DATALOGIC

EOX 10W

USER'S MANUAL

821002154

Printed in Donnas (AO), Italy.

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 marking system, 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
0.0	20-10-2011	Release
821002150	10-02-2012	Appendix A
821002151	05-09-2012	30
821002152	07-11-2012	19, 38, 41, 43
821002153	10-04-2014	13, 39
821002154	10-02-2015	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 internationals rules and local legislations.

Following manual is referred to an Eox 610X-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 CO_2 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 CO_2 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 scan 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 CO_2, N_2 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!

The marking system is composed by a single device (All-In-One) with laser head and compact dimensions for an easy integration inside a complex system able to manage marking signals and customer's complementary modules.

All marking system connections are found on the back of device: supply input, controls and signals and interfaces for 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 belts are provided for cooling down the marking system; their flow must never be obstructed.

Figure 1: Eox 10W.

INTENDED USE

The marking system is intended for the identification marking of organic and plastic materials and for the removal of coatings, paints and surface treatments from metals.

NOTE:

CO_2 marking systems mainly interact with materials through a thermal carbonization process with the emission of fumes and vapours.

Suitable methods for the treatment and abatement of marking fumes must be provided for, especially when working on plastic materials.

IMPORTANT WARNINGS

Access to the internal parts of the electrical equipment is allowed only to authorized personnel, duly qualified and trained with regards to risks of an electrical nature.

Datalogic Automation S.r.l. declines any and all responsibility for work carried out on live parts by untrained or unauthorized personnel.

NOTE:

It's not allowed modify destination use of the marking system in different way of its functions.

Datalogic Automation S.r.l. declines any responsibility and liability for irregular and improper use of the marking system which it manufactures.

NOTE:

These marking system actuation is demanded to the system integrator.

TABLE OF CONTENTS

SYMBOLS III

REVISION INDEX IV

FOREWORD V

OVERVIEW VI

OPERATION OF A LASER SYSTEM WITH GALVANOMETRIC SCANNING vi
LASER SOURCE vi
GALVANOMETRIC SCANNING HEAD vi
MARKING SOFTWARE vi
INTENDED USE vii
IMPORTANT WARNINGS vii

TABLE OF CONTENTS VIII

1 TECHNICAL SPECIFICATIONS 10

1.1 TECHNICAL CHARACTERISTICS 10
1.2 SYSTEM'S DESCRIPTION 12
1.3 MARKING AREA SPECIFICATION 13
1.4 CONNECTORS SPECIFICATIONS 14
1.4.1 INTERLOCK CONNECTOR 14
1.4.2 COMMAND BOX CONNECTOR (LASER CONTROL) 15
1.4.3 AXES CONNECTOR (I/O CONTROL) 17
1.4.4 RS232 CONNECTOR 18
1.4.5 ENCODER CONNECTOR 19
1.4.6 PHOTOCELL CONNECTOR 19
1.5 SIGNALS SPECIFICATIONS 20
1.5.1 ENABLE SIGNAL'S SCHEME (COMMAND BOX CONNECTOR) 20
1.5.2 LASER CONTROL SIGNALS TIMING 20
1.5.3 MARKING PROCESS SIGNALS TIMING 21
1.5.4 INPUT/OUTPUT SIGNALS SPECIFICATIONS 22
1.6 CONNECTION EXAMPLES 23

2 INSTALLATION AND SET UP 26

2.1 UNPACKING 26
2.2 CONTENTS OF PACKAGING 27
2.2.1 MAIN HARDWARE 27
2.2.2 CABLES AND OTHER COMPONENTS 27
2.3 TRANSPORT 28
2.4 FIXING AND POSITIONING 29
2.5 INSTALLATION ENVIRONMENT 30
2.6 FUME / DUST EXTRACTOR 30
2.7 CONNECTIONS 31
2.7.1 COMMAND BOX CONNECTOR CONNECTION 31
2.7.2 INTERLOCK CONNECTOR CONNECTION 32
2.7.3 POWER SUPPLY CABLE CONNECTION 32
2.7.4 LOCAL MODE CONNECTION 33
2.7.5 REMOTE CONTROL MODE CONNECTION 34
2.7.6 MARKING ON FLY MODE CONNECTION 35

TABLE OF CONTENTS

3 USE AND OPERATION 36

3.1 POWER ON PROCEDURE 36
3.2 LOCAL MODE OPERATIONS 40
3.3 REMOTE MODE OPERATIONS 40
3.4 OPERATING IN LOCAL MODE 42
3.4.1 HOW TO CREATE AND EDIT YOUR FIRST GRAPHIC DOCUMENT 43
3.4.2 HOW TO TEST AND ENGRAVE YOUR DOCUMENT 46
3.4.3 HOW TO USE EXTERNAL SIGNALS TO ENGRAVE YOUR DOCUMENT 48

4 CUSTOMIZE THE SYSTEM'S SOFTWARE 50

4.1 CHANGE O.S. LANGUAGE AND KEYBOARD LAYOUT 50
4.2 CHANGE LAN CONFIGURATION AND IP ADDRESS 53
4.3 CHANGE VIDEO SETTING 56
4.4 REMOTE DESKTOP CONNECTION 58

5 TECHNICAL SUPPORT 60

5.1 SEALS 60
5.2 MAINTENANCE 61
5.3 PRODUCT SUPPORT AND CUSTOMER SERVICE 62

APPENDIX A: LABEL IDENTIFICATION 64

POSITIONING OF EXTERNAL LABELS 65

APPENDIX B: STANDARDS 66

LASER STANDARDS 66
CE COMPLIANCE 66
FCC COMPLIANCE 66

APPENDX C: GUIDE FOR SYSTEM INTEGRATOR 67

APPENDIX D: NOTE ABOUT LASER 68

LASER SAFETY 68
LASER RADIATION 70
ABSORPTION OF LASER RADIATION 71
CLASSIFICATION AND DANGER LEVEL 71
RADIATION VIEWING CONDITIONS 72
DIRECT VIEWING OF THE LASER BEAM 72
DIRECT VIEWING OF THE BEAM AFTER MIRROR REFLECTION 72
DIRECT VIEWING OF THE BEAM AFTER FOCUSING 72
SCATTERED VIEWING OF THE BEAM AFTER FOCUSING 72
EYES AND SKIN RISKS 72
GENERAL SAFETY REGULATIONS 73
COLLATERAL RISKS 73

APPENDIX E: SOFTWARE UPGRADE 74

APPENDIX F: RECOVER THE SYSTEM USING USB RECOVERY DISK 77

APPENDIX G: MECHANICAL DRAWINGS 82

APPENDIX H: DECLARATION OF CONFORMITY 84

FIGURES 86

1 TECHNICAL SPECIFICATIONS

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

1.1 TECHNICAL CHARACTERISTICS

MECHANICAL CHARACTERISTICS

Weight	17 Kg
Height	180 mm*
Width	180 mm
Depth	598 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	All-In-One
Scanning Head	Straight, Left side, Right side
Average Power[1]	10W
Stability	± 10% (cold start)
Wavelength	10.57-10.63 µm; Peak @10.6 µm
Range Frequency	10 – 25000 Hz; CW
Rise Time	< 150 µs
M2	≤ 1.2
Beam Ø[1]	~ 3.5 mm @ $1/e^2$
Standard Bexp	2x
Ellipticity	< 1.2
Divergence[1]	< 4 mrad
Aiming Beam	Class 2 Red Diode Laser; λ=635nm ± 5nm; 1mW
Focusing Beam	Class 2 Red Diode Laser; 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 400W, Maximum 600W
Marking on the Fly (MOF)	YES [constant speed or variable speed with encoder]
Line speed productivity[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	4x 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 10W
[4] Single line string, Roman-s font

1.2 SYSTEM'S DESCRIPTION

A description of the main parts of the Eox is provided here below:

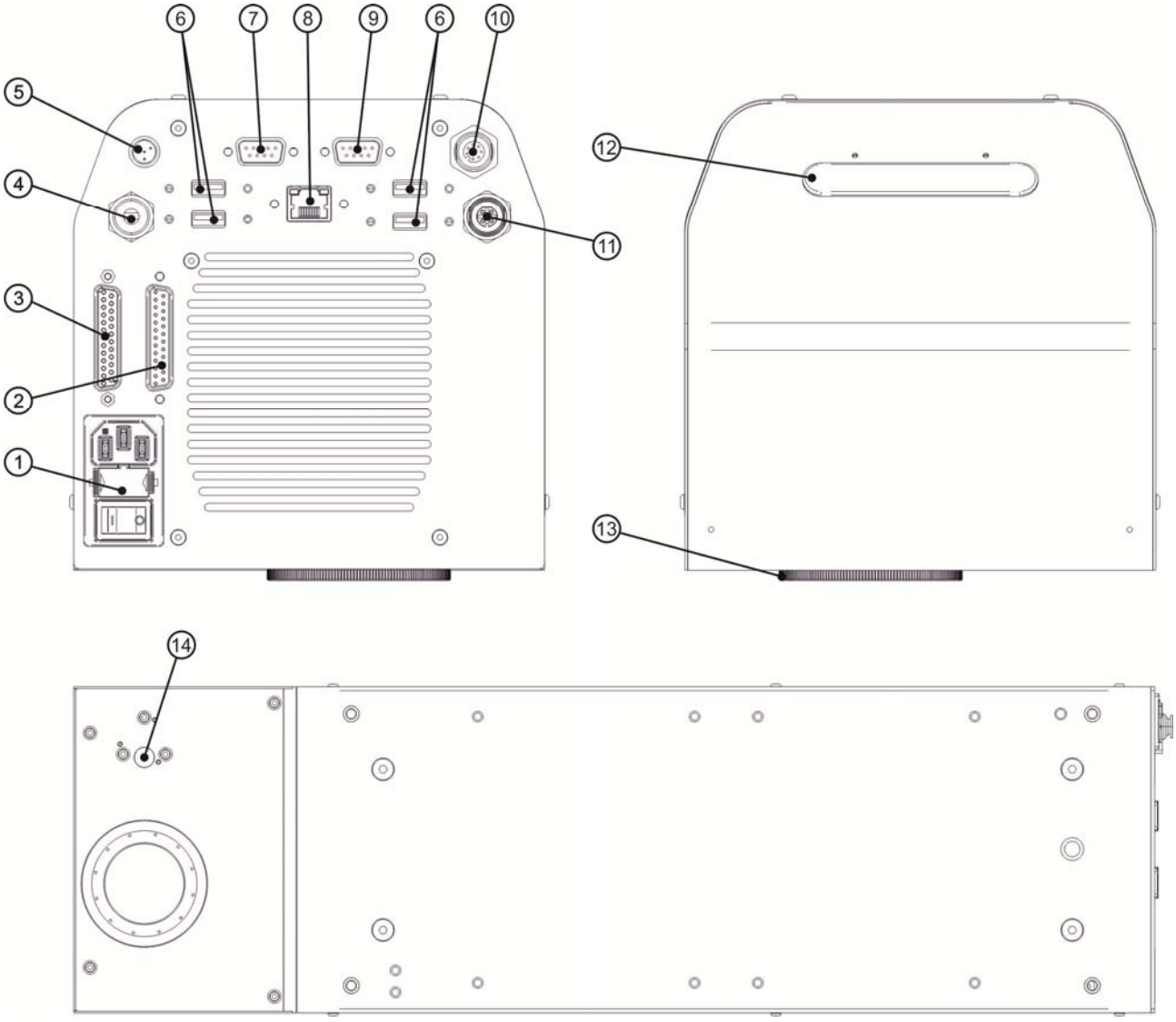


Figure 2: EOX 10W overview.

1) Main power supply	8) LAN port
2) Command Box Connector (Laser Control)	9) VGA connector
3) I/O Connector (Axes Control)	10) Photocell connector
4) Inlet air	11) Encoder connector
5) Interlock connector	12) Status Led bar
6) 4x USB 2.0 ports	13) F-Theta with air compressed issue holes
7) RS232 port	14) 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: ± 2mm

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

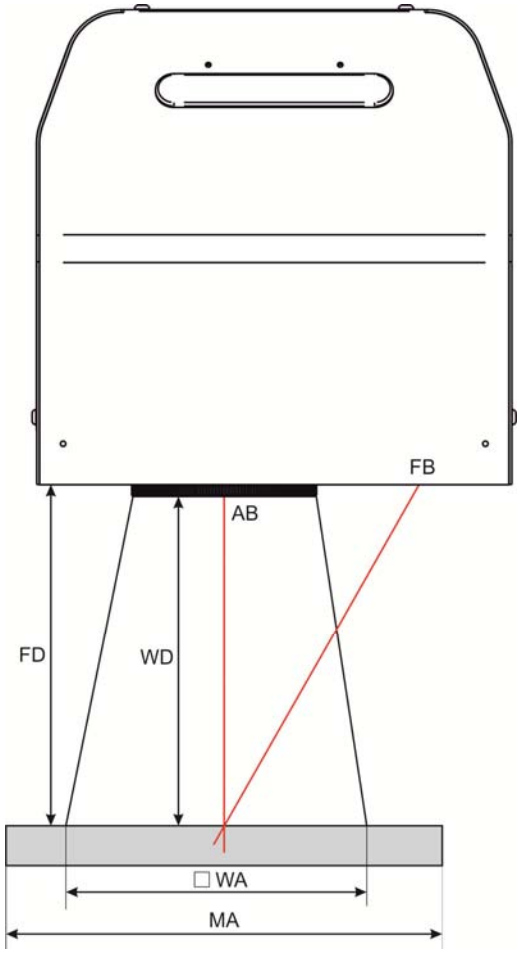


Figure 3: Working distance.

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.

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 connector Pin-out.

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

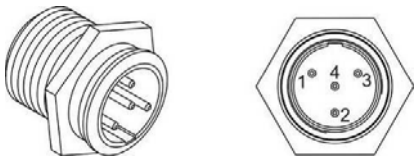


Figure 4: Male panel plug cod. TB4M (front view).

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

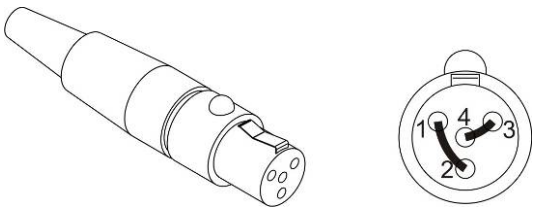


Figure 5: Female cable mount connector cod. TY4F (solder view).

NOTE:
To restore the marking system is necessary repeat the "*Power ON procedure*" 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.

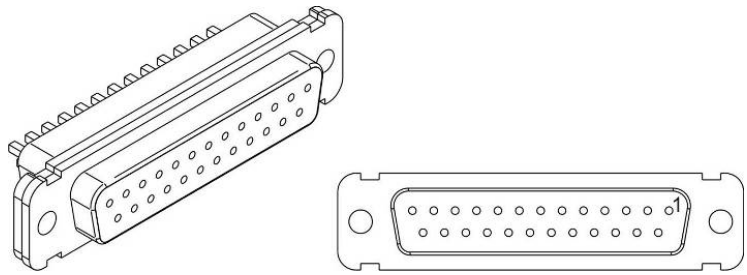


Figure 6: Female panel socket SUB-D 25 (frontal view).

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

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 n 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 see paragraph 1.6

1.4.3 AXES CONNECTOR (I/O CONTROL)

Panel socket SUB-D, 25 positions, male.

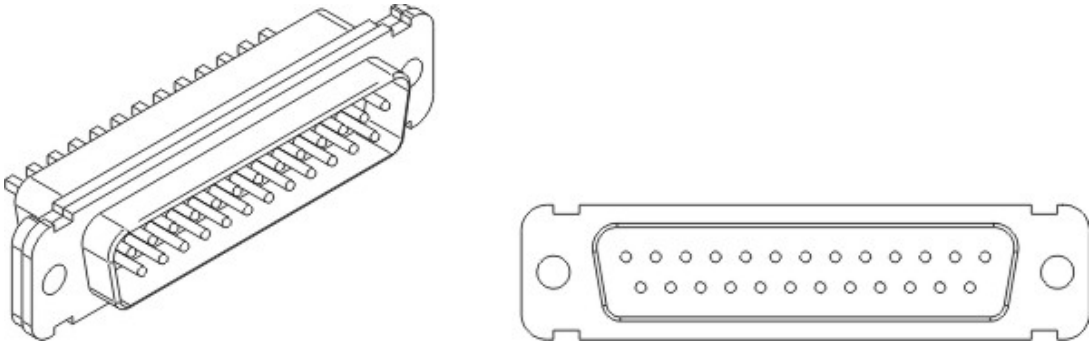


Figure 7: Male panel socket SUB-D 25 (frontal view).

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

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 see paragraph 1.5.4

1.4.4 RS232 CONNECTOR

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

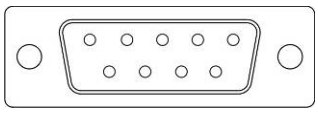


Figure 8: Male panel socket SUB-D 9 (frontal view).

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.

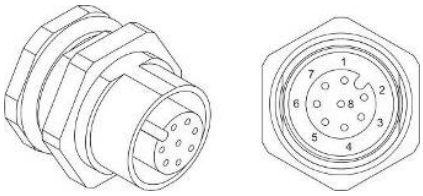


Figure 9: Female panel socket cod. 09-3482-87-08 (front view).

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.

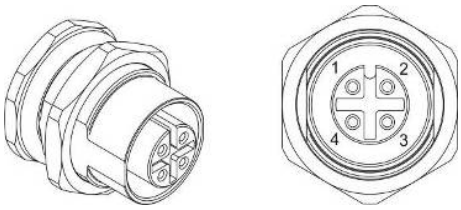


Figure 10: Female panel socket cod. 09-3482-87-04 (front view).

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 ENABLE SIGNAL'S SCHEME (COMMAND BOX CONNECTOR)

ENABLE	DOUBLE ENABLE CONTACT (EN60825-1 COMPLIANT)	
EXT_ENABLE_A	EXT_ENABLE_B	
+12V PIN 8	+12V PIN 2	ENABLE CONTACT IS OFF
+12V PIN 8	+12V PIN 2	ENABLE CONTACT IS OFF
+12V PIN 8	+12V PIN 2	ENABLE CONTACT IS OFF
+12V PIN 8	+12V PIN 2	ENABLE CONTACT IS ON

Figure 11: Enable signal's scheme

1.5.2 LASER CONTROL SIGNALS TIMING

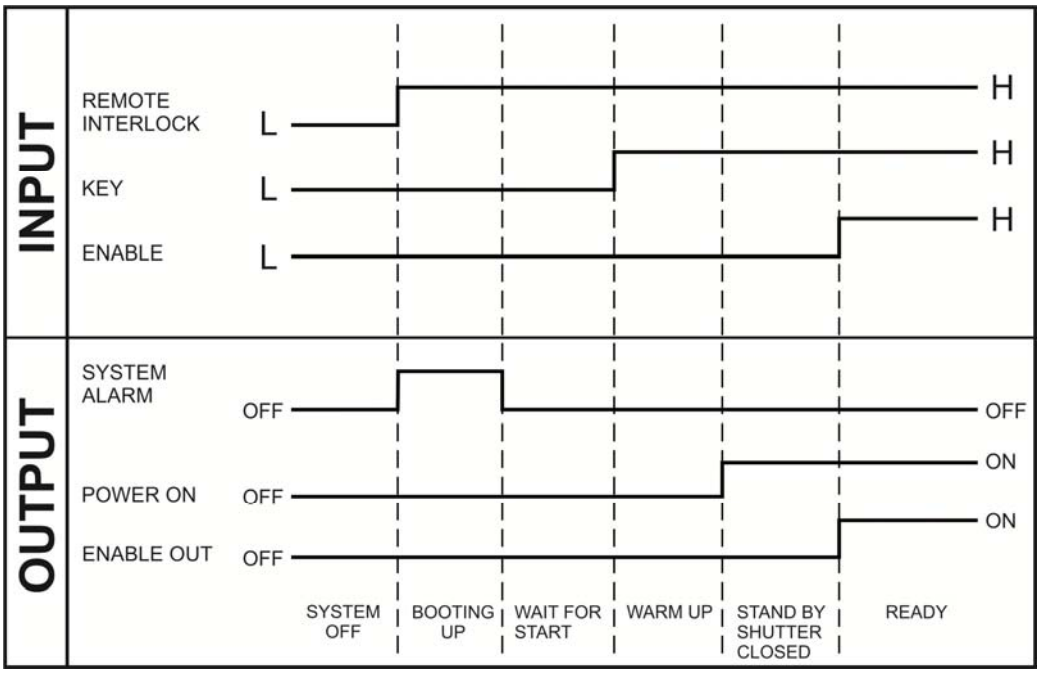


Figure 12: Timing control signals

1.5.3 MARKING PROCESS SIGNALS TIMING

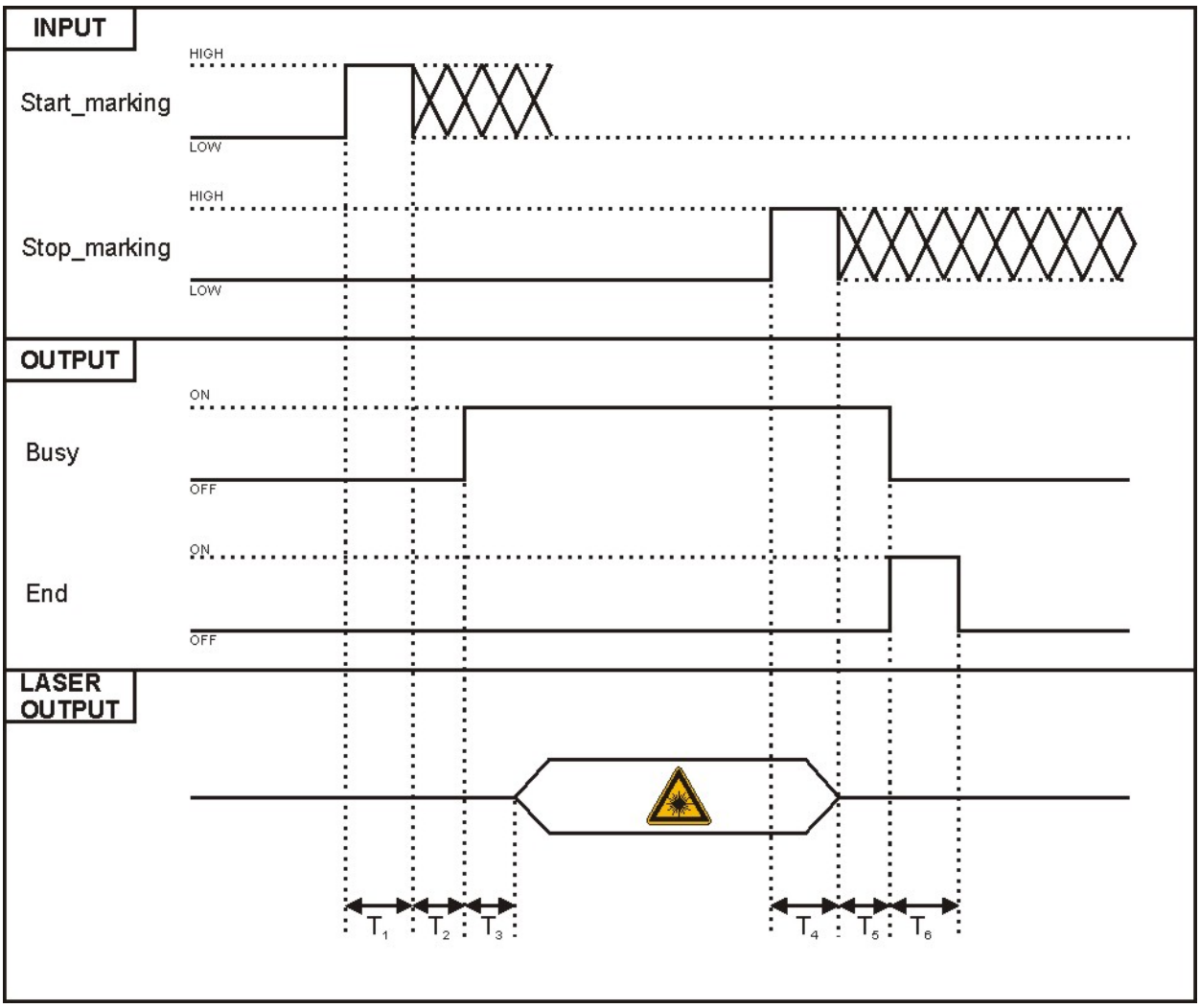


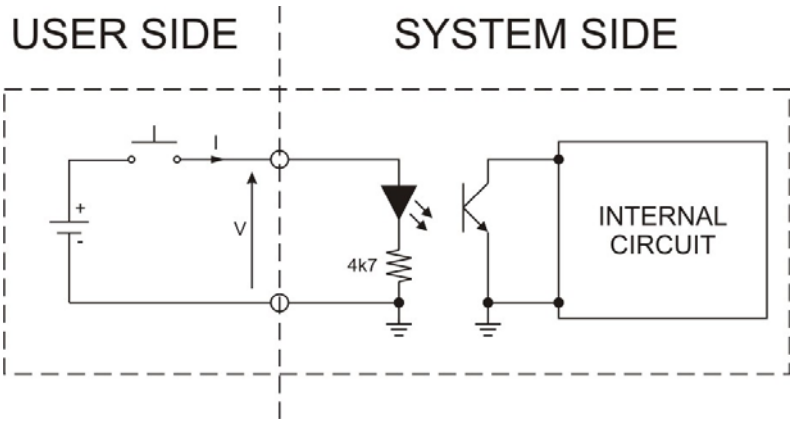
Figure 13: Timing signals (normal operation)

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

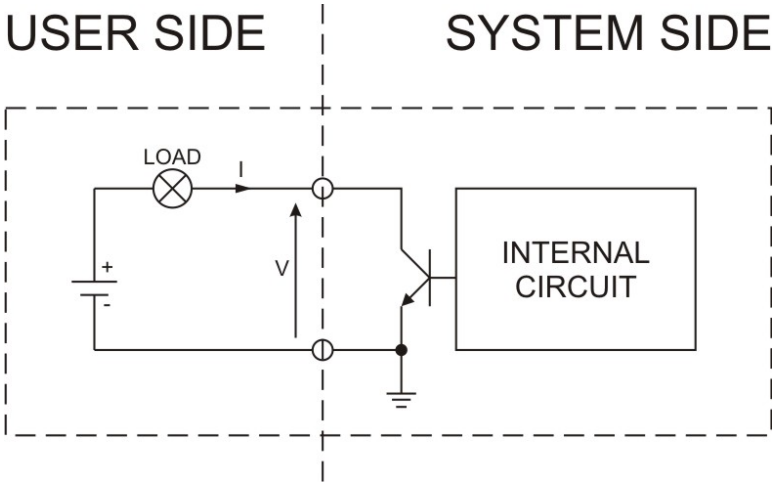
(*) Refer to Lighter user's manual "Setting I/O parameters" to set the signal's properties.

