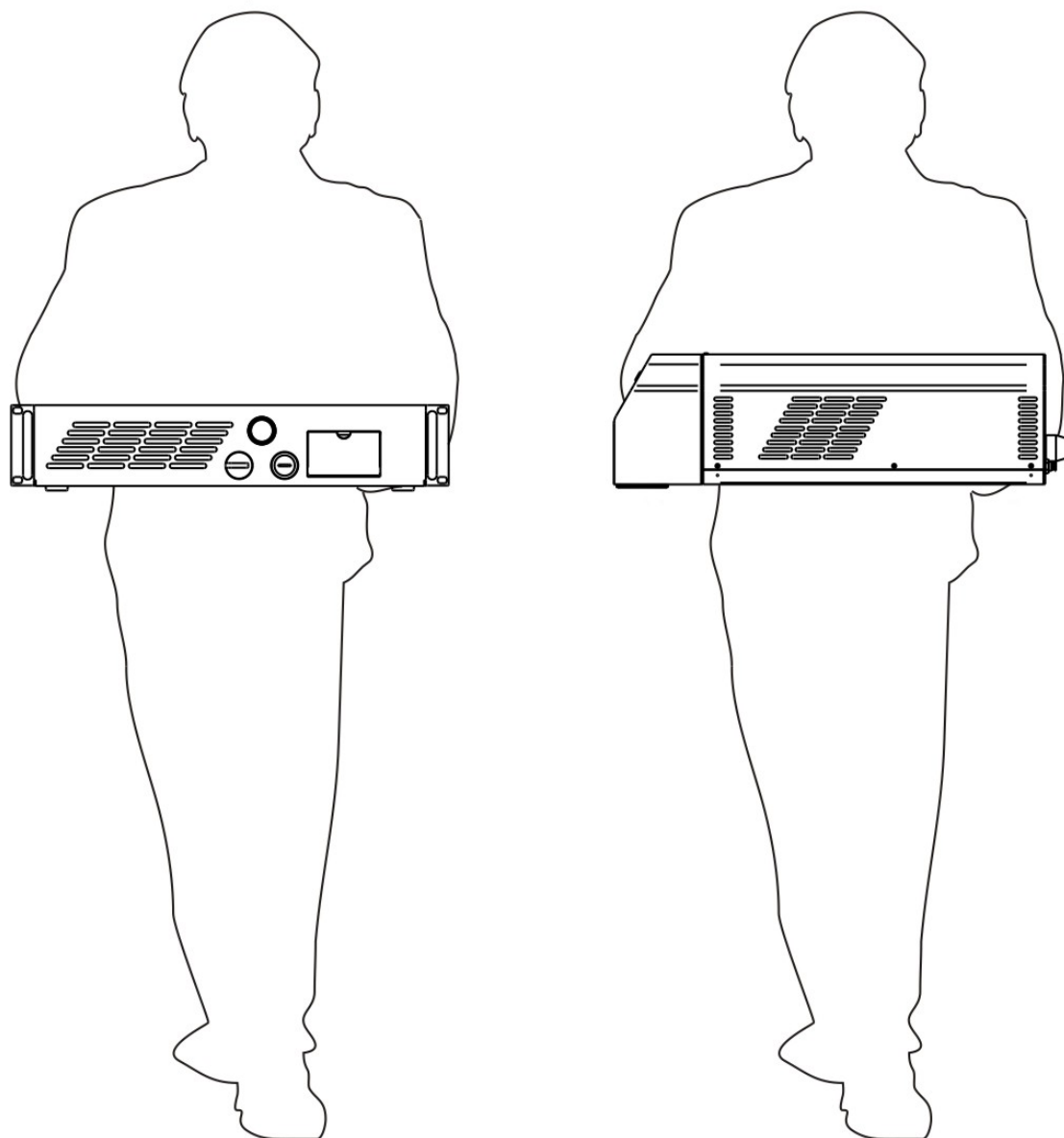


Figure 20: Eox 30W transport.



NOTE:

The marking system is a delicate opto-electronic device, avoid damaging shock and vibrations.



NOTE:

Be extremely careful to not damage the connection cable between resonator and rack.

CHAPTER 2

2.4 FIXING AND POSITIONING

The marking system must be safely positioned and must be followed below instructions.

The control rack can be fitted inside a special rack cabinet equipped with special support shoulders.

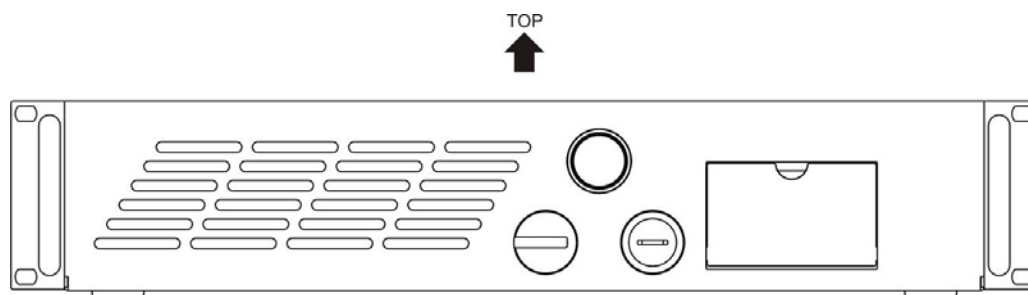


Figure 21: Positioning rack.

Don't fix the system in different as shown in figure.

Here are the odds of the mounting points for mounting in rack:

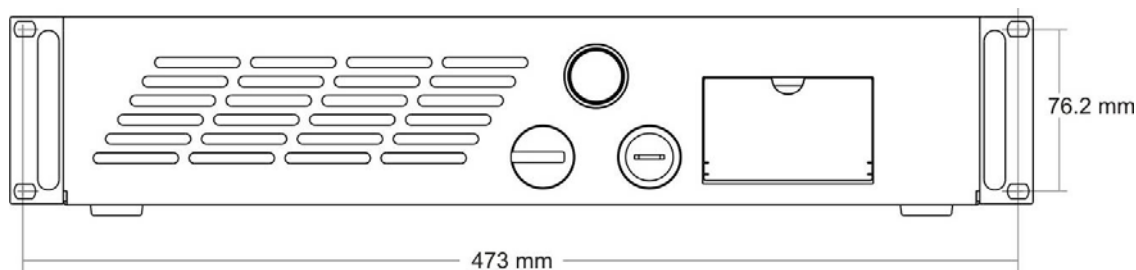


Figure 22: Fixing points on shrug rack (cabinet assembly).

The resonator must be secured to a suitable base (not supplied by Datalogic Automation S.r.l.) using the four M6 threaded holes:

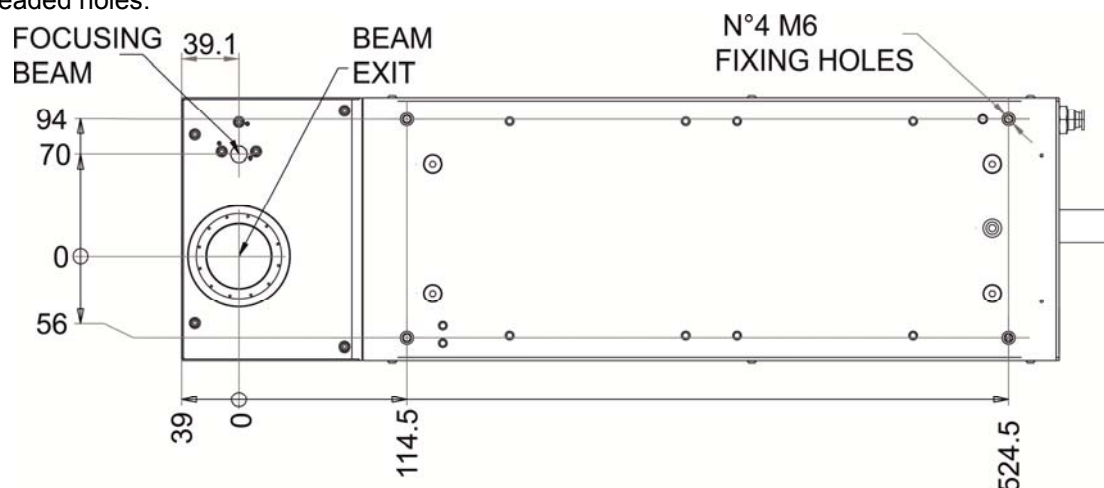


Figure 23: Fixing points on resonator (vertical mount).

The marking system must be safely positioned and secured to a specific surface, parallel to the marking area and totally vibration-free. The resonator can be fixed either vertically or horizontally. In order to prevent marking distortions, fit a vibrometer at the base of the piece to be marked and make sure there are no vibrations during the marking process. It is also possible to request a different position of the scanning head in order to have a side laser output.

2.5 INSTALLATION ENVIRONMENT

The control rack must be installed in a suitable environment in order to allow proper air flow passage and correct housing of the cables. Proper air flow can only be guaranteed by assembling the cooling fans correctly:

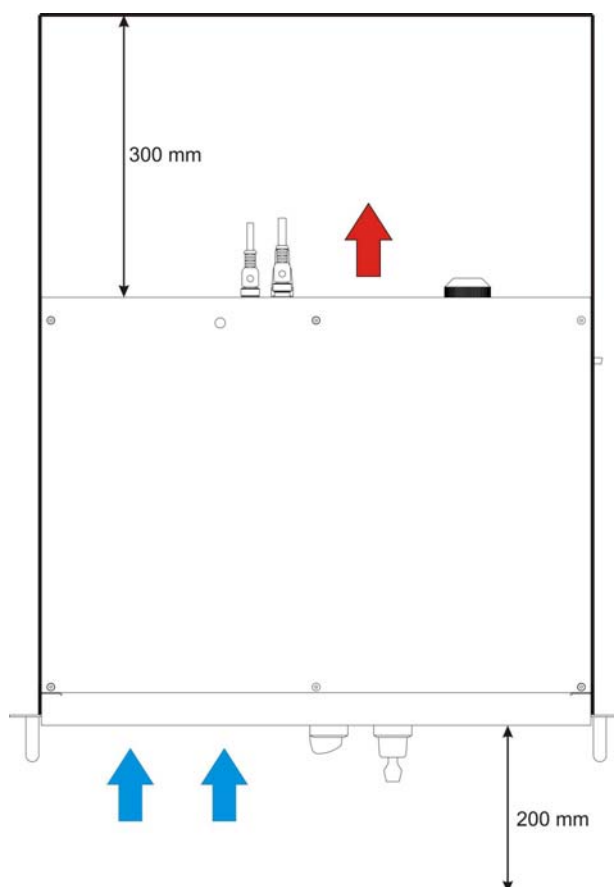


Figure 24: Rack installation environment.

Even the resonator must be installed in a suitable environment in order to allow proper air flow passage and correct housing of the cables:

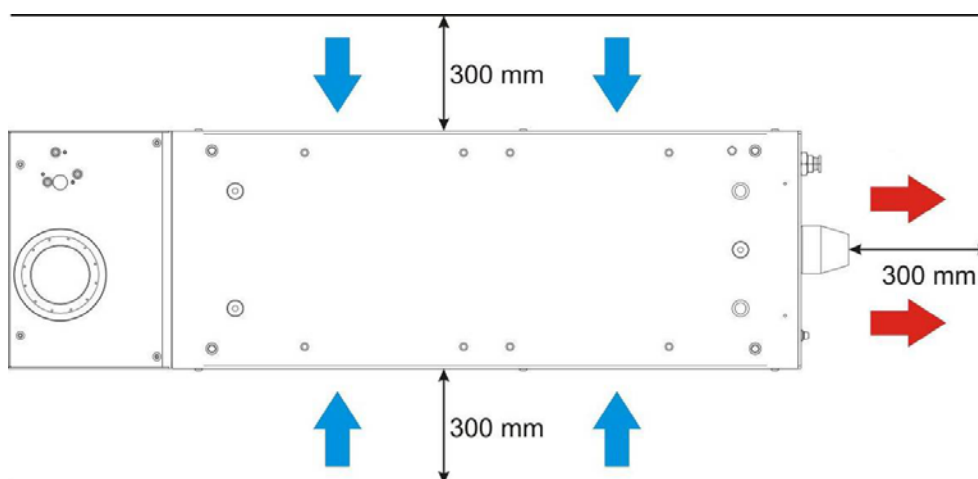


Figure 25: Resonator installation environment.

According to have a marking system in safety mode (see Appendices for more details) we recommended to install the marking system like figure below in order to limit laser output area. To obtain a good marking quality, and not to decrease life time, we recommended a ventilation or vacuum system in a protection box to limit dust due to marking phase.

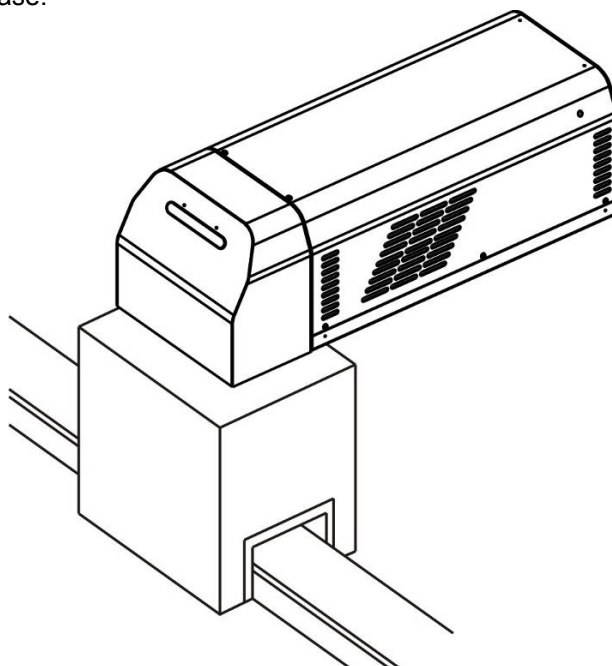


Figure 26: Safety mode example.

2.6 FUME / DUST EXTRACTOR

During marking process, dust and/or gas may be produced. It is important to use adequate fume extractor and/or air filtration.



NOTE:

Marking PVC (or other plastic material) can cause the release of chlorine gas which can be harmful to the laser operator and to the laser units itself. Always use adequate fume extractor during PVC and plastic marking.

2.7 CONNECTIONS

This section of the manual describes the marking system connections. Carry out the connecting operations as described below.



WARNING:

Connect the marking system one to the other **WITH NO** voltage in order to avoid risks to the operator and to the laser source.

2.7.1 RESONATOR-RACK CONNECTION

In order to connect the resonator to the rack, perform some simple operation:

- 1) open the control rack. Unscrew the six screws that secure the cover of the rack.

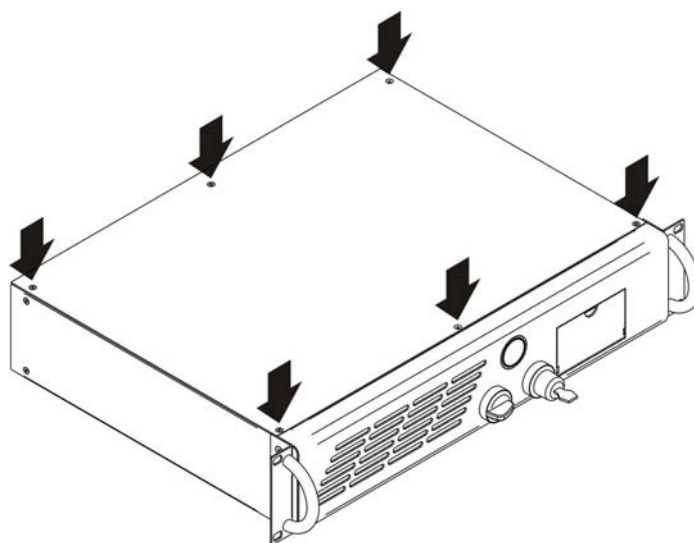


Figure 27: Remove cover screws rack.

- 2) hook the cable into the slot on the rack as shown:

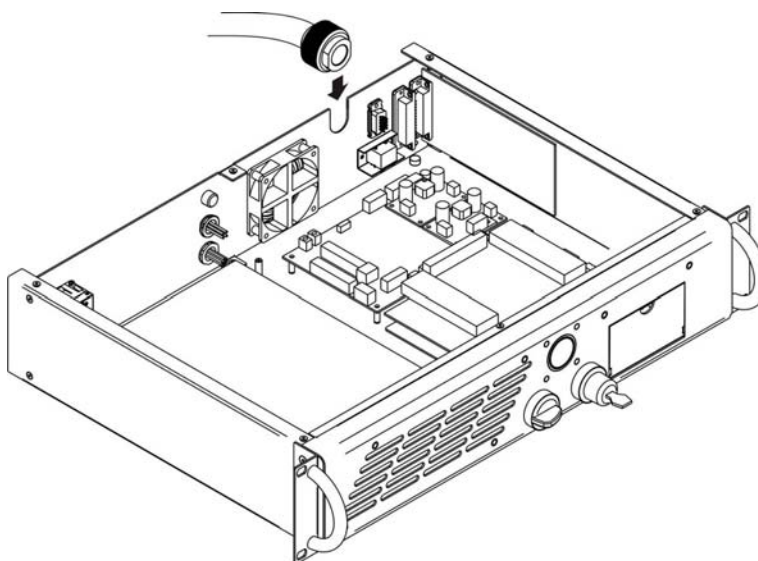


Figure 28: Hooking main cable.

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3) connect rack-resonator signals cable (connector **J7**):

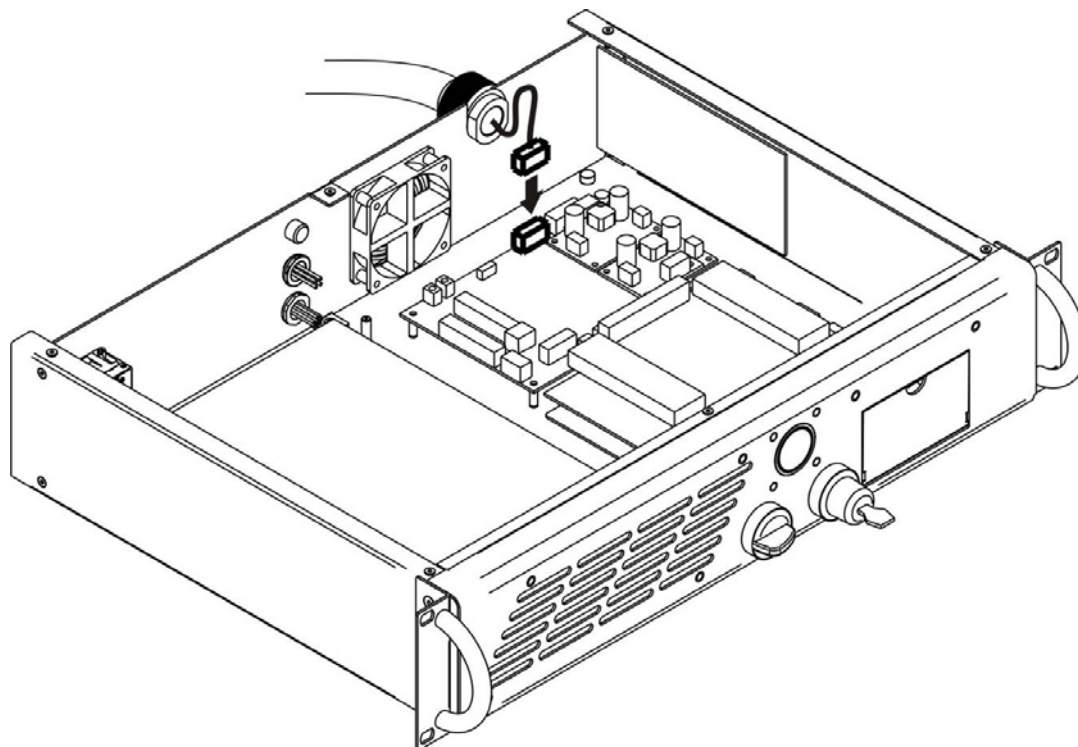


Figure 29: Connection rack-resonator boards cable.

4) connect female terminal block power supply (+5V and +12V) to male terminal block **J18**:

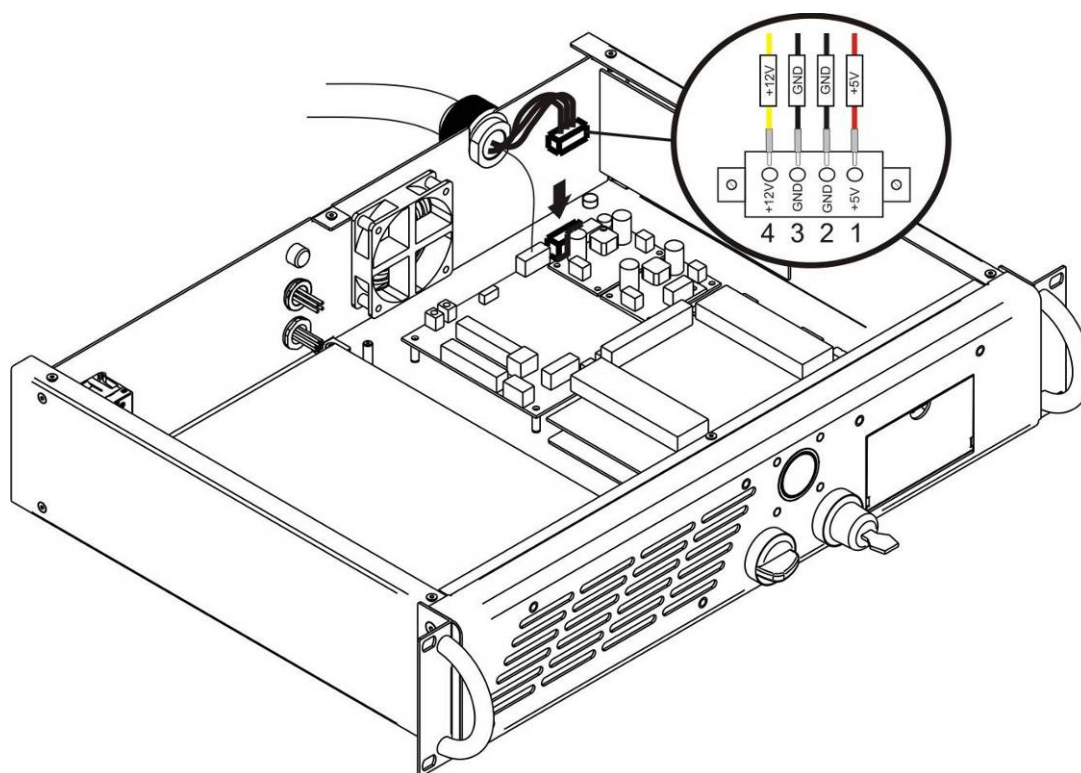


Figure 30: Connection to power supply terminal block (+5V e +12V).

5) connect iMark signals cable to iMark board (conn. **J2001**):

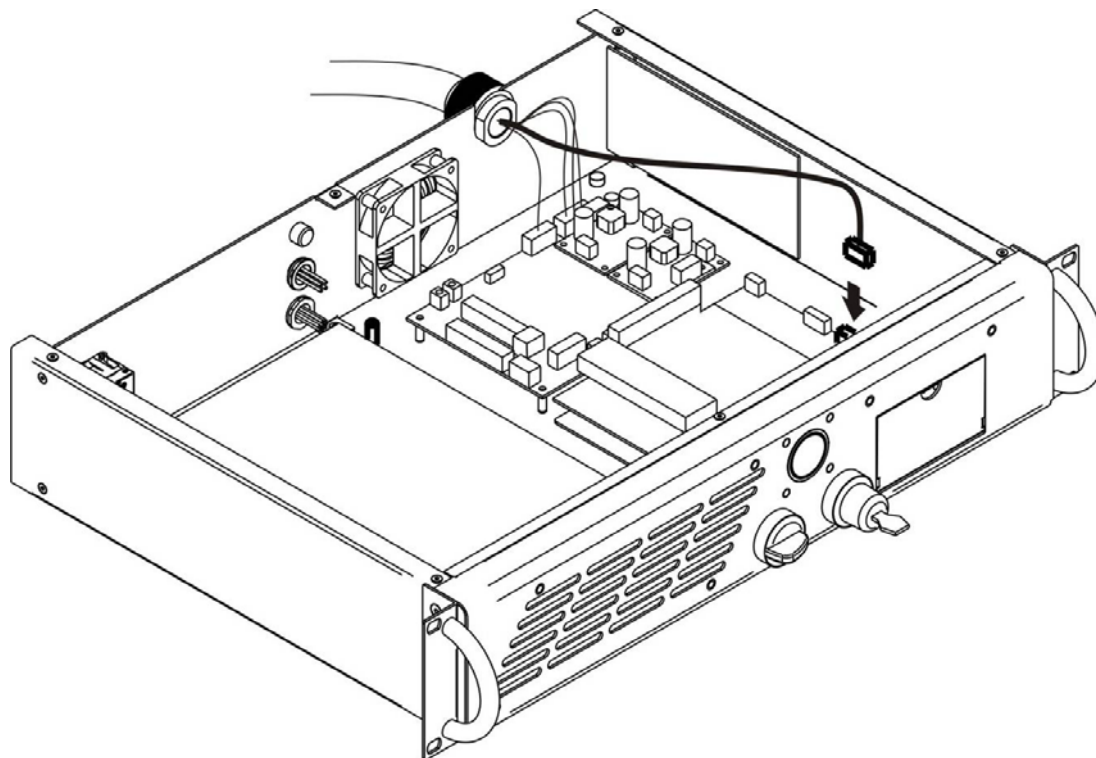


Figure 31: Connection iMark cable.

6) connect GND of iMark signals cable to iMark board:

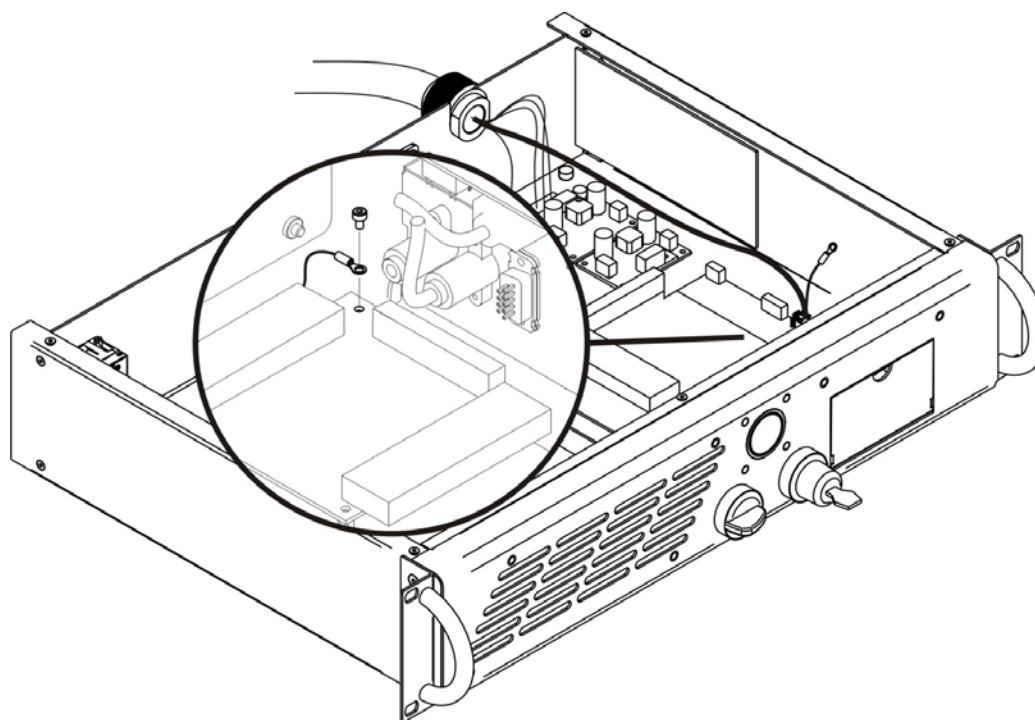


Figure 32: Connection GND of iMark cable.