1.5.4 INPUT/OUTPUT SIGNALS SPECIFICATIONS



DIGITAL INPUT:

Type	Optocoupler		
V_{max}	24Vdc		
I_{max}	5mA @ 24Vdc		
Pulse Width	≥ 1ms (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
Vsaturation	<0.5Vdc
Leakage current	< 5µA
OUTPUT State ON	V ≤ 0.5 Vdc; I ≤ 250mA
OUTPUT State OFF	V ≤ 24 Vdc; I ≤ 5µA

1.6 CONNECTION EXAMPLES

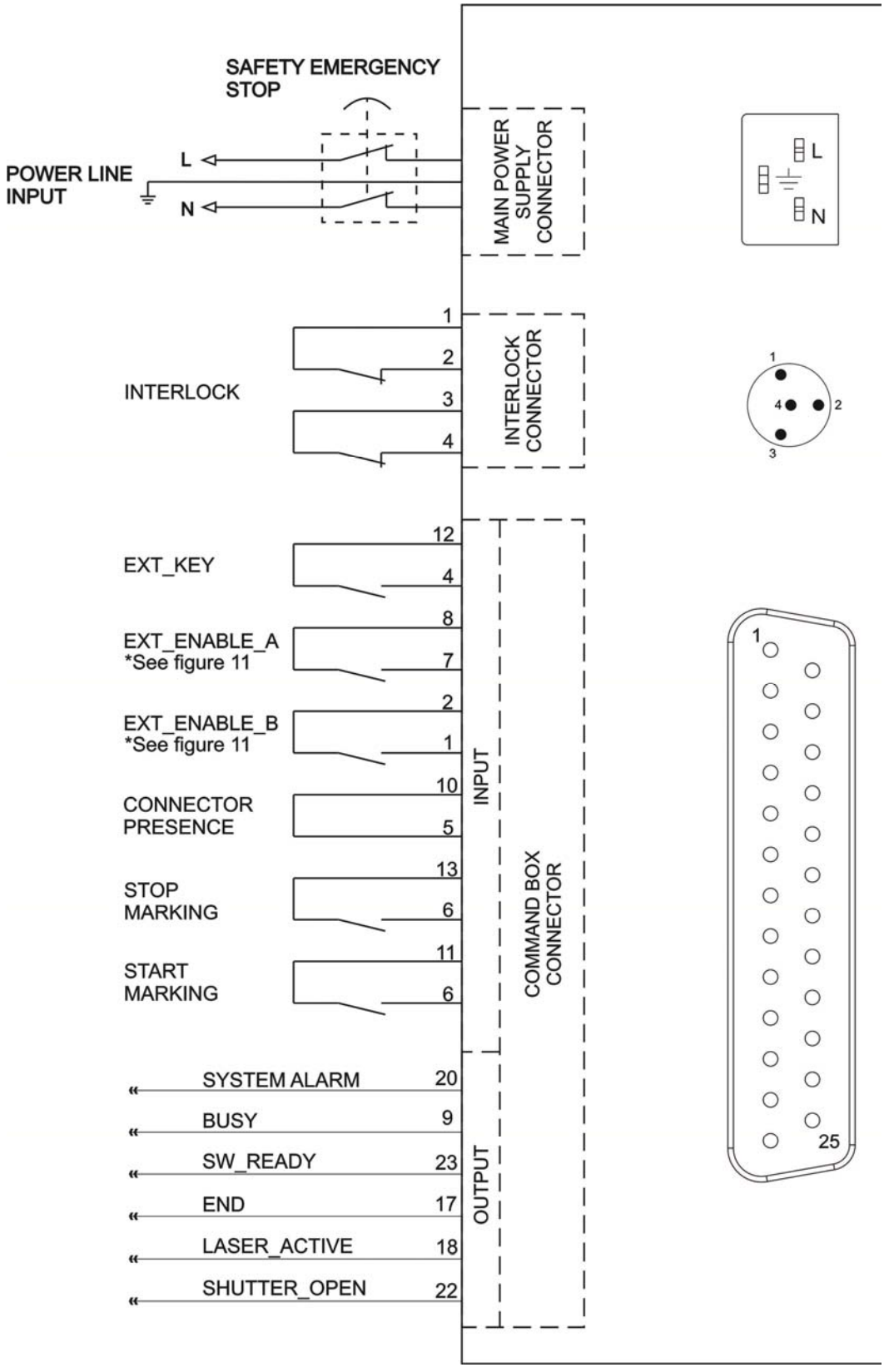


Figure 14: Connection example.

EXAMPLE OF APPLICATIONS AND EXTERNAL CONNECTIONS

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

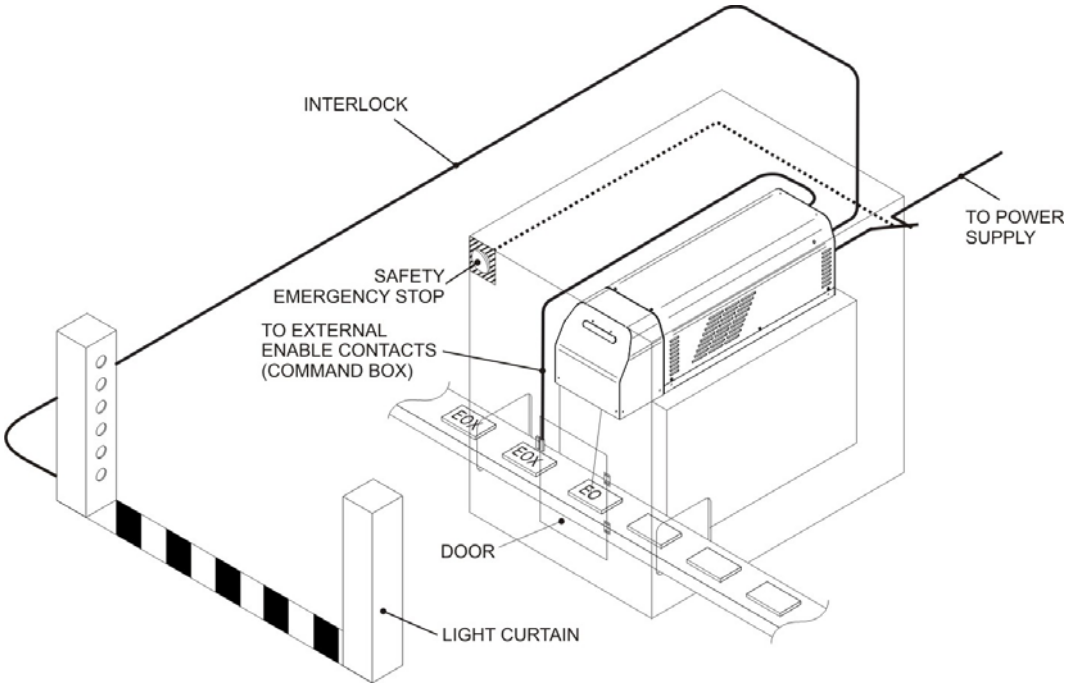


Figure 15: Example of static marking application.

NOTE:

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

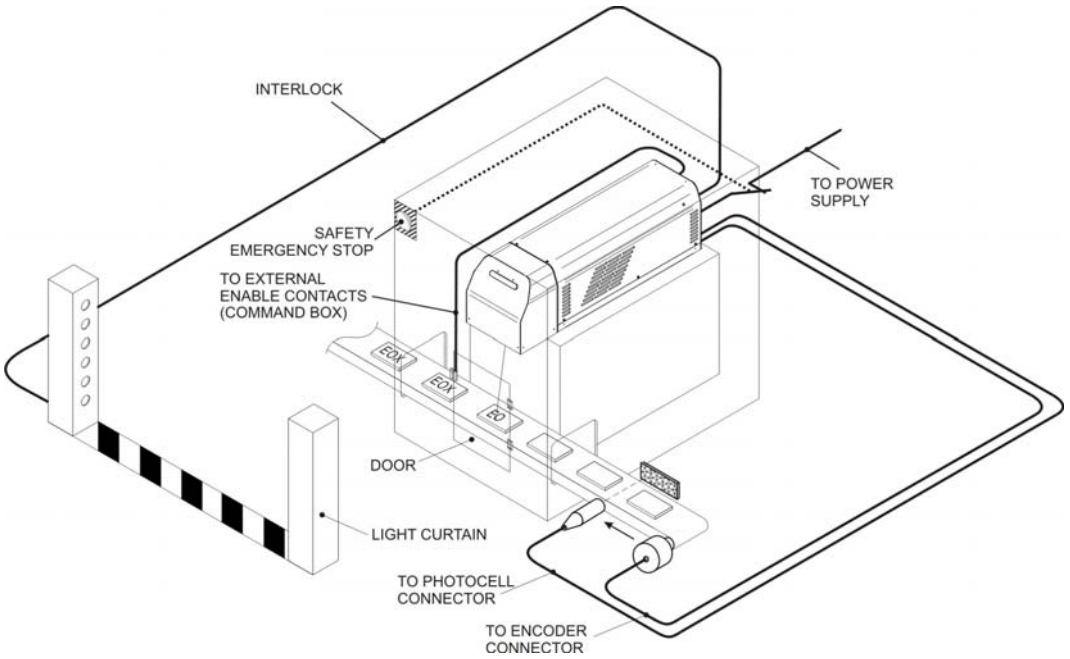


Figure 16: Example of Marking on Fly (MOF) application.

2 INSTALLATION AND SET UP

NOTE:
Eox is a **Class 4** laser source.
For proper use under conditions of safety it must be brought down 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

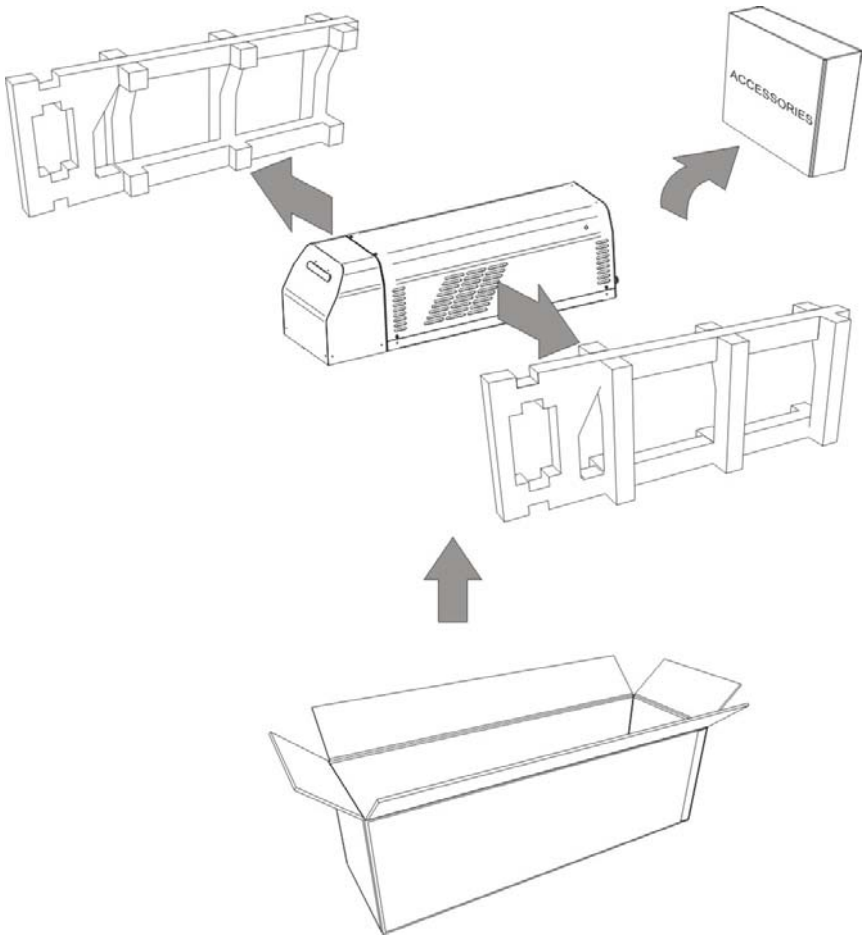


Figure 17: Unpacking.

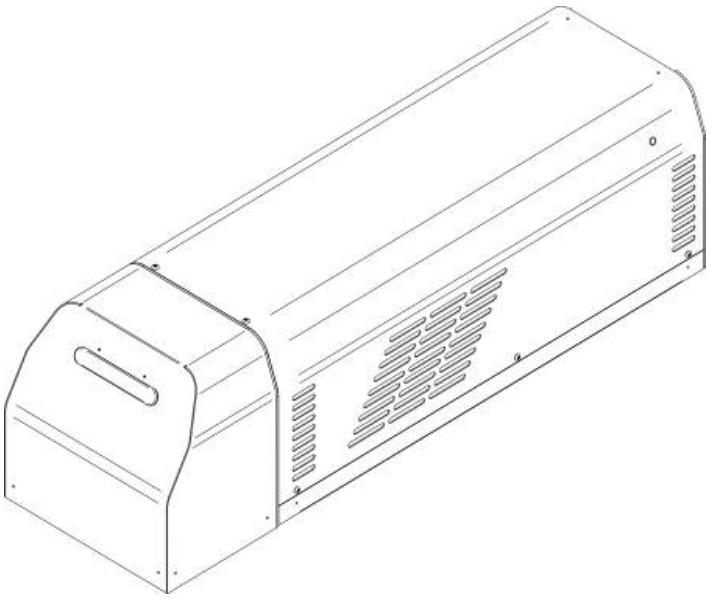
Before installing or operating the marking system, you should:

- 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

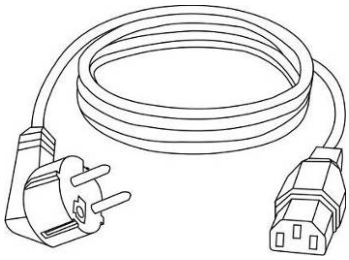
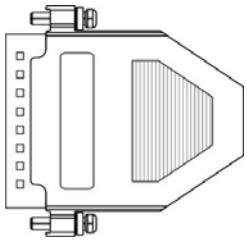
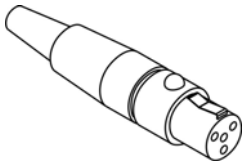
Retain all packaging materials until the marking system has been inspected for completeness and damage, and you have checked the operating performance. If anything is missing or defective, see technical support for contact details.

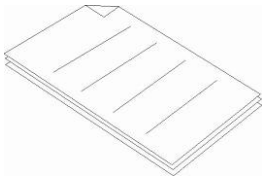
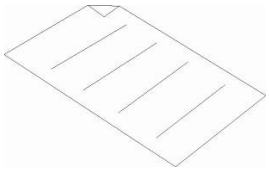
2.2 CONTENTS OF PACKAGING

2.2.1 MAIN HARDWARE



2.2.2 CABLES AND OTHER COMPONENTS

 **Power supply cable**	 **Command Box connector**	 **Interlock connector**

 **USB flash drive**	 **User Manual**	 **Test Report**

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.

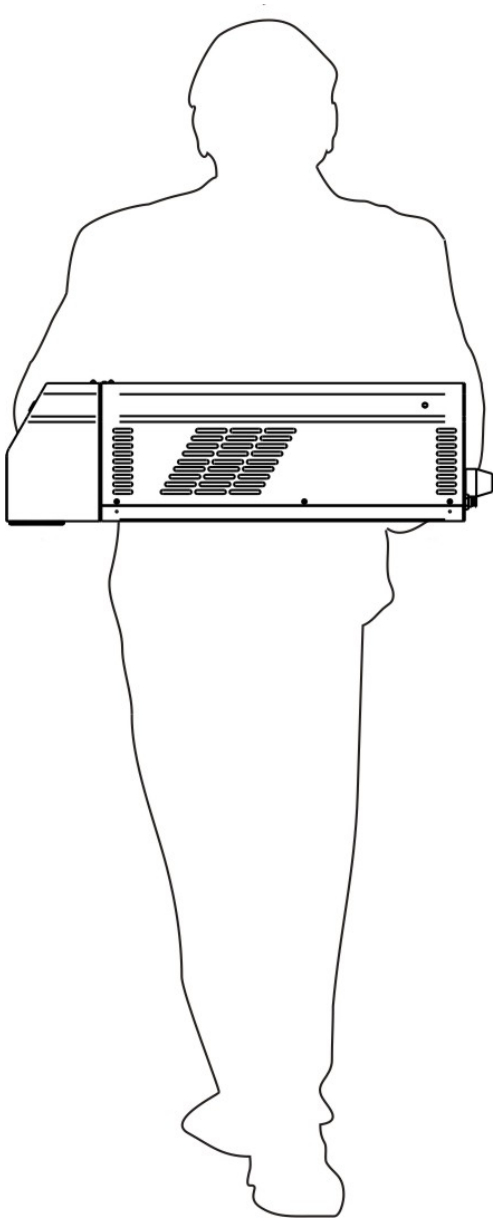


Figure 18: EOX 10W transport.

NOTE:
Eox is a delicate opto-electronic marking system, avoid damaging it with shock and vibrations.

2.4 FIXING AND POSITIONING

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

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

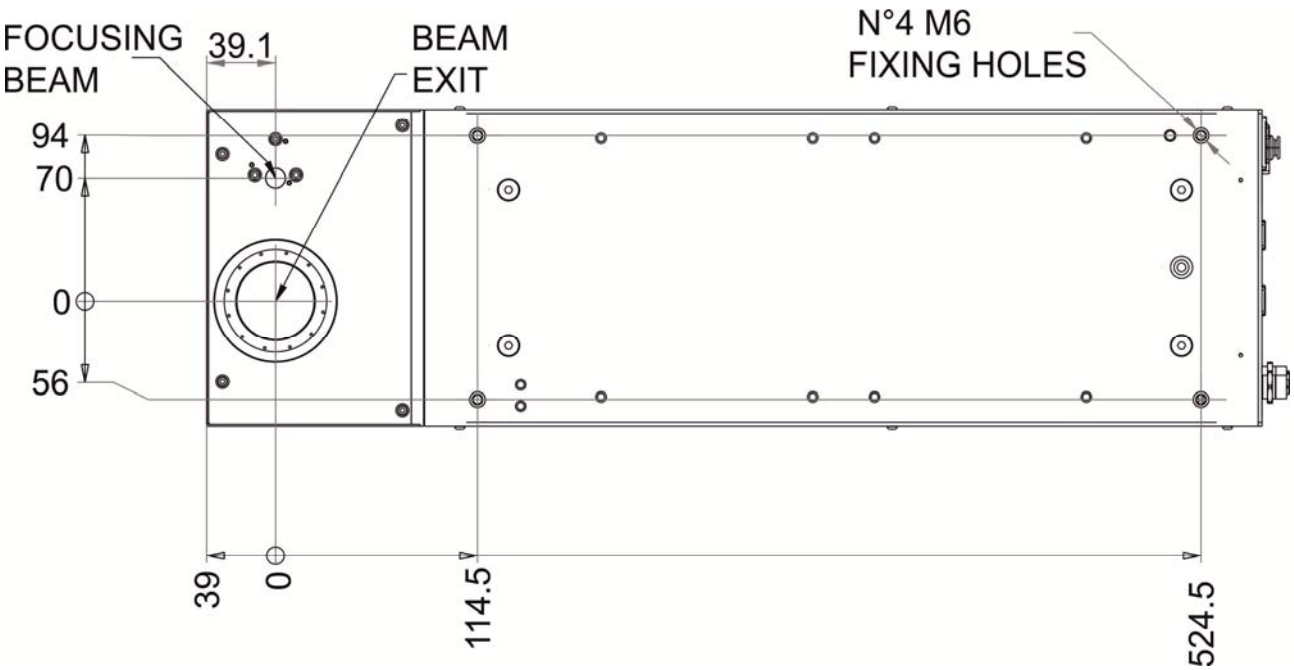


Figure 19: Fixing points on marking system (standard mount).

The marking system must be safely positioned and secured to a specific surface, parallel to the marking area and totally vibration-free. The marking system can be fixed either vertically or horizontally.

NOTE:
It is very important to secure the marking system before you start marking the piece since improper securing or positioning may cause serious damage. Do not secure the marking system in a way other than the one described in the figure.

NOTE:
In order to prevent marking distortions, check for the absence of vibrations between marking system and piece to be marked.

NOTE:
It is recommended to install the marking system on a micrometer positioning Z-axis system!

2.5 INSTALLATION ENVIRONMENT

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

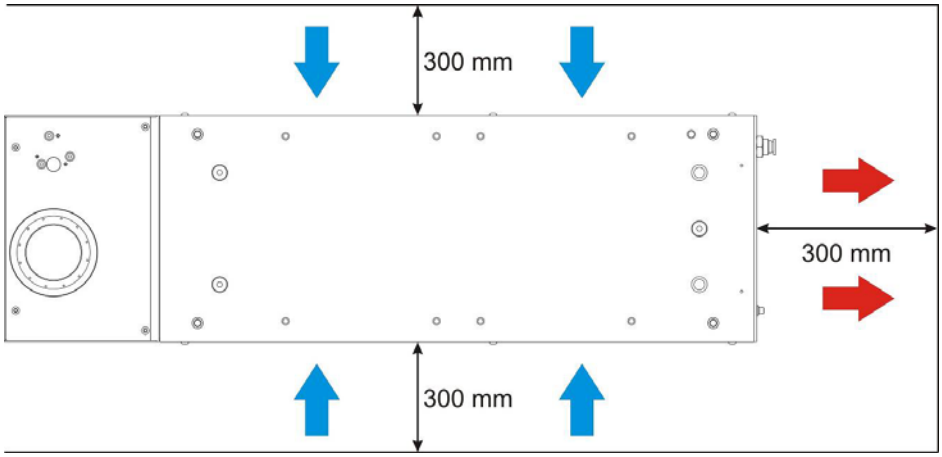


Figure 20: Resonator installation environment.

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.

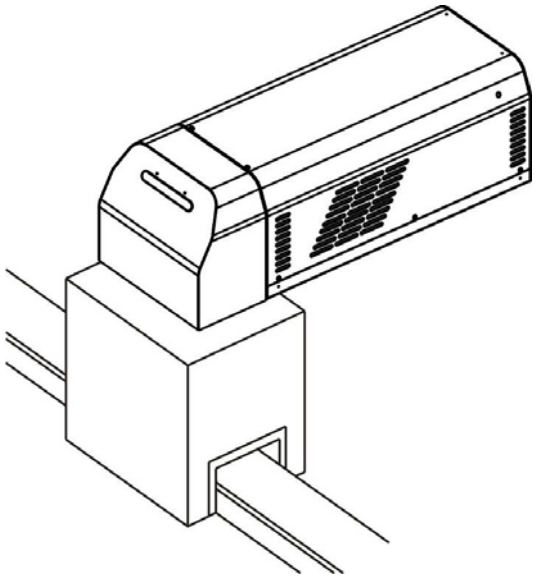


Figure 21: Safety mode example.

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 witch 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 to the other device **WITHOUT** voltage in order to avoid risks to the operator and to the laser source.

2.7.1 COMMAND BOX CONNECTOR CONNECTION

Connecting command box cable.