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7) connect GND cable to GND PEM site into the rack:

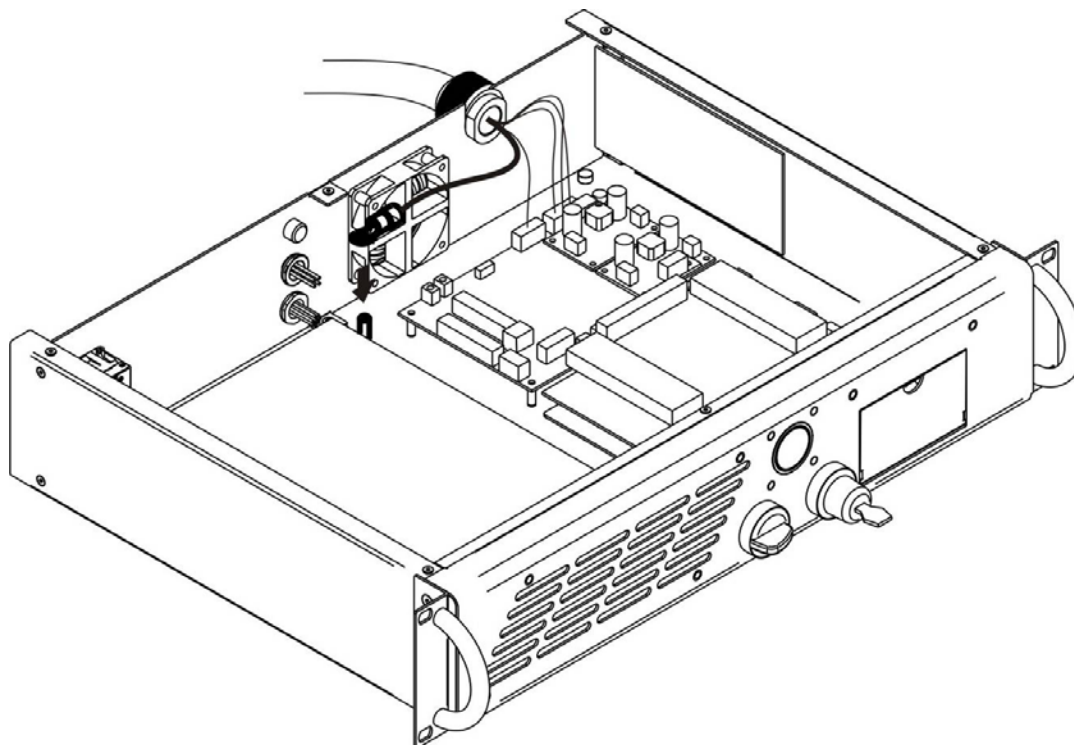


Figure 33: Connection rack-resonator earth cable.

8) connect +30V power supply and GND to dedicate terminal block:

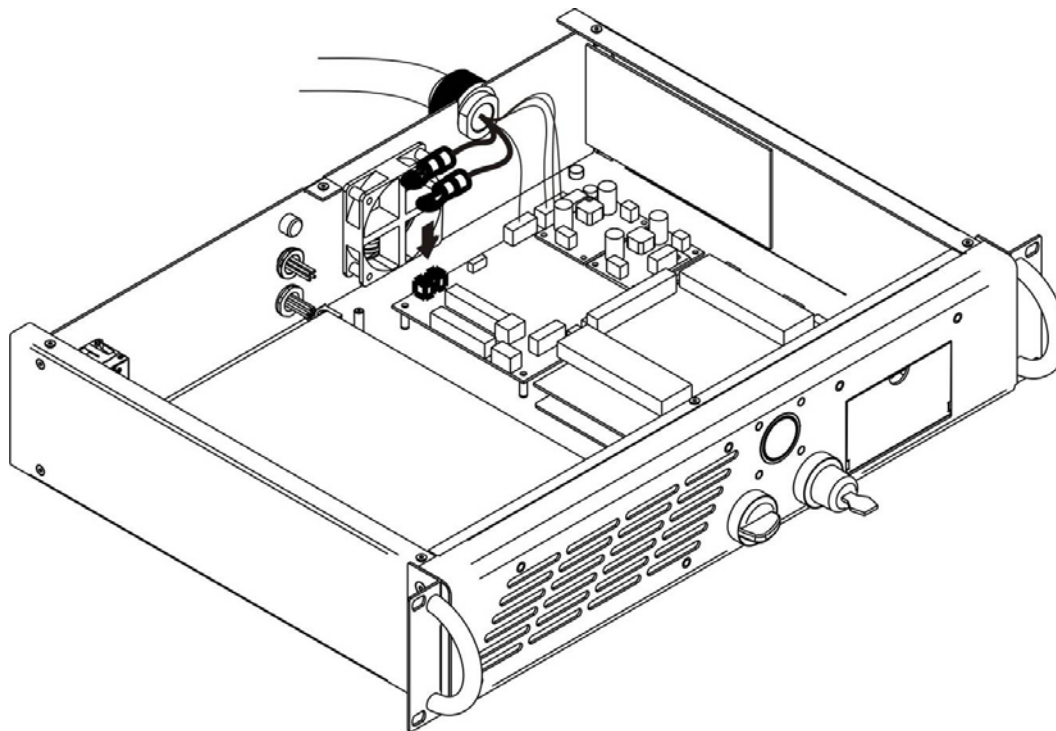


Figure 34: Connect +30V power supply.

9) close rack cover:

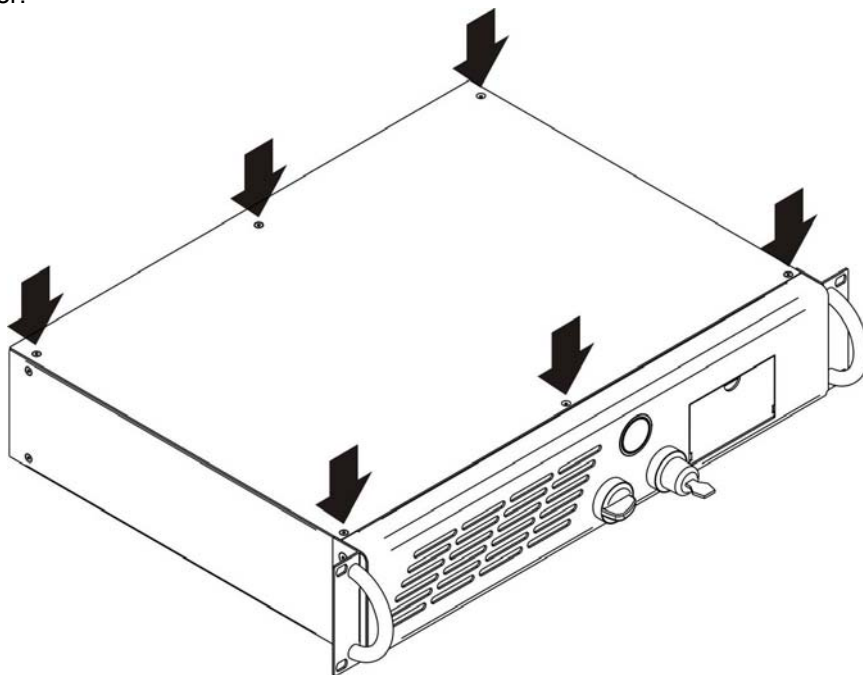


Figure 35: Closing rack.

2.7.2 COMMAND BOX CONNECTOR CONNECTION

Connect Command Box connector on back panel.

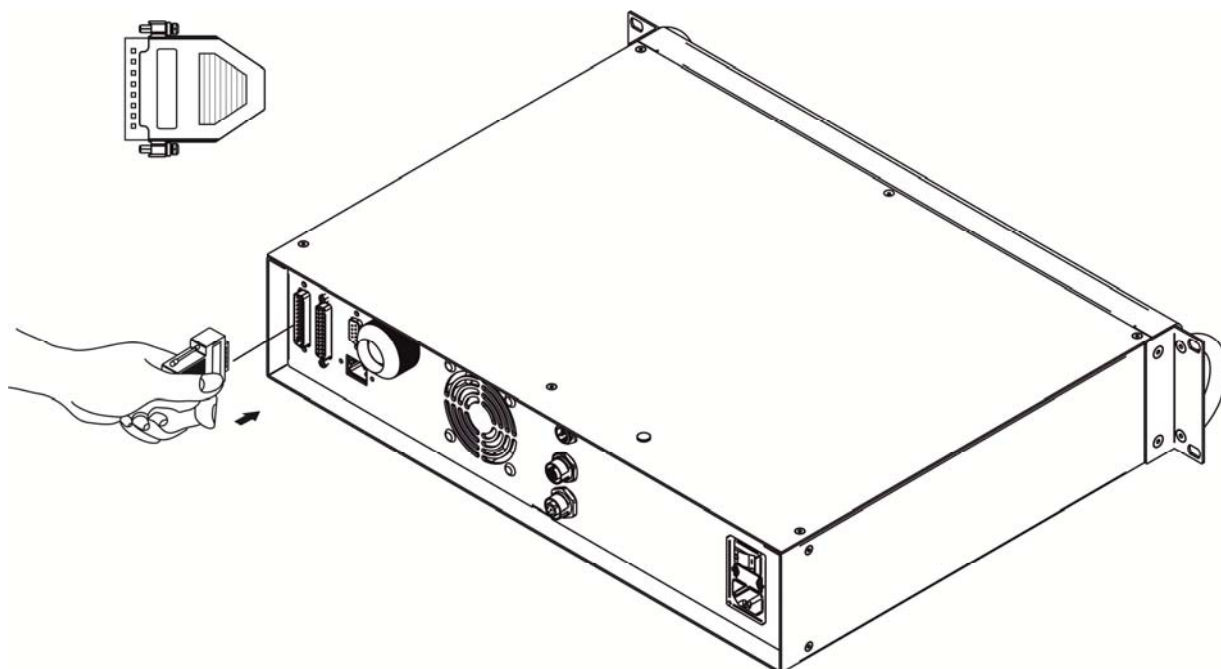


Figure 36: Connector Command Box connection rear side rack.



NOTE:

If this connection is not present the marking system can't be used because it goes in error status.

2.7.3 INTERLOCK CONNECTOR CONNECTION

Connecting interlock connector to control rack.

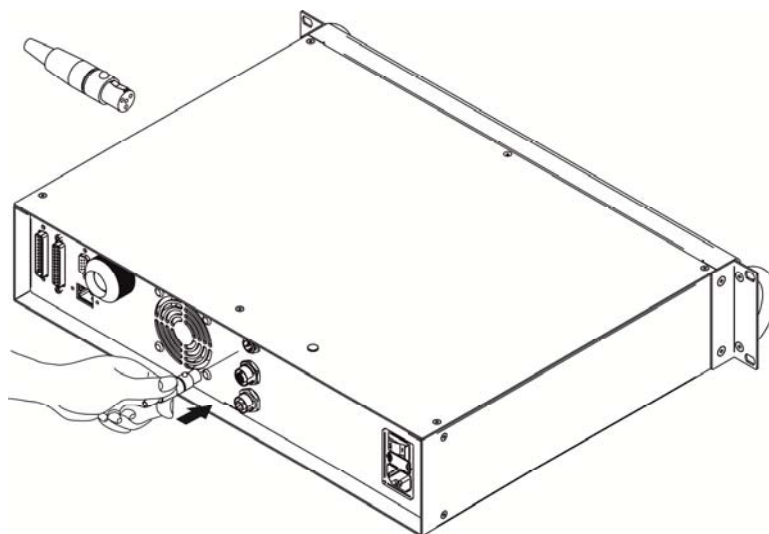


Figure 37: Interlock connector connection.



NOTE:

The interlock connector must always be inserted in order to use the marking system. The absence of such connector locks the marking system.

2.7.4 POWER SUPPLY CONNECTION



WARNING:

First of all, make sure the power supply upstream the control rack is turned off, and consequently that there is no voltage in the cables connecting power supply and rack.

Connecting power supply cable.

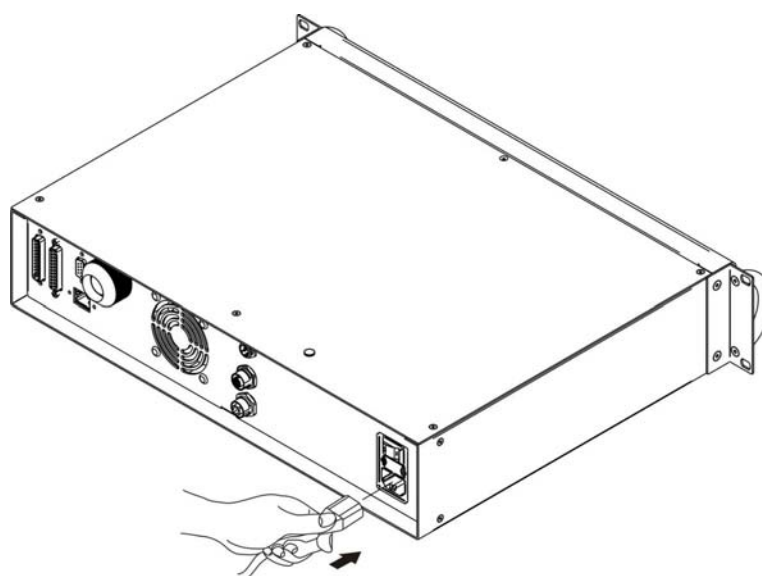


Figure 38: Connecting power supply cable.

2.7.5 LOCAL CONTROL MODE CONNECTION

To use the marking system in “Local Control” mode is necessary to install a mouse, keyboard and monitor. Connect the monitor and input devices to marking system as shown below:

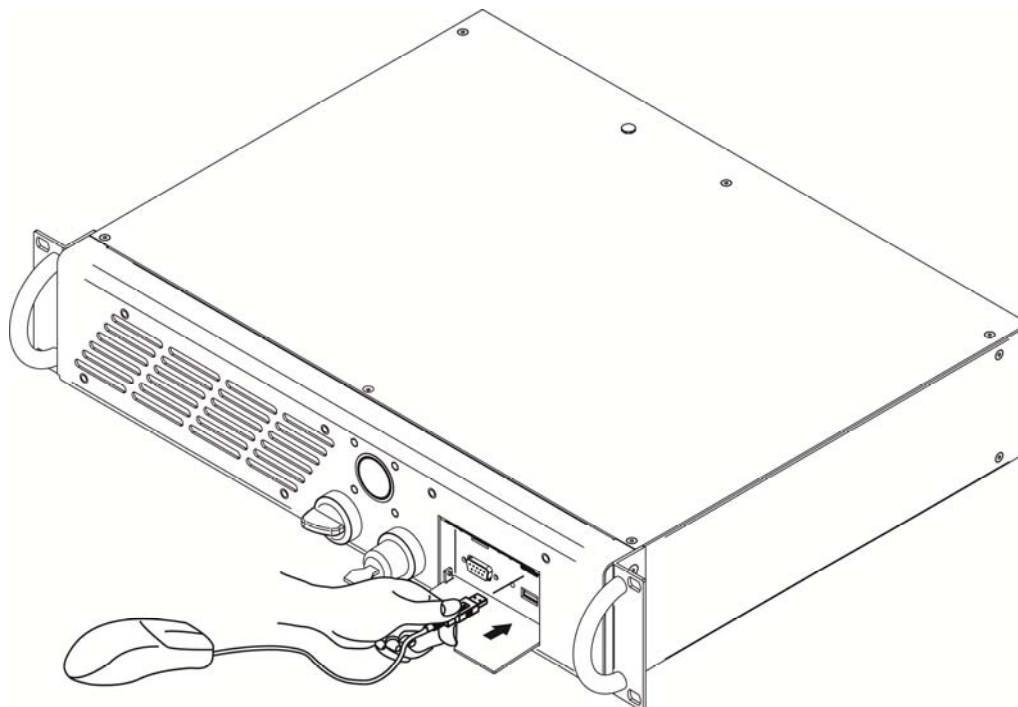


Figure 39: USB mouse connection.

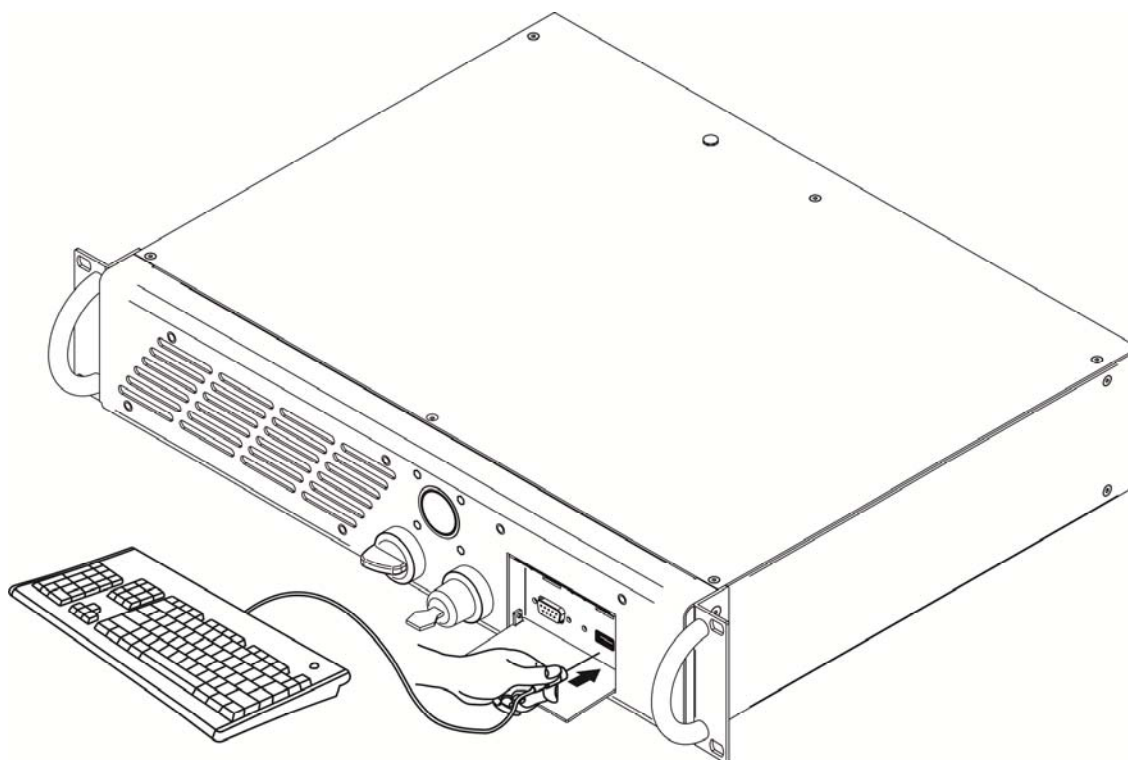


Figure 40: USB keyboard connection.

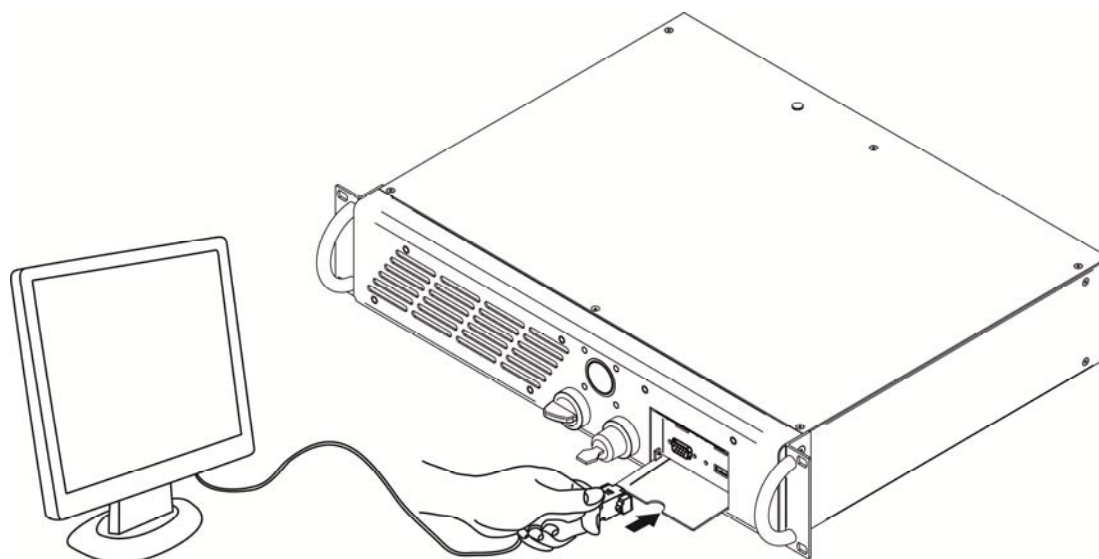


Figure 41: VGA monitor connection.



NOTE:

Minimum resolution 800 x 600.

2.7.6 REMOTE CONTROL MODE CONNECTION

To use “Remote Control” mode it is necessary a LAN cable connection. This configuration permits to control the system by an external PC in order to send from a remote position a marking project and check the laser status.

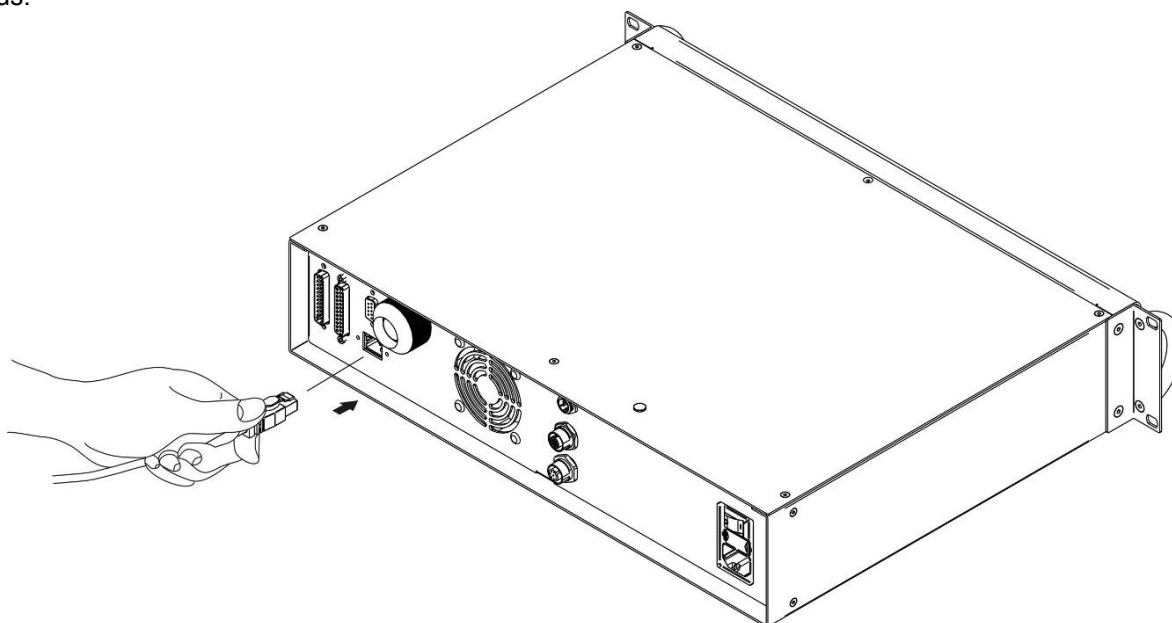


Figure 42: LAN Ethernet connection.



NOTE:

Ethernet TCP/IP 10, 100 Mbit.

2.7.7 AXES CONNECTION (I/O CONTROL)

In case of moving axes control it is possible to connect to a dedicated port (Refer to [chapter 1.4.3](#) for any further information).

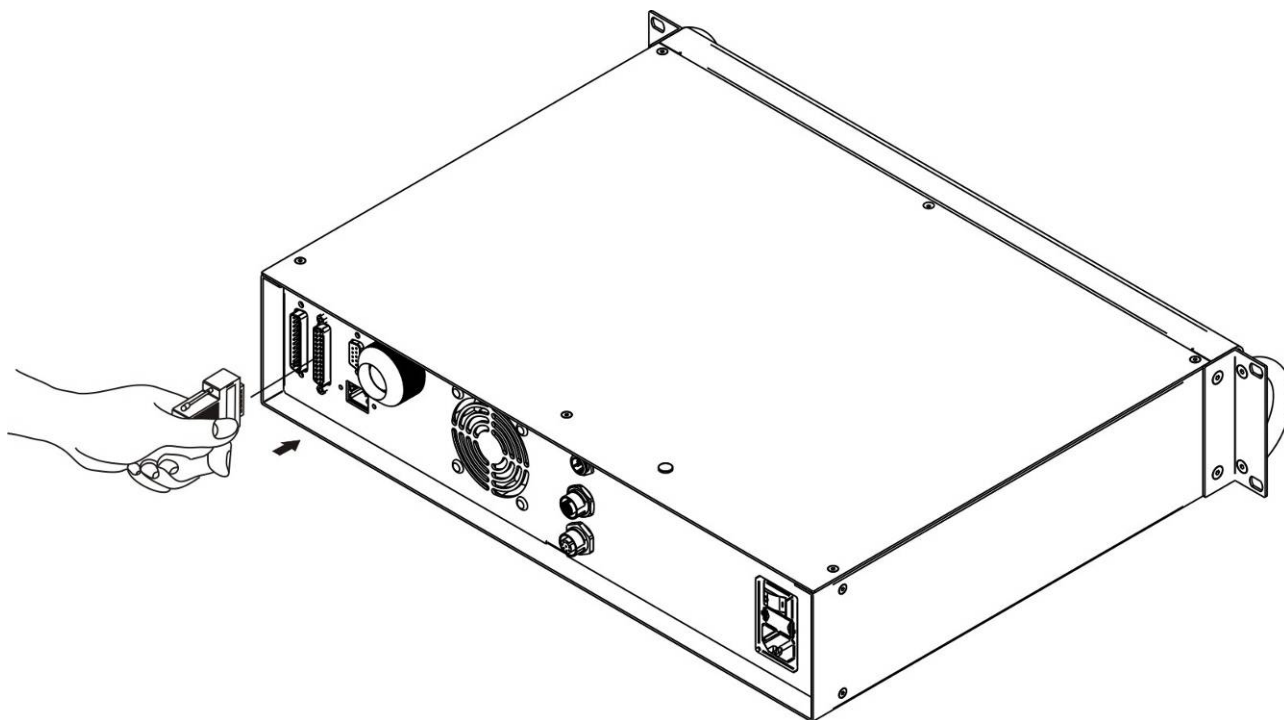


Figure 43: Axes connector connection.