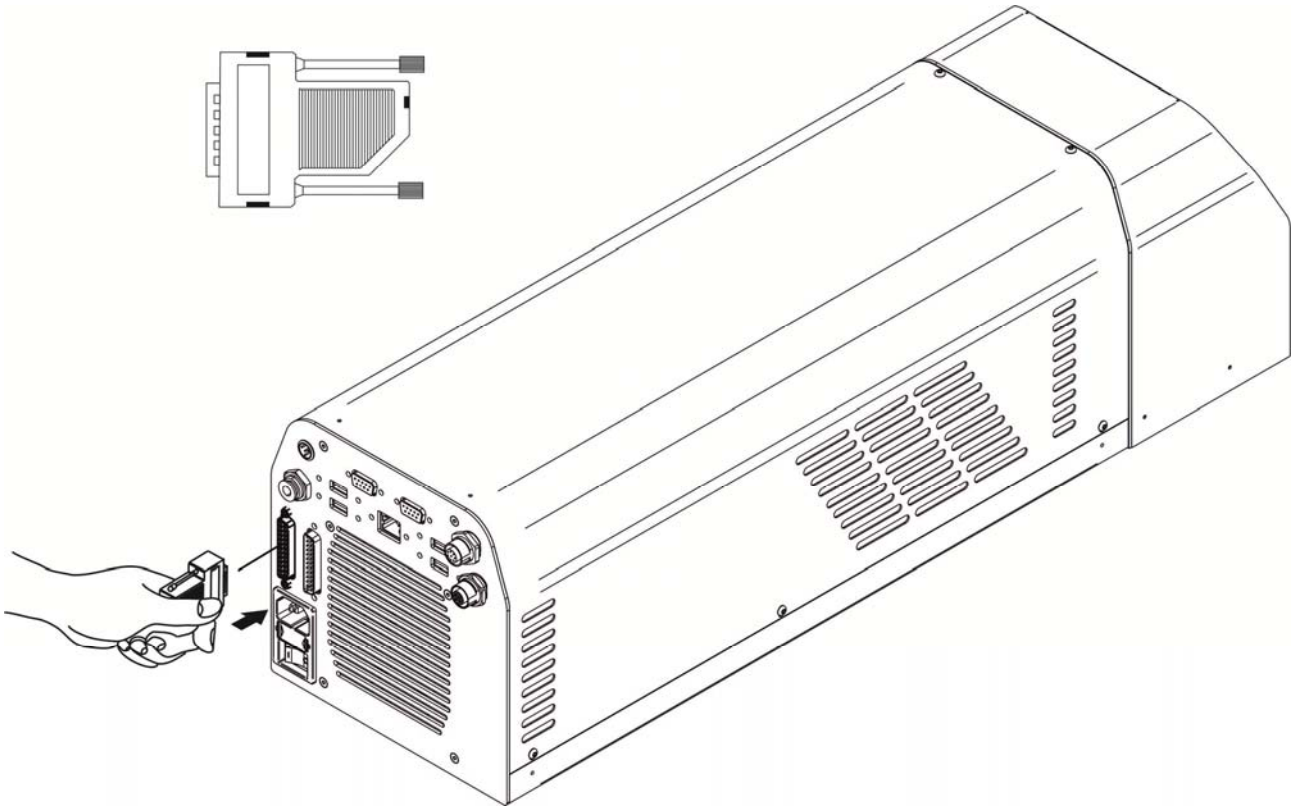


Figure 22: Command Box connector connection.

NOTE:
The command box connector must always be inserted and wired properly in order to use the marking system. If this connection is not present the marking system goes in error status.

2.7.2 INTERLOCK CONNECTOR CONNECTION

Connecting interlock connector.

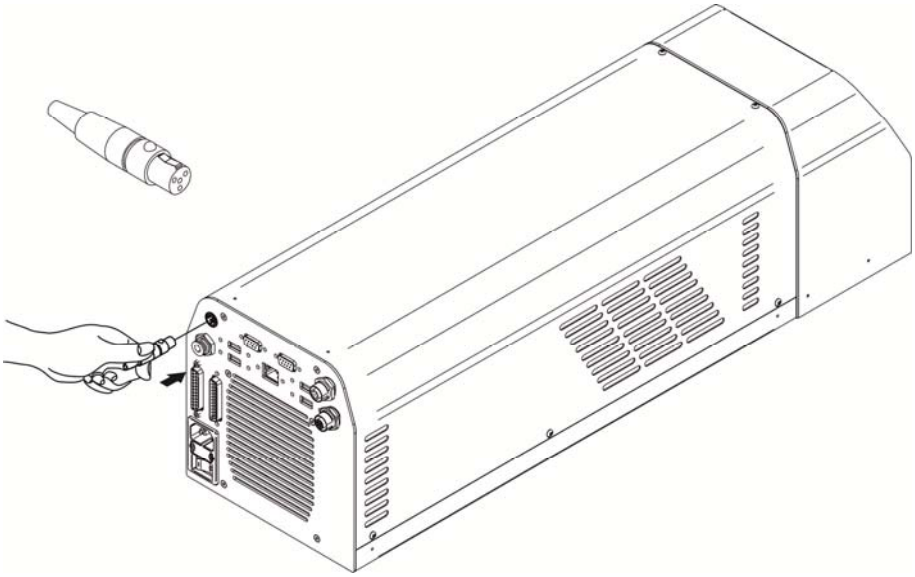


Figure 23: Interlock connector connection.

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

2.7.3 POWER SUPPLY CABLE CONNECTION

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

Connecting power supply cable.

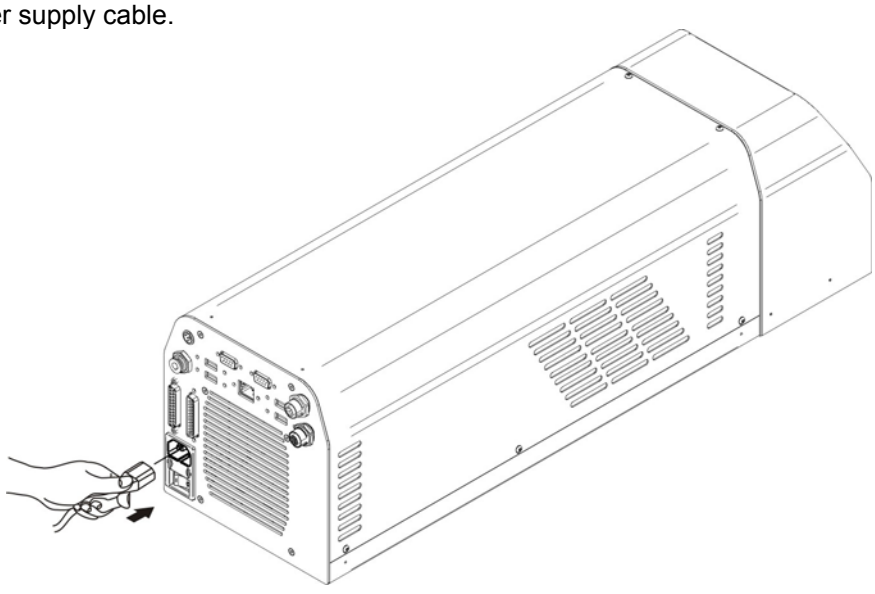


Figure 24: Connecting power supply cable.

2.7.4 LOCAL 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:

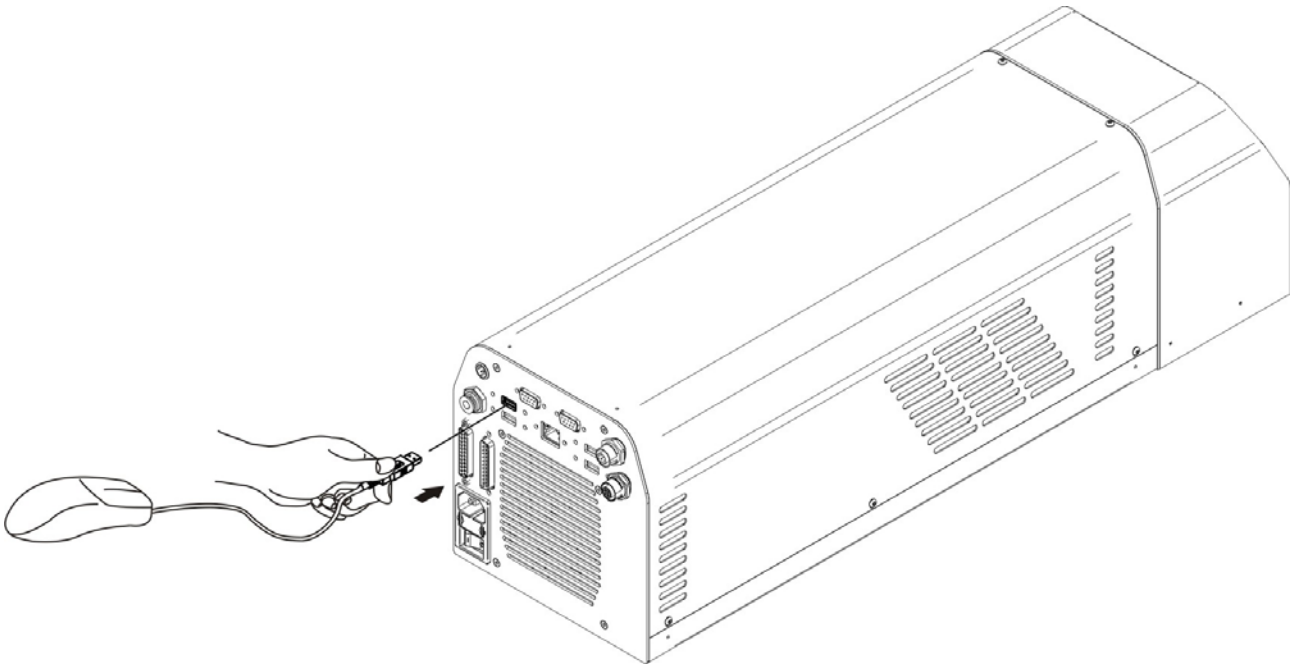


Figure 25: USB mouse connection.

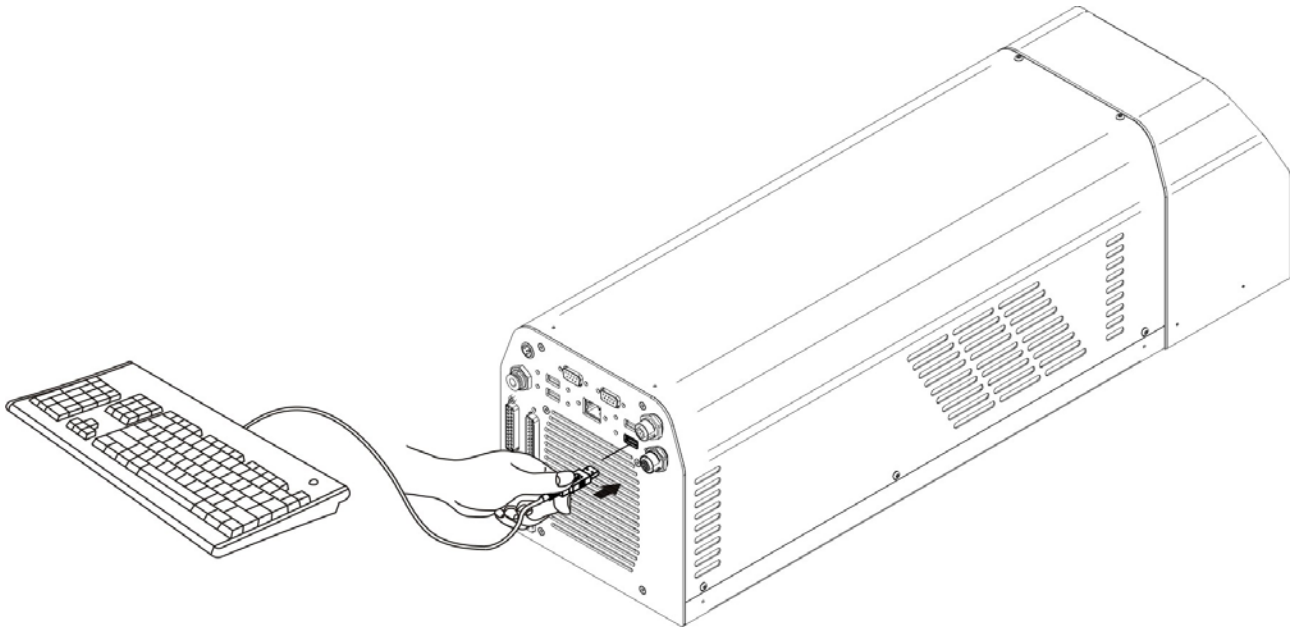


Figure 26: USB keyboard connection.

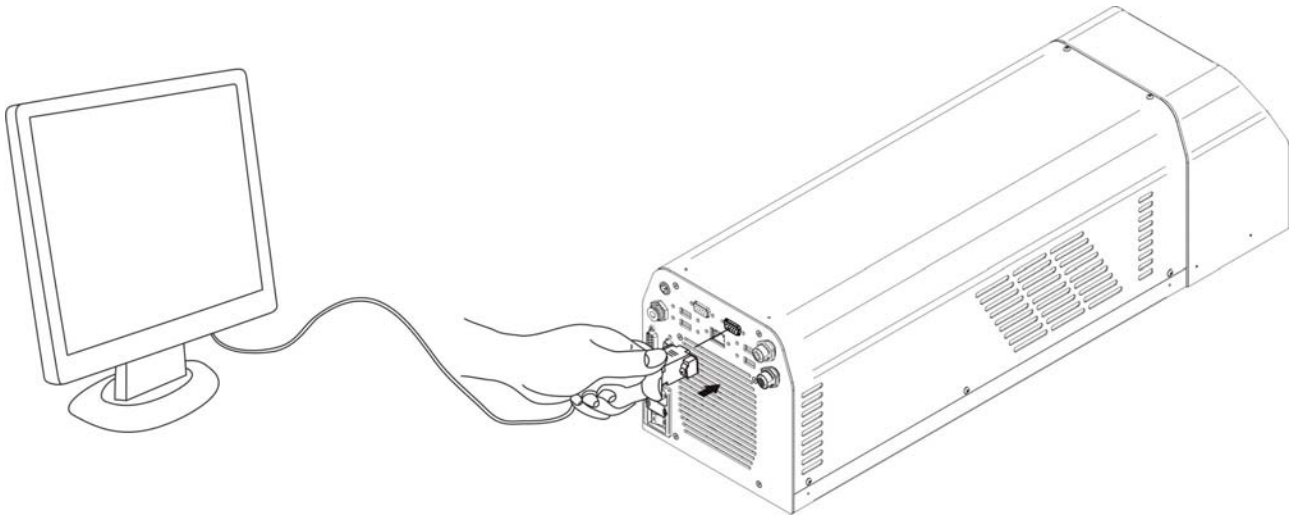


Figure 27: VGA monitor connection.

NOTE:
Minimum resolution 800 x 600.

2.7.5 REMOTE CONTROL MODE CONNECTION

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

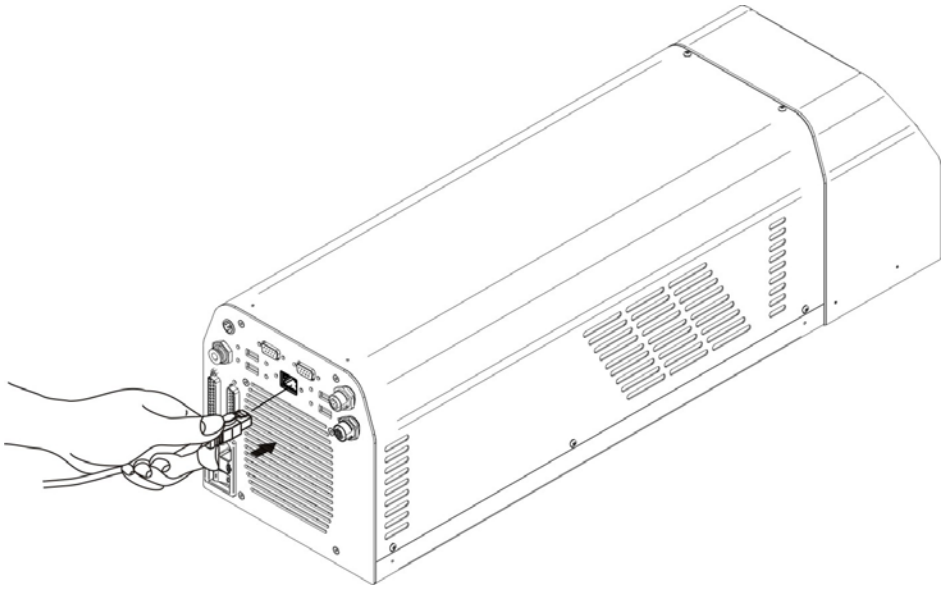


Figure 28: Ethernet connection.

NOTE:
Ethernet TCP/IP 10, 100 Mbit.

2.7.6 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):

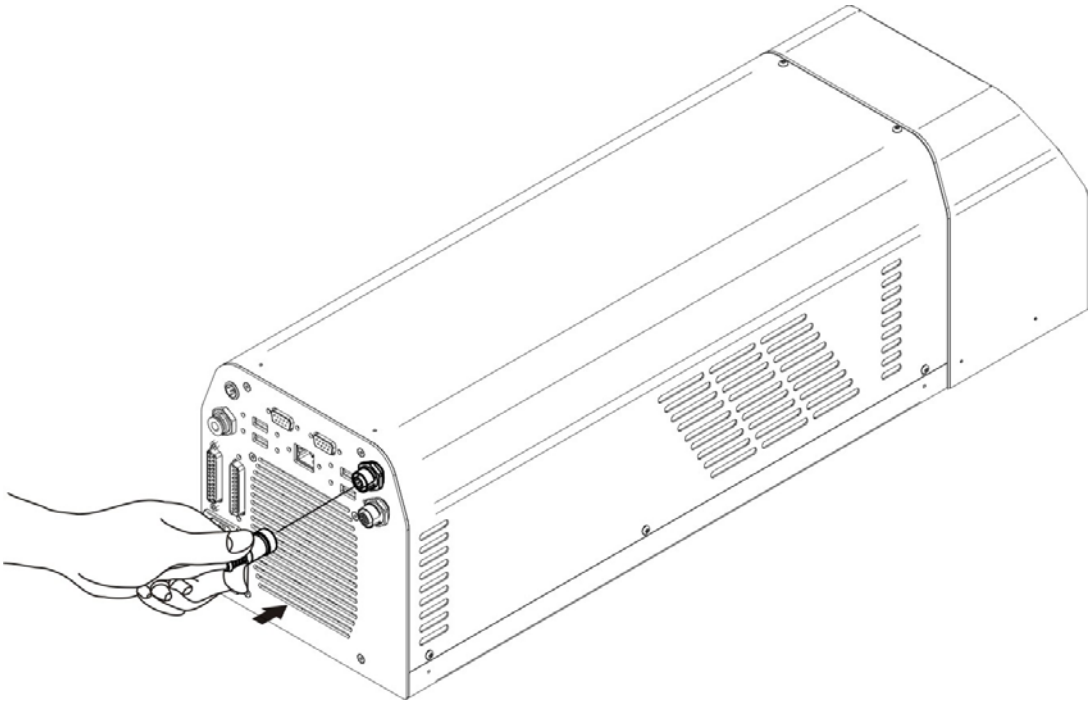


Figure 29: Photocell connection.

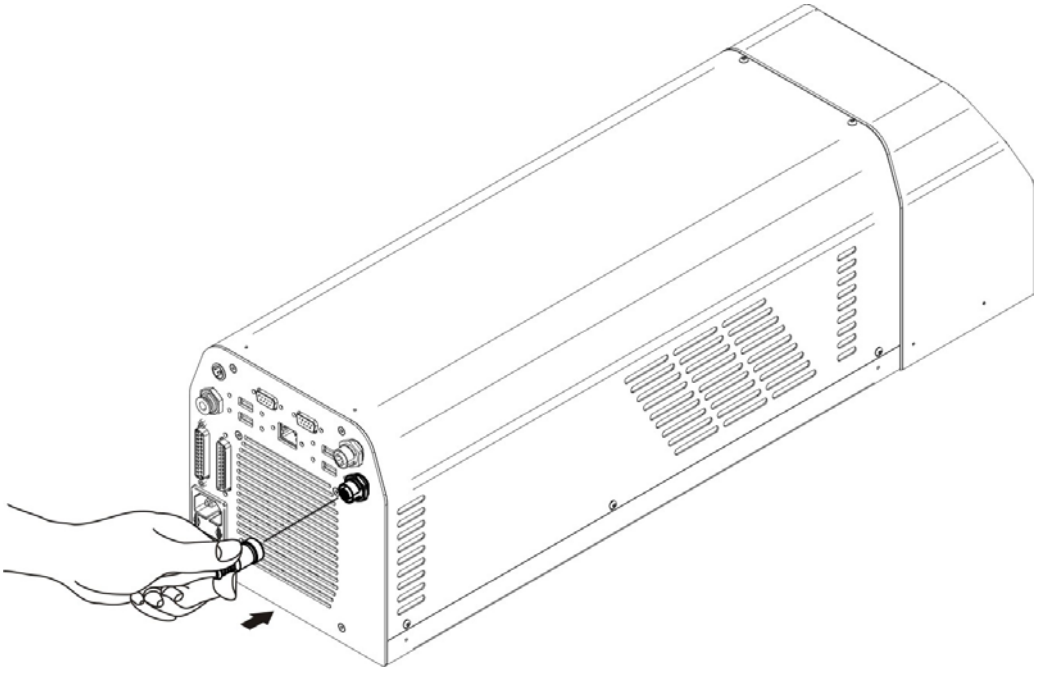


Figure 30: Encoder connection.

3 USE AND OPERATION

3.1 POWER ON PROCEDURE

1) Before turning on the marking system, be sure that the devices are connected as previously described. Check presence of voltage power supply connection, interlock connector and Command Box connection.

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

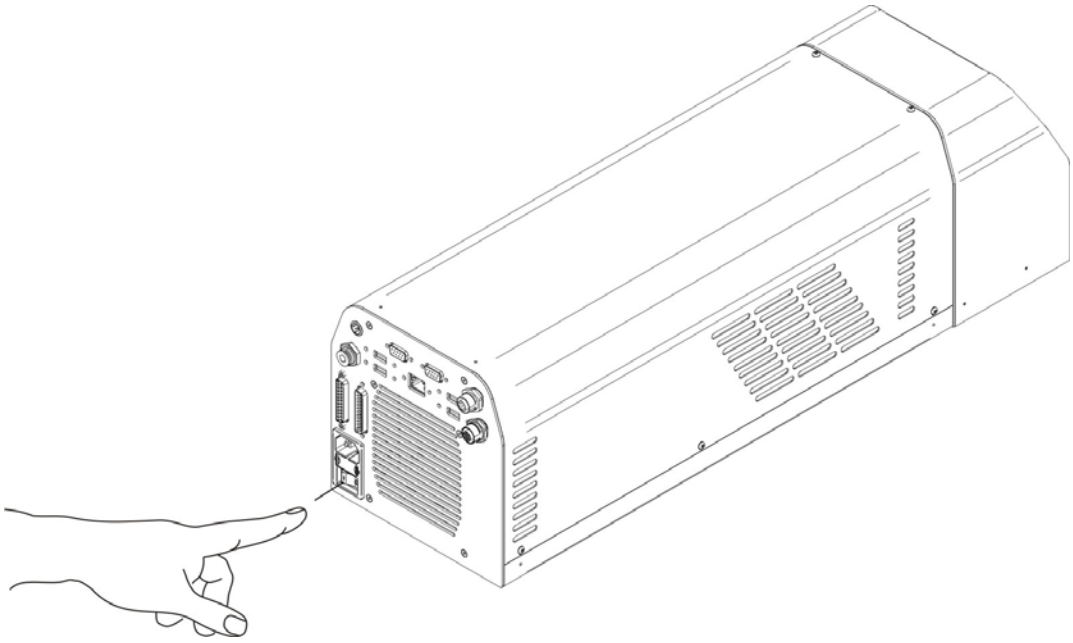


Figure 31: Power on.

If the marking system is turned on cooling fans are running. If possible to know if the marking system is switched on checking the EXT_12V auxiliary power supply available on the Command Box Connector.

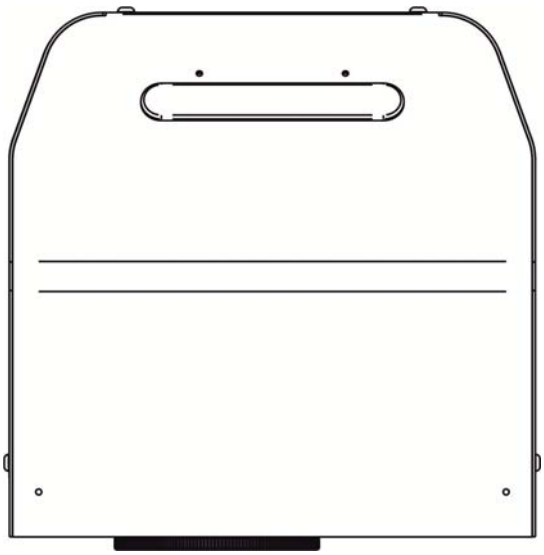


Figure 32: Status led bar turned off.