2.7.8 MARKING ON FLY MODE CONNECTION

Dynamic state of marking is used for critical production where it is not possible to stop the marking objects. To use the marking system in “Marking on fly” mode is necessary connecting a photocell sensor and an encoder (not supplied by Datalogic Automation):

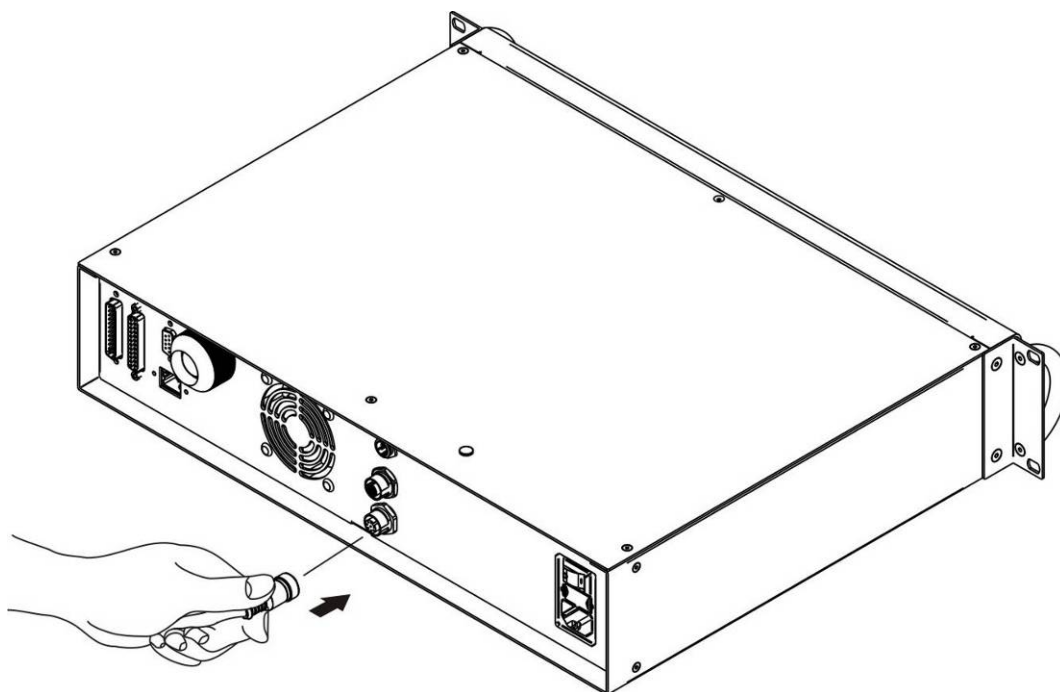


Figure 44: Photocell connection.

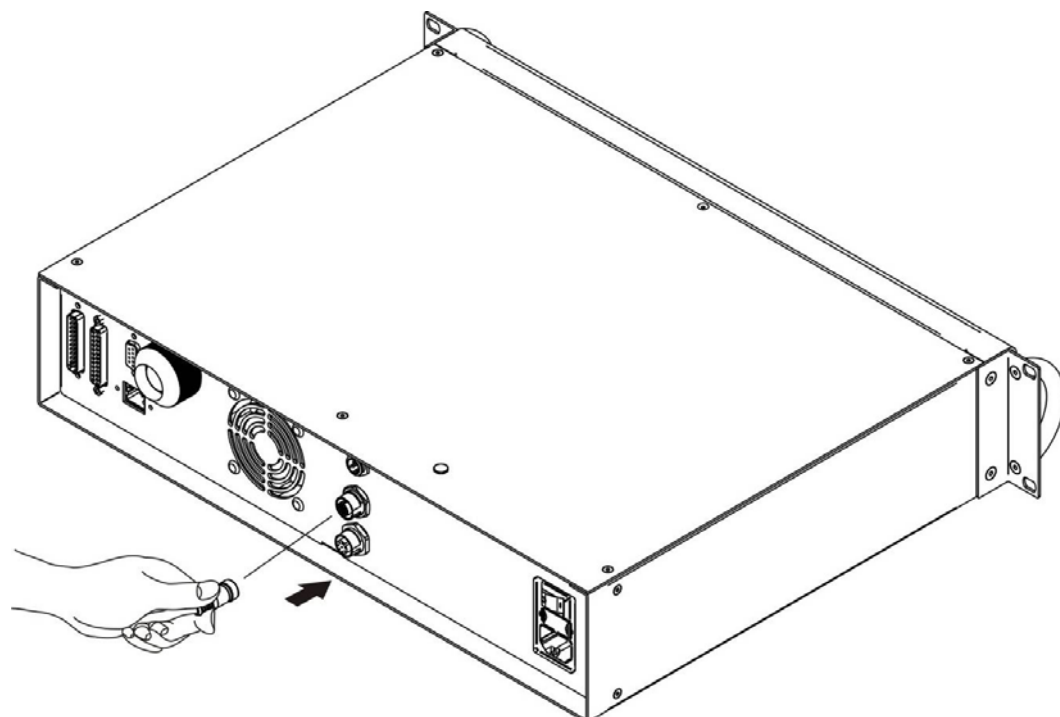


Figure 45: Encoder connection.

3 USE AND OPERATION

3.1 POWER ON PROCEDURE

First to proceed with turn on the marking system, insure to a right device connection like described previously.



NOTE:

First to use marking system must be read marking software user manual.

Proceed as follow:

- 1) Provide power supply to the marking system by pressing the switch on the power input jack:

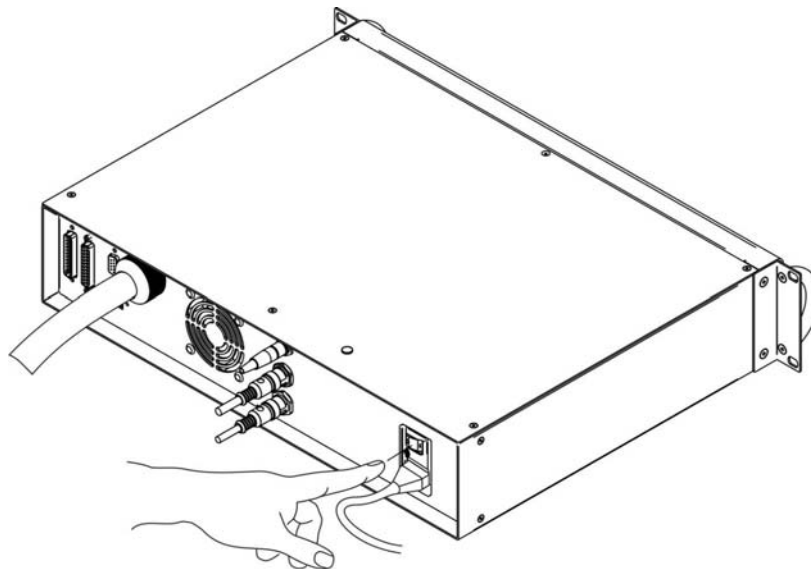


Figure 46: Power on.

If the marking system is turned on cooling fans are running. Through Command Box connector on back panel is possible to check that the system is switched on by auxiliary 12VDC voltage available on the output pins.

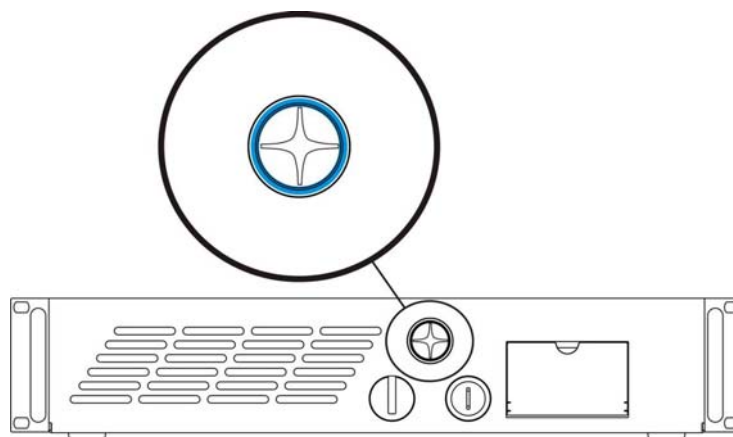


Figure 47: Power supply Led.

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The rack status led will be blinking green. The led bar on resonator is power off.

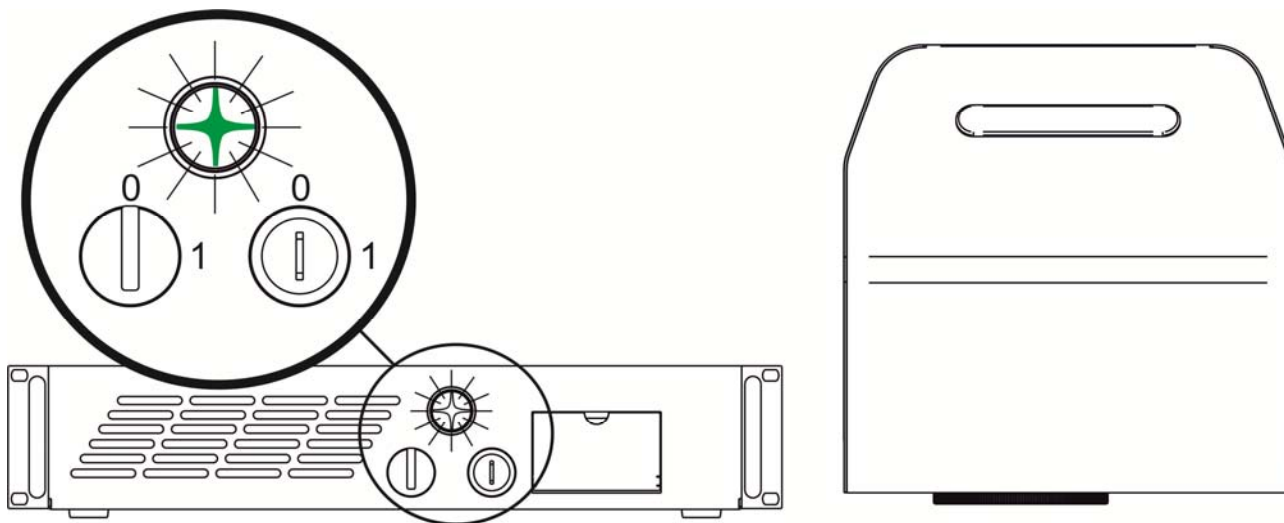


Figure 48: Status led and led bar status.

- 2) Once completed internal booting up procedure, rack led status will be green and the system allow to enable "KEY" command on rack front panel and on Command Box connector in back panel:

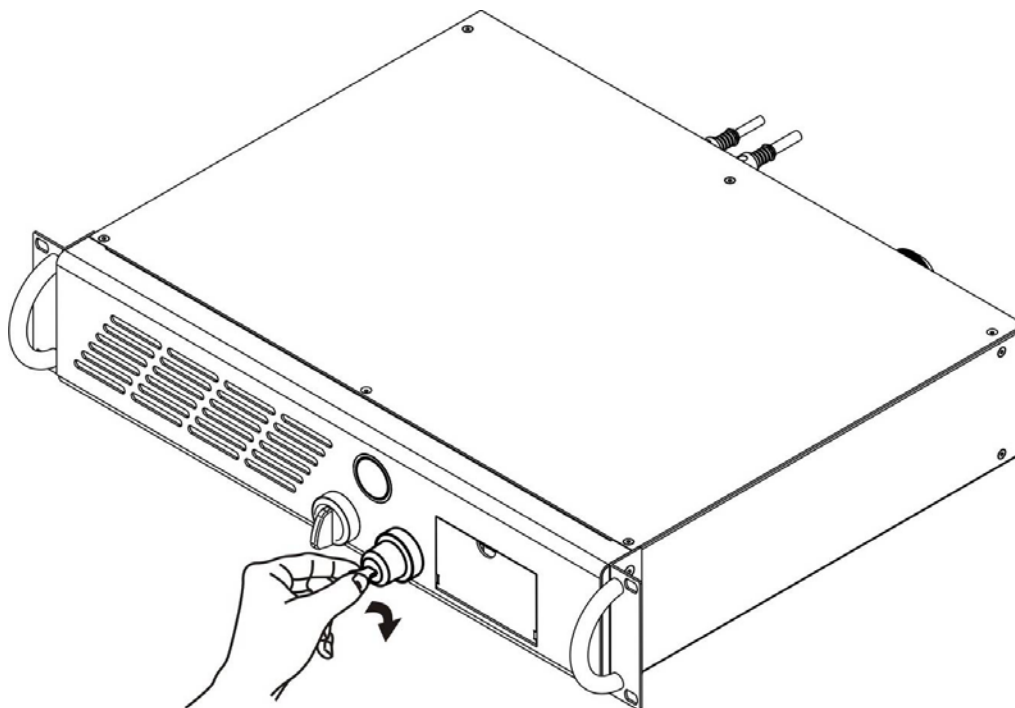


Figure 49: Enable command KEY.

When the "KEY" command is enabled, the status LED on the rack turns orange, while the status LED bar on the resonator turns green.



NOTE:

Refer to [paragraph 1.5](#) for any further information on the connections.

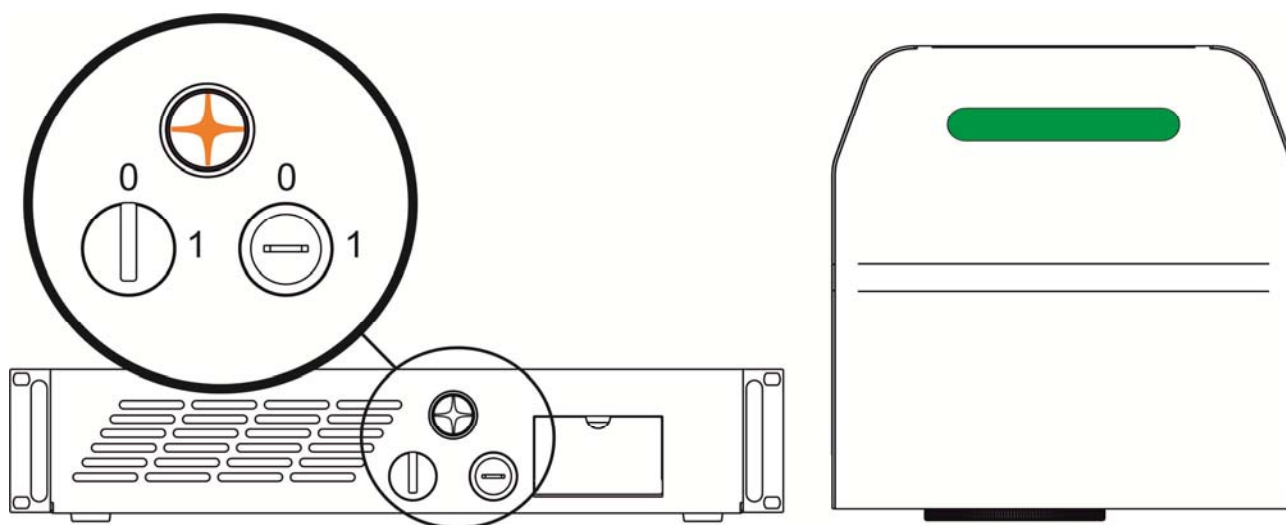


Figure 50: Status led and led bar status.

- 3) Now activate the “ENABLE” command on both the rack and on the Command Box connector:

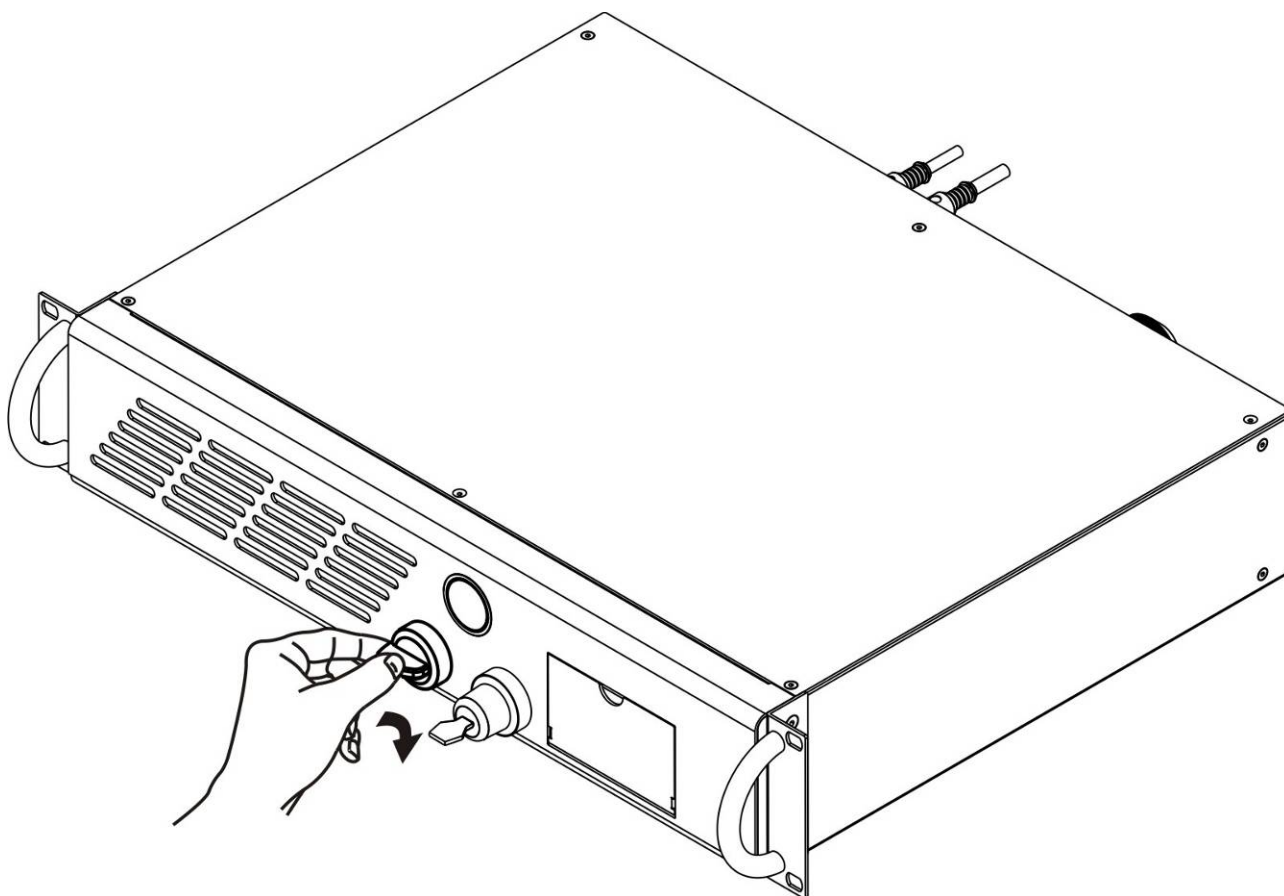


Figure 51: Enable command ENABLE.

The marking system is ready to mark. The led bar status on device will turn orange. "SHUTTER_OPEN" signal will activate on Command Box connector in the back panel.

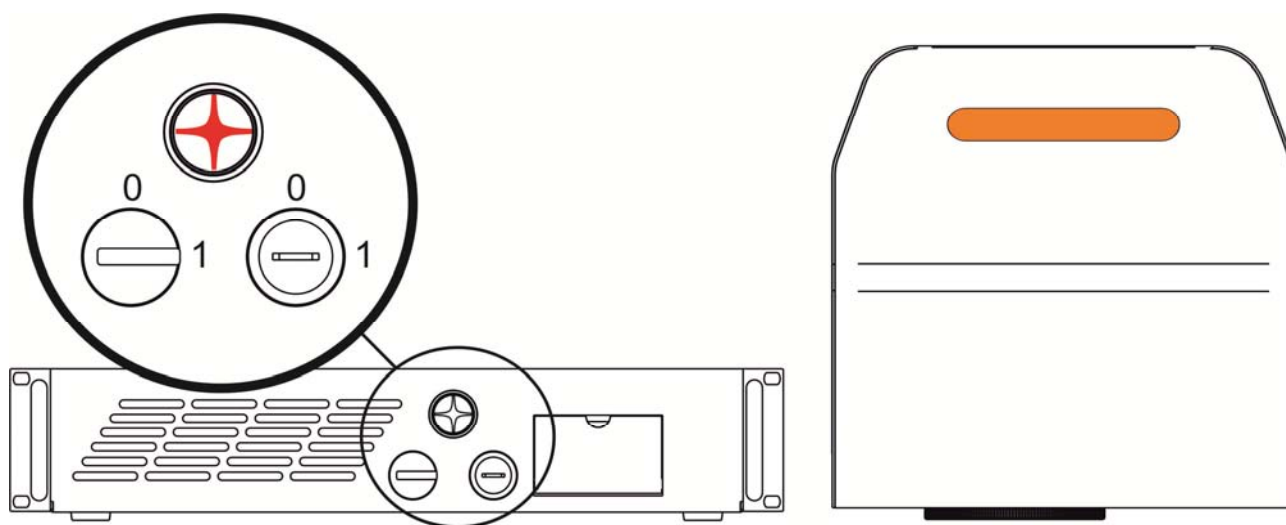


Figure 52: Status led and led bar status.



NOTE:

Refer to [paragraph 1.5](#) for any further information on the connections.



WARNING:

During this status, the shutter is opened and **it is possible to have LASER beam output!**

- 4) To laser emission it is possible to operate manually through the marking software or in automatic mode by external START signal. During the emission led bar will be red. "Busy" output signal will be active on the Command Box connector in back panel:

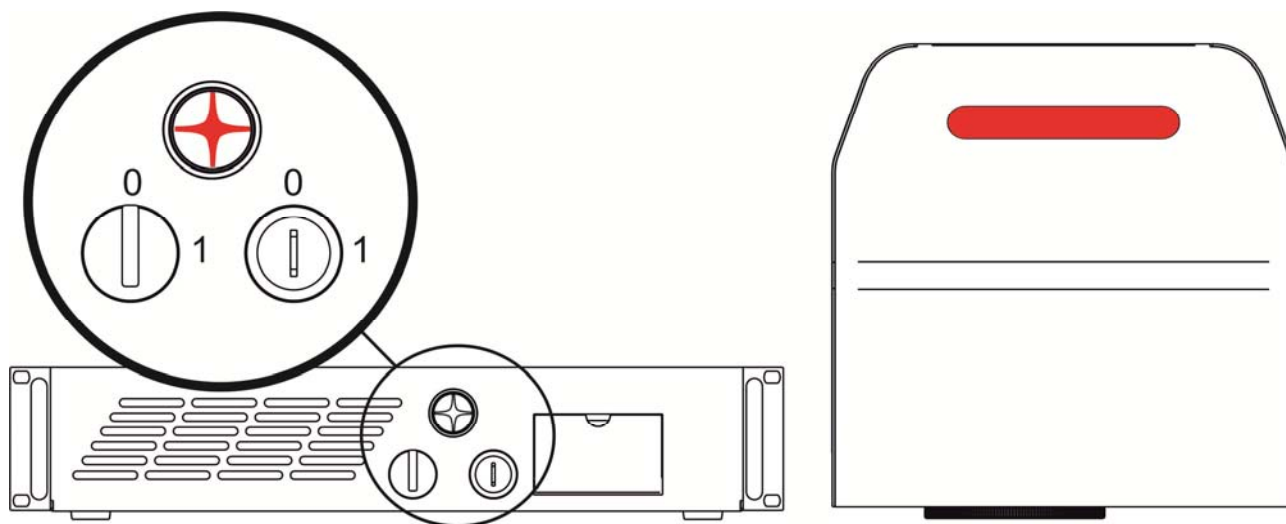


Figure 53: Status led and led bar status.



NOTE:

Refer to [paragraph 1.5](#) for any further information on the connections.

RESUME TABLE

STATUS	RACK STATUS LED	RESONATOR STATUS LED	INPUT STATUS ^(*)		OUTPUT STATUS ^(*)	
SYSTEM BOOTING UP	BLINKING GREEN	TURNED OFF	KEY ENABLE	LOW LOW	ALARM LASER_ACTIVE SHUTTER_OPEN	OFF OFF OFF
WAIT FOR START	STEADY GREEN	TURNED OFF	KEY ENABLE	LOW LOW	ALARM LASER_ACTIVE SHUTTER_OPEN	OFF OFF OFF
STANDBY SHUTTER CLOSED	STEADY ORANGE	STEADY GREEN	KEY ENABLE	HIGH LOW	ALARM LASER_ACTIVE SHUTTER_OPEN	OFF ON OFF
READY	STEADY RED	STEADY ORANGE	KEY ENABLE	HIGH HIGH	ALARM LASER_ACTIVE SHUTTER_OPEN	OFF ON ON

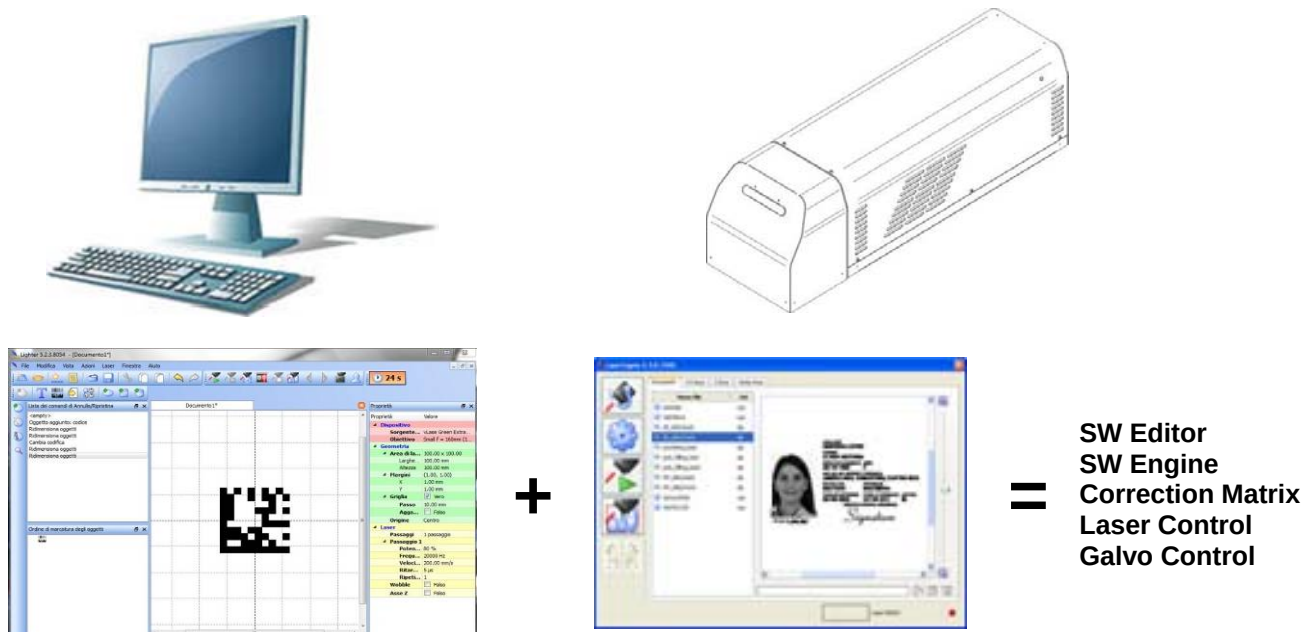
STATUS	RACK STATUS LED	RESONATOR STATUS LED	OUTPUT STATUS ^(*)	
WARNING INVALID START SEQUENCE	BLINKING ORANGE (2Hz)	BLINKING ORANGE (2Hz)	ALARM LASER_ACTIVE SHUTTER_OPEN	OFF OFF OFF
SYSTEM ERROR	BLINKING RED (2Hz)	BLINKING RED (2Hz)	ALARM LASER_ACTIVE SHUTTER_OPEN	ON OFF OFF

(*) See [paragraph 1.5](#) for more information.