3) After booting up the marking system allows to activate EXT_KEY signal on Command Box connector:

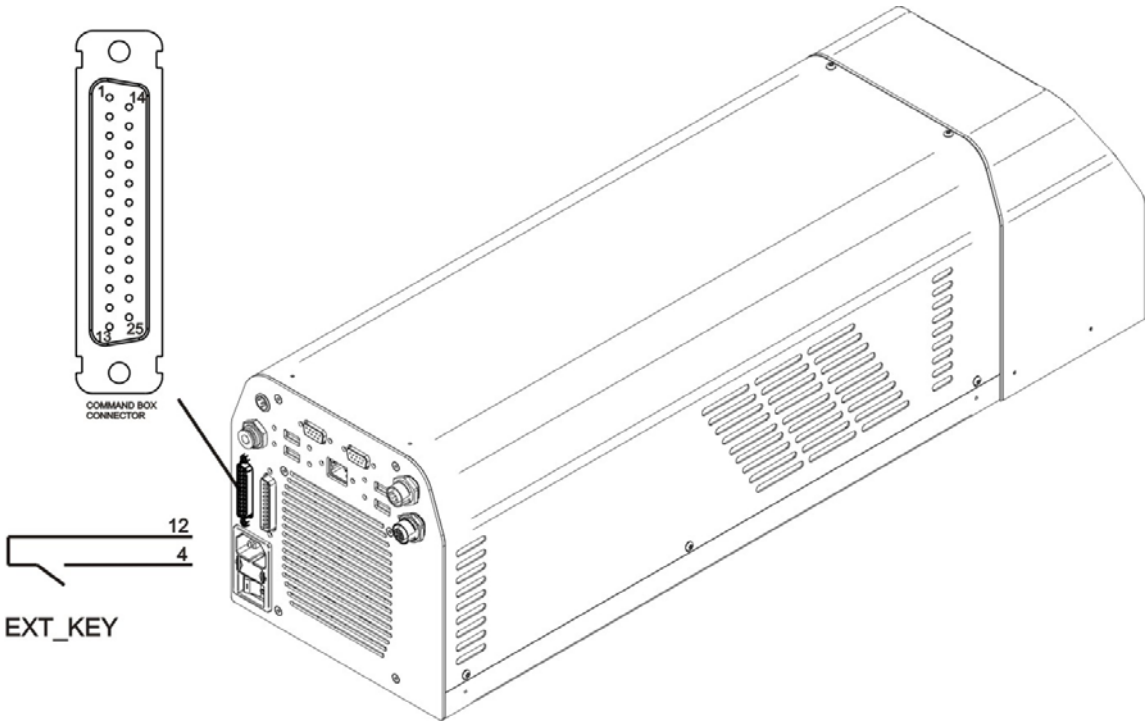


Figure 33: KEY command activation.

With EXT_KEY signal activated the led bar becomes green and “LASER ACTIVE” signal is activated on Command Box connector.

NOTE:
Refer to paragraph 1.5 for any further information on the connections.

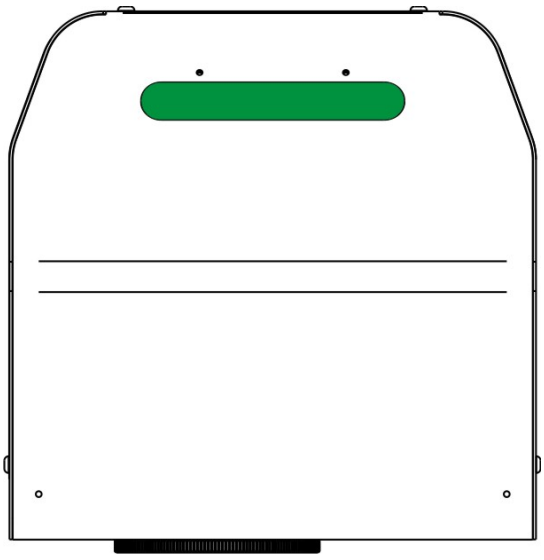


Figure 34: Led bar status.

4) Activate EXT_ENABLE_A and EXT_ENABLE_B signals on the Command Box connector:

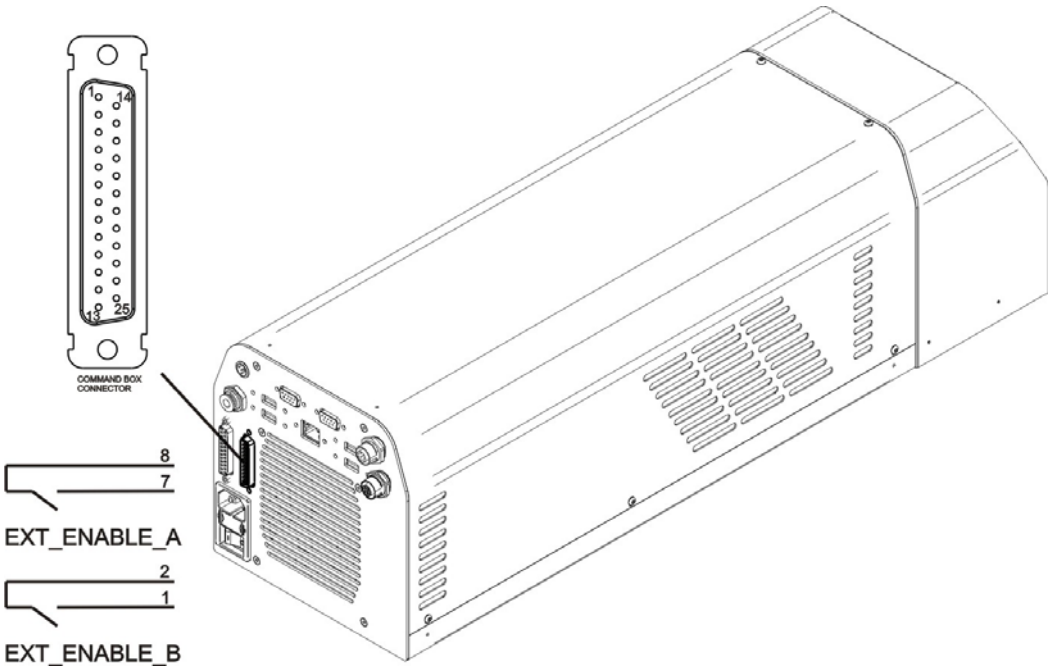


Figure 35: ENABLE command activation.

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!**

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

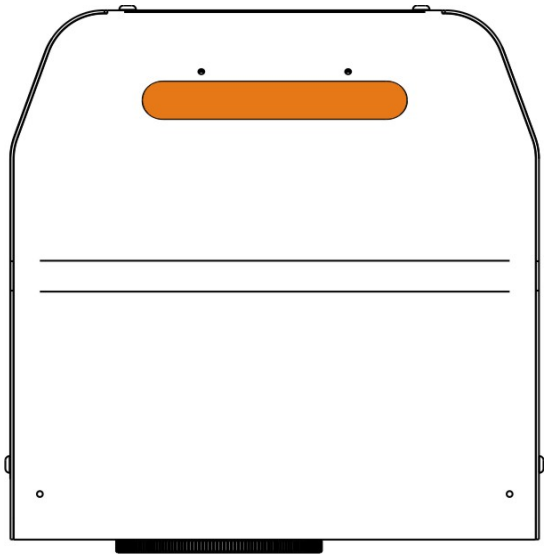


Figure 36: Led bar status.

5) During laser emission led bar becomes red. The BUSY output signal is active on the Command Box connector.

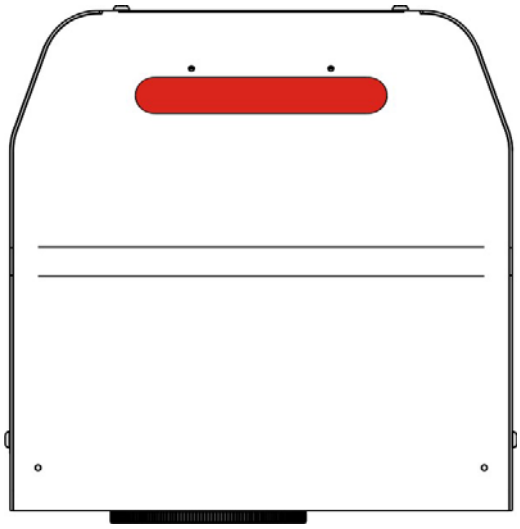


Figure 37: Led bar status.

NOTE:
Refer to paragraph 1.5 for any further information on the connections.

RESUME TABLE

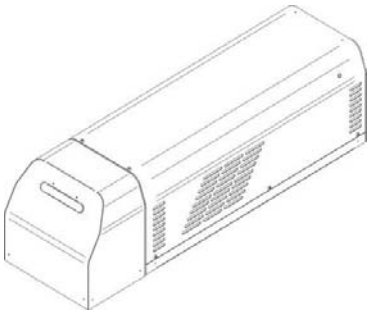
STATUS	STATUS LED	INPUT STATUS (*)	OUTPUT STATUS (*)
SYSTEM BOOTING UP	TURNED OFF	KEY LOW ENABLE LOW	ALARM OFF LASER ACTIVE OFF SHUTTER OPEN OFF
WAIT FOR START	TURNED OFF	KEY LOW ENABLE LOW	ALARM OFF LASER ACTIVE OFF SHUTTER OPEN OFF
STANDBY SHUTTER CLOSED	STEADY GREEN	KEY HIGH ENABLE LOW	ALARM OFF LASER ACTIVE ON SHUTTER OPEN OFF
READY	STEADY ORANGE	KEY HIGH ENABLE HIGH	ALARM OFF LASER ACTIVE ON SHUTTER OPEN ON

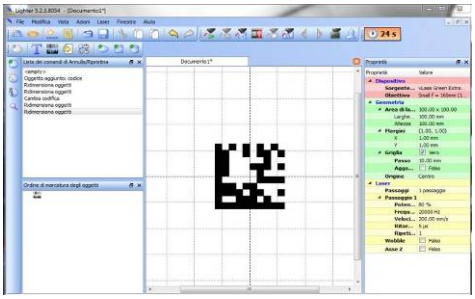
STATUS	STATUS LED	OUTPUT STATUS (*)
WARNING INVALID START SEQUENCE	BLINKING ORANGE (2Hz)	ALARM OFF LASER ACTIVE OFF SHUTTER OPEN OFF
SYSTEM ERROR	BLINKING RED (2Hz)	ALARM ON LASER ACTIVE OFF SHUTTER OPEN OFF

(*) See paragraph 1.5 for more information.

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.





+

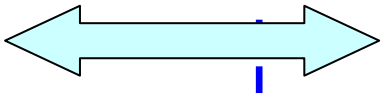
=

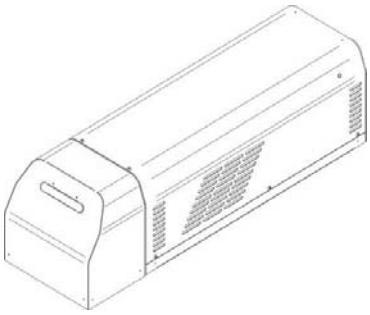
SW Editor
SW Engine
Correction Matrix
Laser Control
Galvo Control

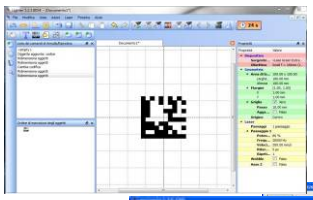
3.3 REMOTE MODE OPERATIONS

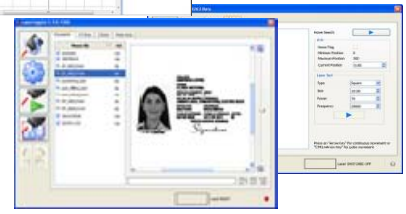
Keyboard, mouse and monitor are not necessary in this configuration.

LAN





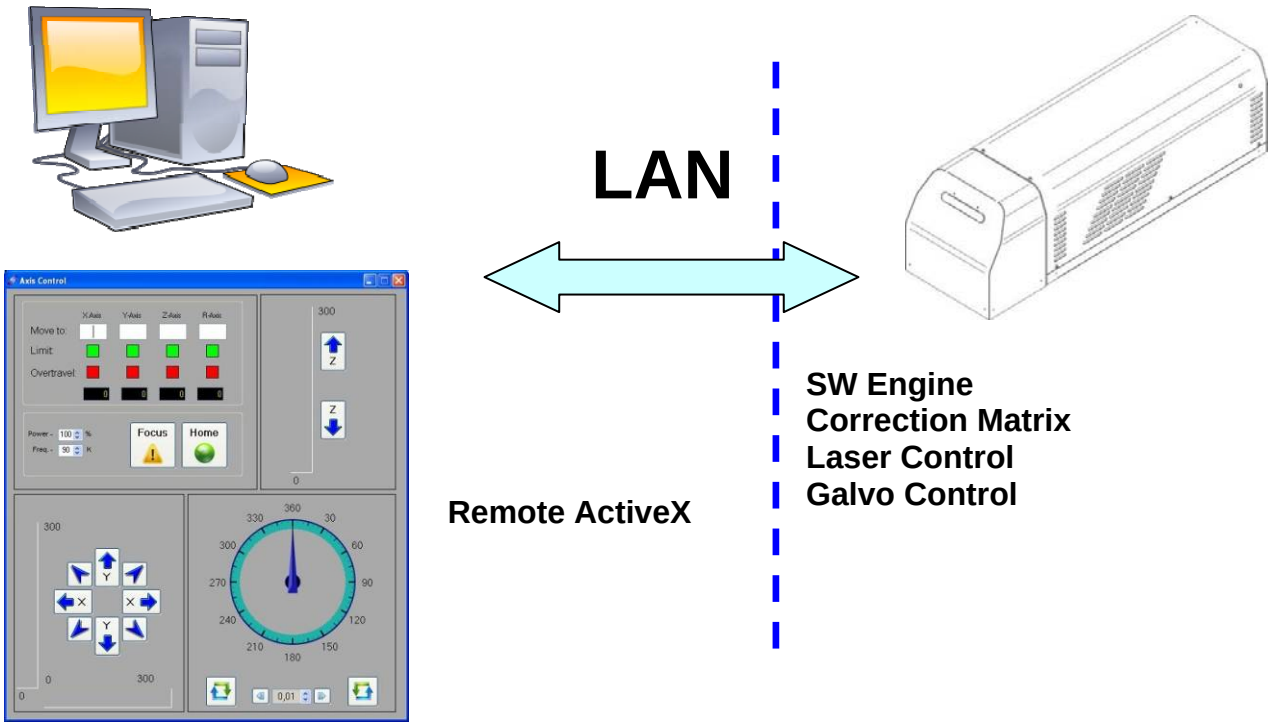




SW Editor
Remote SW Engine
Remote Active-X

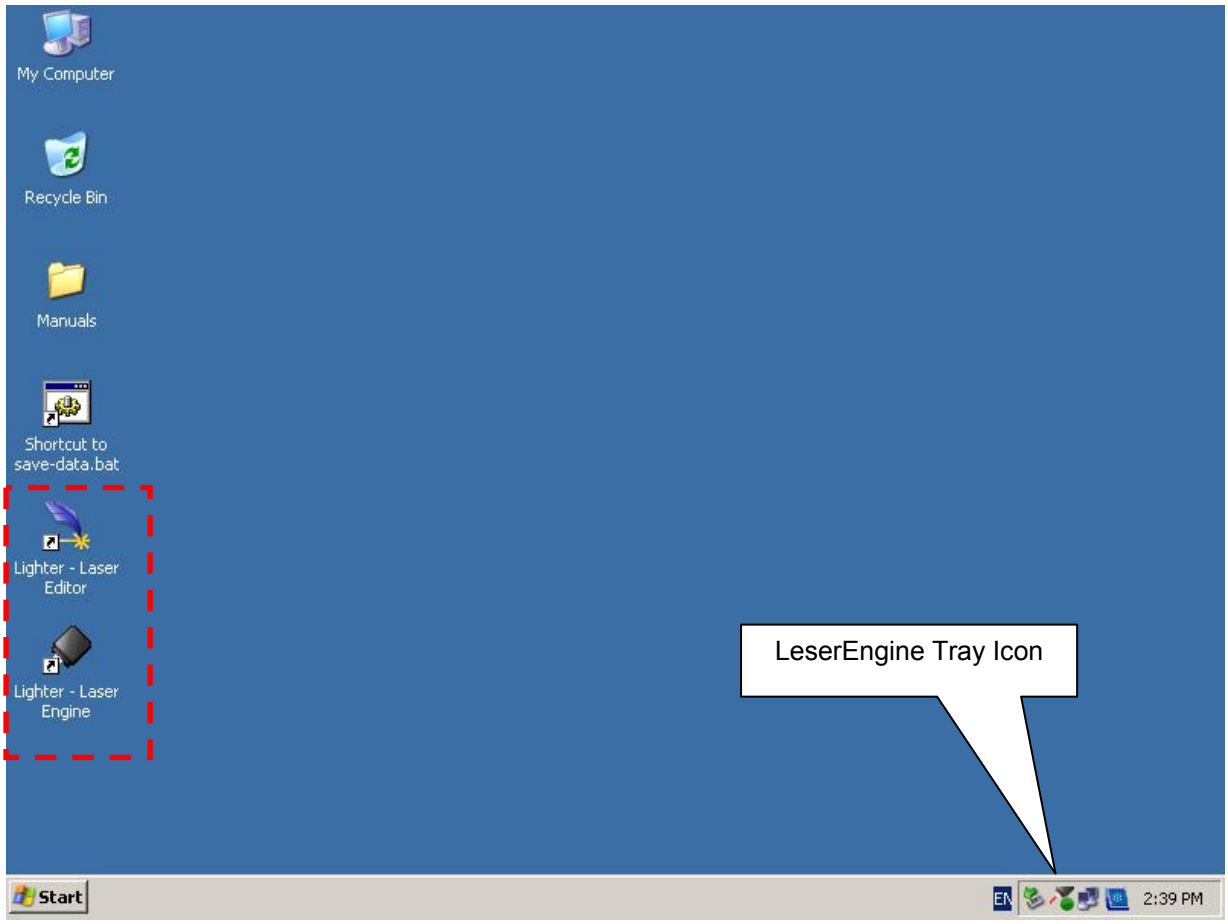
SW Engine
Correction Matrix
Laser Control
Galvo Control

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.



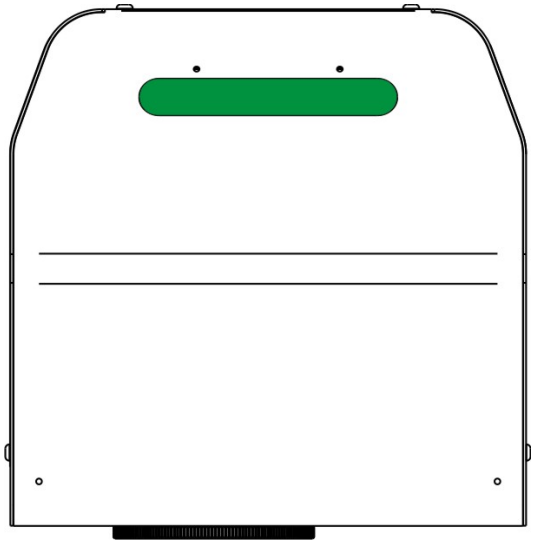
3.4 OPERATING IN LOCAL MODE

Connecting monitor, mouse & keyboard to the marking system (paragraph 2.6.5) allows the operator to access the console which contains the instruments to operate with laser.



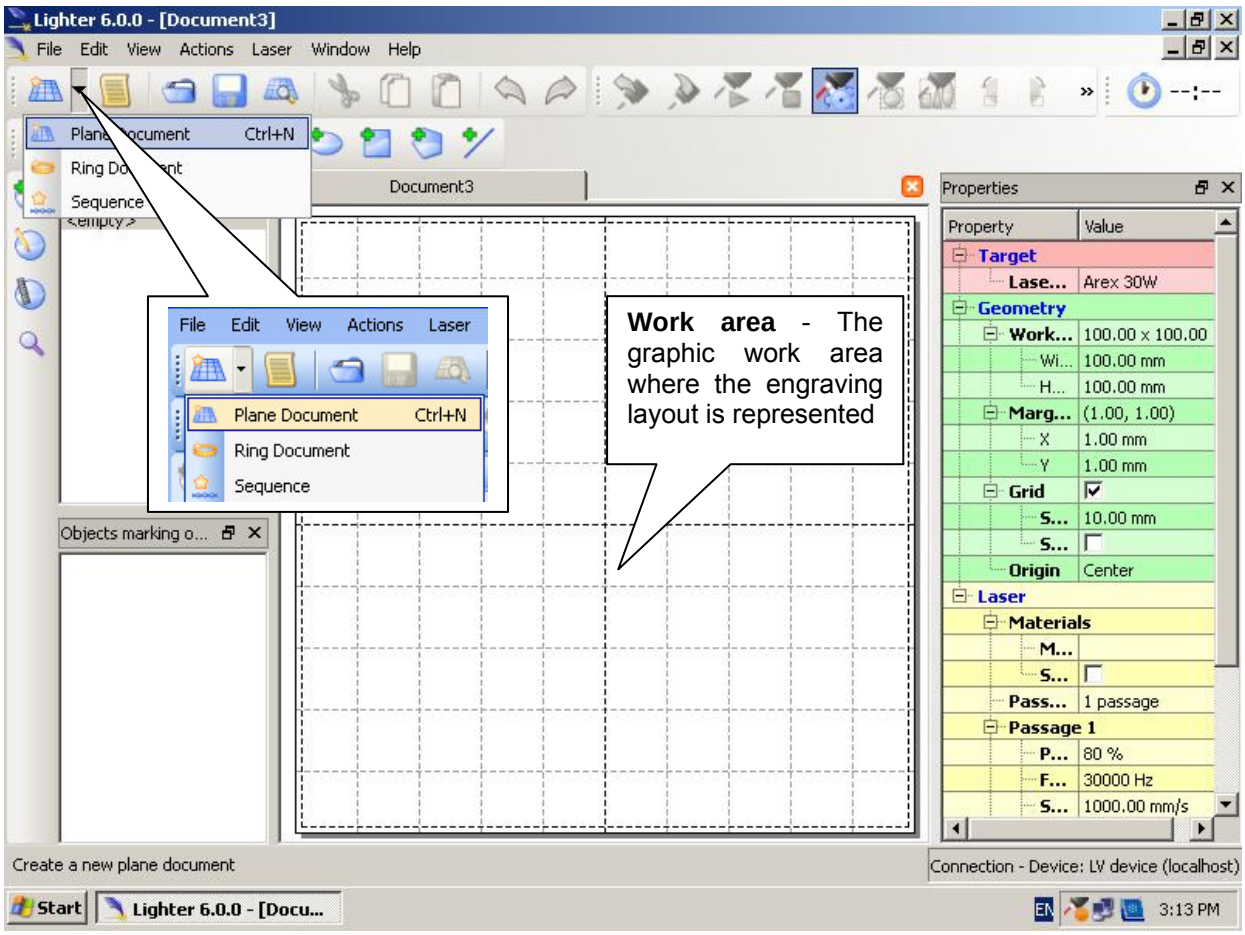
	Laser Editor is a software that allows to easily mark or engrave product identification information such as 2D matrix codes, barcodes, text, alpha-numeric serial numbers, date codes, part numbers, graphics and logos in any production environment. With Laser Editor you can: o edit graphic layouts o set 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