CHAPTER 3

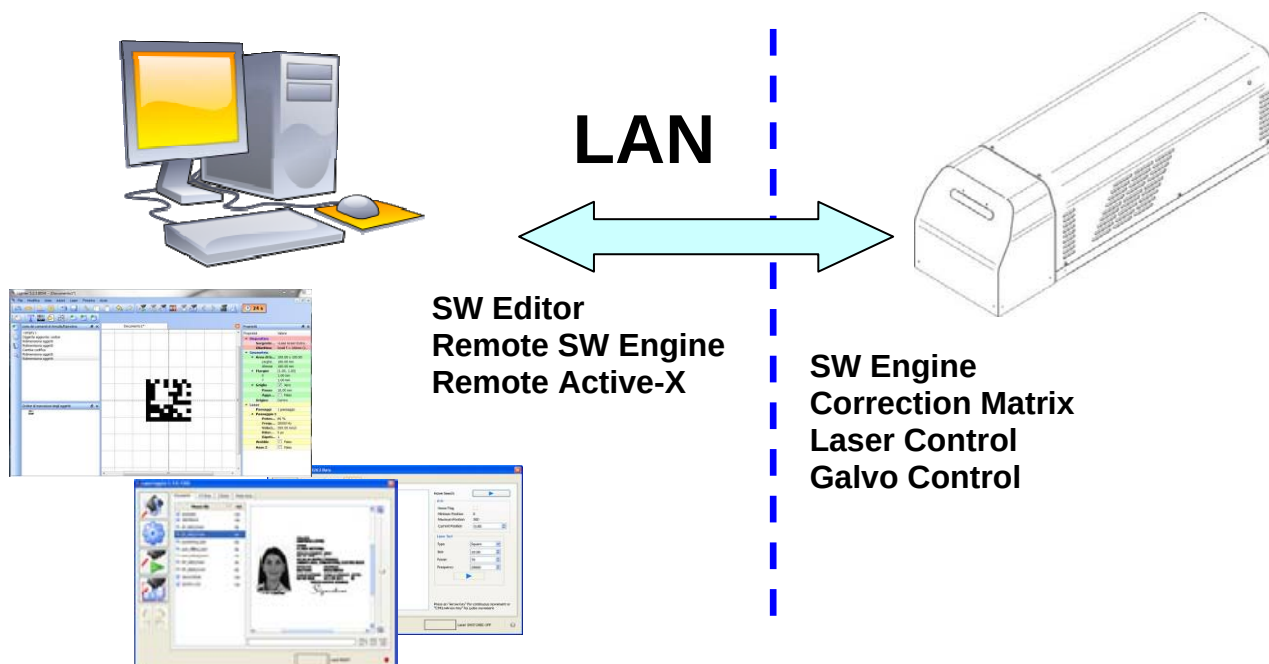
3.2 LOCAL MODE OPERATIONS

The local mode (with monitor, keyboard and mouse connected) is optimal to fully benefit of the ALL-IN-ONE architecture characteristics.



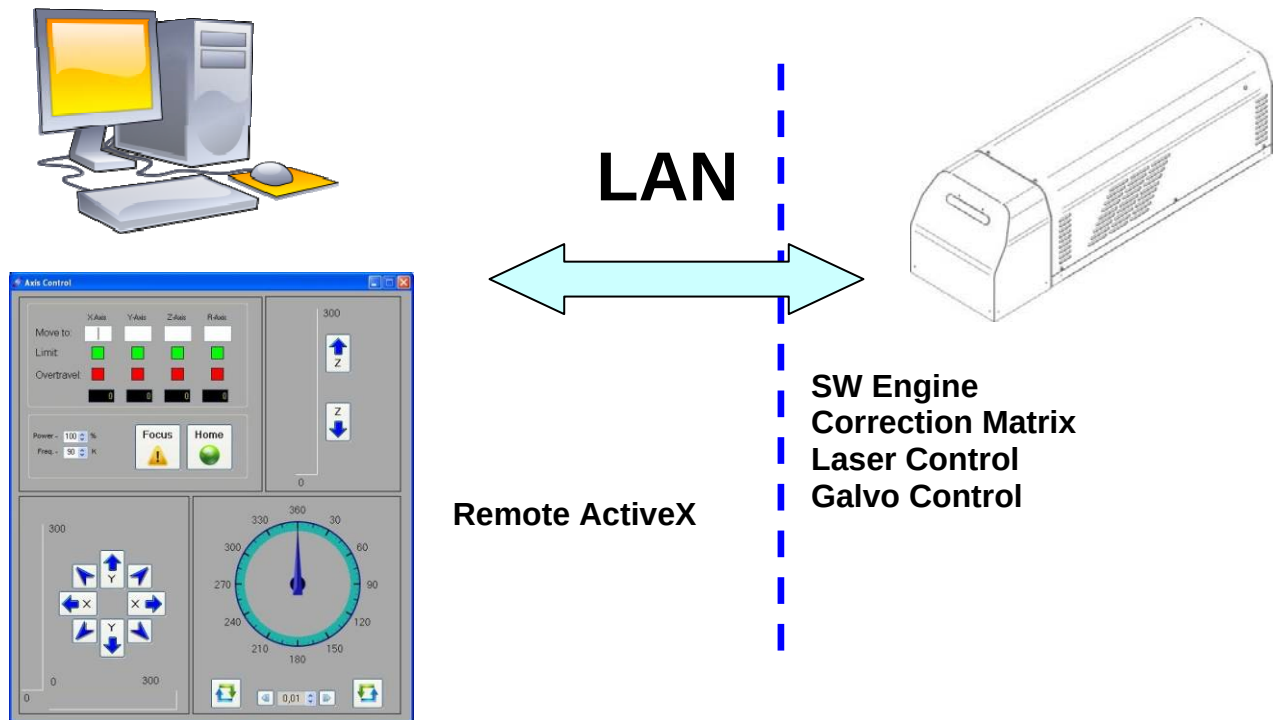
3.3 REMOTE MODE OPERATIONS

Keyboard, mouse and monitor are not necessary in this configuration.



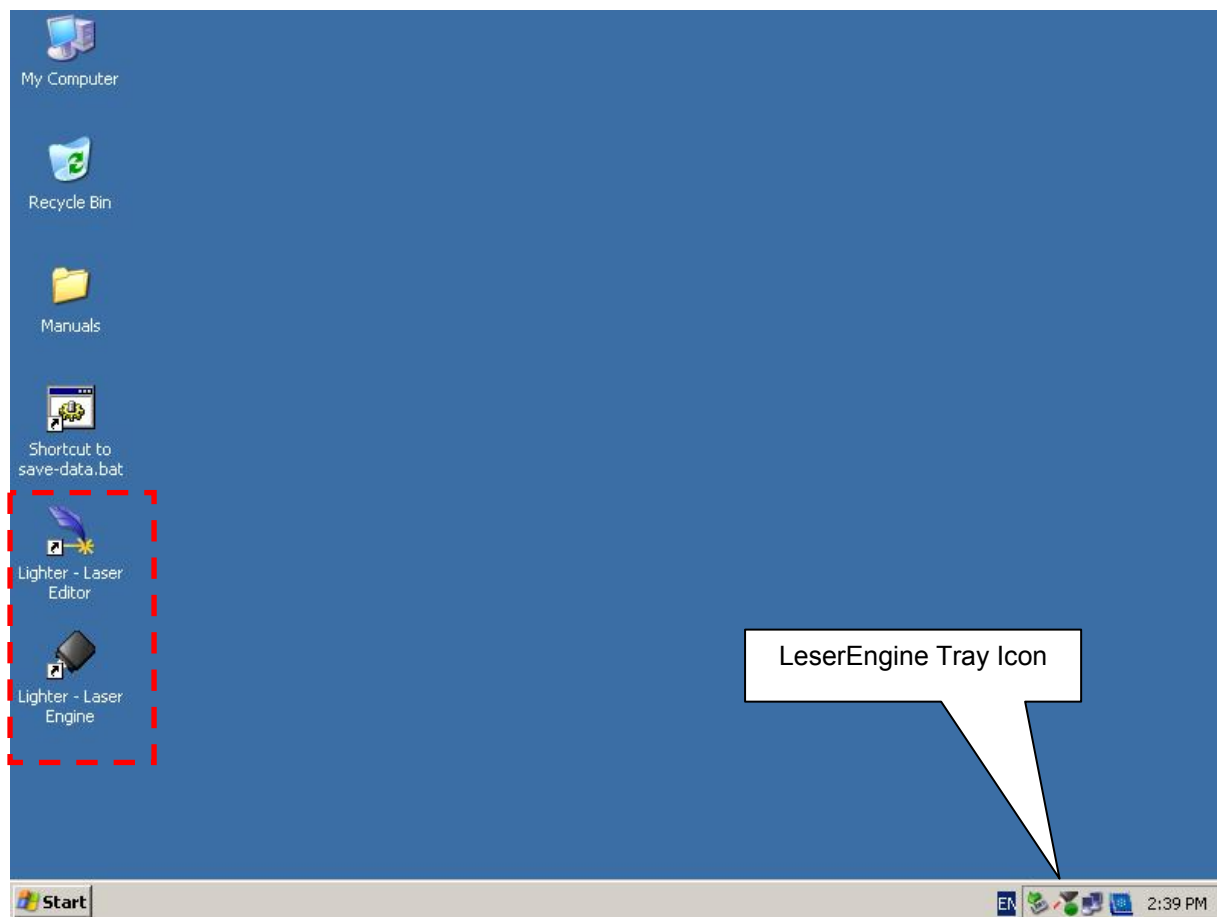
New IP ActiveX allows OEM integrators and end-users to create customized Applications and User Interfaces via Ethernet.

Local or remote ActiveX control interface is available with the same commands to allow the use of the same application developed for both local and remote configurations.



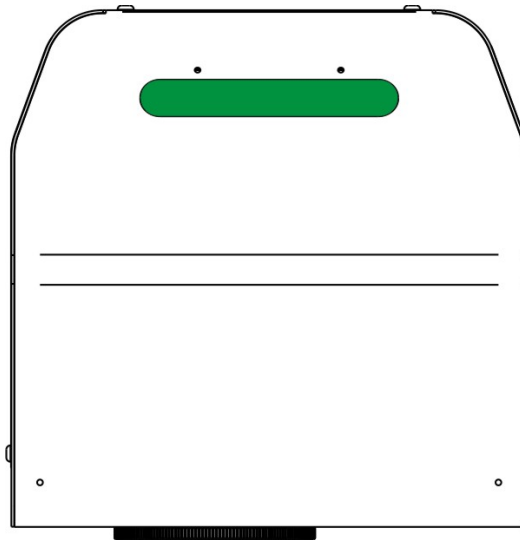
3.4 OPERATING IN LOCAL MODE

Connecting monitor, mouse & keyboard to the marking system ([paragraph 2.7.5](#)) allows the operator to access the console which contains the instruments to operate with laser.



	Laser Editor is a software that allows to easily mark or engrave product identification information such as 2D matrix codes, barcodes, text, alpha-numeric serial numbers, date codes, part numbers, graphics and logos in any production environment. With Laser Editor you can: - o edit graphic layouts - o set laser parameters - o set marking system configuration - o control the integrated I/O module for axis management - o create automated procedures - o create programs using Lighter programming language
	Laser Engine is an application automatically loaded at start-up that allows to operate on the marking system. Laser Engine is present in the tray icon. With Laser Engine you can: - o watch the marking system status - o select a saved document, display limits using a red laser pointer, watch the marking preview and do marking tests - o switch between Manual/Auto mode (engraving operations controlled by operator or external signals)

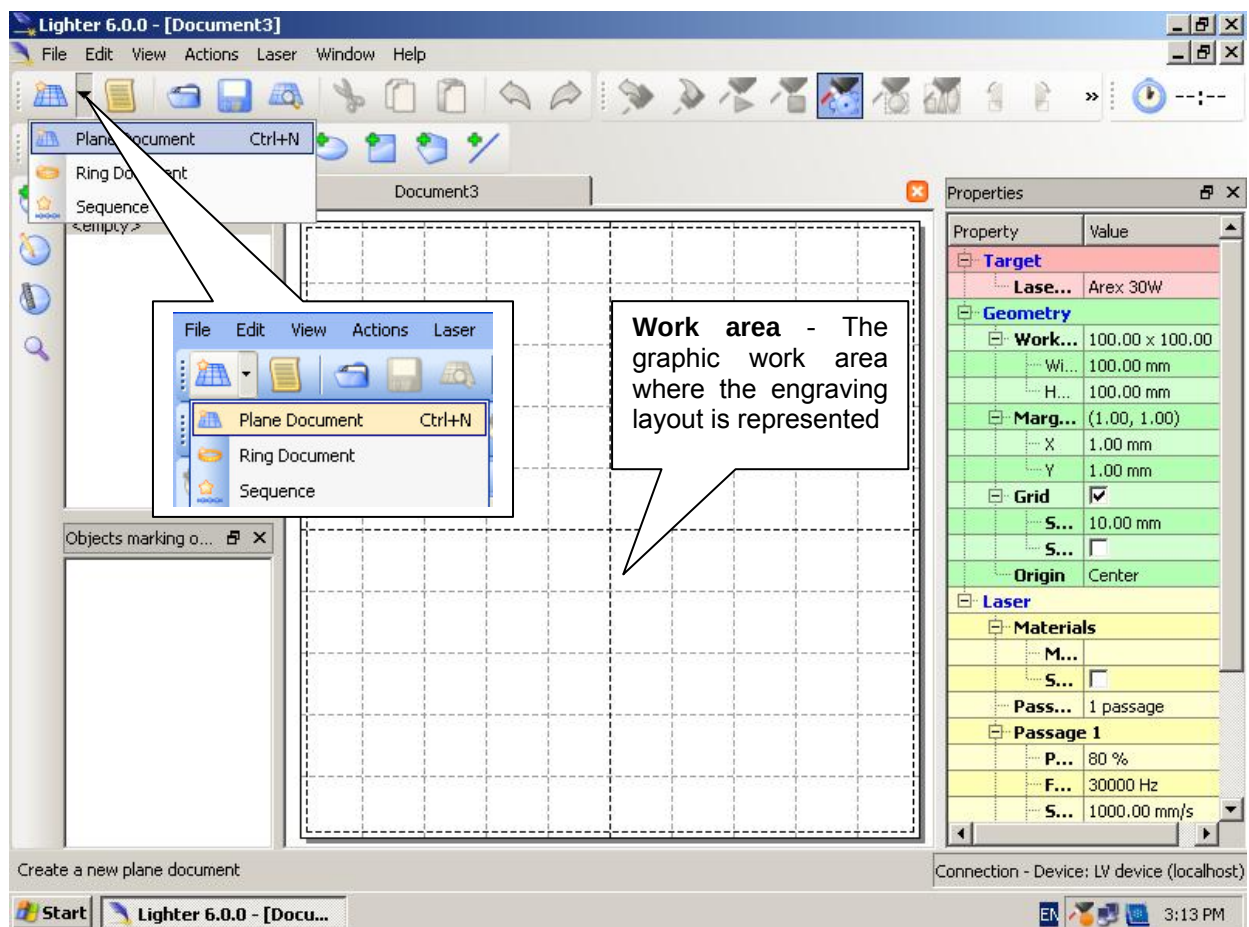
3.4.1 HOW TO CREATE AND EDIT YOUR FIRST GRAPHIC DOCUMENT



Double click on LaserEditor icon to start the layout editor application

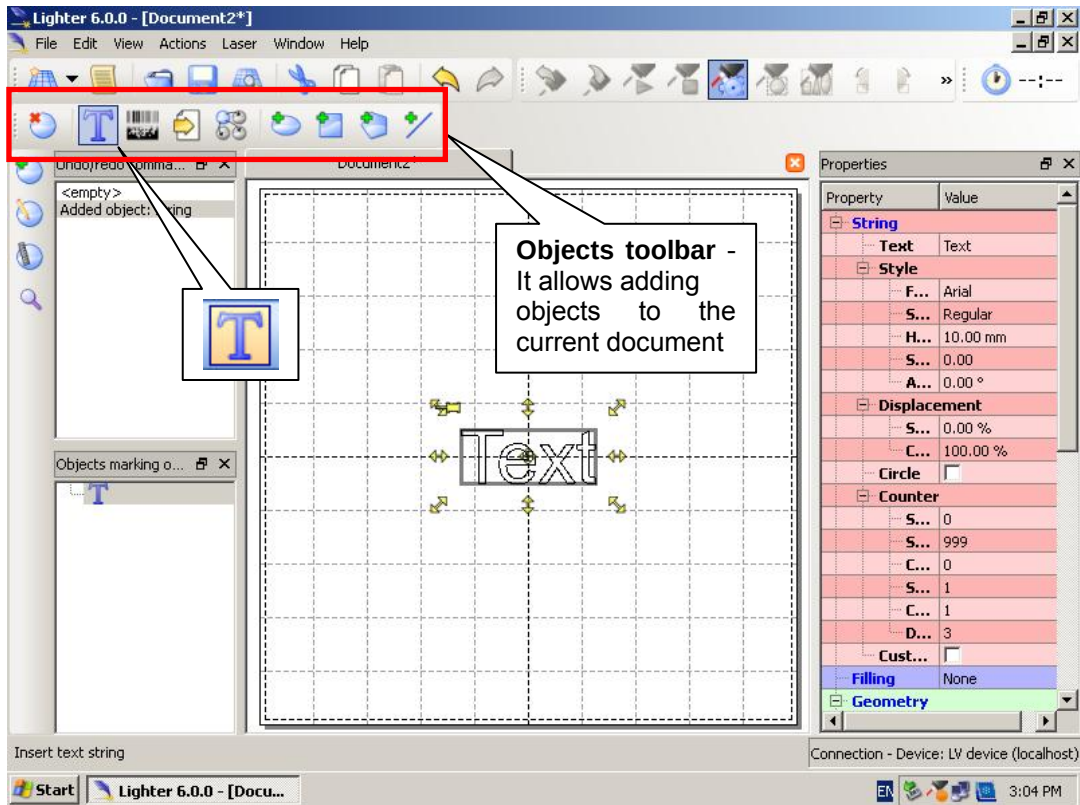


Click on the document type selector and choose *Plane Document*:

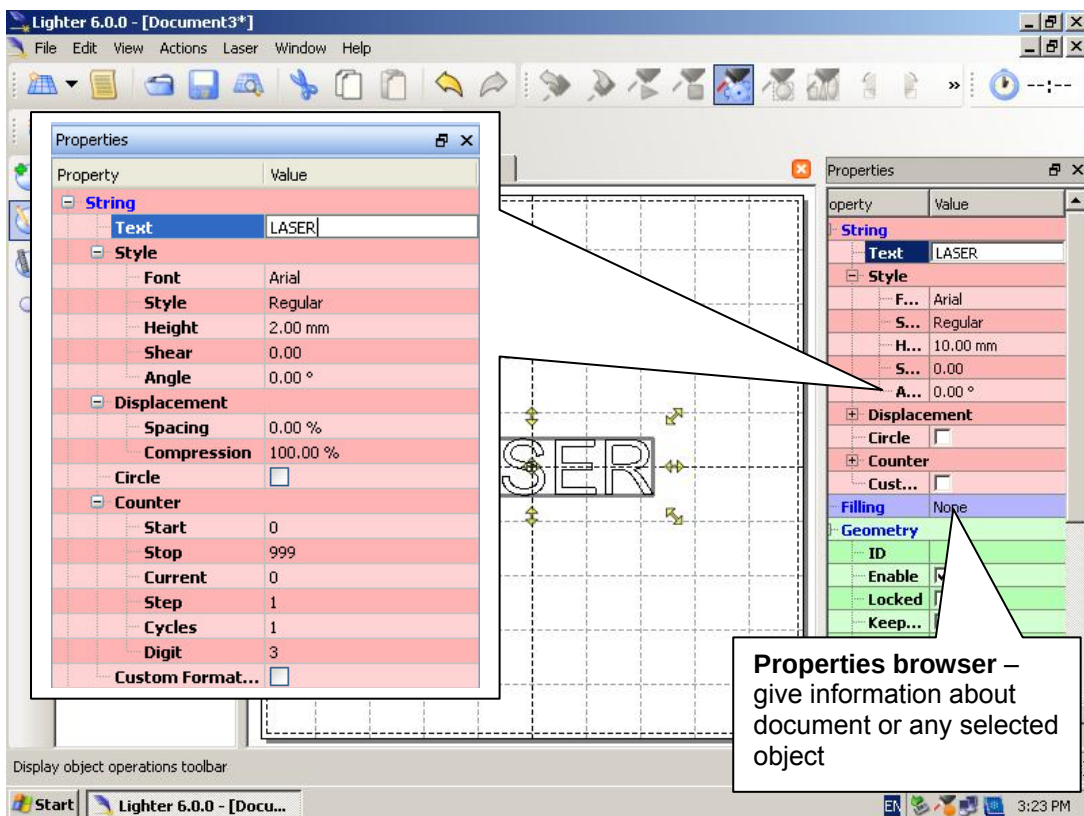


CHAPTER 3

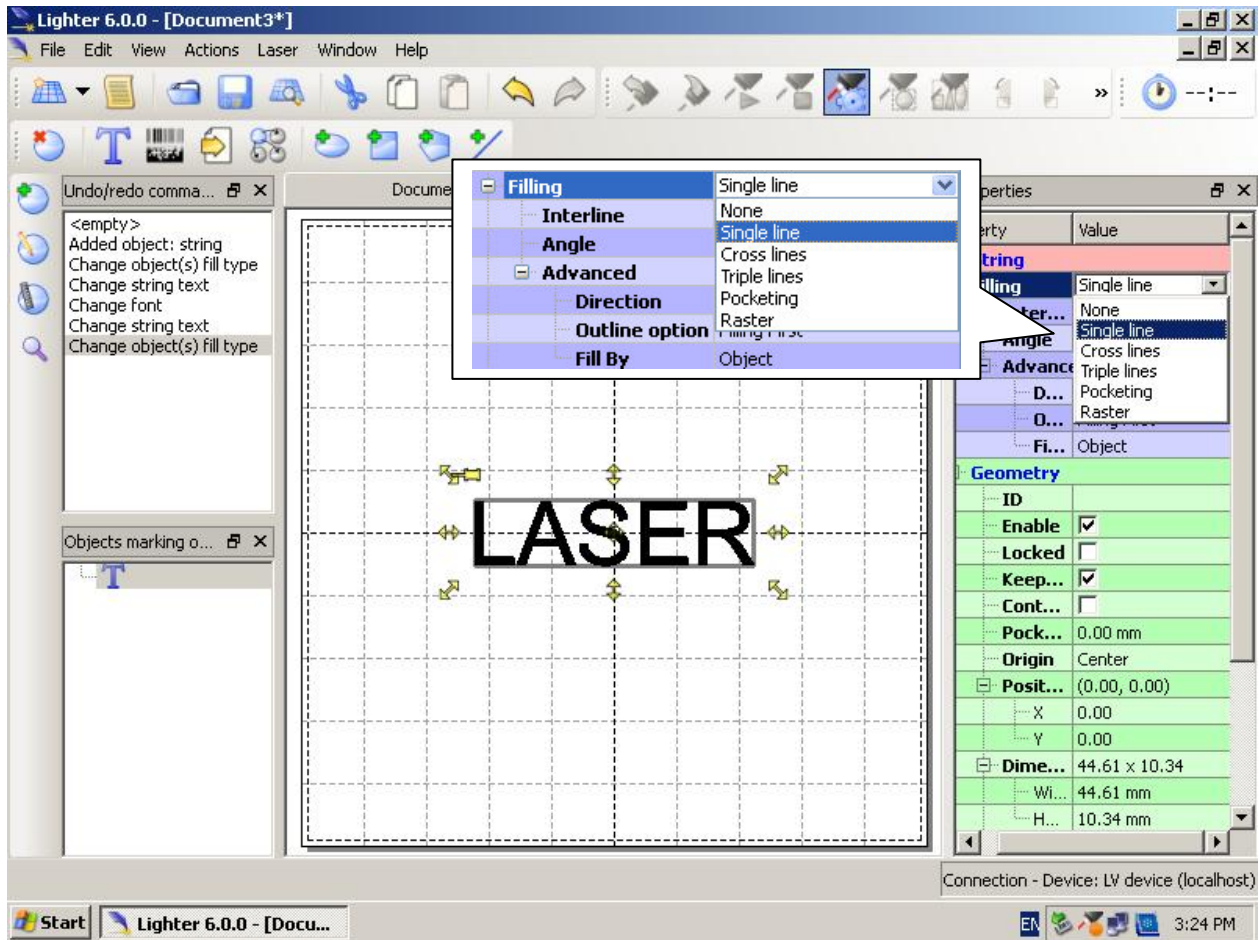
Click on the *Text String* icon in the Object toolbar to add a string object to the plane:



Edit String property like value, font, style, etc using the *Properties browser*:

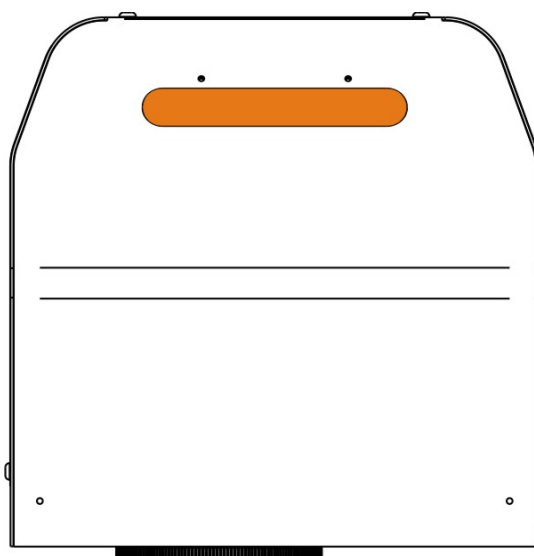


Edit Filling property like filling type, interline, etc using the *Properties* browser:

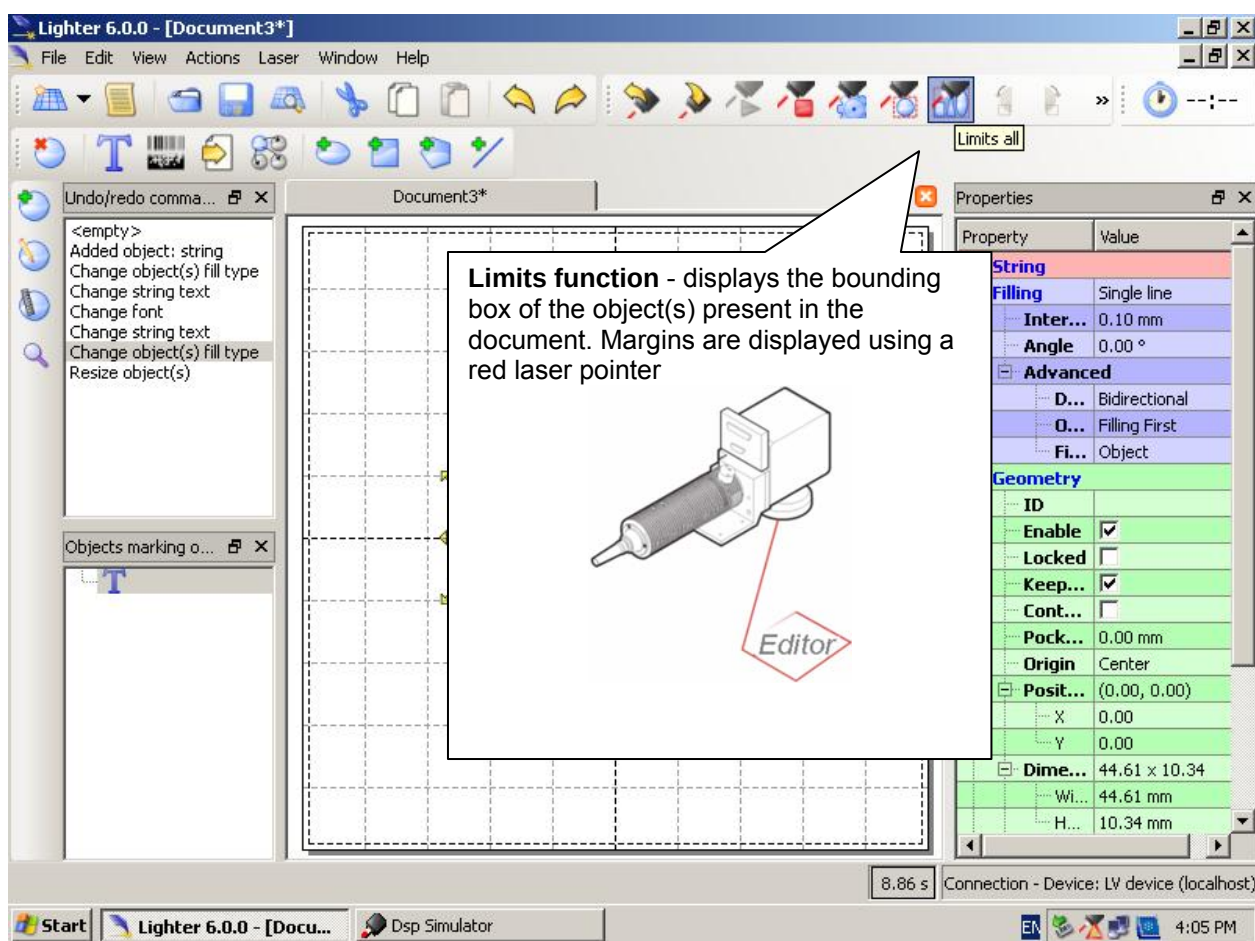


CHAPTER 3

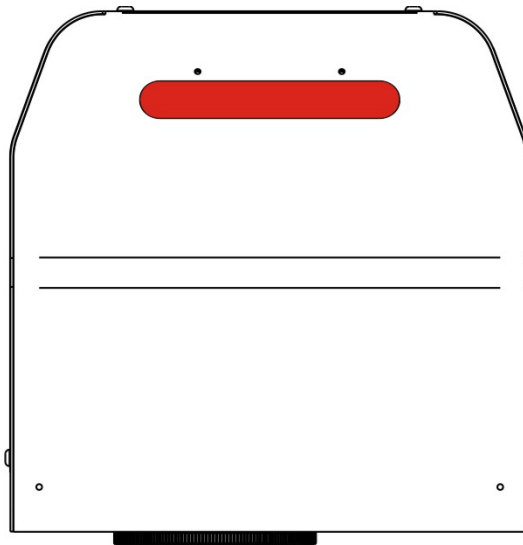
3.4.2 HOW TO TEST AND ENGRAVE YOUR DOCUMENT



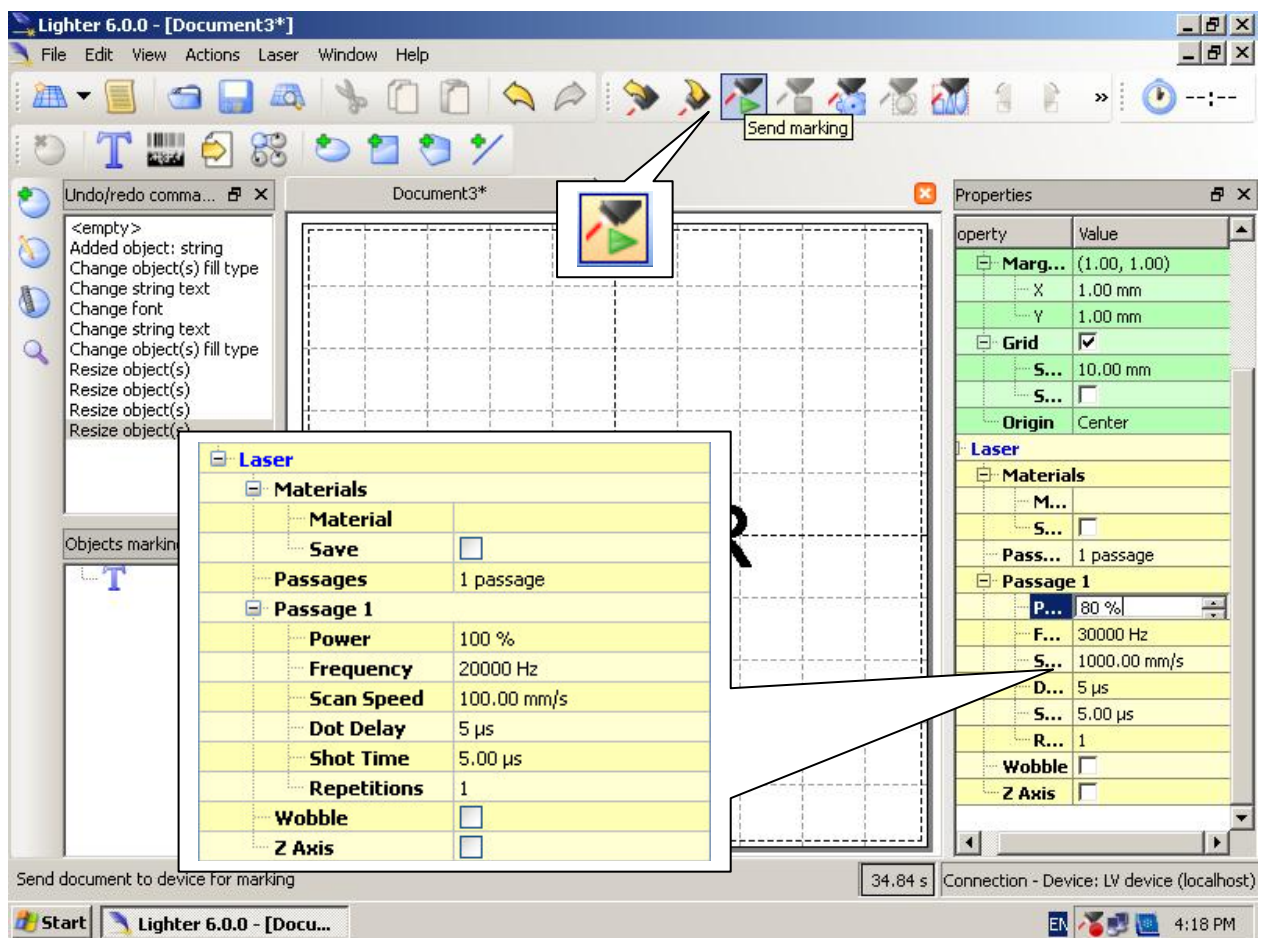
Press *Limits All* button in the *Laser Toolbar* to adjust the object position in the marking field:



Adjust the Laser parameters using the *Properties* browser



Press *Send Marking* button in the *Laser Toolbar* to start the engraving process:

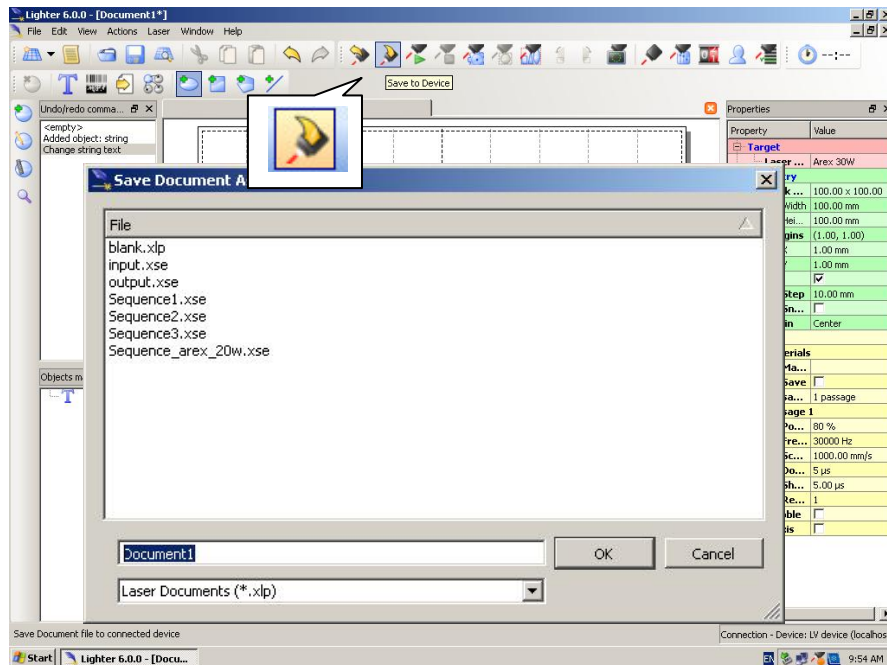


CHAPTER 3

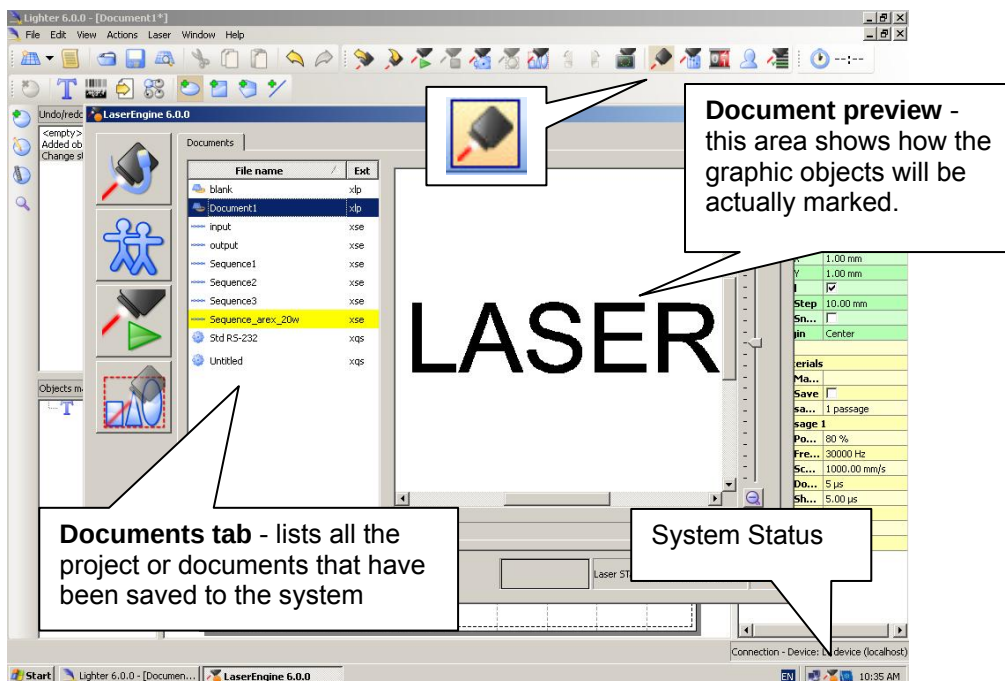
3.4.3 HOW TO USE EXTERNAL SIGNALS TO ENGRAVE YOUR DOCUMENT

Automate the marking process means that documents are marked using external START & STOP signals, that can be generated by PLC or other external devices.

Click on *Save to Device* button to save the layout in the marking system memory:



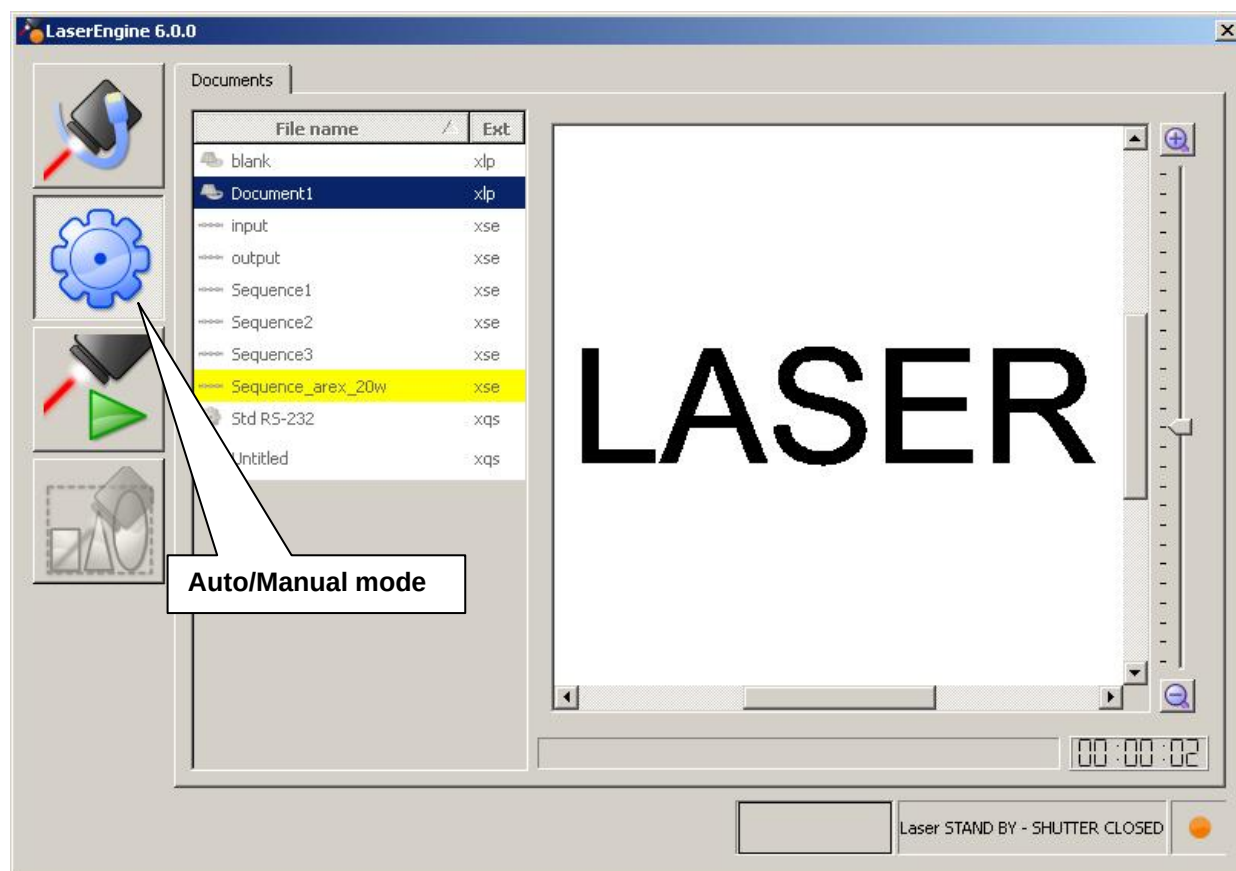
Click on *Show LaserEngine* button to display LaserEngine window:



AUTO/MANUAL Mode button allows switching between the two available working modes:

- o Auto mode: the engraving operations are executed automatically using external signals.
- o Manual mode: used for displaying the margins of the graphic objects to be marked and testing layouts.

Select the document from the list and click on *To Auto Mode* button:



Marking system is ready to mark document using external START & STOP signals:



4 CUSTOMIZE THE SYSTEM'S SOFTWARE

4.1 CHANGE O.S. LANGUAGE AND KEYBOARD LAYOUT

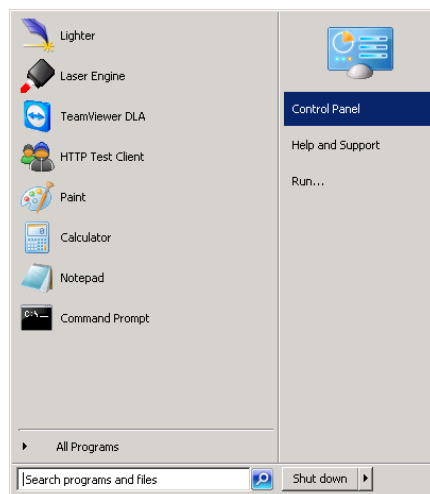
The marking system allows you to personalize the operating system changing the language used in menus and dialogs, languages you can use to enter text and keyboard layout.



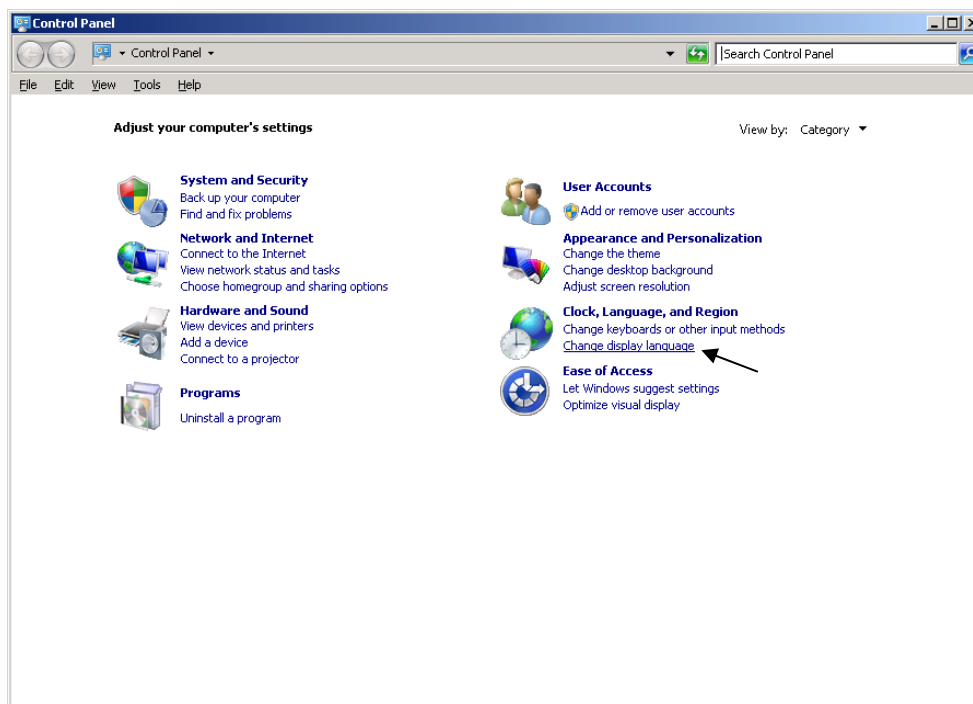
NOTE:

In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system ([paragraph 2.7.5](#)).

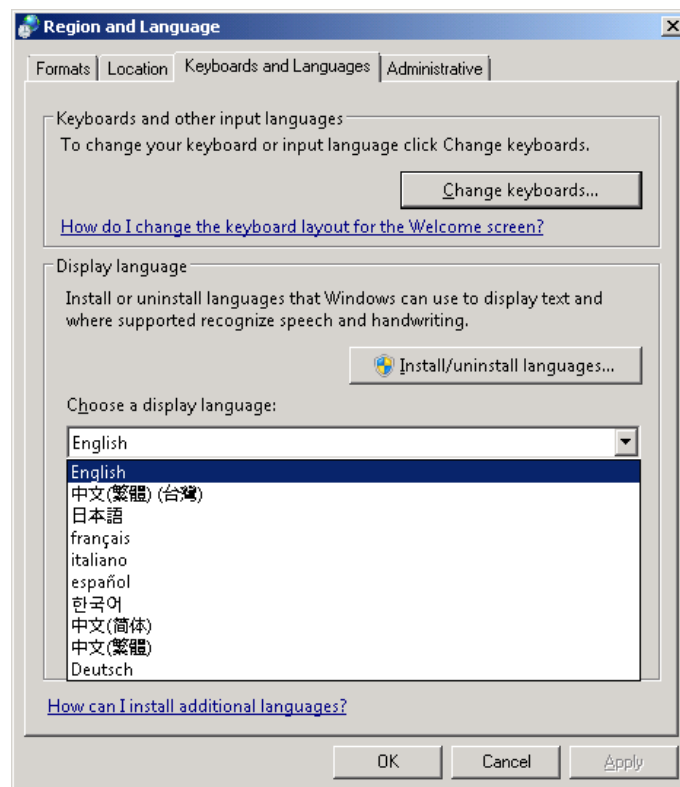
- o Turn OFF and ON the marking system and wait the end of the booting-up (the status LED on the rack must be steady green)
- o From the main screen click on *START/Control Panel*



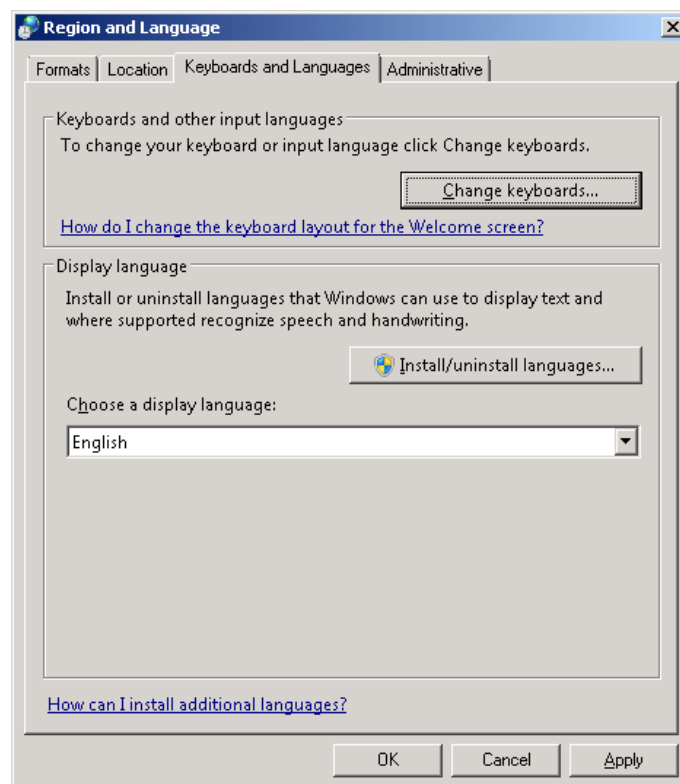
- o Select *Change display language*:



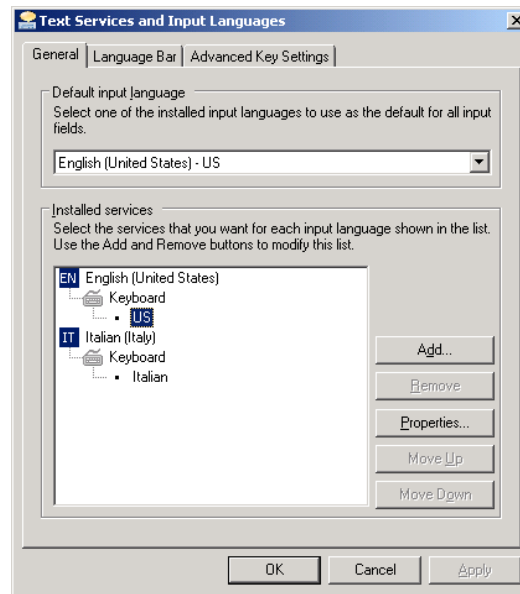
- o In “Keyboards and Languages” select and choose the desired language.



- o Select *Change keyboards* to change your keyboard or input language click *Change keyboards*:



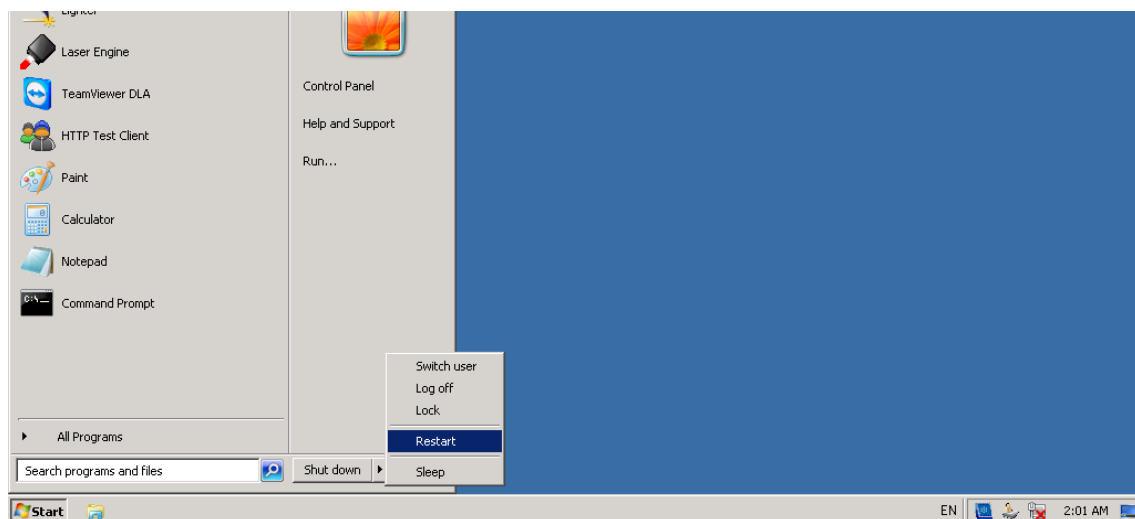
- o Select now input languages and press OK:



- o Close all the open screen and double click on the `Shortcut to save-data.bat` icon in the Desktop screen:



- o Restart the system in order to save the new settings:



WARNING:
DO NOT turn off the sistem while Windows restarts.

4.2 CHANGE LAN CONFIGURATION AND IP ADDRESS

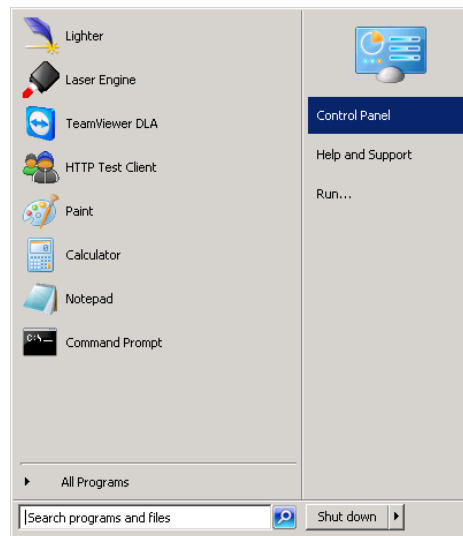
The system allows you to change the LAN configuration and IP address.