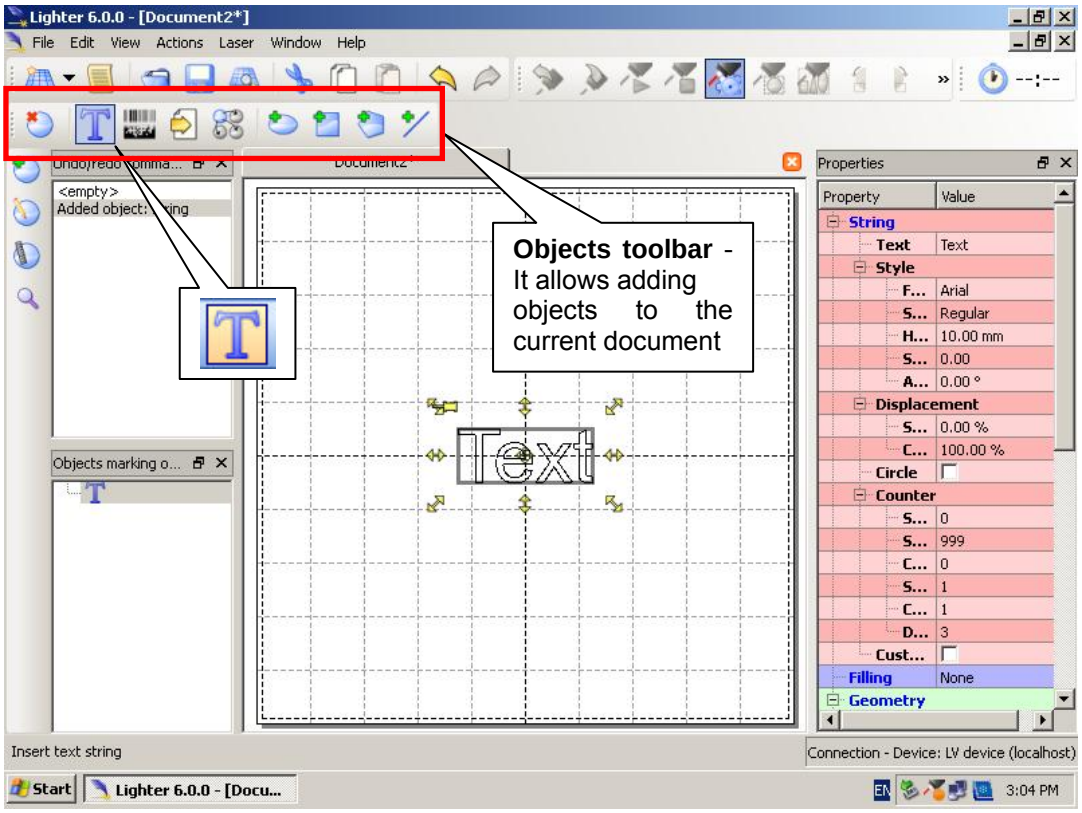


Double click on LaserEditor icon to start the layout editor application 

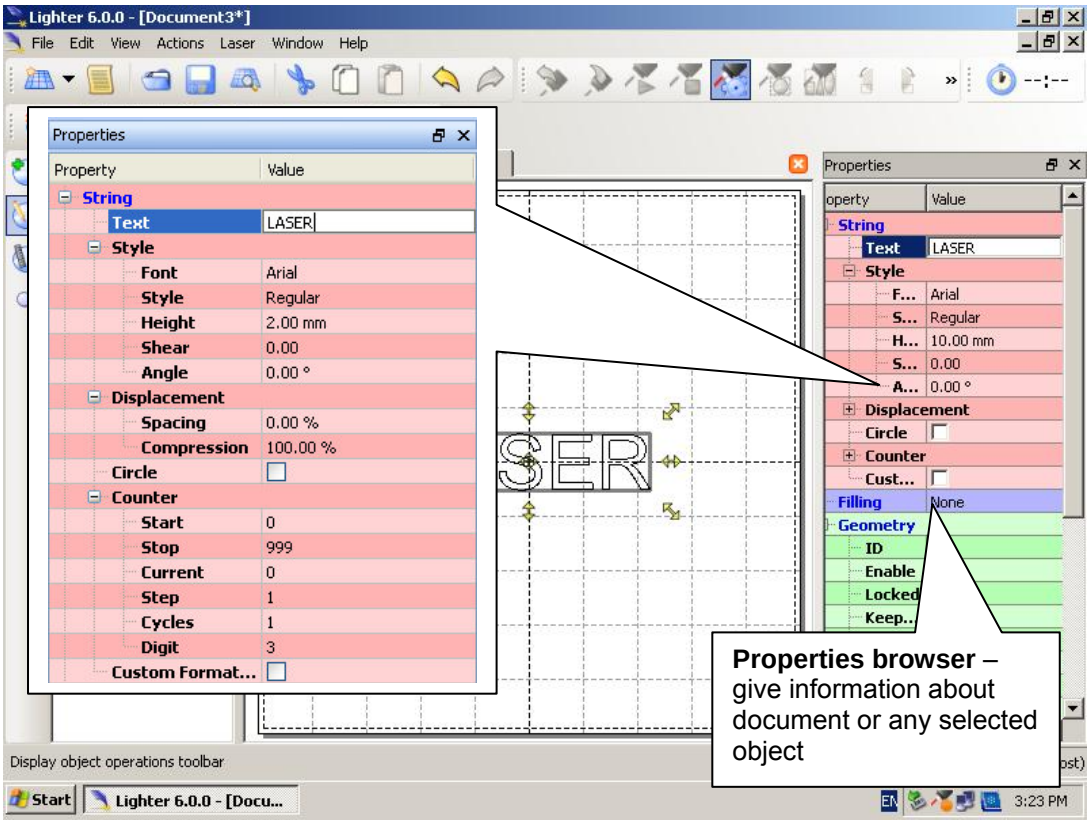
Click on the document type selector and choose *Plane Document:*



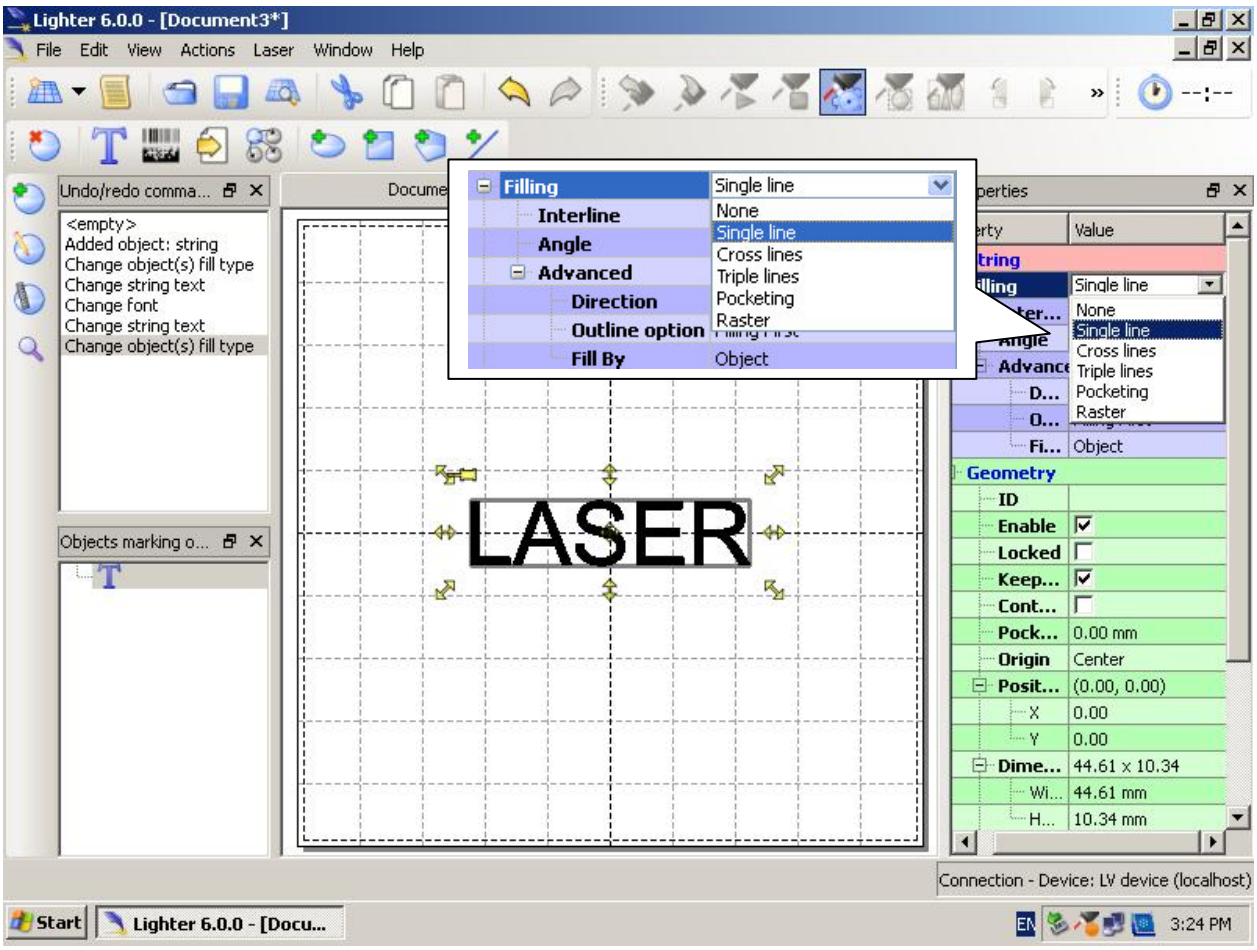
Click on the *Text String* icon in the Object toolbar to add a string object to the plane:



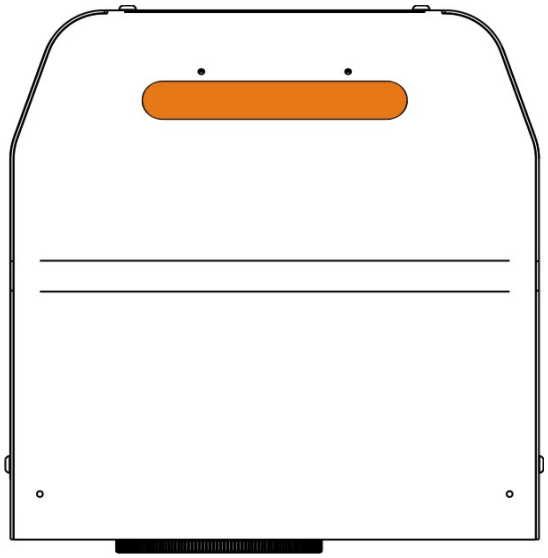
Edit String property like value, font, style, etc using the *Properties browser*:



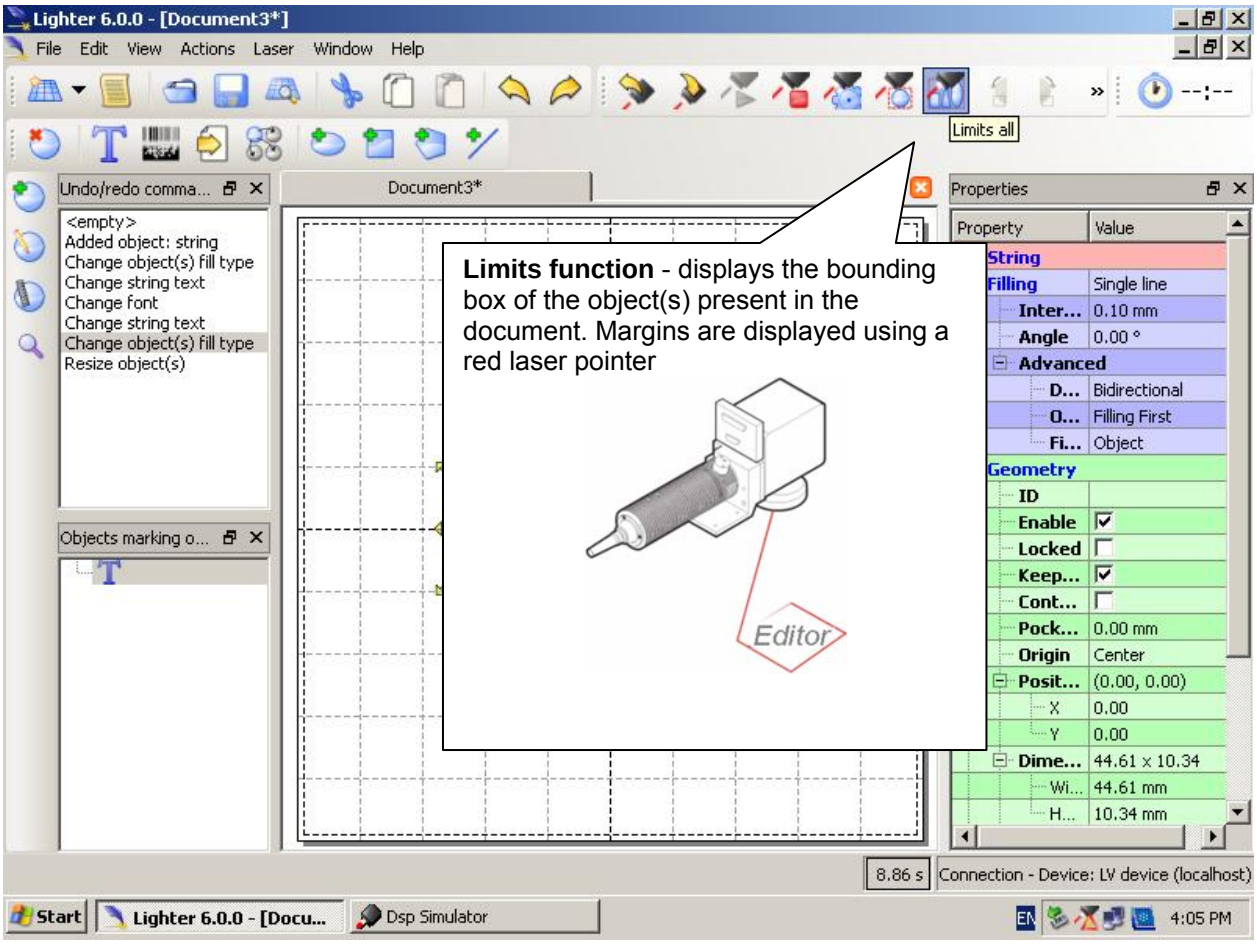
Edit Filling property like filling type, interline, etc using the *Properties browser*:



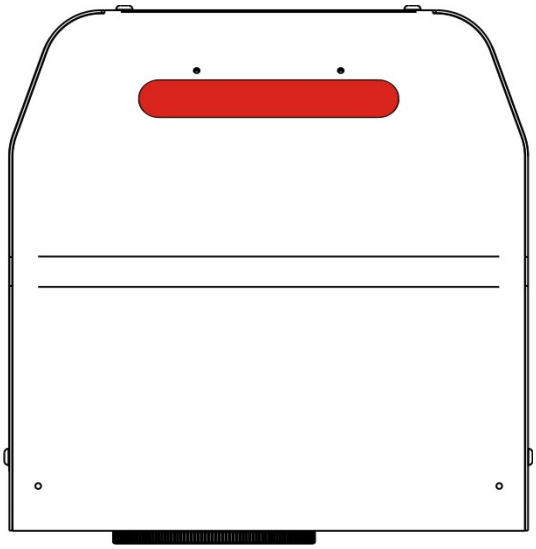
3.4.2 HOW TO TEST AND ENGRAVE YOUR DOCUMENT



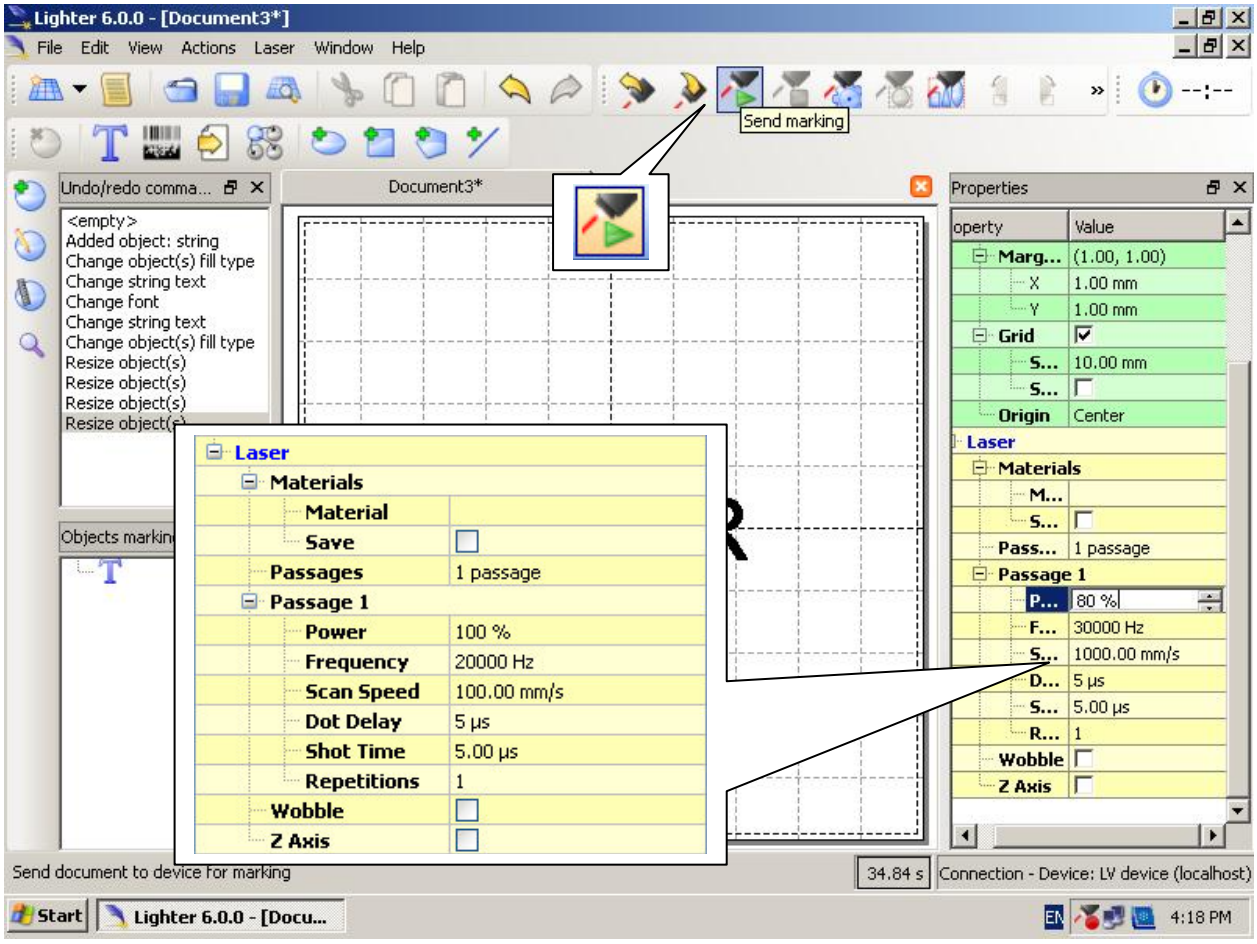
Press *Limits All* button in the *Laser Toolbar* to adjust the object position in the marking field:



Adjust the Laser parameters using the *Properties browser*



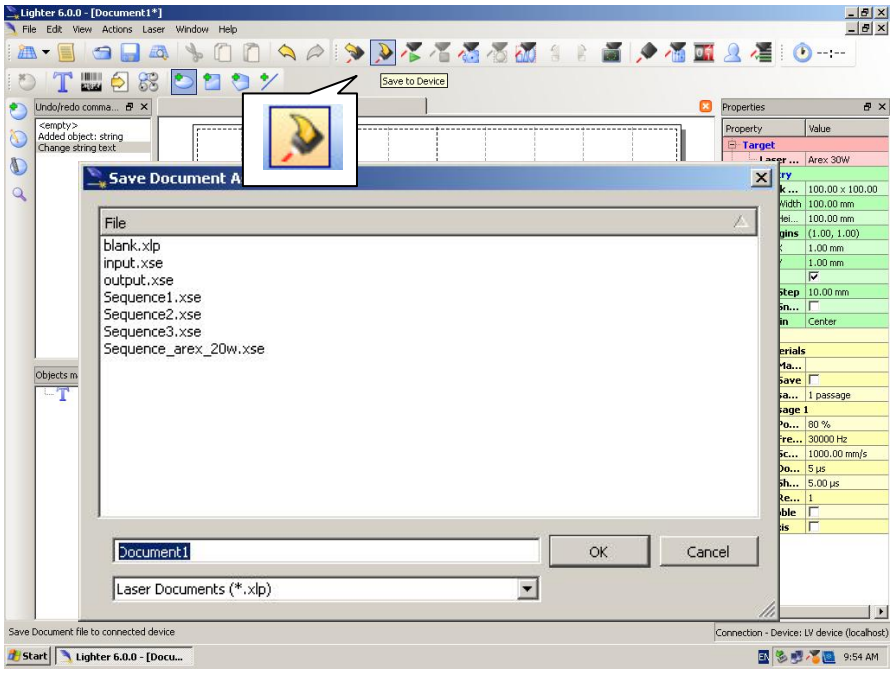
Press *Send Marking* button in the *Laser Toolbar* to start the engraving process:



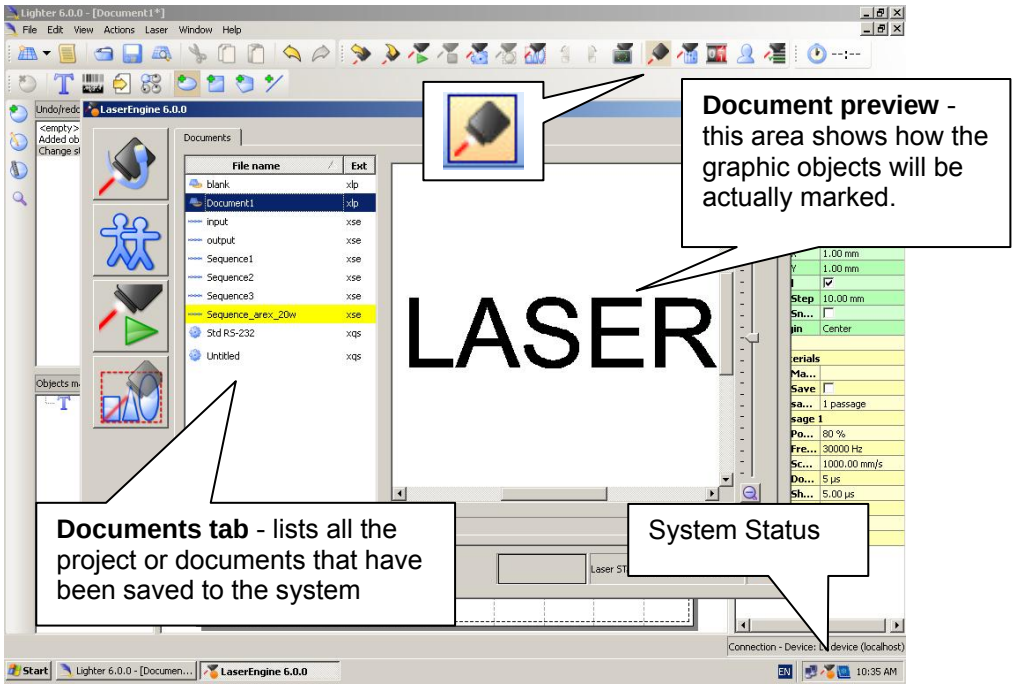
3.4.3 HOW TO USE EXTERNAL SIGNALS TO ENGRAVE YOUR DOCUMENT

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:



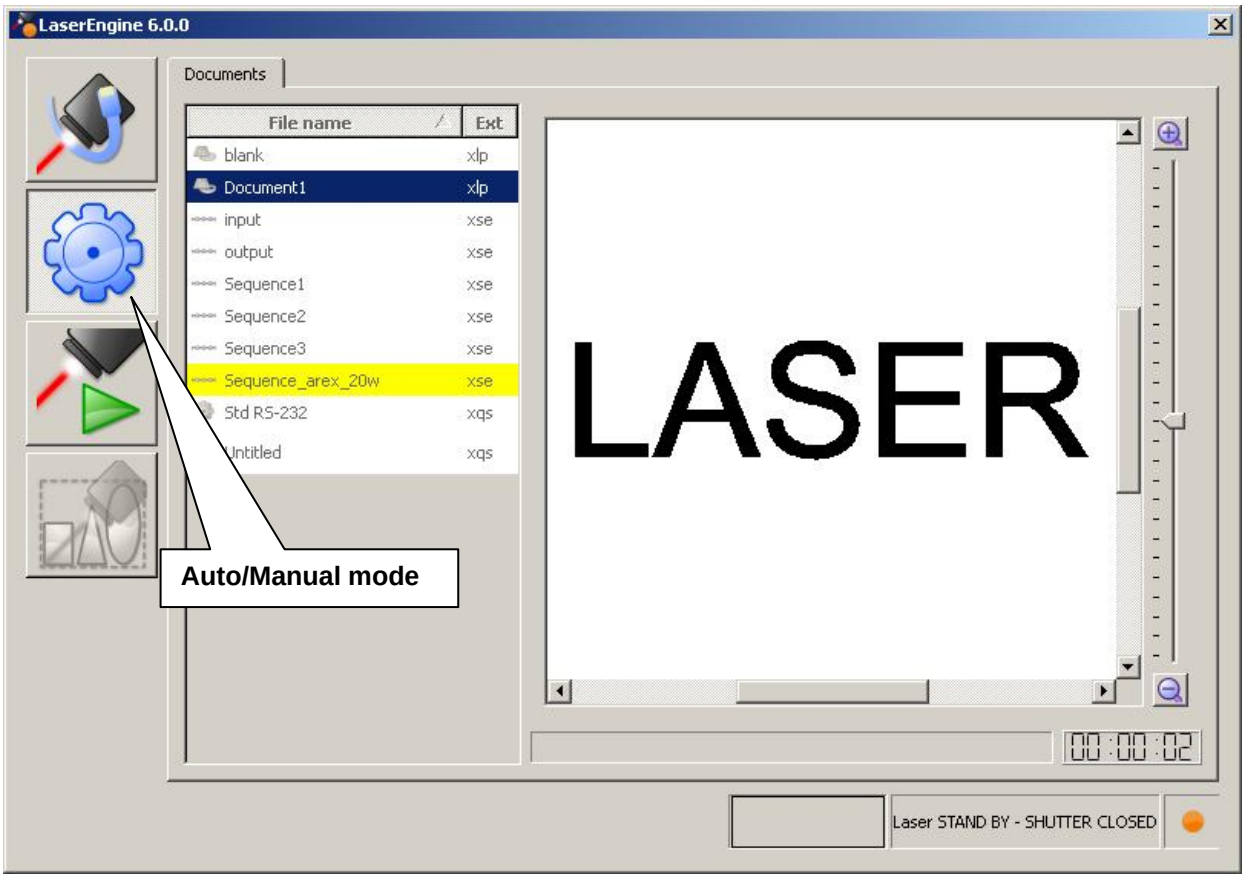
Click on *Show LaserEngine* button to display LaserEngine window:



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

- Auto mode: the engraving operations are executed automatically using external signals.
- 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:

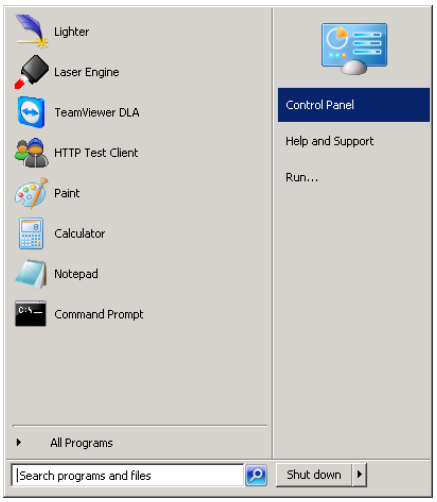
4 CUSTOMIZE THE SYSTEM'S SOFTWARE

4.1 CHANGE O.S. LANGUAGE AND KEYBOARD LAYOUT

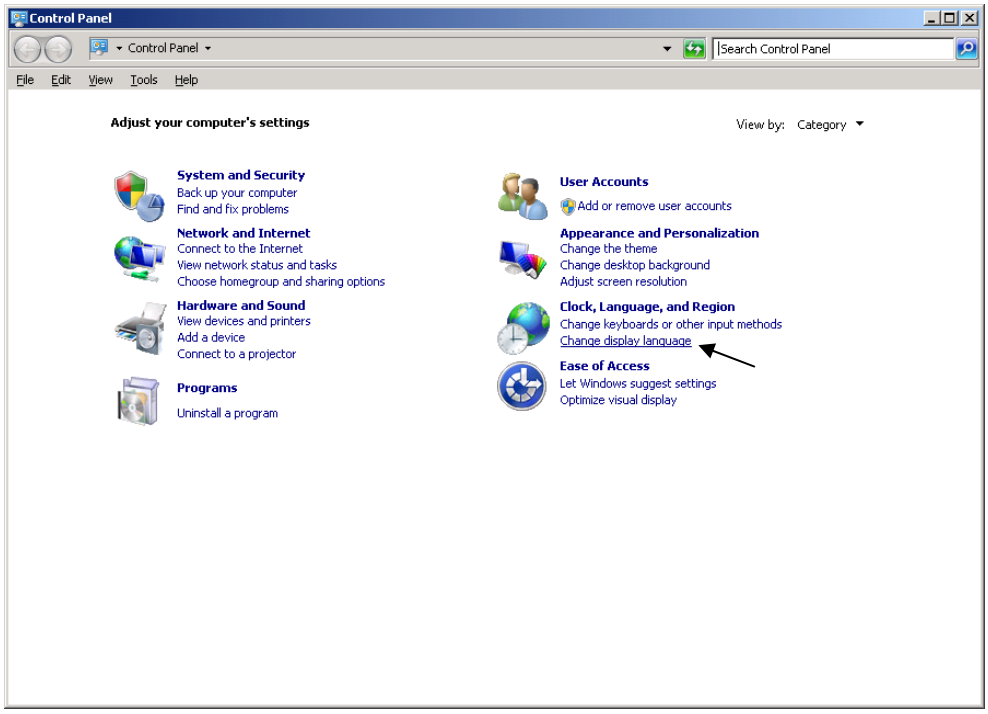
The marking system allows you to personalize the operating system changing the language used in menus and dialogs, languages you can use to enter text and keyboard layout.

NOTE:
In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system (paragraph 2.6.5).

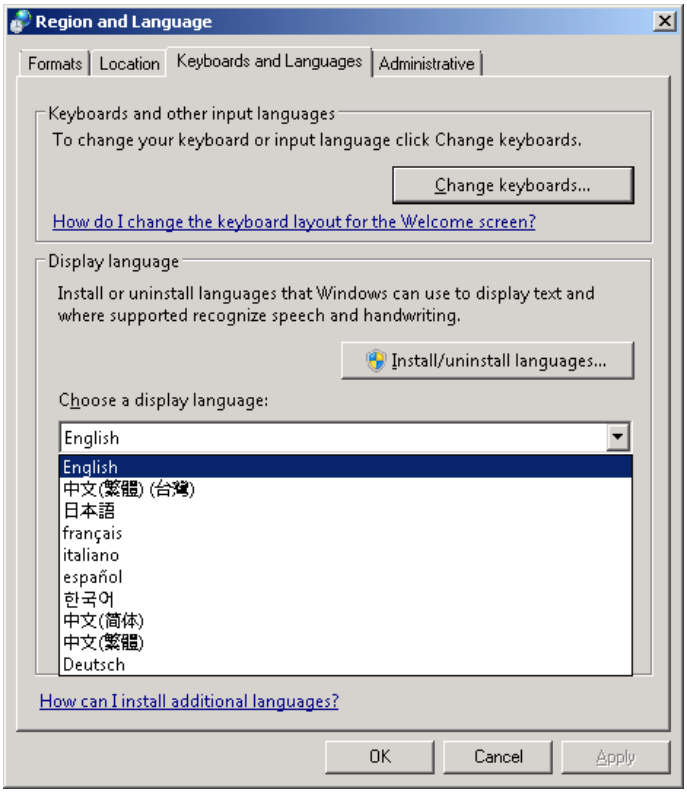
- Turn OFF and ON the marking system and wait the end of the booting-up (the status LED must be steady green)
- From the main screen click on *START/Control Panel*



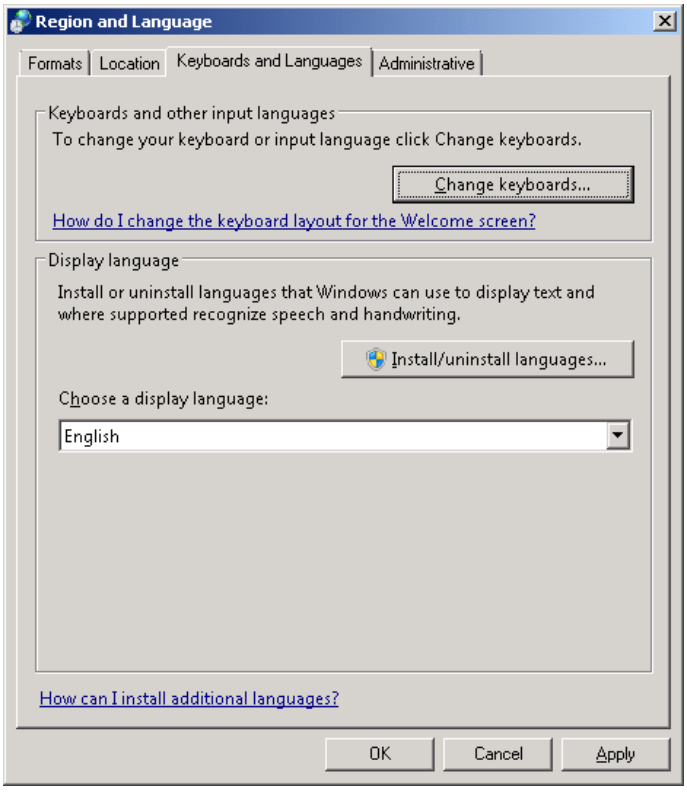
- Select *Change display language*:



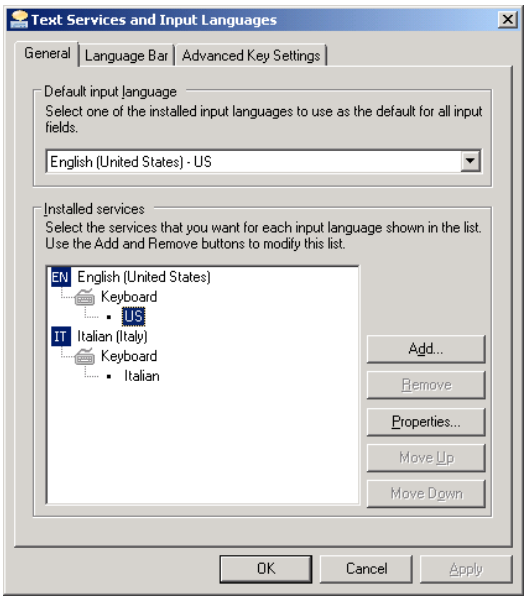
o In *"Keyboards and Languages"* select and choose the desired language.



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

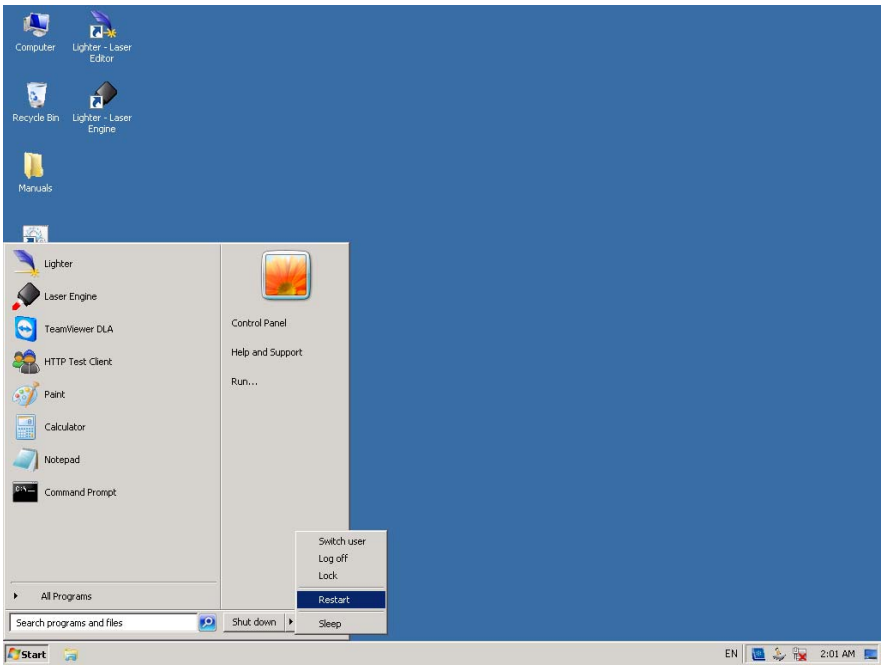


- Select now input languages and press *OK*:



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

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

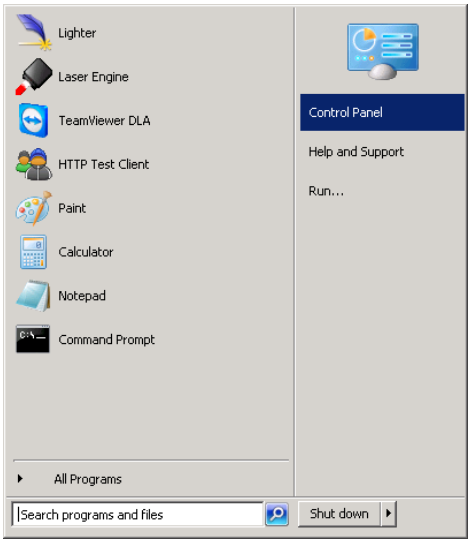


4.2 CHANGE LAN CONFIGURATION AND IP ADDRESS

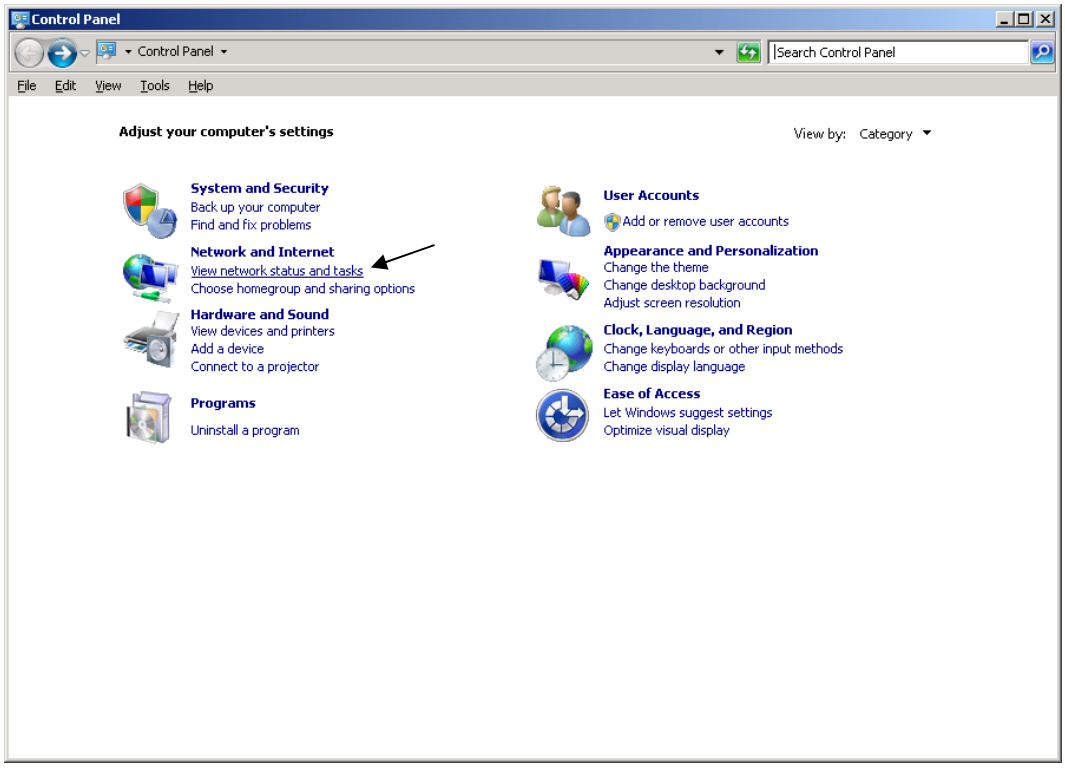
The system allows you to change the LAN configuration and IP address.

NOTE:
In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system (paragraph 2.6.5).

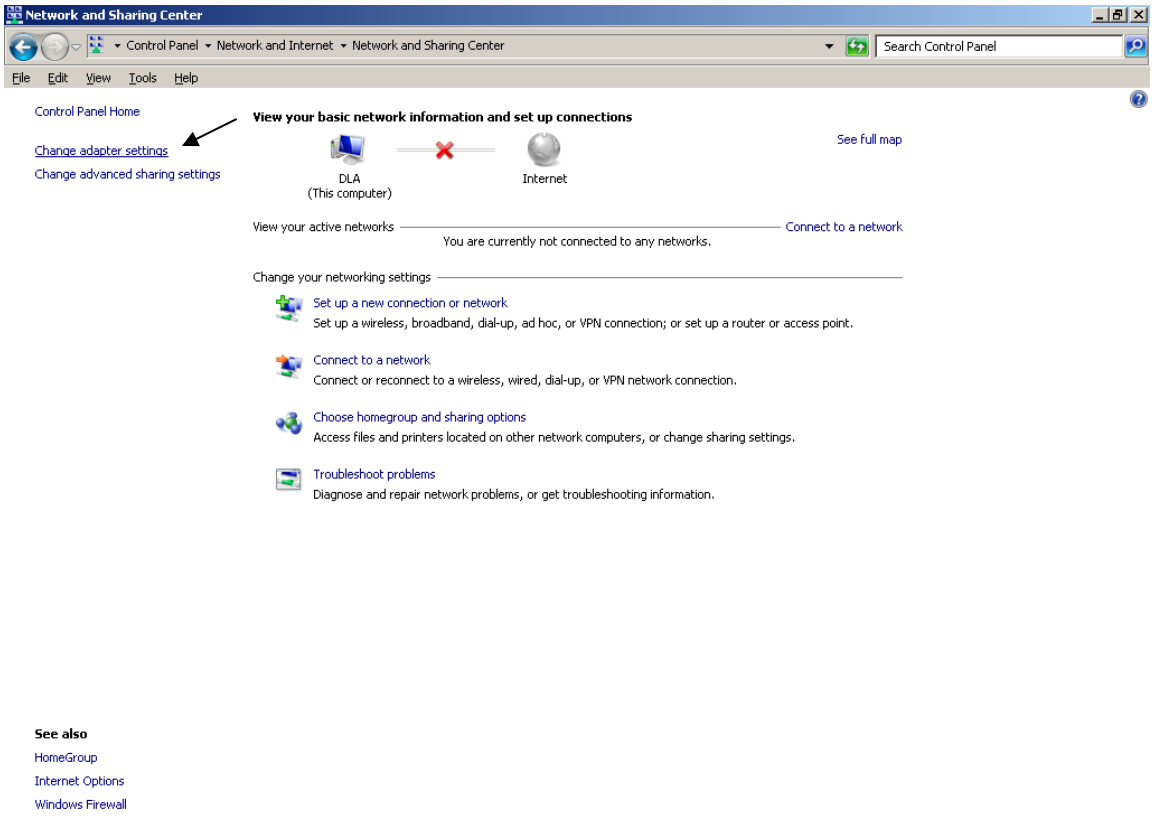
- Turn OFF and ON the marking system and wait the end of the booting-up (the status LED must be steady green)
- From the main screen click on *START/Control Panel*



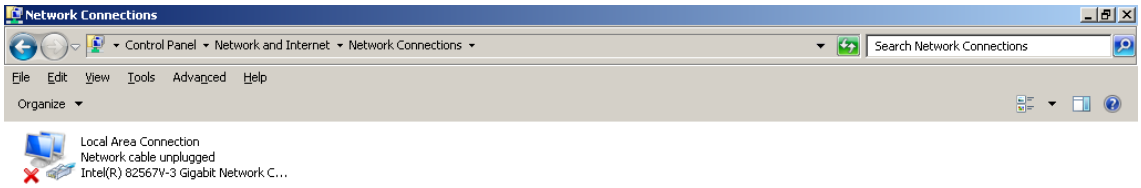
- Select *View network status and tasks*:



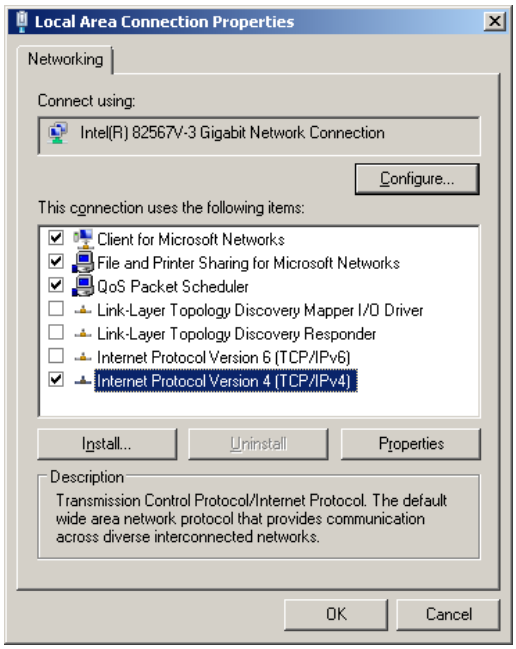
- In the “Network and Sharing Center” screen select *Change adapter settings*:

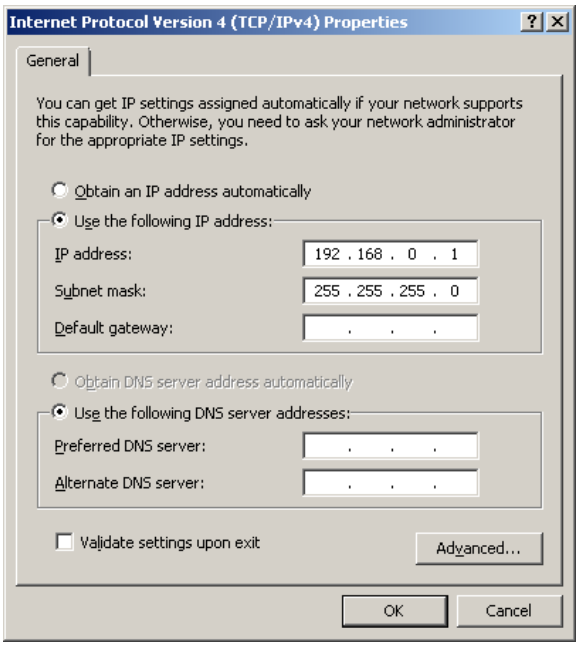


- In the “Network Connections” screen double click on *Local Area Connection*



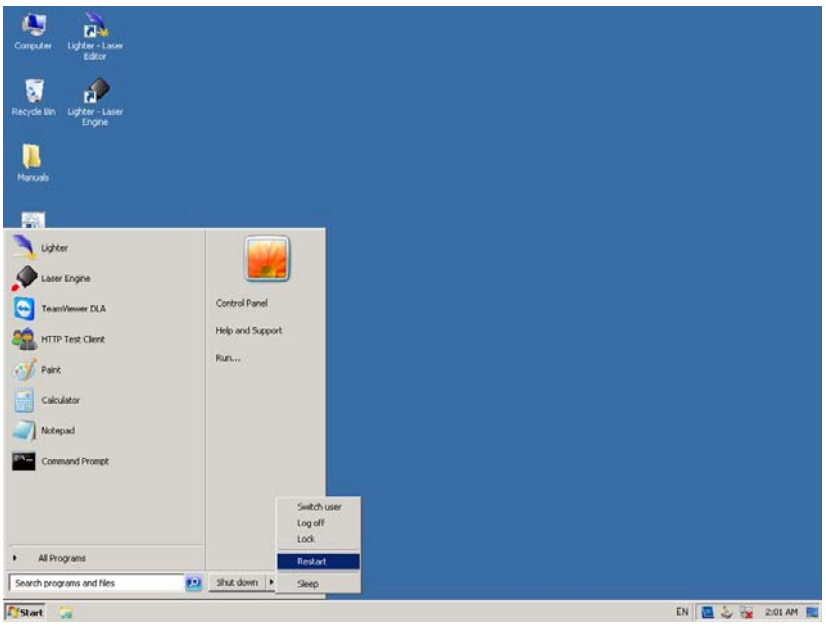
- In the “Local Area Connection Properties” screen double click on *Internet Protocol Version 4 (TCP/IPv4)*
- In the “Internet Protocol Version 4 (TCP/IPv4) Properties” you can change the IP address and configuration





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

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

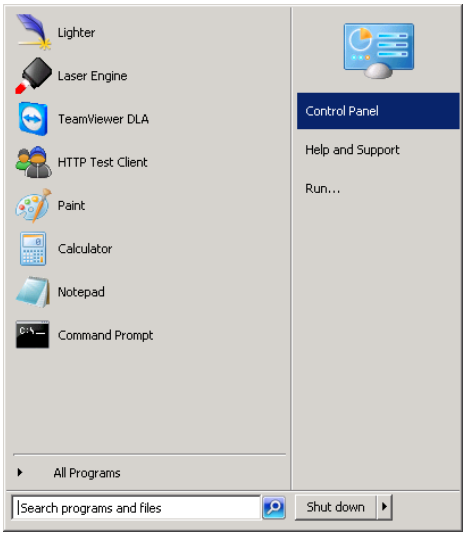


4.3 CHANGE VIDEO SETTING

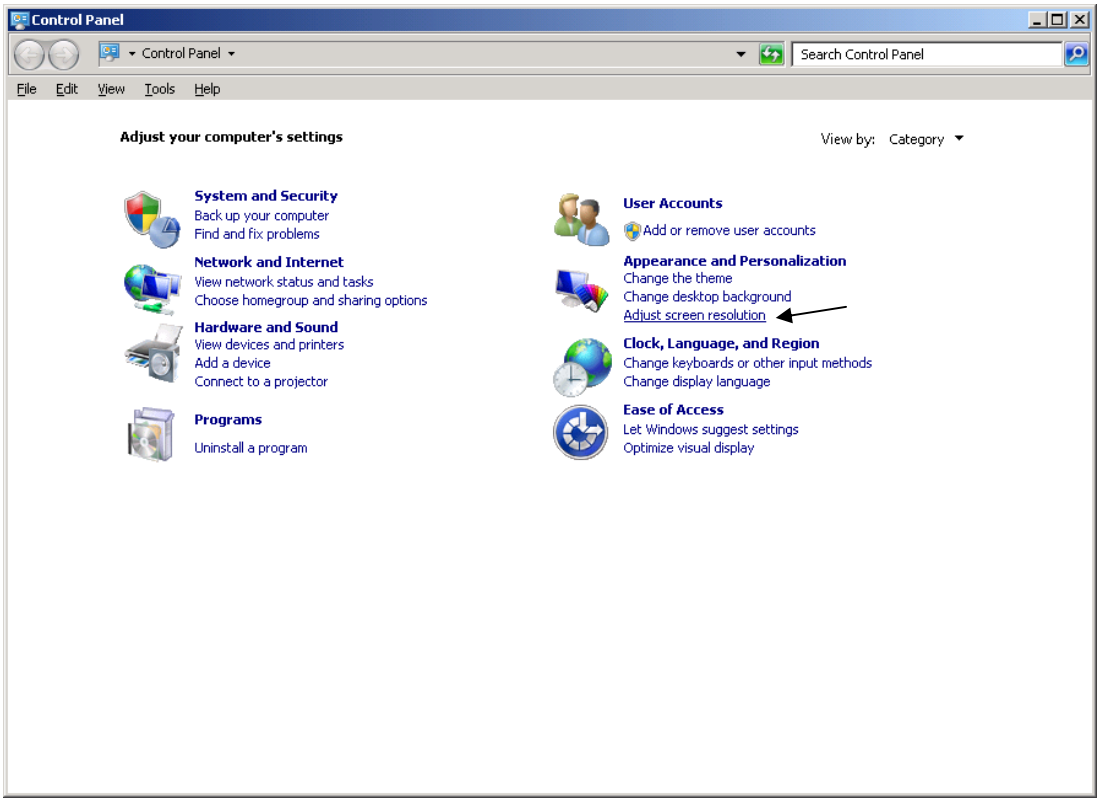
The system allows you to change the Video setting.