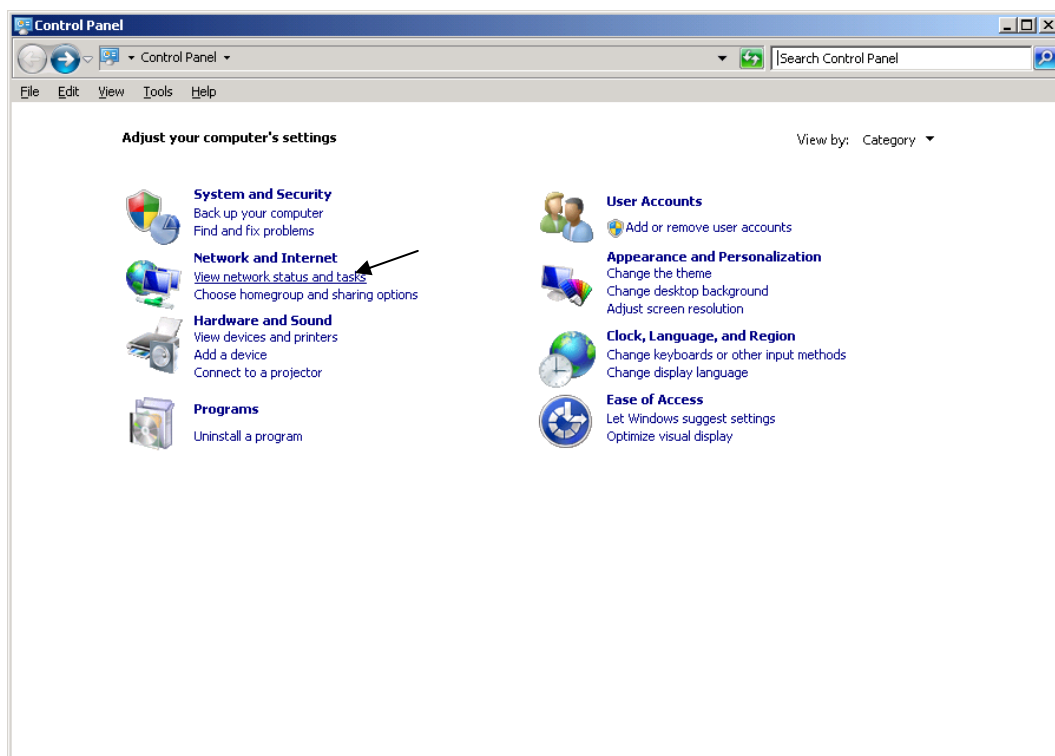
NOTE:

In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system ([paragraph 2.7.5](#)).

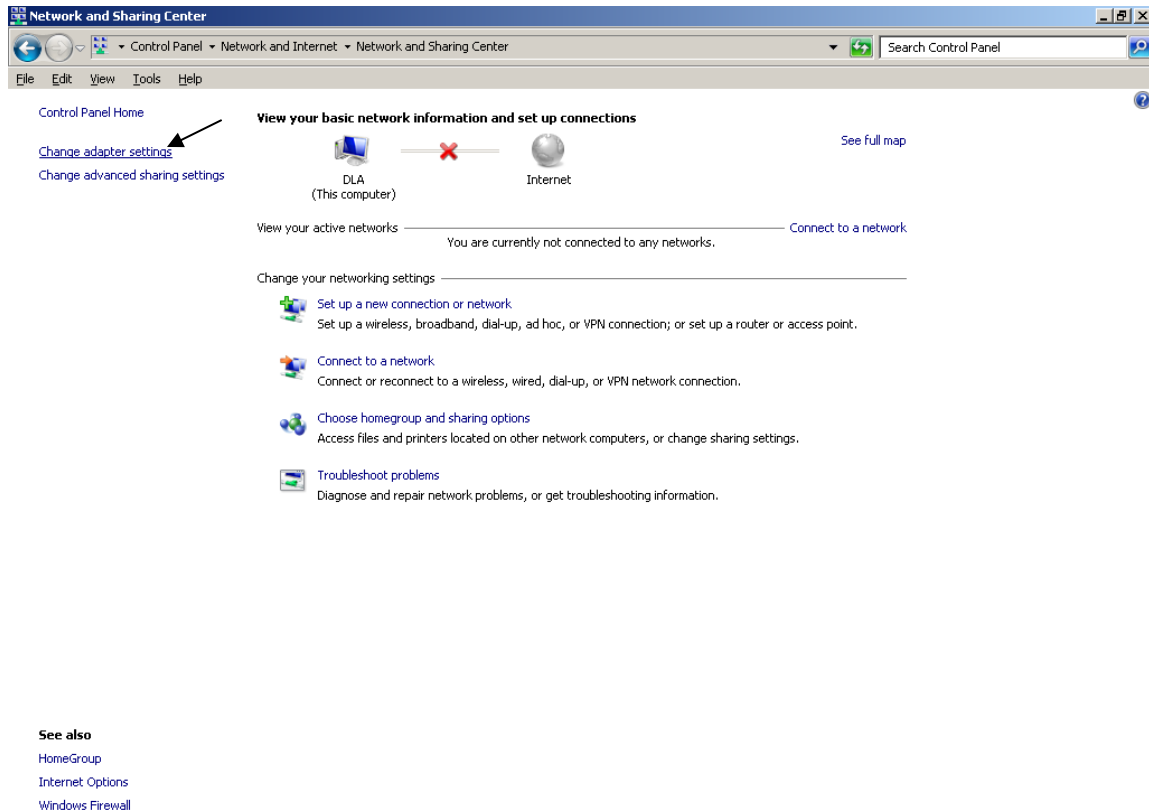
- o Turn OFF and ON the marking system and wait the end of the booting-up (the status LED on the rack must be steady green)
- o From the main screen click on *START/Control Panel*



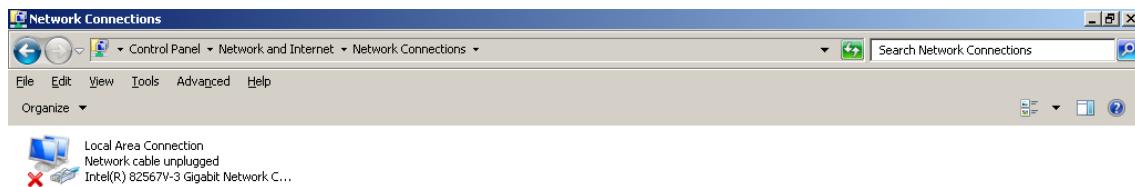
- o Select *View network status and tasks*:



- o In the “Network and Sharing Center” screen select *Change adapter settings*:

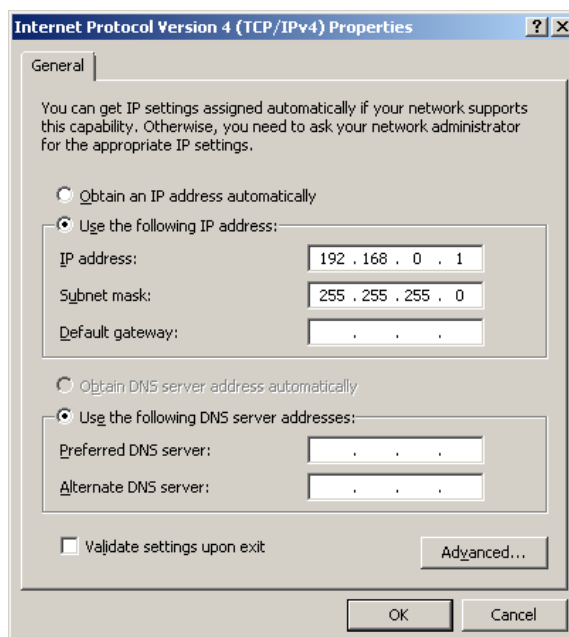
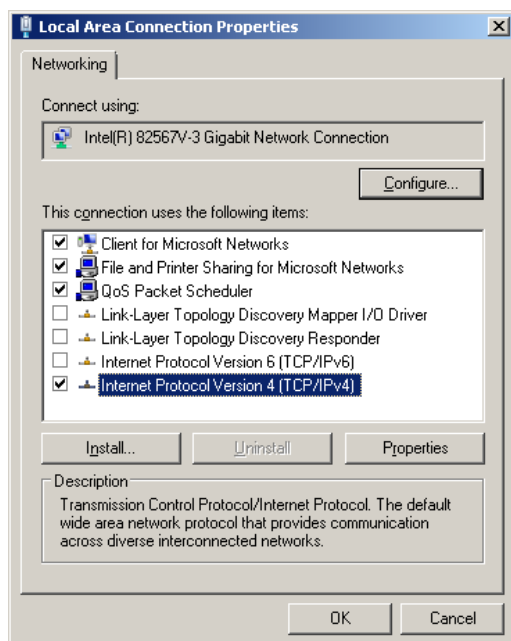


- o In the “Network Connections” screen double click on *Local Area Connection*



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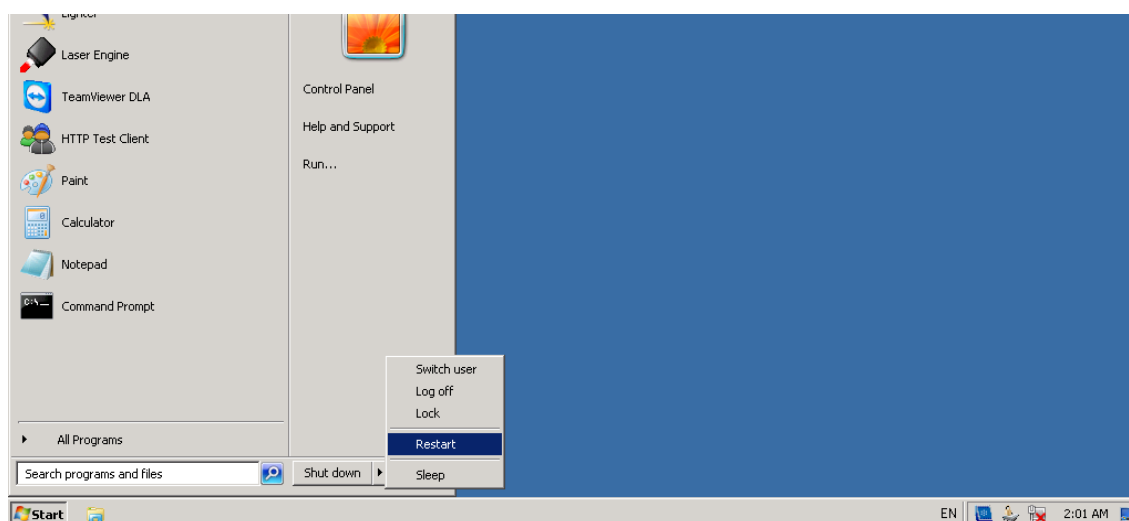
- o In the “Local Area Connection Properties” screen double click on *Internet Protocol Version 4 (TCP/IPv4)*
- o In the “Internet Protocol Version 4 (TCP/IPv4) Properties” you can change the IP address and configuration



- o Close all the open screen and double click on the *Shortcut to save-data.bat* icon in the Desktop screen:



- o Restart the system in order to save the new settings:



WARNING:
DO NOT turn off the sistem while Windows restarts.

4.3 CHANGE VIDEO SETTING

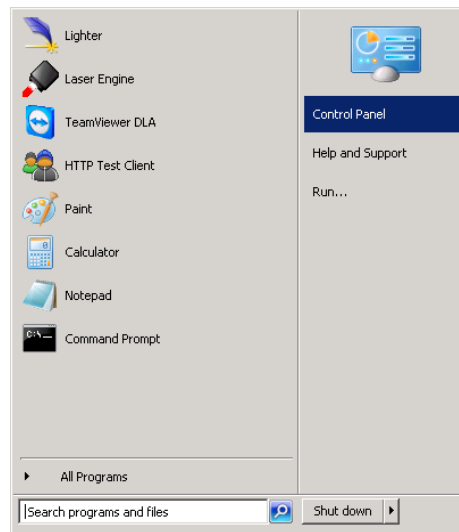
The system allows you to change the Video setting.



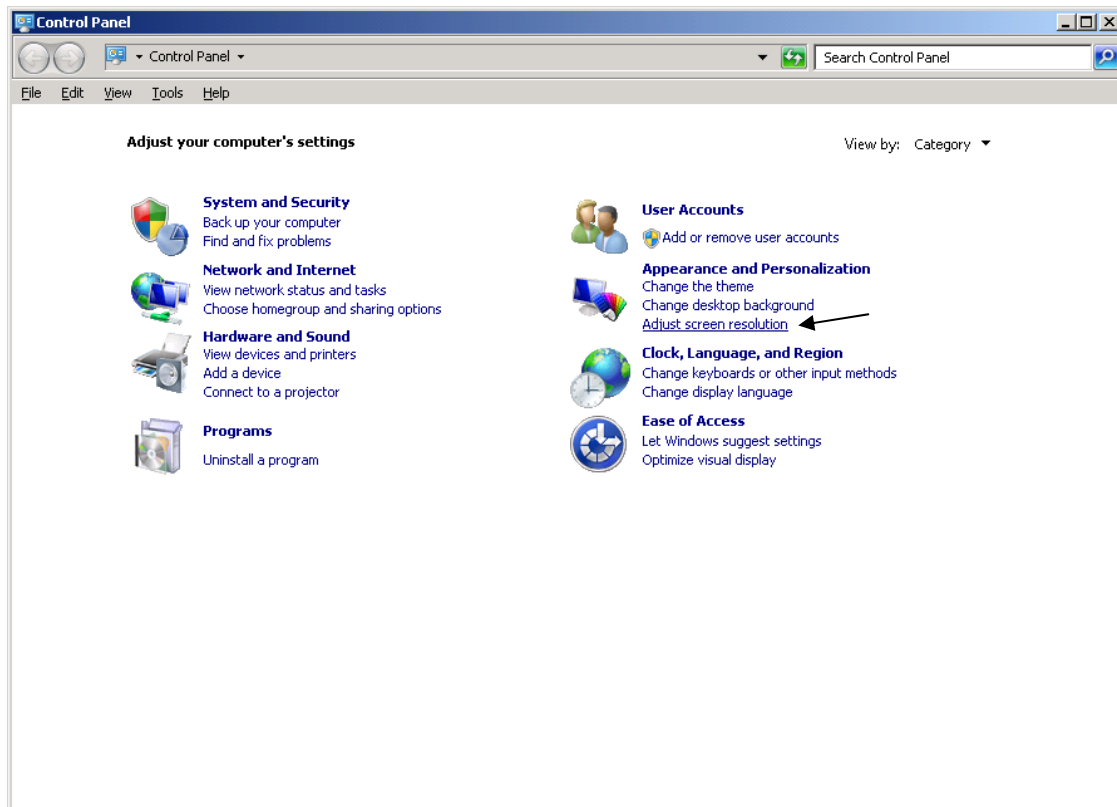
NOTE:

In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system ([paragraph 2.7.5](#)).

- o Turn OFF and ON the marking system and wait the end of the booting-up (the status LED on the rack must be steady green)
- o From the main screen click on *START/Control Panel*

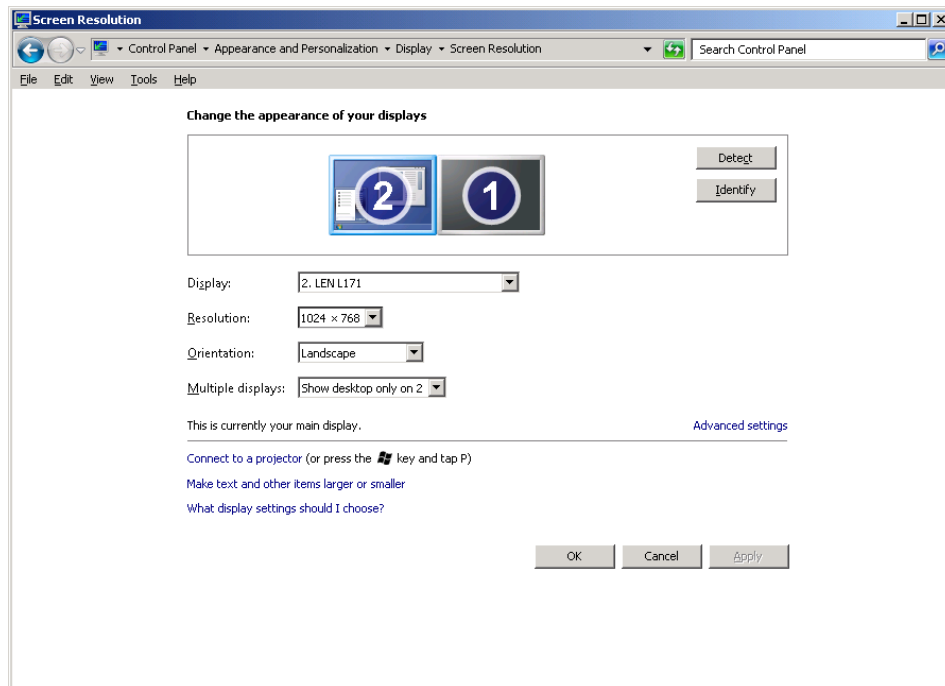


- o Select *Adjust screen resolution*:



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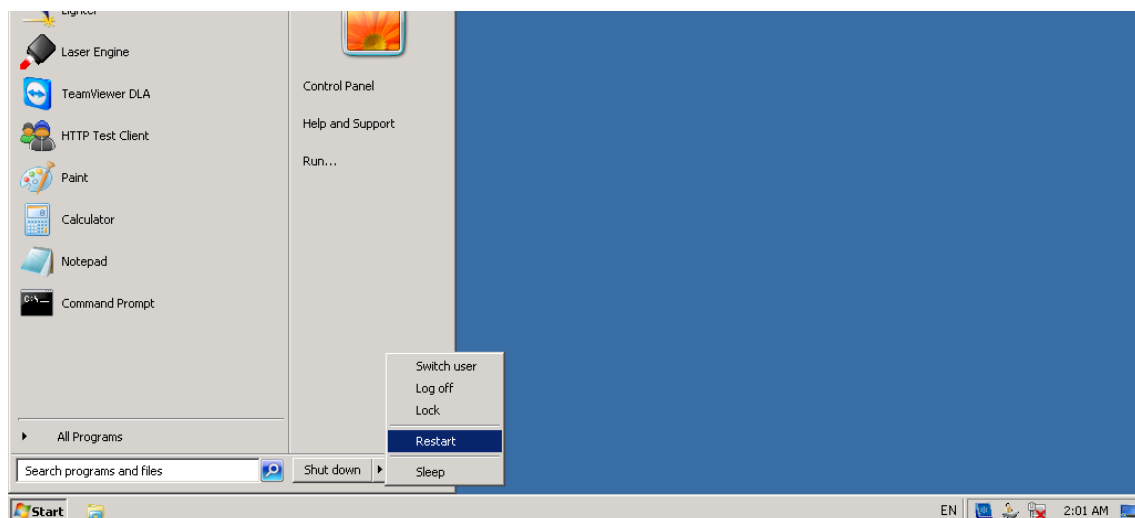
- o In the Display Properties screen select the desired Screen resolution and Color quality:



- o Close all the open screen and double click on the Shortcut to save-data.bat icon in the Desktop screen:



- o Restart the system in order to save the new settings:

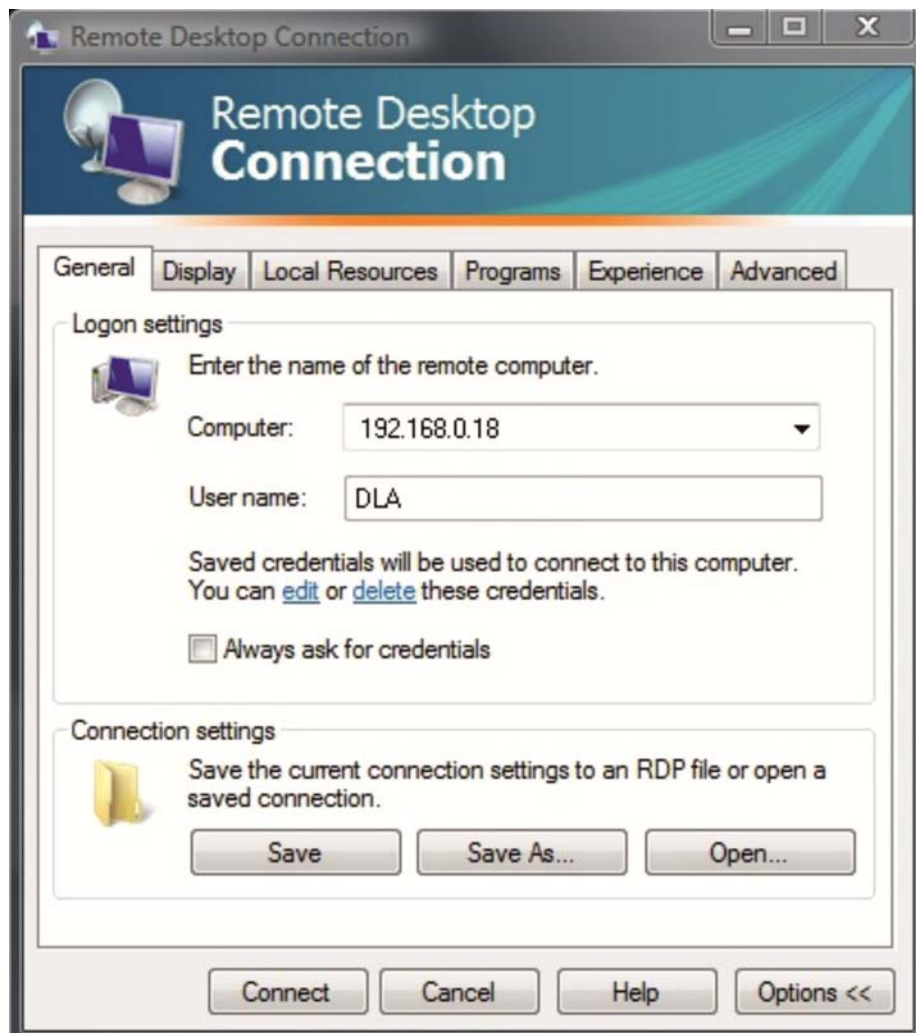


WARNING:
DO NOT turn off the sistem while Windows restarts.

4.4 REMOTE DESKTOP CONNECTION

To connect the marking system to a remote Windows® based computer, follow these steps:

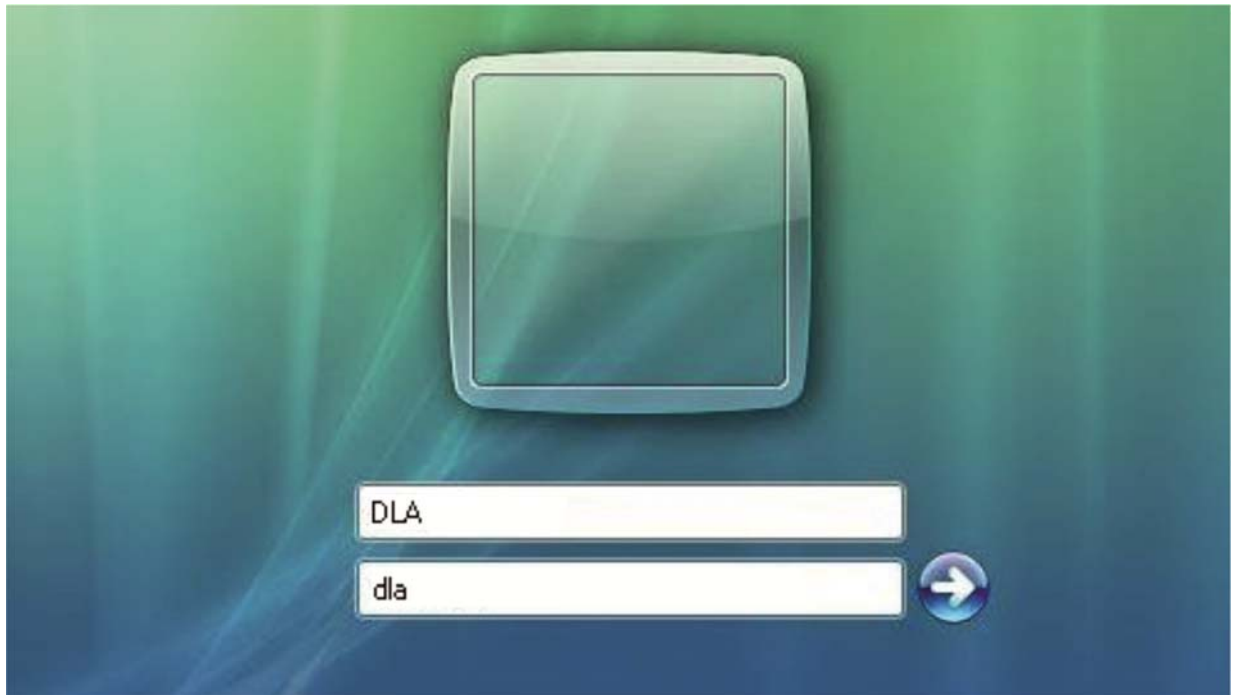
- o Turn on marking system
- o Make sure that both marking system and remote computer are connected to the LAN
- o Click *Start/All Programs/Accessories*, and then click *Remote Desktop Connection*
- o Click *Options*
- o In the *Computer* list, type the host name or the IP address of the computer to which you want to connect
- o Type the user name, password, and domain (if applicable) of an account to which you have allowed remote access into the corresponding boxes, and then click *Connect*



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- o In the **Log On to Windows** dialog box that appears, type the password of the account with remote access privileges into the **Password** box:

User name: **DLA**
Password: **dla**



- o In the **Log on to** list, if applicable, select the domain or remote computer that you want, and then click **OK**

The remote desktop is displayed in a window on the desktop. The remote computer is locked during this session

- o To disconnect the session, click the *Close* button in the session window, and then click **OK** when you are prompted to disconnect the Windows® session.

5 TECHNICAL SUPPORT

5.1 SEALS

Several seals have been applied to the marking system.



Figure 54: Example of a seal.

The marking system has seals in some areas. The seals must not be broken or removed for any reason. The sealed parts may be opened only and exclusively by Datalogic Automation S.r.l. Breakage of these seals by a customer shall result in immediate cancellation of the warranty on the entire marking system.



NOTE:

If a customer **breaks or removes the seals placed** by the manufacturer on the marking system **the warranty** on the entire marking system will immediately become **null and void**.



WARNING!

The manufacturer shall not be held liable for any **non conforming use** of marking system of its manufacture.

It is **forbidden** to operate the the marking system before the machine it is intended for has been **declared in conformance** with statutory Directives.



NOTE:

Access to the internal parts of the electrical marking system is only permitted for **authorized personnel**, who have been trained and instructed on the electrical risks.

Datalogic Automation S.r.l. shall not be held liable for work on electrically charged parts by inadequately trained personnel!



NOTE:

Access to the internal parts of the marking system is only permitted for **authorized personnel**, who have been trained and instructed on the optical risks!