NOTE:
In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system (paragraph 2.6.5).

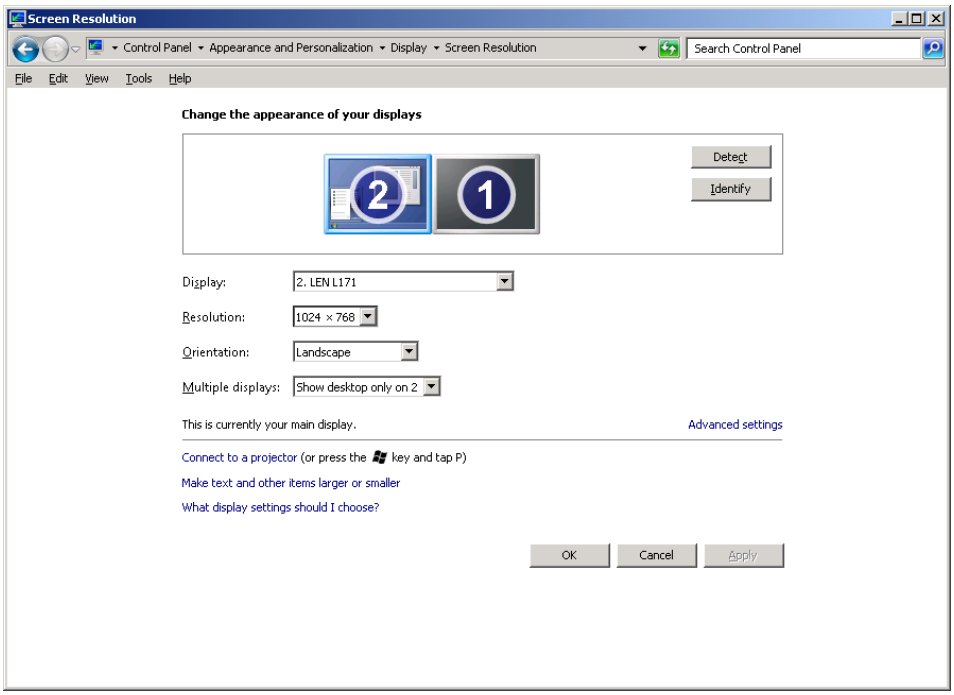
- Turn OFF and ON the marking system and wait the end of the booting-up (the status LED on the front cover must be steady green)
- From the main screen click on *START/Control Panel*



- Select *Adjust screen resolution*:

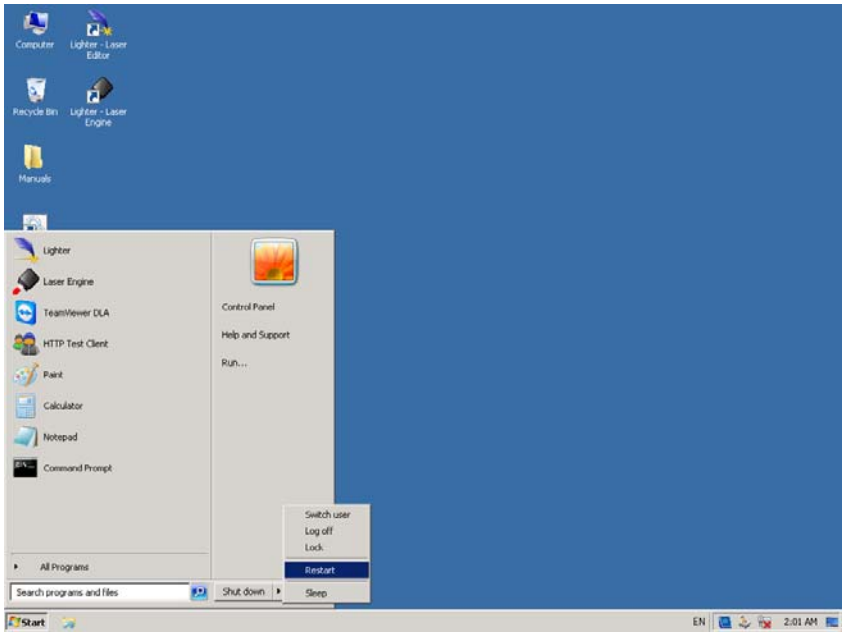


o In the Display Properties screen select the desired Screen resolution and Color quality:



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

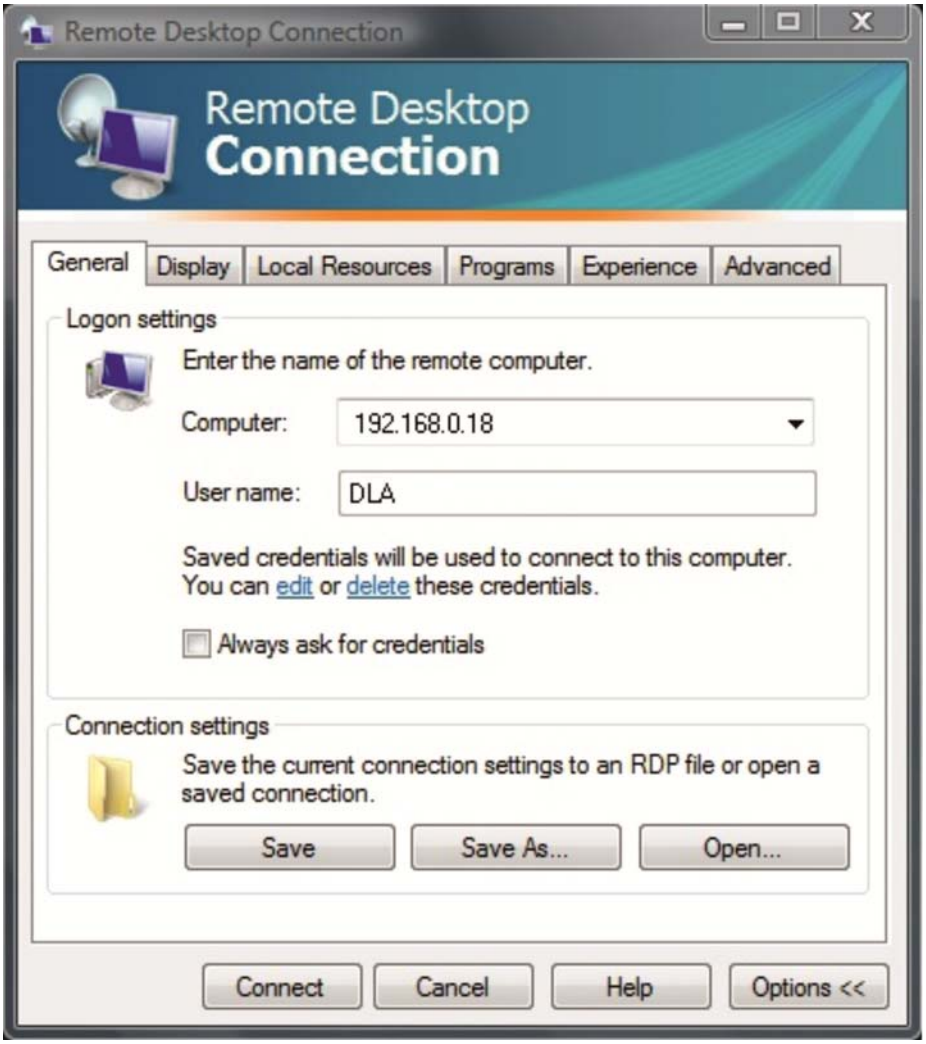
o Restart the system in order to save the new settings:



4.4 REMOTE DESKTOP CONNECTION

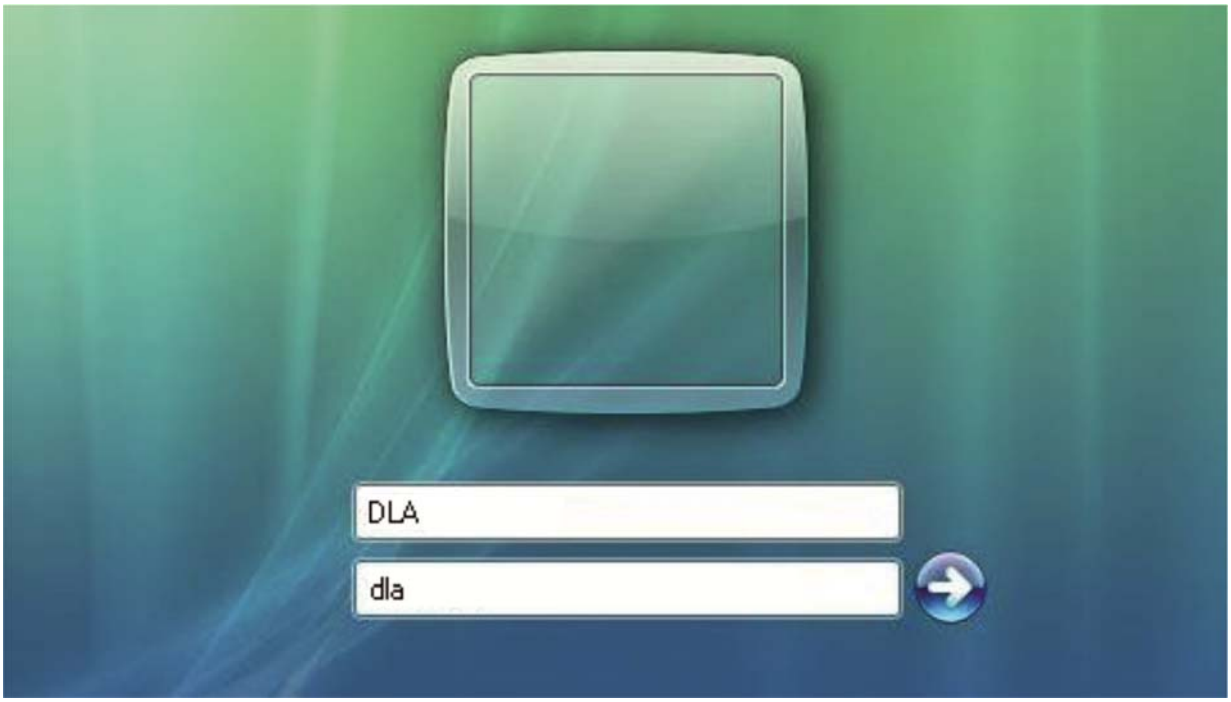
To connect the marking system to a remote Windows® based computer, follow these steps:

- Turn on marking system
- Make sure that both marking system and remote computer are connected to the LAN
- Click *Start/All Programs/Accessories*, and then click *Remote Desktop Connection*
- Click *Options*
- In the *Computer* list, type the host name or the IP address of the computer to which you want to connect
- 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*



- 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**



- 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

- 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 38: 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)

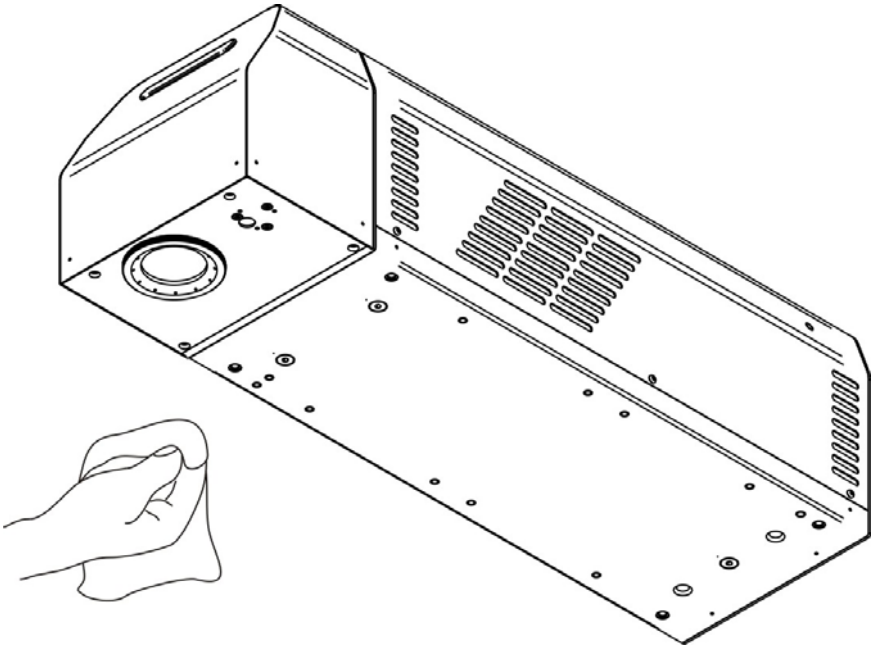


Figure 39: Cleaning laser output.

5.3 PRODUCT SUPPORT AND CUSTOMER SERVICE

Warranty Information

Datalogic Automation S.r.l. reserves the right to change the information and specification container 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.

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

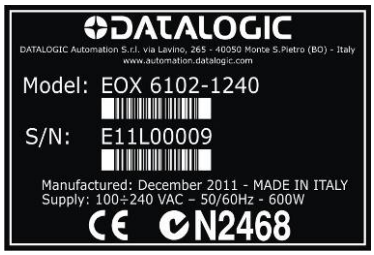
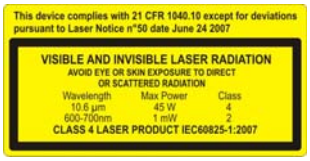
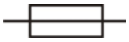
Or contact your local distributor

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**
INTERLOCK	**Interlock connector.**
COMMAND BOX	**Command Box connector.**
AXES	**Control Axes connector.**
INLET AIR	**Inlet air.**
USB	**USB plug.**
LAN	**LAN connector.**
	**Fuses**

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

RS232	**RS232 connector.**
VGA	**VGA connector.**
PHOT	**Photocell connector.**
ENC	**Encoder connector.**

POSITIONING OF EXTERNAL LABELS

Positioning of labels:

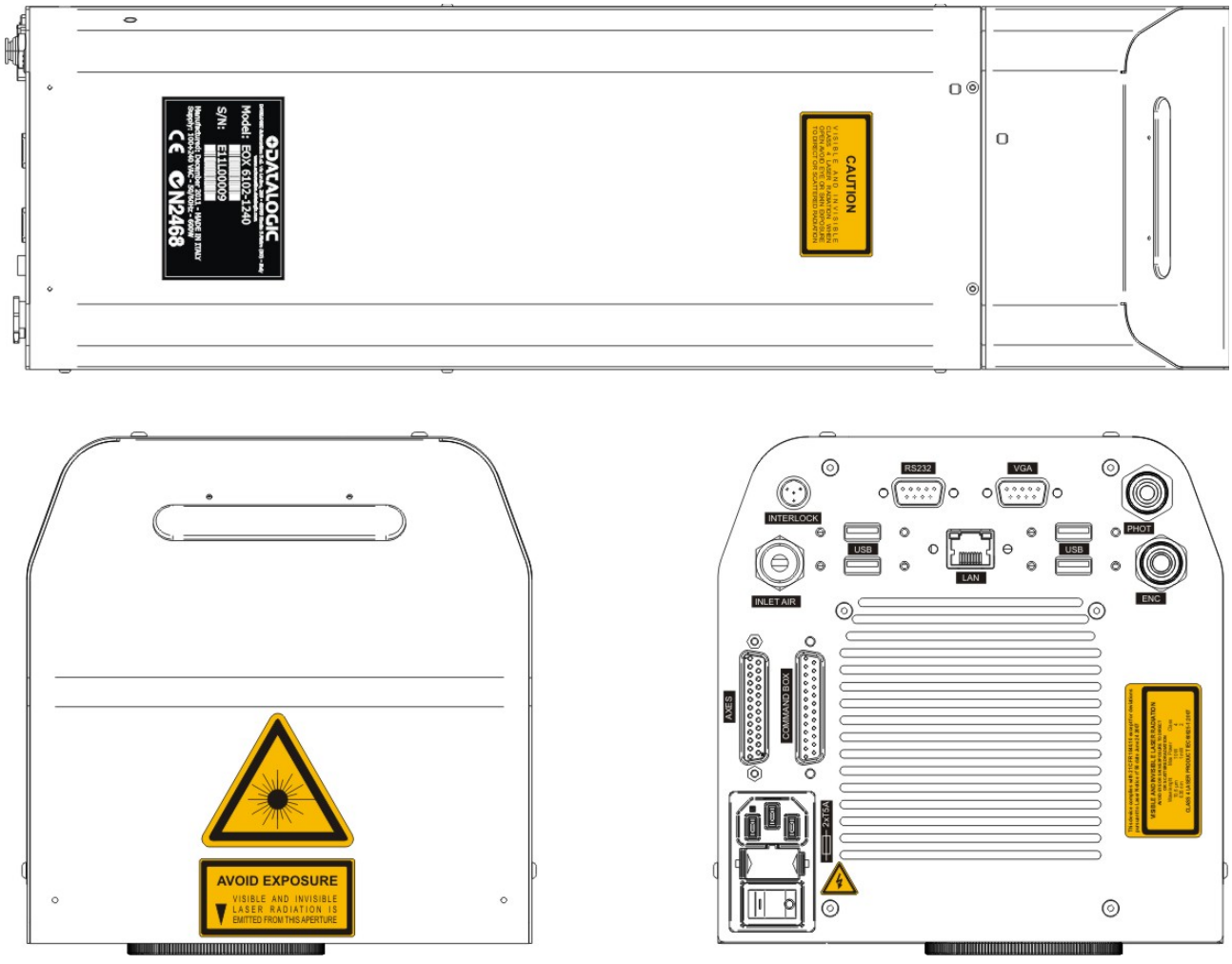


Figure 40: External labels.

APPENDIX B: STANDARDS

LASER STANDARDS

Eox 10W is designed to complies 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 10W" 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.

APPENDX C: GUIDE FOR SYSTEM INTEGRATOR

Eox 10W is classified as Class 4 marking system. It is intended to be installed in a system by system integrator/OEMs that they have the final responsability of Classification of their end product.

Final system MUST complies 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 10W 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 10W column means that the feature is available through dedicated connector and MUST be completely implemented by the system integrator/OEM.

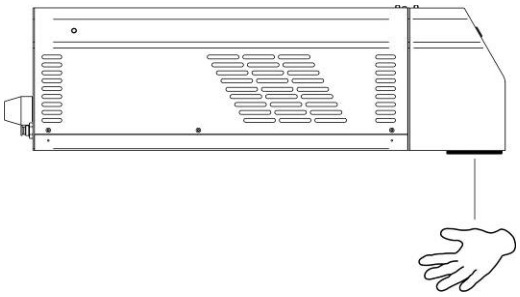
FEATURE	LOCATION/DESCRIPTION	CDRH	EN60825-1	EOX 10W
Keyswitch	Located on the command box connector. It turns on the laser source when activated	YES	YES	YES
Shutter Function	Located on the command box connector. When enabled open the safety mechanical shutter after the laser source	YES	YES	YES
Power indicator	Led bar front panel (green): Illuminates green to indicate that system is in standby mode	NO	NO	YES
Ready Indicator	Led bar front panel (yellow): Indicates that the system has power applied, shutter is open and is capable of lasing	YES	YES	YES
Laser on indicator	Led bar front panel (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 10W 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.

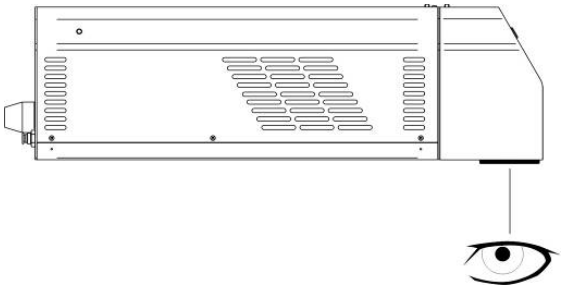
APPENDIX D: NOTE ABOUT LASER

LASER SAFETY

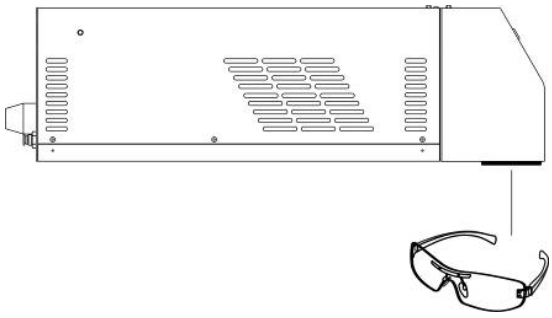
The following information is provided in compliance with regulations set by International Authorities, and it refers to proper use of marking system.



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 CO_2 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 vapours 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 (CO_2 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 Eox 10W the emission is generated by CO_2 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.

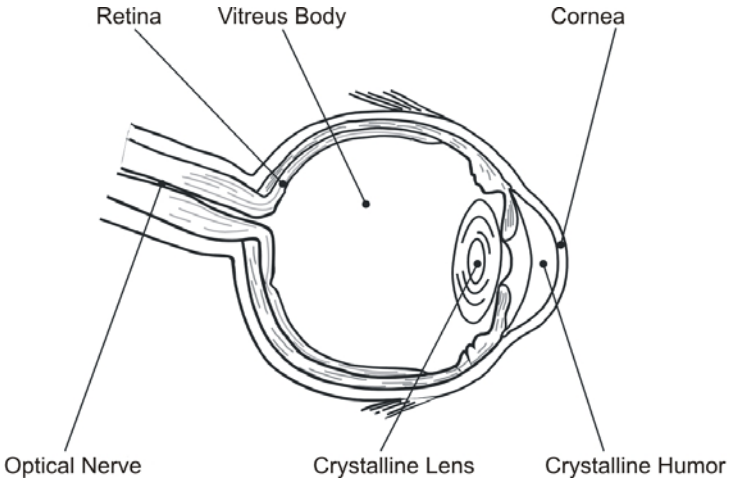


Figure 41: Eyeball section.

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:
This 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 10W 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.

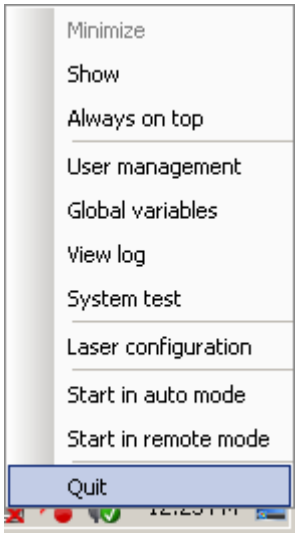
The most serious collateral risk associated with laser marking system, which may be fatal, is electricity.
This may occur when the manufacturer's warning and procedures are not followed. Unauthorized and untrained personnel must never do any work on the electrical part. The safety devices must never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

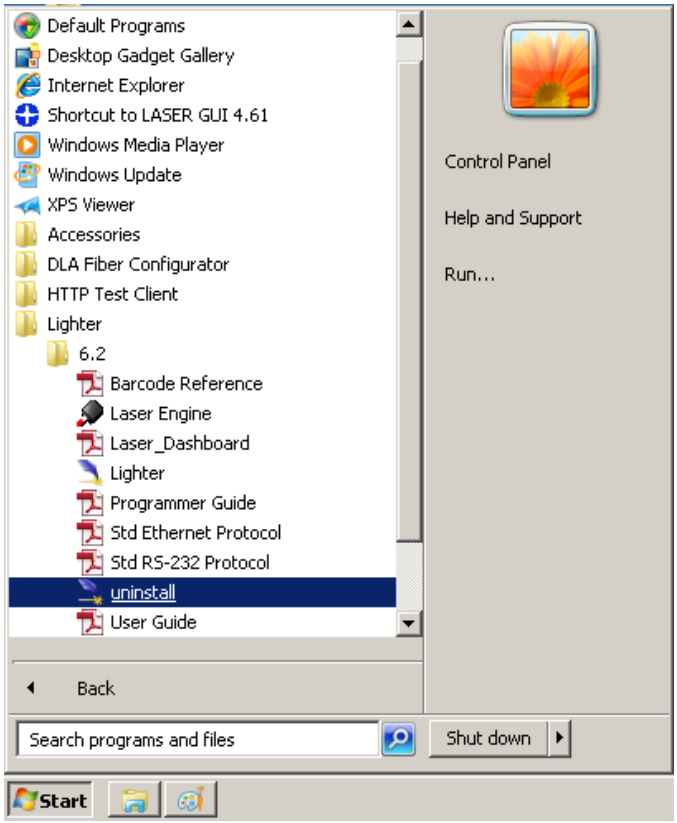
APPENDIX E: SOFTWARE UPGRADE

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

1. Close the Lighter and Laser Engine (Click on "*QUIT*")



2. Do Lighter "*UNISTALL*": you can't run the new installer before having removed the old SW version

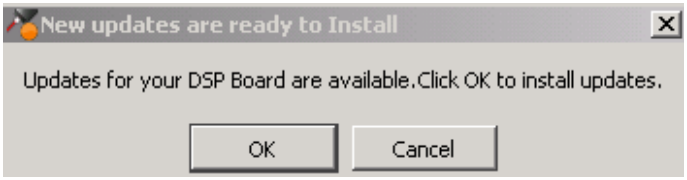


3. Wait the end of uninstall procedure.

4. Run new Lighter installer from an external device (USB dongle).

5. Wait until installation procedure is completed.

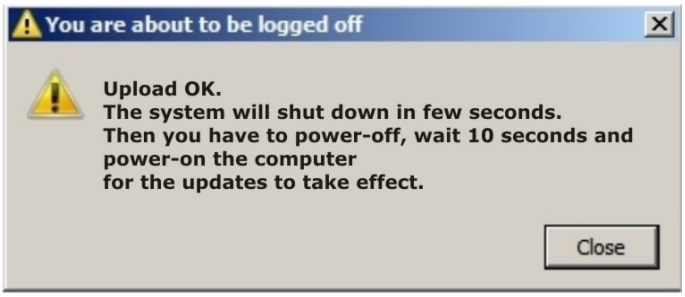
6. Depending on whether the Lighter update includes any control board updates, the following screen may appear:



- Procedure with control board update:

    - press OK to execute control board update

    - upon completion, a window informs user that data is automatically saved in the system



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

WARNING:
DO NOT restart the system or turn off the device!