Datalogic Automation S.r.l. shall not be held liable for work on parts by inadequately trained personnel!

5.2 MAINTENANCE

The ordinary maintenance program foresees only. Some operations consist in a mere “check” of the operating condition.

The maintenance activities must be done in respect of law prescriptions regarding the safety rules during the operations.

The following parts/functions have to be controlled:

MAINTENANCE PROGRAM

COMPONENT OR FUNCTION	TYPE OF OPERATION	INTERVALS
F-Theta scan lens	Check	Weekly: rub gently with a cloth tampered with acetone or ethyl ether
Fan and heat exchanger unit	Check	Every 6 months (according to the place and frequency of use)

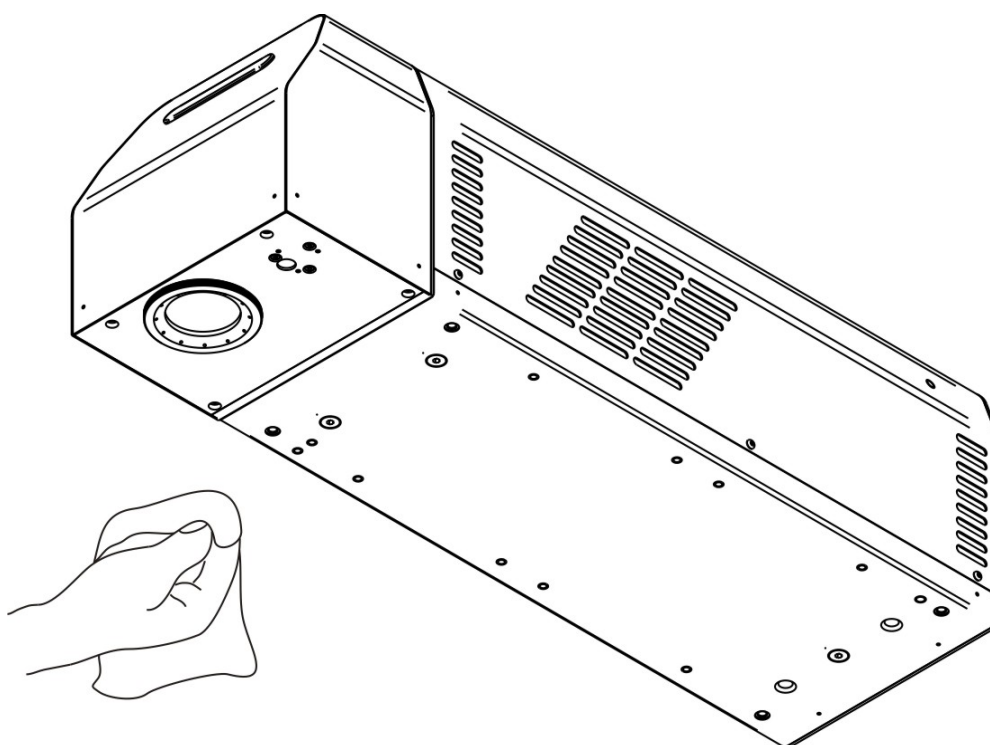


Figure 55: Cleaning laser output.

5.3 PRODUCT SUPPORT AND CUSTOMER SERVICE

Warranty Information

Datalogic Automation S.r.l. reserves the right to change the information and specification contained in this manual without prior notice.

Product Support

In the unlikely event that the marking system does not function normally and that it requires attention, contact Datalogic Automation S.r.l. for advice on further on-site fault diagnosis and/or module return.

If the marking system is to be returned to Datalogic Automation S.r.l., ensure that all relevant return documentation is in place before shipment. Details of documentation requirements and copies can be obtained where required from Datalogic Automation S.r.l.

Pack the marking system in the original packing and include all original accessories and documentation as detailed in the original inventory. It is advised that the correct and original packaging is used to prevent transit damage to the marking system. If part or all of the original packaging is unavailable, please contact Datalogic Automation S.r.l. for replacement items. Please take time to complete all return documentation. This can be obtained from Datalogic Automation S.r.l. and accurate details, diagnosis and comments in the documentation can help reduce turn around time for module repair at Datalogic Automation S.r.l.

On request, Datalogic Automation S.r.l. will supply a report detailing faults found and repairs out necessary to return the module to full operational specification.

Product Support and Customer Service Contacts

Product Support

support-dla-lasermarking@datalogic.com

Tel: +39 051-6765611

Customer Services

service-dla-lasermarking@datalogic.com

Tel: +39 0331-918001

Company Web Site

www.datalogic.com

Or contact your local distributor

Sales and Customer Service Contacts

IT Corporate Office Datalogic Automation S.r.l. Via Lavino, 265 40050 Monte San Pietro (BO) Italy Tel: +39 051-6765611 Fax: +39 051-6759324	US Corporate Office Datalogic Automation Inc. 511 School House Road Telford, PA 18969-1196 USA Tel: +1 800-BAR-CODE Fax: + 215-799-1646
Laservall China Co. Ltd. 3/F, West, Tower E Tongfang Information Harbor, No. 11 Langshan Rd., North Area, Hi-tech Park, Nanshan District, Shenzhen China Tel: +86 755-86281638 Fax: +86 755-86281738	Datalogic Automation PTY Ltd Unit 130, 45 Gilby Rd Mount Waverley, VIC 3149 Australia Tel: +61 3/9558 9299 Fax: +61 3/9558 9233

APPENDIX A: LABEL IDENTIFICATION

LABEL	DESCRIPTION
	Identification label
	Warning logotype
	Warning logotype (Dangerous voltage)
	Laser label *
	Aperture label
	Label for non-interlock protective housing
COMMAND BOX	Command Box connector
AXES	Control Axes connector
INTERLOCK	Interlock connector
INLET AIR	Inlet air
USB	USB plug
LAN	LAN connector
0 - I	KEY/ENABLE Positions

* Maximum output of laser radiation as per definition 3.55 of IEC60825-1 considering single fault conditions.

APPENDIX A

RS232	RS232 connector
VGA	VGA connector
PHOT	Photocell connector
ENC	Encoder connector
 2xT10A	Fuses

POSITIONING OF EXTERNAL LABELS

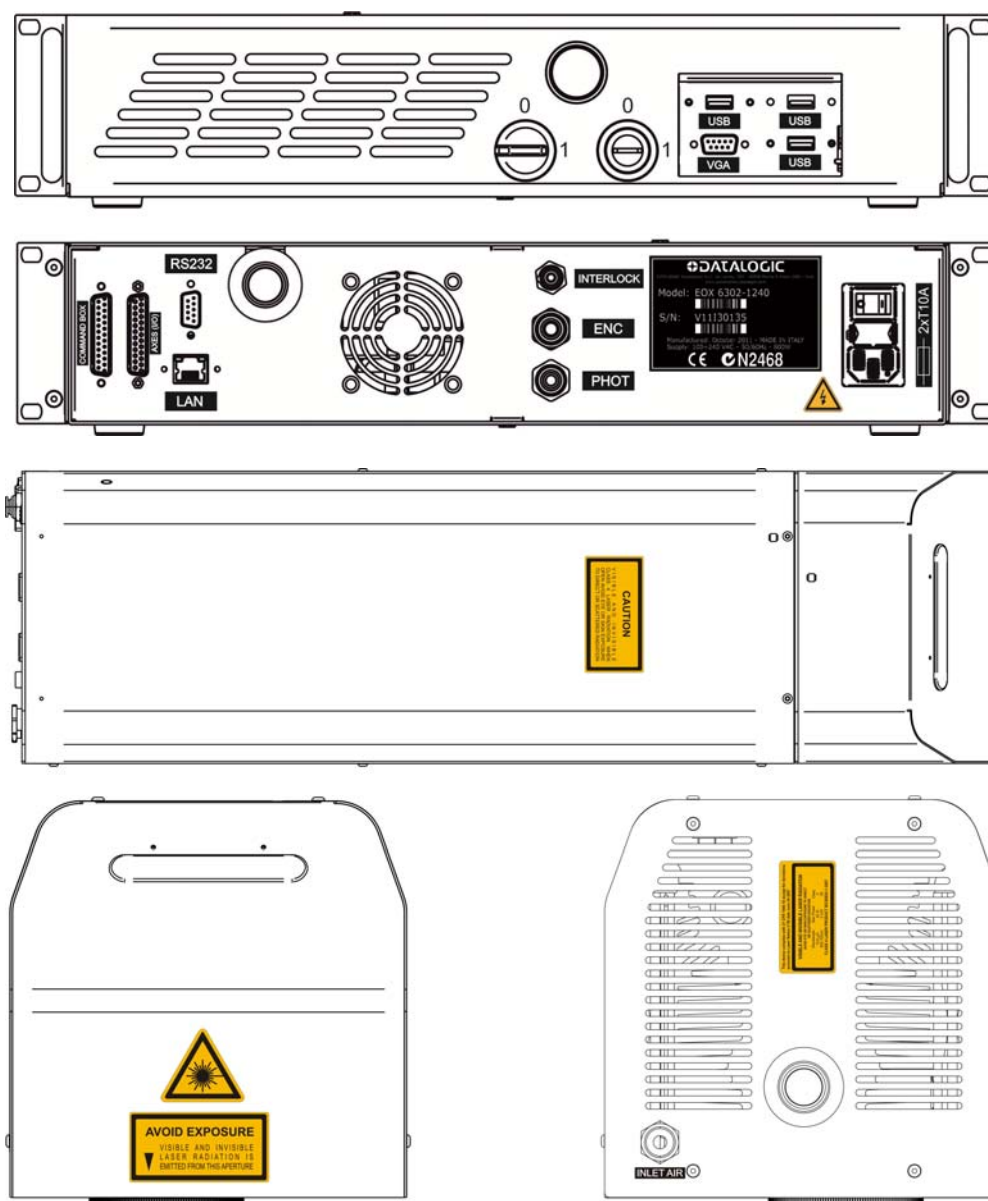


Figure 56: External labels location.

APPENDIX B: STANDARDS

LASER STANDARDS

Eox 30W is designed to comply with the applicable sections of these laser standards:

EU : EN60825-1

USA : 21 CFR 1040.10

The marking system is classified as Class 4 Laser Product.

Datalogic Automation S.r.l., as manufacturer of "Eox 30W" laser sources, provides a marking system which is NOT intended for immediate use, but it must be connected, by others, to other devices which have the final aim of creating a laser processing system.

The final system manufacturer MUST ensure the safety of the laser processing machine according to its standards including the risk-analysis, implementation of safety measures, certification and testing of safety measures and the production of adequate information for use of the marking system.

Datalogic Automation S.r.l. is available for providing to the system integrator/OEM all the information in its possession to help in complying with applicable standards.

CE COMPLIANCE

See Declaration of Conformity. Note about compliance to EN61010-1. The Risk Assessment regarding the DATALOGIC MARKING SYSTEM has been made in relation to the applicable point of that standard. It is under the responsibility of the system integrator to do a new Risk Assessment regarding the final installation of the DATALOGIC MARKING SYSTEM.



WARNING!

This is a Class A product. In a Class B environment this product may cause radio interference in which case the user may be required to take adequate measures.

FCC COMPLIANCE

Modifications or changes to this marking system without the expressed written approval of Datalogic could void the authority to use the marking system.

This marking system complies with PART 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This marking system may not cause harmful interference, and (2) this marking system must accept any interference received, including interference which may cause undesired operation.

This marking system has been tested and found to Comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the marking system is operated in a commercial environment. This marking system generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this marking system in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

APPENDIX C: GUIDE FOR SYSTEM INTEGRATOR

Eox 30W is classified as Class 4 Laser product. It is intended to be installed in a system by system integrator/OEMs that they have the final responsibility of Classification of their end product.

Final system MUST comply with all requirements in order that the system will be classified as:

- CLASS 1 LASER PRODUCT if end user could be exposed to a radiation not exceed the AEL for Class 1 during marking operation (10.6 μm)
- CLASS 2 LASER PRODUCT if end user is not exposed to a radiation during marking but could be exposed to the radiation not exceeding the AEL for Class 2 during focusing and aiming (635nm)

Eox 30W is designed to easily fulfil all the requirement as per EU/USA standards.

Below a YES/NO table for features of Class 4 Laser. A "NO" in the Eox 30W column means that the feature is available through an external connection and MUST be completely implemented by the system integrator/OEM.

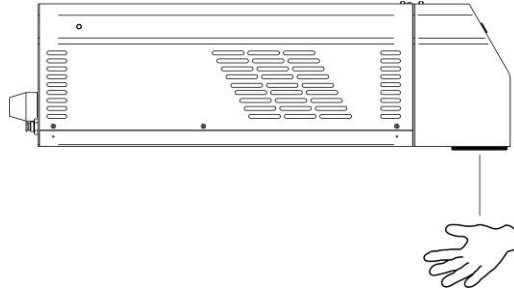
FEATURE	LOCATION/DESCRIPTION	CDRH	EN60825-1	EOX 30W
Keyswitch	Rack front panel: On/Off/Reset Keyswitch controls power to laser electronics. Key can non be removed from switch in "On" position	YES	YES	YES
Shutter Function	Laser control: Functions as a beam attenuator to disable RF driver/laser output when closed	YES	YES	YES
Power indicator	Rack front panel Indicator (blue): Illuminates blue to indicate DC power is applied	NO	NO	YES
Ready Indicator	Resonator Indicator (yellow): Indicates that the laser has power applied and is capable of lasing	YES	YES	YES
Laser on indicator	Panel Indicator (red): Indicates that the laser is actively lasing	YES	YES	YES
Five seconds delay	Internal circuit elements: disables RF driver/laser output for five seconds after Laser Enable signal is applied	YES	NO	YES
Power fail lockout	Internal circuit elements: disables laser output if input power is removed then later reapplied (AC power failure or remote interlock actuation) while Keyswitch is in "On" position.	YES	NO	YES
Remote Interlock	Rear panel connection: disables laser output when a remote interlock switch on an equipment door or panel is opened	YES	YES	YES
Over temperature protection	Internal circuit element: temperature shutdown occurs if temperature of the laser tube rises above safe operating limits	NO	NO	YES
Warning labels	EOX exterior: labels attached to various external housing locations to warn personnel of potential laser hazard	YES	YES	YES*

* Eox 30W labels comply with Class 4 Laser Product Requirement. The labels to be used in the system where Eox is installed MUST comply with the requirements for the Laser Class of the marking system itself.

APPENDIX D: NOTE ABOUT LASER

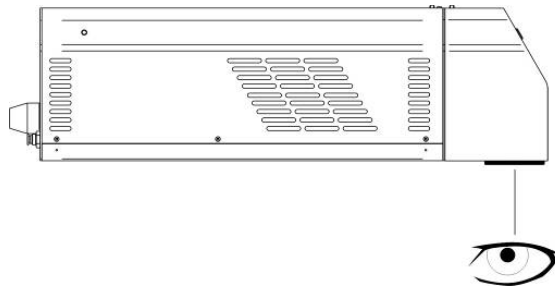
LASER SAFETY

The following information is provided in compliance with regulations set by International Authorities, and it refers to proper use of marking system.



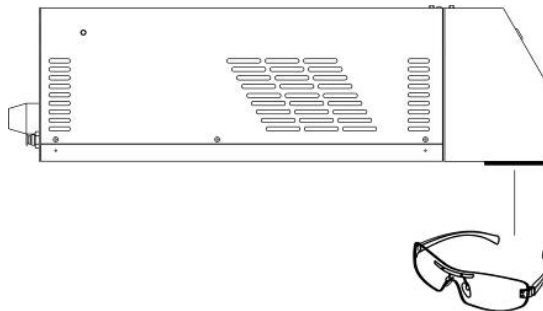
NOTE:

It is crucial that you protect yourself against beams of reflected or direct light as they cause permanent damage to your skin.



NOTE:

Staring directly at a laser beam may cause irreversible damage to your eyes.



NOTE:

Wear safety goggles while using the marking system!



NOTE:

BEFORE INSTALLING AND USING THE LASER, READ CAREFULLY THE APPENDIX CONCERNING LASER SAFETY.

NOTE:



The marking system is designed for the processing of non-flammable materials.

Infrared laser radiation carries very high energy: **FIRE HAZARD!**

Do not direct the laser beam at flammable materials (paper, wood, containers filled with flammable liquids, etc.) without taking suitable precautions (inert gas, etc.).

Do not direct the laser beam at sloping surfaces as there is a risk of reflection.

Keep solvents and flammable materials away from the marking system. Avoid the accumulation of combustible vapours.

NOTE:



When marking materials using CO₂ laser radiations, decomposition products may form which are harmful to man's health.

The vaporization of certain materials may generate ultra-fine dust and vapors containing carbonization products which are harmful to man's health.

We **strongly** recommend installing an adequately sized extraction system equipped with filters suited to the dust and fumes to be extracted.

Certain processes may generate fumes and vapors of such density that they cause the extraction system to become totally ineffective in a very short time.

Periodically check for proper operation of the extraction system.

NOTE: Zinc selenide



The marking system uses a special focusing lens (mounted on the scanning head) in Zinc Selenide (ZnSe).

When broken down to dust and fragments, this material is toxic for man's health if inhaled, swallowed or in case of eye contact.

There are no health hazards under normal operating and maintenance conditions.

Do not scratch the lens while cleaning it.

In case the lens breaks, wear protective gloves and clean up all lens pieces, putting them in a sealed bag to be sent back to Datalogic Automation Srl.

LASER RADIATION

Laser radiation is an electromagnetic emission with a micrometric wavelength which ranges from the long infrared (CO₂ Laser), close infrared (Nd Laser: Yag, Nd: YVO₄), visible (He Laser: Ne or Argon) and ultraviolet (excimer laser).

It should be considered non-ionizing Radiation. In the marking system the emission is generated by CO₂ tube. The continuous reflection of Photons, between a front mirror and rear mirror, creates a positive reaction so that their number continues to increase, until reaching the concentration necessary to produce a beam which projects from the semi-reflecting front mirror. The radiation (which we can imagine as a "Beam of invisible light") is then Collimated and Focalized with Lenses at a point where the intensity becomes high enough to be able to react with various materials producing an alteration in them due to thermal effect.

The radiations of marking system are invisible and visible and the Eye receives it almost in its entirety without using the natural defense provided by pupil reflex! Added to this is the fact that it is generally very intense, with the result that it can be very harmful to the eye and present vision problems.



NOTE:

Directly viewing a Laser beam **can cause irreversible damage** to vision.

To prevent permanent damage to vision, a few precautions must be taken.

All individuals who may be exposed to dangerous levels of laser radiation, must know that the laser is active and wear protective goggles if necessary.

Due to its high power, the laser integrated in the Datalogic Automation system provokes reflected laser light from flat surfaces. Reflected light is potentially dangerous for the eyes and skin. Electromagnetic emission with a micrometric wave length is placed in long infrared, and is therefore invisible, thus it is not clear where reflected beams are aimed.



NOTE:

It is **indispensable to protect yourself from reflected light beams**, because they can be sufficiently intense to create permanent injury to the eyes or skin.

In addition to possible injury to the eyes or skin, direct laser emission can cause flammable materials to burn like organic solvents (alcohol, acetone) or gasoline and cause fabric and clothing to burn.



NOTE:

This marking system is classified as **class 4**. Class 4 includes lasers which can produce risks, not only from **direct** or **reflected** radiation, but also from **scattered** radiation! The marking systems may be a significant risk for the skin and risk of burning flammable materials.

ABSORPTION OF LASER RADIATION

Human skin absorbs electromagnetic radiation in different ways depending on the wave length of the radiation. Both the eye and skin have a “predisposition” for accepting certain wave lengths, and are more unresponsive to absorbing others. In the specific case of the Eye, the Cornea and Crystalline lens let all the wave lengths from 400 to 1400 nm pass and reach the Retina, even with various attenuations. They include the range from visible light to IRA infrared. Therefore, one must immediately note that the radiation of marking system, respectively with wavelength 10,6 μm , **involves the direct exposure of the Retina!**

In terms of the Skin, the “biological window” has different absorption percentages but is not dissimilar in terms of wave length. The maximum exposure values for Skin are much different compared to those tolerated by the Eye.

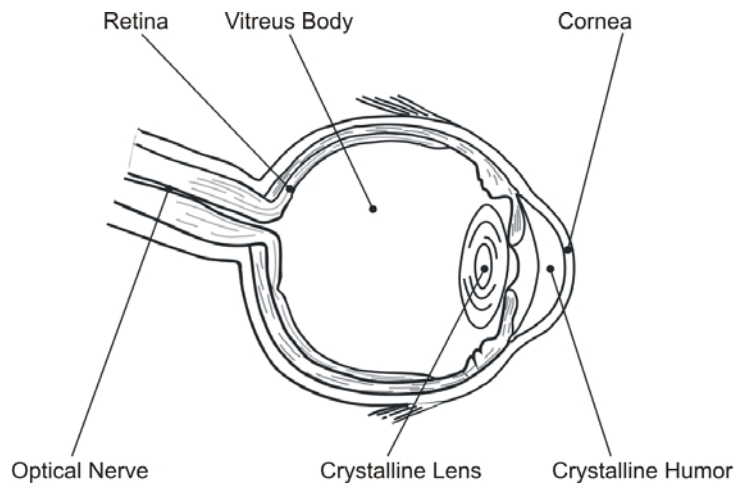


Figure 57: Eyeball section.

In terms of the damage mechanism that absorbed radiation can cause, it also depends on the wave length. Short lengths (ultraviolet: UV-C 180-280nm; UV-B 280-315 nm, UV-A 315-400 nm) generally cause photo-chemical effects:

- cataract, or opacification of the crystalline lens
- melanic coloring, or reddening of the skin

Greater wavelengths (infrared: IR-A 780-1400 nm; IR-B 1400 3000 nm; IR-C 3000-10^{E6} nm) generally cause thermal effects:

- detachment or photocoagulation of the retina
- burning of the skin

The degree of injury obviously depends on the **amount of absorbed radiation** and the **instantaneous power** of the radiation source.

CLASSIFICATION AND DANGER LEVEL

Regulations have established different classes of Laser danger based on the ability to injure people, from Laser class 1 (basically safe in all conditions) to Laser class 4 dangerous in various conditions.

Lasers which can produce risks, not only for direct or reflected radiation, but also for scattered radiation belong to class 4. These marking systems can also have a significant risk for the Skin and fire risk for flammable material. For these reasons, the User must put into effect all measures aimed at containing the radiation to make sure that it is terminated at the end of its useful path. The operator must also be informed of the risks from exposure to Laser radiation and must wear specific I.P.D. (individual protection devices) including goggles that protect against radiation and are certified as suitable for this use.



NOTE:

The laser marking system contains a **class 4 invisible** source.

RADIATION VIEWING CONDITIONS

The Laser output by the resonator is to be considered as a highly collimated and intense monochromatic light source. Due to these characteristics it can be seen as a “punctiform source” of high luminosity. This means that its image is then focalized on the Retina in a very small spot with a dangerously high power density! If the beam becomes divergent and scatters to a non-reflecting screen, then there is an “extended vision” of the image, with a decisively less dangerous power density. So there are different types of radiation viewing based on the access to the radiation and consequently different degrees of dangerousness.

DIRECT VIEWING OF THE LASER BEAM

This type of viewing is the most dangerous and can occur at the outlet of the laser aperture after having removed the lens. It is to be avoided at all costs! No protective goggles represent a valid means against direct viewing of the beam.

DIRECT VIEWING OF THE BEAM AFTER MIRROR REFLECTION

This may occur by directing the beam on a reflecting surface.
Viewing of a mirror reflected beam from a flat surface is very dangerous and equal to direct viewing.

DIRECT VIEWING OF THE BEAM AFTER FOCUSING

This occurs if the Laser beam is not extinguished with an opportune absorber at the end of its useful path. Looking at the beam is dangerous up to a considerable distance. Filters and goggles can ensure safety for brief exposure, as long as they are the right size and certified.

SCATTERED VIEWING OF THE BEAM AFTER FOCUSING

This is the most frequent viewing, but opportune Filters and Goggles can ensure safety, even for prolonged exposure.

The Optical Risk Nominal Distance O.R.N.D. for Eox 30W are showed in the next paragraph.



NOTE:

Always use goggles with conformity certificate.

Remember that **no goggles can provide prolonged protection from direct or mirror-reflected radiation!**

EYES AND SKIN RISKS

If exposed to intense Laser radiation, even of a short duration, or a less intense but longer lasting duration, both the Cornea and the Retina can burn and be damaged irreparably forever. This consequence is completely realistic in the event of direct viewing of a class 4 Laser beam.

If subject to direct focalized radiation, even the skin can burn.

In addition, it is necessary to bear in mind that a collateral ultraviolet radiation may exist with the main radiation: long exposure may cause skin cancer.

GENERAL SAFETY REGULATIONS

The User must comply with the regulations and work in the best possible safety conditions to prevent decreasing the degree of marking system safety. Therefore it is necessary to develop a Standard Operating Procedure (S.O.P.) related to maneuvers to effect for turning on and off the marking system. This procedure, which shall be prepared around the time of installation, shall serve as a reference for the Operator and shall be written in his/her language.

Training is essential and must include:

- Familiarization with system operating procedures.
- Knowledge of the biological effects of radiation on the Eyes and Skin.
- Understanding of the necessity for Individual Protection Devices (I.P.D.)

COLLATERAL RISKS

If the intended use of the marking system is changed, for example for material processing applications, collateral risks may arise represented by the production of fumes and vapors which may be irritating or toxic, if not removed and adequately filtered before being released into the air again.



NOTE:

It is advisable **not to change the intended use** without previously contacting the Manufacturer.

An additional risk may be represented by fire caused by processing materials other than those the marking system is designed for.



NOTE:

When processing **flammable material**, since there is a **fire danger**, it is indispensable to follow the instructions provided by the manufacturer when the marking system is commissioned.



NOTE:

Do not subject **materials other** than those the marking system was designed for to radiation.

The most serious collateral risk associated with laser marking system, which may be fatal, is electricity. This may occur when the manufacturer's warning and procedures are not followed. Unauthorized and untrained personnel must never do any work on the electrical part. The safety devices must never be removed and their operation must be periodically checked.