    - wait until system shuts down automatically (black screen)

    - power off the system to complete installation

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

    - system will be restarted automatically within the next 10 seconds

WARNING:
DO NOT restart the system or turn off the device!

    - wait until system is restarted automatically

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:

- ***the system does not boot*** because the ***CF disk*** containing the operating system ***is corrupted***;
- ***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
	

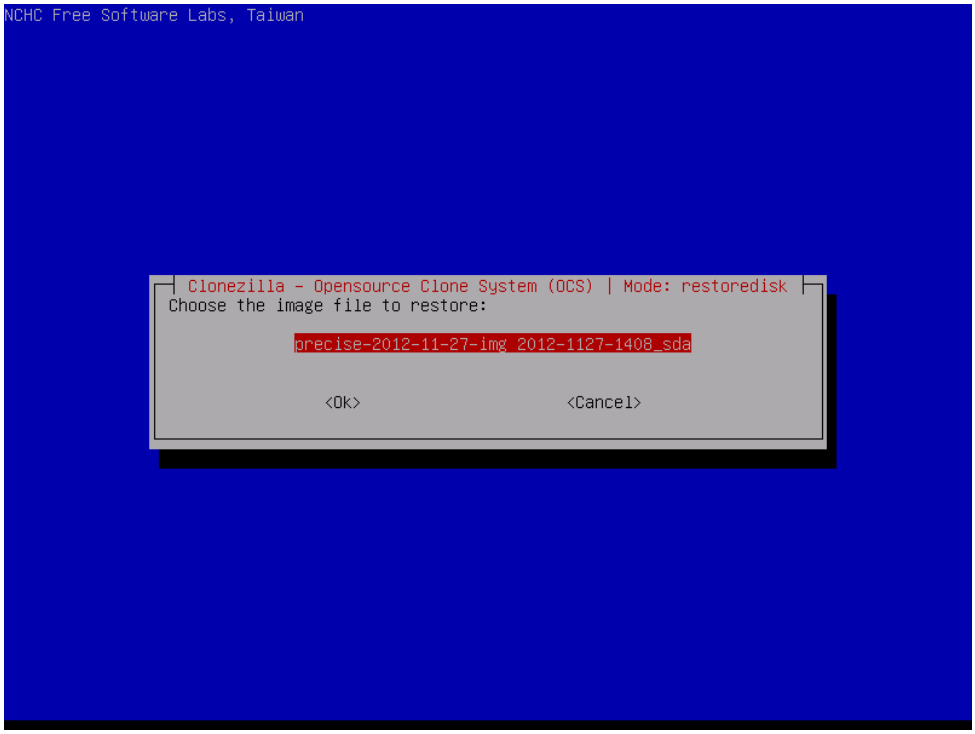
The recovery procedure requires the ***USB recovery disk*** witch is included in the standard equipment.

Procedure:

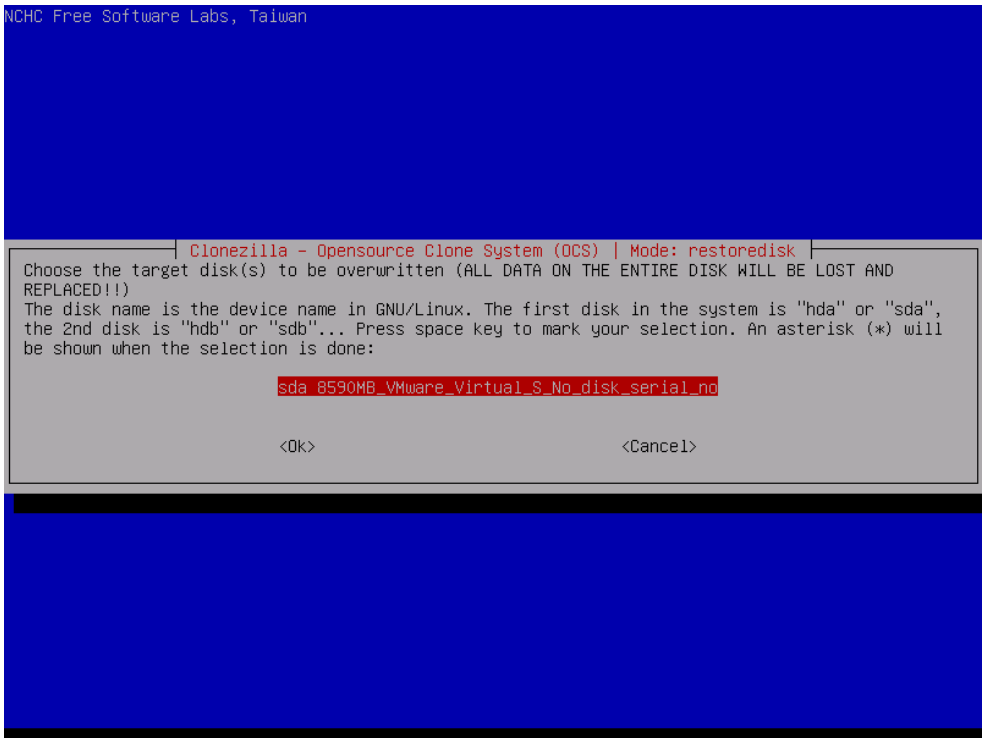
- Turn ***OFF*** the marking system
- Insert the ***USB recovery disk*** provided with the marking system in the USB port
- Turn ***ON*** the marking system and press ***F11*** key to enter ***Select Boot Device*** menu
- Select the ***USB*** device in the list and press ***ENTER*** key

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

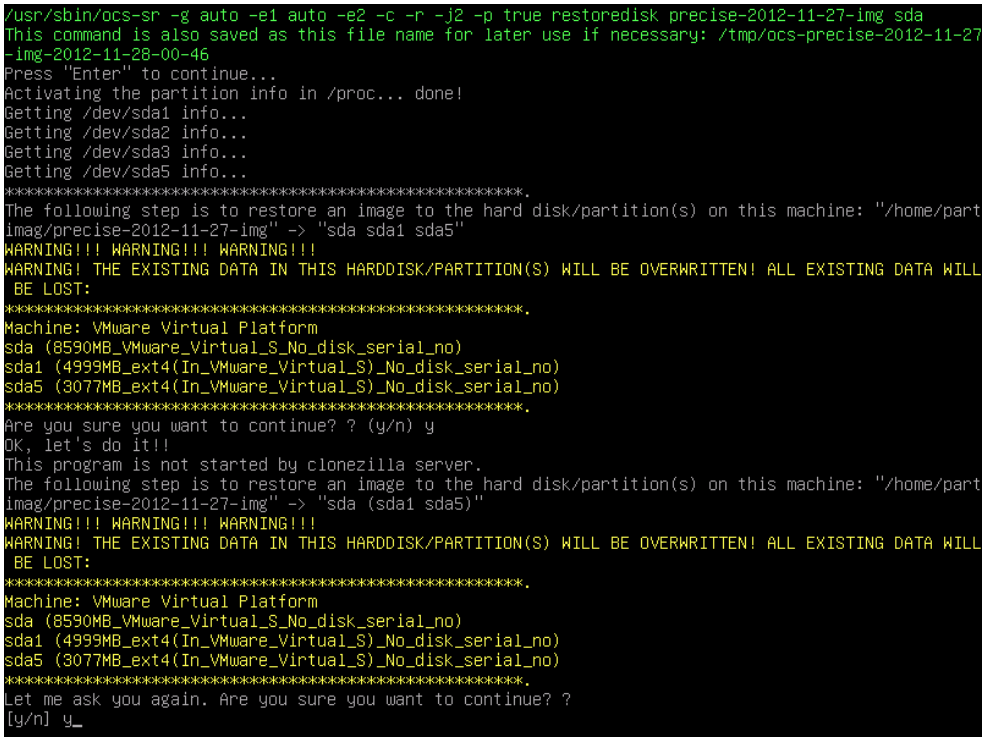
- ***Choose*** the image file to restore:
  - if you want to restore the ***C:\ drive*** which contains the operating system and Lighter Suite choose ***RESTORE_DISK_C_EOX10*** and press ***ENTER*** key
  - if you want to restore the ***D:\ drive*** which contains the Lighter DATA folder choose ***RESTORE_DISK_D_EOX10***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



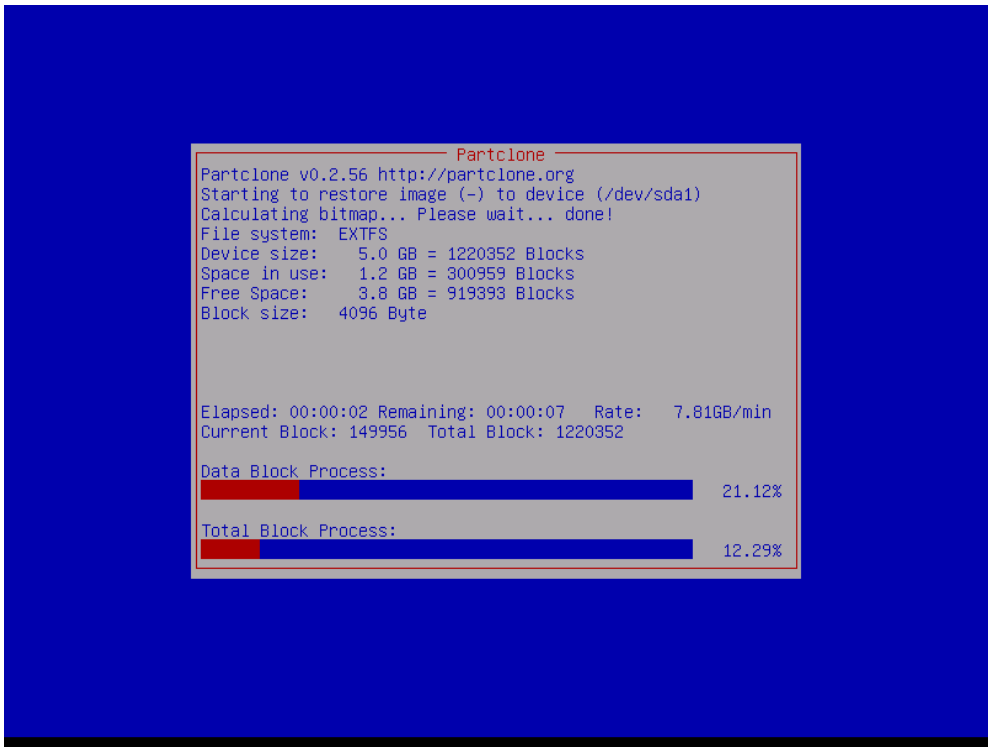
- ***Choose* the target** disk to be overwritten and press ***ENTER*** key
  - ***Compact Flash disk drive*** if you are restoring the disk ***C:\ drive***
  - ***SSD disk drive*** or ***Flash Disk drive*** if you are restoring the disk ***D:\ drive***



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



- ***Wait*** until the procedure is completed



- Choose between
  - ***(3) Start over*** to repeat the procedure and recover another disk
  - ***(0) Power off*** to exit Clonezilla
    - ***Wait*** until the shutdown process is done (black screen)
    - Turn ***OFF*** the marking system using the main switch
    - ***Remove the USB recovery disk*** from the USB port
    - Turn ***ON*** the marking system using the main switch

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.

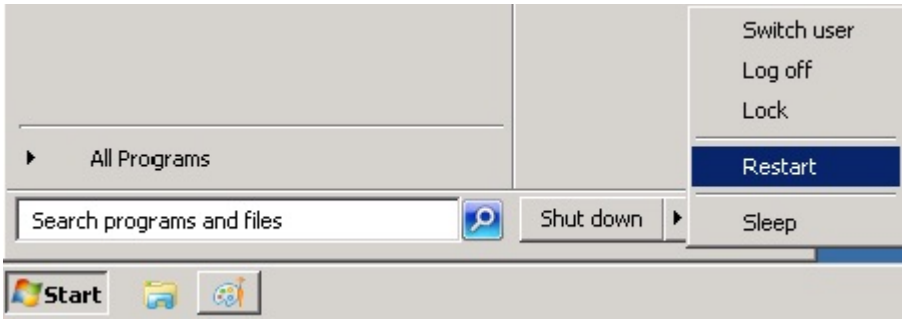
- An ***error message*** about Lighter user database could appears at system restart:

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

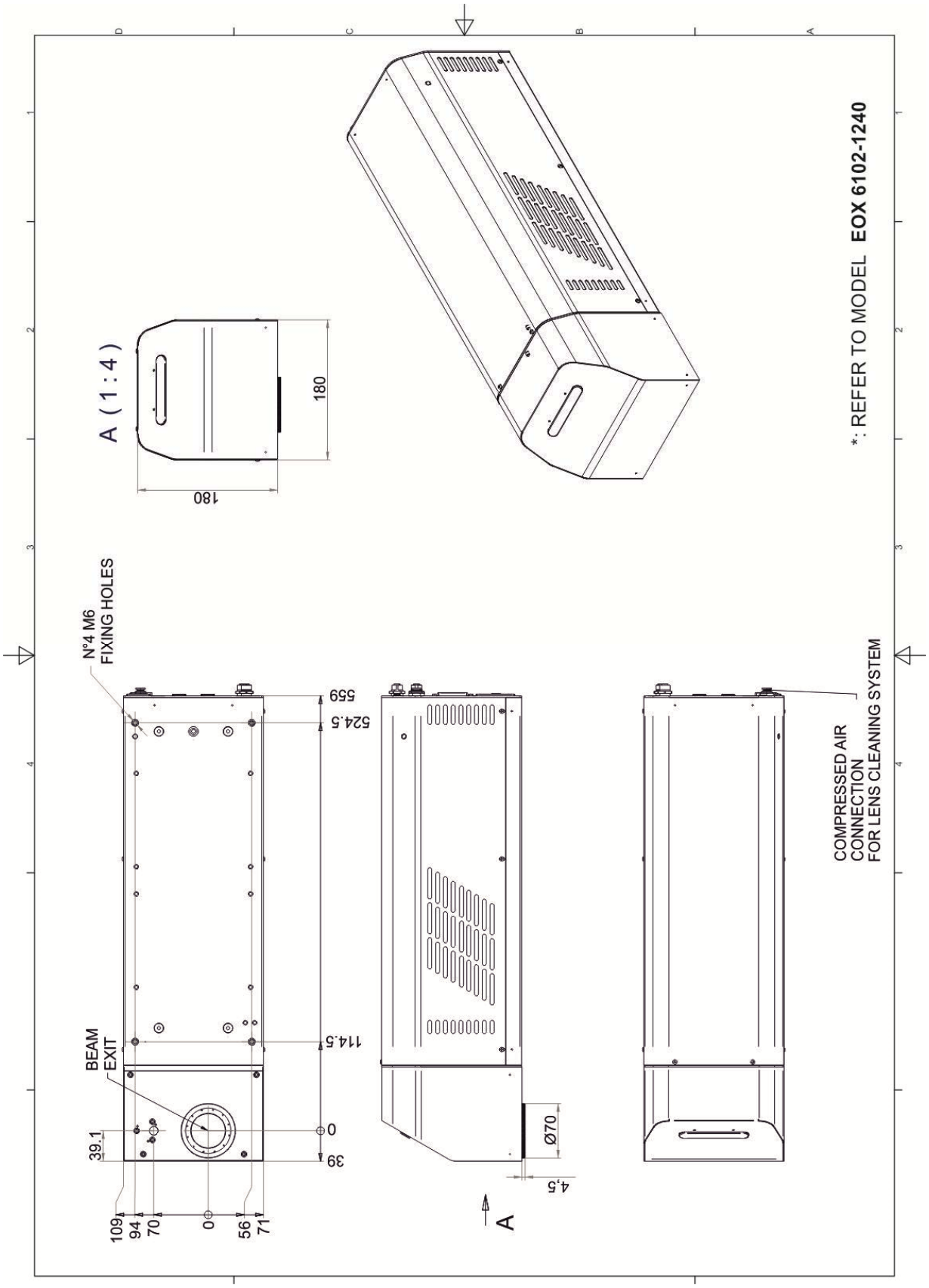
- If ***disk D:*** has been restored (SSD which contain the Lighter DATA folder), ***replace the generic*** `license.dat` and `laser.inz` files in D:\DATA\CONFIG ***with the custom ones*** present into the folder ***Fileinz and report*** in the ***USB recovery disk***

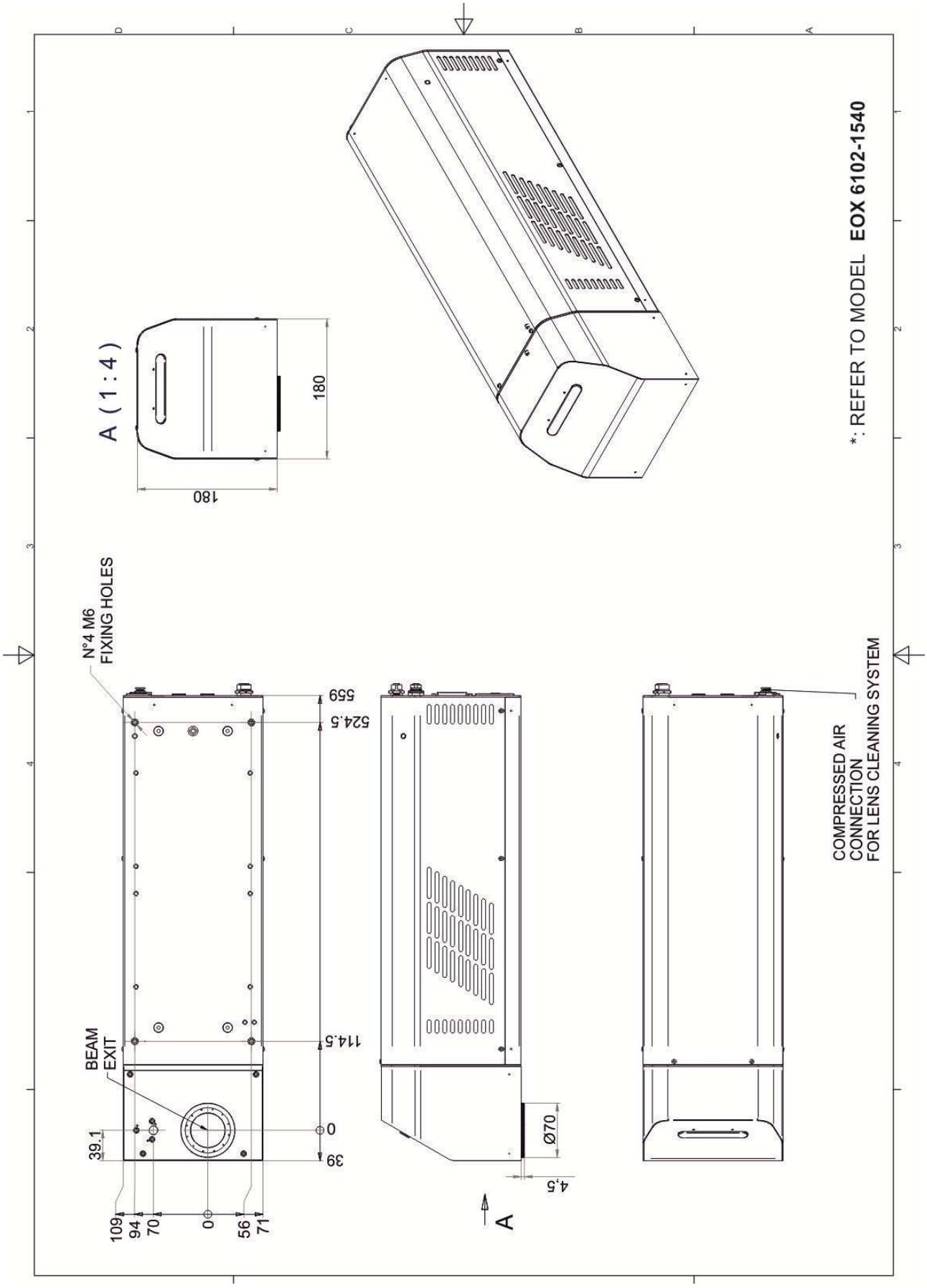
- Double click on Shortcut to ***save-data.bat*** icon in the Desktop

- ***Restart*** Windows <u>without turning OFF the marking system</u>



APPENDIX G: MECHANICAL DRAWINGS




*: REFER TO MODEL EOX 6102-1540
A (1 : 4)
180
180
N°4 M6
FIXING HOLES
559
524.5
114.5
0
39
39.1
BEAM
EXIT
109
94
70
0
56
71
Ø70
4,5
A
COMPRESSED AIR
CONNECTION
FOR LENS CLEANING SYSTEM

APPENDIX H: DECLARATION OF CONFORMITY

CE

Datalogic Automation S.r.l.
Via Lavino 265
40050 Monte San Pietro
Bologna - Italy
www.automation.datalogic.com

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 ABD USER'S GUIDE*

Monte San Pietro, June 12th, 2012

Paolo Morselli
Quality Manager

UNI EN ISO 9001 UNI EN ISO 14001

FIGURES

Figure 1: Eox 10W. vii
Figure 2: EOX 10W overview. 12
Figure 3: Working distance. 13
Figure 4: Male panel plug cod. TB4M (front view). 14
Figure 5: Female cable mount connector cod. TY4F (solder view). 14
Figure 6: Female panel socket SUB-D 25 (frontal view). 15
Figure 7: Male panel socket SUB-D 25 (frontal view). 17
Figure 8: Male panel socket SUB-D 9 (frontal view). 18
Figure 9: Female panel socket cod. 09-3482-87-08 (front view). 19
Figure 10: Female panel socket cod. 09-3482-87-04 (front view). 19
Figure 11: Enable signal's scheme 20
Figure 12: Timing control signals 20
Figure 13: Timing signals (normal operation) 21
Figure 14: Connection example. 23
Figure 15: Example of static marking application. 24
Figure 16: Example of Marking on Fly (MOF) application. 24
Figure 17: Unpacking 26
Figure 18: EOX 10W transport. 28
Figure 19: Fixing points on marking system (standard mount). 29
Figure 20: Resonator installation environment. 30
Figure 21: Safety mode example 30
Figure 22: Command Box connector connection. 31
Figure 23: Interlock connector connection. 32
Figure 24: Connecting power supply cable. 32
Figure 25: USB mouse connection. 33
Figure 26: USB keyboard connection. 33
Figure 27: VGA monitor connection. 34
Figure 28: Ethernet connection. 34
Figure 29: Photocell connection. 35
Figure 30: Encoder connection. 35
Figure 31: Power on. 36
Figure 32: Status led bar turned off. 36
Figure 33: KEY command activation. 37
Figure 34: Led bar status. 37
Figure 35: ENABLE command activation. 38
Figure 36: Led bar status. 38

Figure 37: Led bar status. 39
Figure 38: Example of a seal. 60
Figure 39: Cleaning laser output. 61
Figure 40: External labels. 65
Figure 41: Eyeball section. 71

DATALOGIC

Headquarters
Via Lavino, 265
40050 Monte San Pietro
Bologna - Italy
Tel. +39 051 6765611
Fax +39 051 6759324
Purchasing Dept. Fax +39 051 6765499
info.automation.it@datalogic.com

Laser Marking operation officies

Donnas
Reg. Gurey, via Le Gorrey, 10
11020 Donnas (AO) - ITALY
Tel. +39 0125 8128201
Fax +39 0125 8128401

Sesto Calende
Via dell'Industria, 20
21018 Sesto Calende (VA) - ITALY
Tel. +39 0331 9180601
Fax +39 0331 9180801