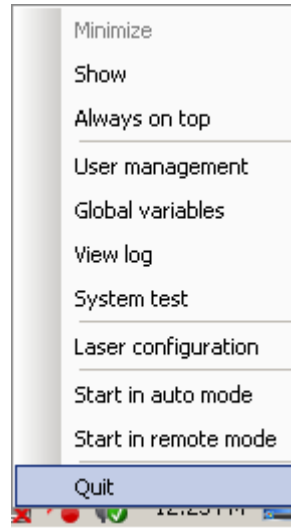
NOTE:

Do not work on the electrical part if you are not trained to do so. **Do not remove protection devices.**

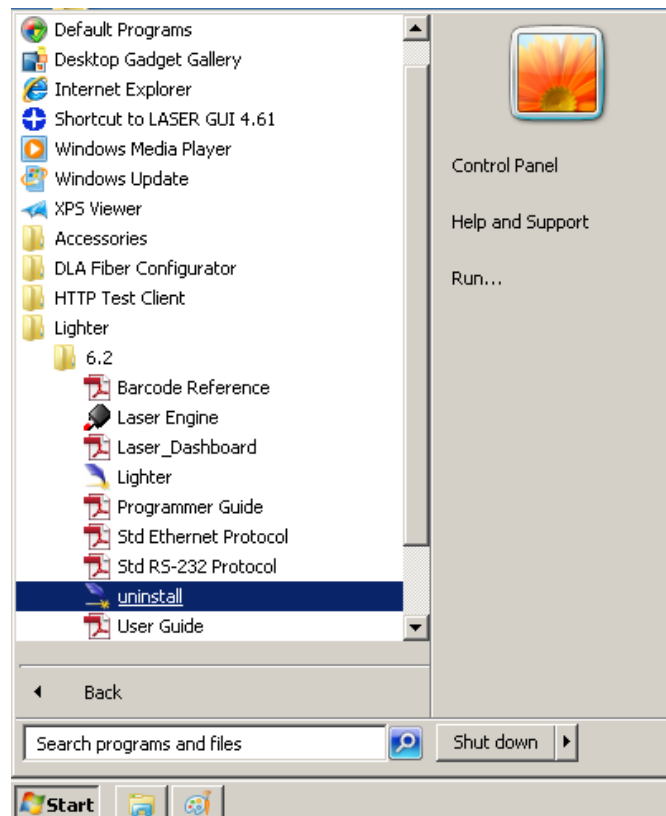
APPENDIX E: SOFTWARE UPGDARE

This document describe how to update SW version on marking systems:

1. Close the Lighter and Laser Engine (Click on “QUIT”)

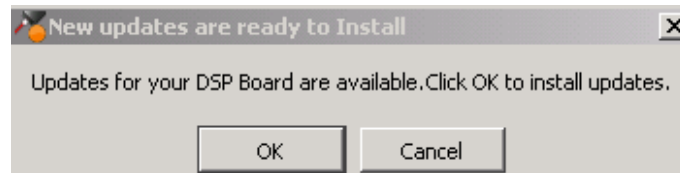


2. Do Lighter “UNINSTALL”: you can’t run the new installer before having removed the old SW version

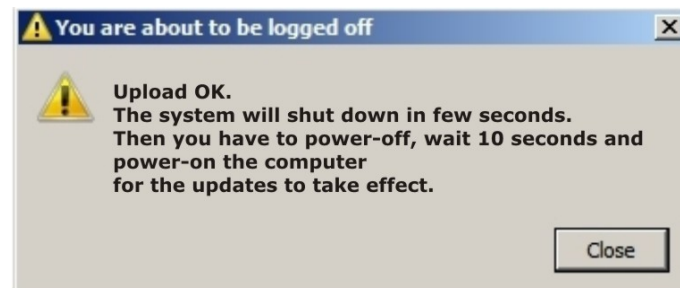


APPENDIX E

3. Wait the end of uninstall procedure.
4. Run new Lighter installer from an external device (USB dongle).
5. Wait until installation procedure is completed.
6. Depending on whether the Lighter update includes any control board updates, the following screen may appear:



- Procedure with control board update:
 - o press OK to execute control board update
 - o upon completion, a window informs user that data is automatically saved in the system



- o system will be shut down automatically within the next 10 seconds



WARNING:

DO NOT restart the system or turn off the device!

- o wait until system shuts down automatically (black screen)
- o power off the system to complete installation

- Procedure without control board update:
 - o a window informs user that data is automatically saved in the system



- o system will be restarted automatically within the next 10 seconds



WARNING:

DO NOT restart the system or turn off the device!

- o wait until system is restarted automatically

APPENDIX F

APPENDIX F: RECOVER THE SYSTEM USING USB RECOVERY DISK

The marking system is provided with a USB recovery disk that can be used in case:

- o **the system does not boot** because the **CF disk** containing the operating system **is corrupted**;
- o **Lighter doesn't work** because the **SSD disk** which contains the Lighter DATA folder **is corrupted**;

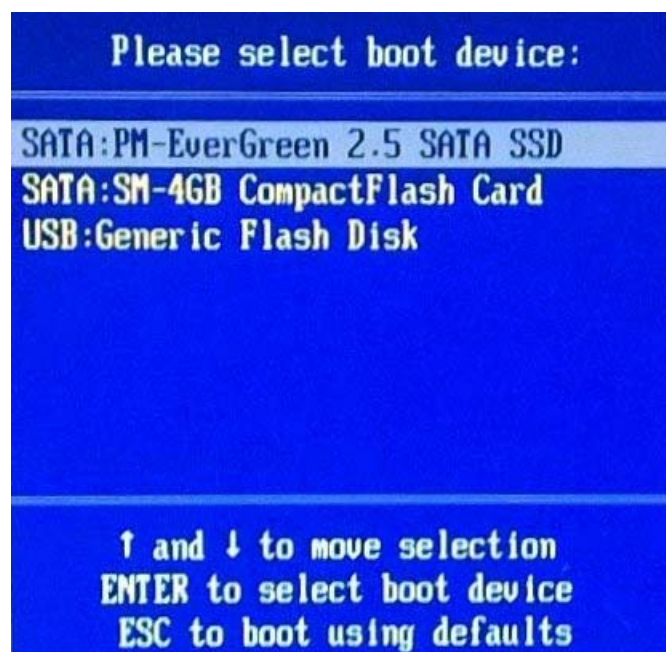
The recovery procedure, allows to go back to the factory configuration without removing the CF or the SSD from its housing.

STORAGE CONFIGURATION	
C:\ drive: CF - o Operating system - o Lighter Suite	D:\ drive: SSD o Lighter DATA folder: configuration files, license, layouts, projects, sequences, etc
	

The recovery procedure requires the **USB recovery disk** which is included in the standard equipment.

Procedure:

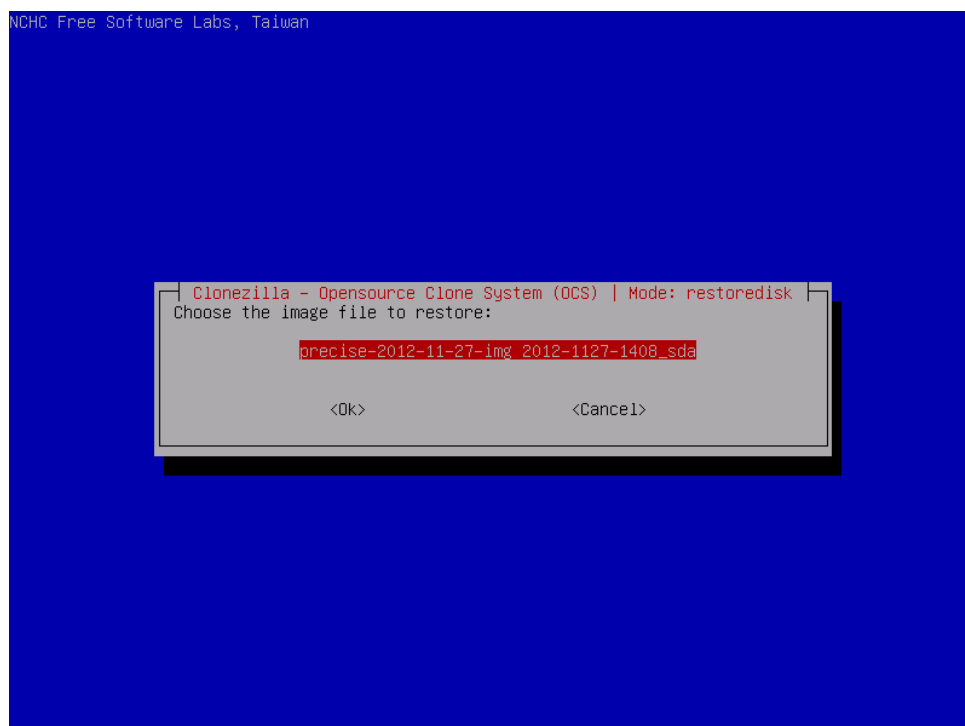
- o Turn **OFF** the marking system
- o Insert the **USB recovery disk** provided with the marking system in the USB port
- o Turn **ON** the marking system and press **F11** key to enter **Select Boot Device** menu
- o Select the **USB** device in the list and press **ENTER** key



- o The marking system will restart and **Clonezilla live** will boot from the USB disk
- o Select **Datalogic Recovery Disk procedure** and press **ENTER**

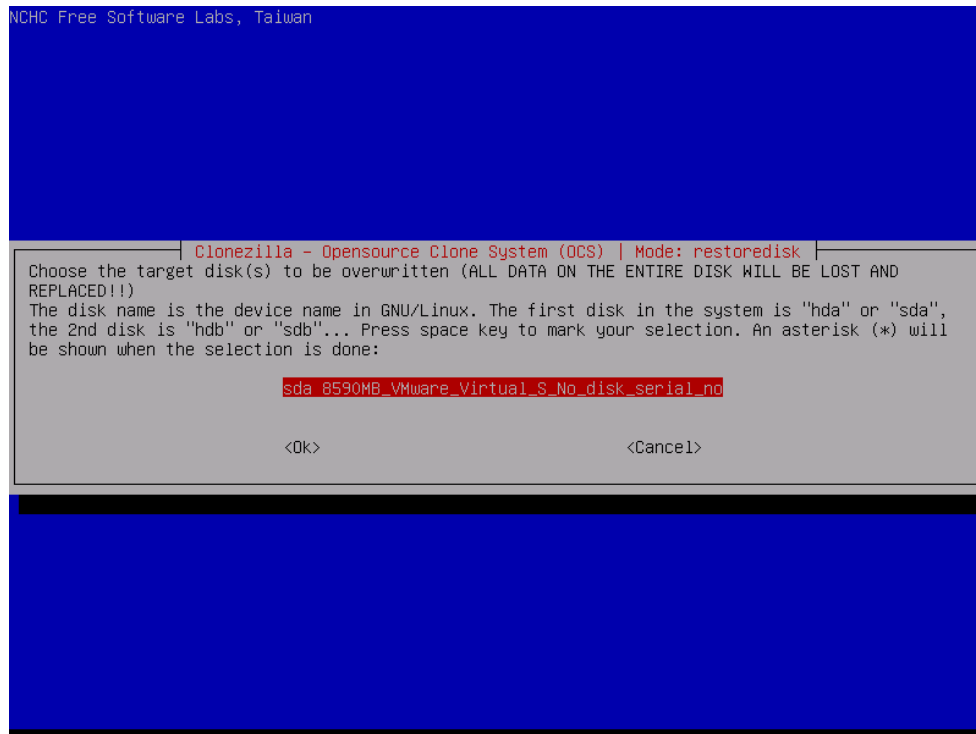


- o **Choose** the image file to restore:
 - o if you want to restore the **C:\ drive** which contains the operating system and Lighter Suite choose **RESTORE_DISK_C_EOX10** and press **ENTER** key
 - o if you want to restore the **D:\ drive** which contains the Lighter DATA folder choose **RESTORE_DISK_D_EOX10** and press **ENTER** key



APPENDIX F

- o Choose the target disk to be overwritten and press **ENTER** key
 - o **Compact Flash disk drive** if you are restoring the disk **C:\ drive**
 - o **SSD disk drive** or **Flash Disk drive** if you are restoring the disk **D:\ drive**



- o Clonezilla will ask you to **confirm twice**:
 - o Press **Y** key and then **ENTER** key to confirm the 1st time
 - o Press **Y** key and then **ENTER** key to confirm the 2st time

```
/usr/sbin/ocs-sr -g auto -e1 auto -e2 -c -r -j2 -p true restoredisk precise-2012-11-27-img sda
This command is also saved as this file name for later use if necessary: /tmp/ocs-precise-2012-11-27-
-precise-2012-11-28-00-46
Press "Enter" to continue...
Activating the partition info in /proc... done!
Getting /dev/sda1 info...
Getting /dev/sda2 info...
Getting /dev/sda3 info...
Getting /dev/sda5 info...
*****
The following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
imag/precise-2012-11-27-img" -> "sda sda1 sda5"
WARNING!!! WARNING!!! WARNING!!!
WARNING! THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
BE LOST:
*****
Machine: VMware Virtual Platform
sda (8590MB_Virtual_S_No_disk_serial_no)
sda1 (4999MB_ext4(In_Virtual_S_No_disk_serial_no)
sda5 (3077MB_ext4(In_Virtual_S_No_disk_serial_no)
*****
Are you sure you want to continue? ? (y/n) y
OK, let's do it!!
This program is not started by clonezilla server.
The following step is to restore an image to the hard disk/partition(s) on this machine: "/home/part
imag/precise-2012-11-27-img" -> "sda (sda1 sda5)"
WARNING!!! WARNING!!! WARNING!!!
WARNING! THE EXISTING DATA IN THIS HARDDISK/PARTITION(S) WILL BE OVERWRITTEN! ALL EXISTING DATA WILL
BE LOST:
*****
Machine: VMware Virtual Platform
sda (8590MB_Virtual_S_No_disk_serial_no)
sda1 (4999MB_ext4(In_Virtual_S_No_disk_serial_no)
sda5 (3077MB_ext4(In_Virtual_S_No_disk_serial_no)
*****
Let me ask you again. Are you sure you want to continue? ?
[y/n] y_
```


APPENDIX F

5.3.1.1 Customize the system



NOTE:

All the images used to restore disks are generic and must be customized with the correct configuration and license files.

- o An **error message** about Lighter user database could appears at system restart:



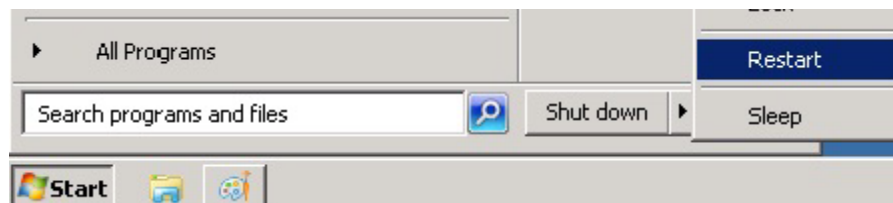
- o Press **ENTER** key to continue
- o Recreate the Lighter user database **double click on** file C:\user_db.bat



- o If **disk D:** has been restored (SSD which contain the Lighter DATA folder), **replace the generic** license.dat and laser.inz files in D:\DATA\CONFIG **with the custom ones** present into the folder **Fileinz and report** in the **USB recovery disk**
- o Double click on Shortcut to **save-data.bat** icon in the Desktop



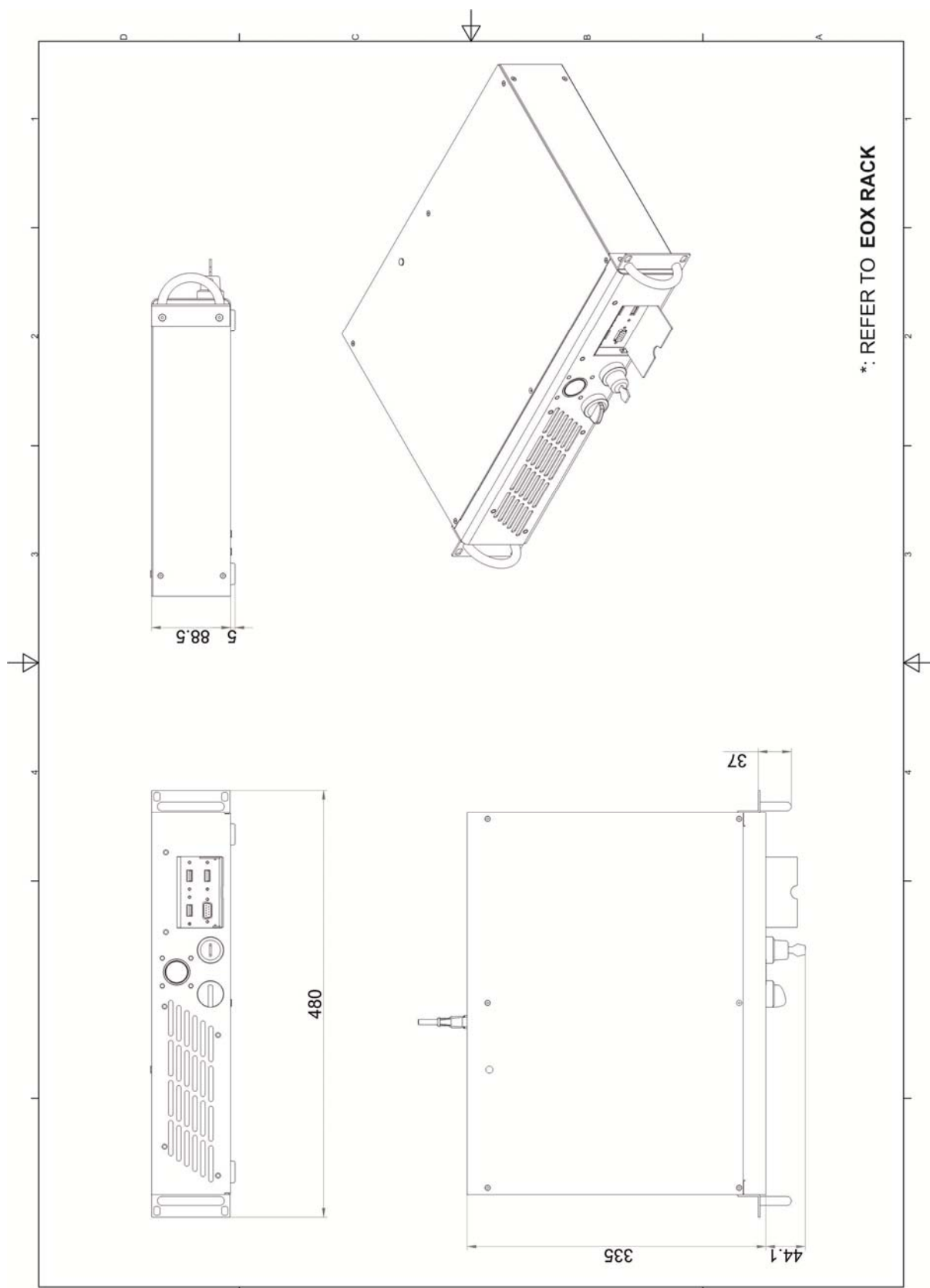
- o **Restart** Windows:



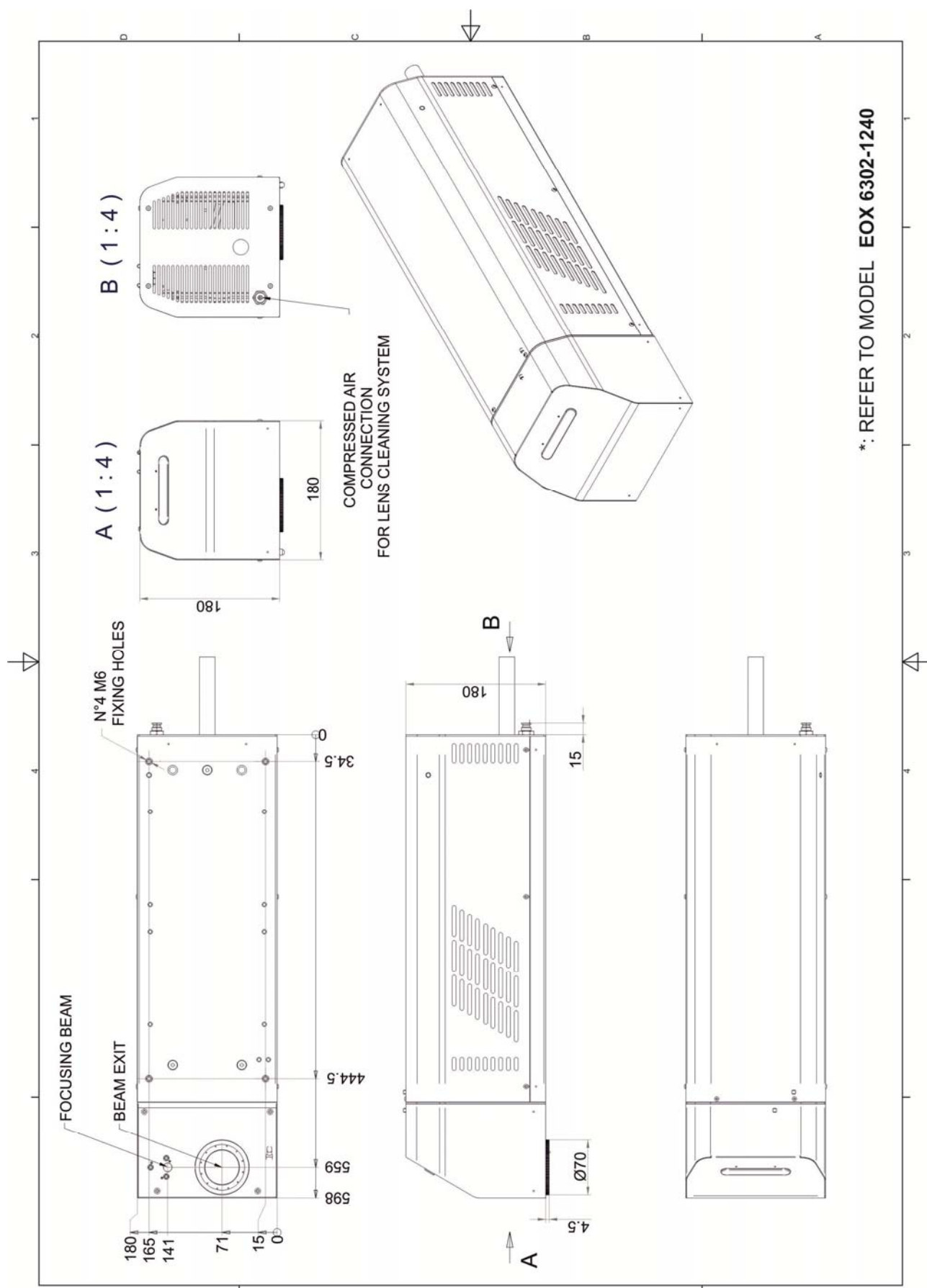
WARNING:

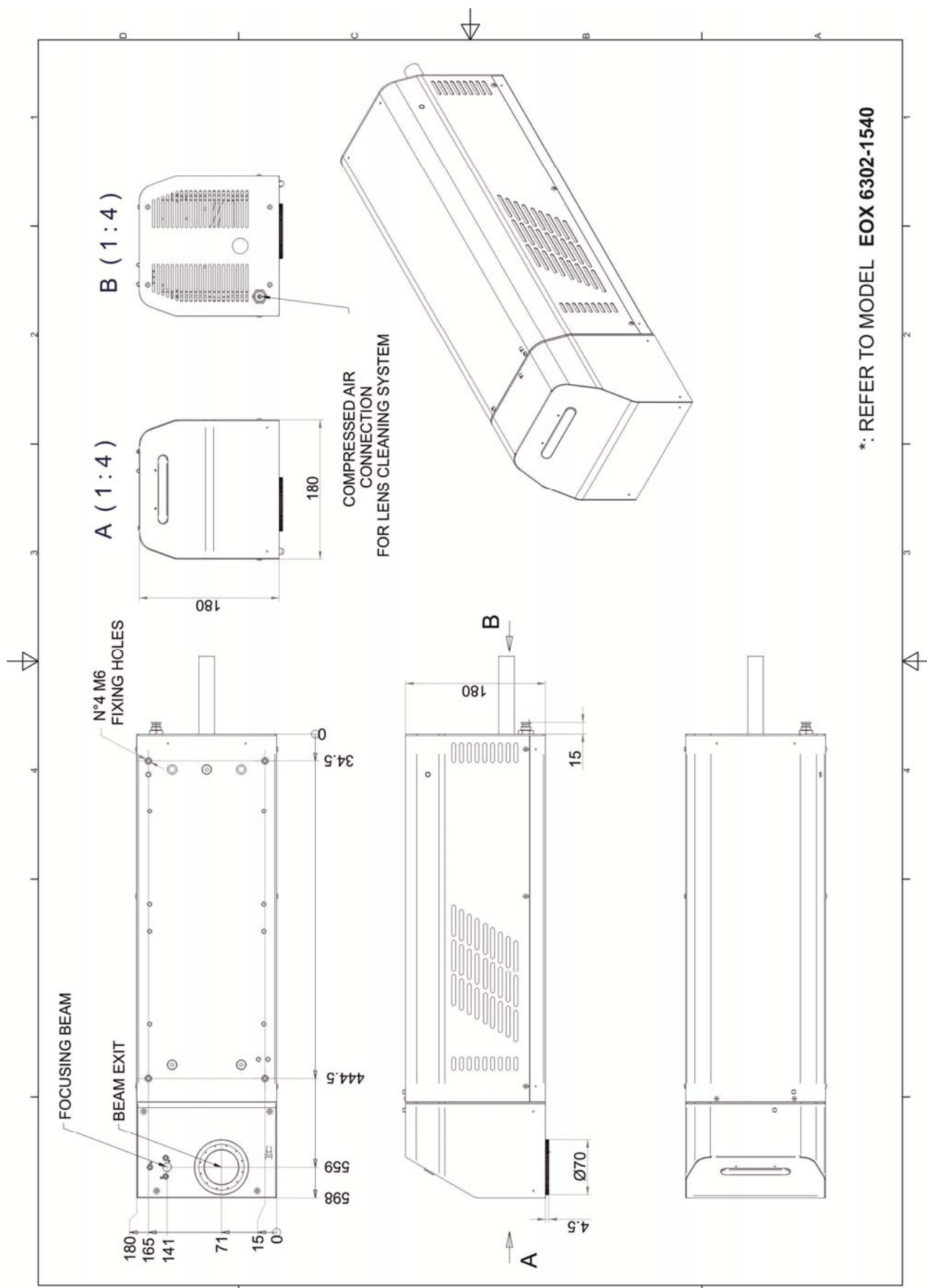
DO NOT turn off the sistem while Windows restarts.

APPENDIX G: MECHANICAL DRAWINGS



APPENDIX G





APPENDIX H: DECLARATION OF CONFORMITY


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Laser Marking Business Unit

Via Le Gorrey 10 – 11020 Donnas (AO)
Via dell'Industria 20 – 21018 Sesto Calende (VA)

declares that the

EOX CO2 SYSTEM

and all its models

are in conformity with the requirements of the European Council Directives listed below:

2004 / 108 / EC EMC Directive
2006/95/EC Low Voltage Directive

This Declaration is based upon compliance of the products to the following standards:

EN 61000-6-2, SEPTEMBER 2005:

ELECTROMAGNETIC COMPATIBILITY (EMC)
PART 6-2: GENERIC STANDARDS –
IMMUNITY FOR INDUSTRIAL ENVIRONMENTS

EN 61000-6-4, JANUARY 2007:

ELECTROMAGNETIC COMPATIBILITY (EMC)
PART 6-4: GENERIC STANDARDS –
EMISSION STANDARD FOR INDUSTRIAL ENVIRONMENTS

EN 61010-1, OCTOBER 2010:

SAFETY REQUIREMENTS FOR ELECTRICAL EQUIPMENT FOR
MEASUREMENT, CONTROL, AND LABORATORY USE –
PART 1: GENERAL REQUIREMENTS

EN 60825-1, OCTOBER 2007:

SAFETY OF LASER PRODUCTS –
PART 1: EQUIPMENT CLASSIFICATION, REQUIREMENTS AND
USER'S GUIDE

Monte San Pietro, June 12th, 2012

Paolo Morselli
Quality Manager




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