

# USER'S MANUAL



> Arex 30W – 50W

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Arex 30W 50W User's Manual

Ed.: 821004082

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**Printed in Donnas (AO), Italy.**

# SYMBOLS

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



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**Generic Warning:**

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

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**Electricity Warning:**

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

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**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.

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**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.

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**Notice:**

Notes, usage tips, or additional information.

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**Note:**

Carefully read the user's manual before using the marking system.

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## REVISION INDEX

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Revision	Date	Number of added or edited pages
821004080	30/10/2015	Release
821004081	03/02/2016	General Review
821004082	05/05/2016	16, Appendix C



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**NOTE:**

We sometimes update the documentation after original publication. Therefore, you should also review the documentation at [www.datalogic.com](http://www.datalogic.com) for updates.

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# FOREWORD

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Information included in this manual is intended for a *qualified installer* able to integrate the marking system into a system, complying with all the protection features required by international rules and local legislations. Refer to the Appendices for further information.

Following manual refers to Arex Fiber 130X-TLS2 and 150X-TLS2 marking systems 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 to 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 her/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.



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## **WARNING!**

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

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## **NOTE:**

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

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# OVERVIEW

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The Fiber 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 laser generates an invisible, high-energy infrared beam. In order to obtain a more accurate focus, the laser beam is first enlarged using an optical expansion system and then deflected by a scanning system consisting of two mirrors mounted on galvanometric motors. These mirrors deflect the beam in a controlled beam along the X and Y axes; processing 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**

On AREX marking system it is used a sealed fiber laser source. This source is based on the new fiber solid state technology. It guaranties high stability, lower sensitivity on optical misalignment and a longer product lifetime.

## **GALVANOMETRIC SCANNING HEAD**

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

## **MARKING SOFTWARE**

The marking software Lighter is preinstalled on the system.



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### **NOTE:**

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

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### **NOTE:**

Consult the proper Appendix to upgrade the preinstalled software if necessary.

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### **WARNING!**

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

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The **Arex** marking system features a power supply unit whose size is compatible with the standard 19" 2,5U in varnished steel, and a scan head whose compact dimensions make it easy to integrate into a system that comprises safety systems required by applicable regulations, the management of marking signals and the customer's complementary modules, if any.

All marking system connections are found on the rear of the rack: mains power supply, safety, electrical signals, communication ports, patch cord to the scanner head, while the front features key and enable command devices, status LED in addition to a USB connector for communication with the internal embedded controller.



Figure 1: Arex Control Rack and Scan Head.



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**WARNING!**

Laser marking may strongly interact with materials through a thermal carbonization process with the emission of fumes and vapours.

Adequate fume extractor and fume treatment must be provided for, especially when working on plastic materials such PVC.

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**IMPORTANT WARNINGS**

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

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



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**WARNING!**

It is forbidden to change the intended use for which the system was designed and developed.

Datalogic Automation S.r.l. declines any and all responsibility for improper use of its marking system.

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**WARNING!**

These marking system actuation is demanded to the system integrator.

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# TABLE OF CONTENTS

---

<b>SYMBOLS</b>	<b>III</b>
<b>REVISION INDEX</b>	<b>IV</b>
<b>FOREWORD</b>	<b>V</b>
<b>OVERVIEW</b>	<b>VI</b>
OPERATION OF A LASER SYSTEM WITH GALVANOMETRIC SCANNING	vi
LASER SOURCE	vi
GALVANOMETRIC SCANNING HEAD	vi
MARKING SOFTWARE	vi
IMPORTANT WARNINGS	vii
<b>TABLE OF CONTENTS</b>	<b>VIII</b>
<b>1 CONTENTS OF THE PACKAGING</b>	<b>10</b>
1.1 UNPACKING	10
1.2 MAIN HARDWARE	11
1.3 CABLE AND ACCESSORIES	11
1.4 TRANSPORT	12
1.5 ON MOISTURE CONDENSATION	12
1.6 FIXING AND POSITIONING	13
1.7 INSTALLATION ENVIRONMENT	15
1.8 FUME / DUST EXTRACTOR	15
<b>2 TECHNICAL SPECIFICATIONS</b>	<b>16</b>
2.1 TECHNICAL CHARACTERISTICS	16
2.2 DESCRIPTION OF THE LASER MODULES	18
2.2.1 SCAN HEAD	18
2.2.2 CONTROL RACK	19
2.3 MARKING AREA SPECIFICATION	20
2.4 CONNECTORS SPECIFICATIONS	22
2.4.1 INTERLOCK CONNECTOR	22
2.4.2 COMMAND BOX CONNECTOR (LASER CONTROL)	24
2.4.3 AXES CONNECTOR (I/O CONTROL)	29
2.4.4 RS232 CONNECTOR (COM2)	30
2.4.5 ENCODER CONNECTOR	31
2.4.6 PHOTOCCELL CONNECTOR	31
2.5 INPUT/OUTPUT SIGNAL SPECIFICATIONS	32
2.6 CONNECTION EXAMPLES	33
<b>3 INSTALLATION AND SET UP</b>	<b>34</b>
3.1 CONNECTIONS	34
3.1.1 COMMAND BOX CONNECTOR CONNECTION	34
3.1.2 INTERLOCK CONNECTOR CONNECTION	35
3.1.3 POWER SUPPLY CABLE CONNECTION	36
3.1.4 GROUND CONNECTION	36
3.1.5 LOCAL MODE CONNECTION	37
3.1.6 REMOTE MODE CONNECTION	38
<b>4 USE AND OPERATION</b>	<b>39</b>
4.1 TURNING ON SEQUENCE	39
4.1.1 ADVICE ON USING THE SYSTEM	42
4.2 LOCAL MODE OPERATIONS	43
4.3 REMOTE MODE OPERATIONS	43
4.4 OPERATING IN LOCAL MODE	45
4.4.1 HOW TO CREATE AND EDIT YOUR FIRST GRAPHIC DOCUMENT	46
4.4.2 HOW TO TEST AND ENGRAVE YOUR DOCUMENT	49
4.4.3 HOW TO USE EXTERNAL SIGNALS TO ENGRAVE YOUR DOCUMENT	51



<b>5</b>	<b>CUSTOMIZE THE SYSTEM'S SOFTWARE</b>	<b>53</b>
5.1	CHANGE O.S. LANGUAGE AND KEYBOARD LAYOUT	53
5.2	CHANGE THE LAN CONFIGURATION AND IP ADDRESS	56
5.3	CHANGE THE VIDEO SETTING	59
5.4	REMOTE DESKTOP CONNECTION	61
<b>6</b>	<b>ACCESSORIES</b>	<b>63</b>
6.1	CONTROL BOX	63
6.2	MARKING ON FLY KIT	64
6.3	RACK HANDLES	64
<b>7</b>	<b>TECHNICAL SUPPORT</b>	<b>65</b>
7.1	SEALS	65
7.2	MAINTENANCE	66
7.2.1	F-THETA SCAN LENS CLEANING PROCEDURE	66
7.2.2	AIR FILTER CLEANING PROCEDURE	67
7.3	PRODUCT SUPPORT AND CUSTOMER SERVICE	68
<b>APPENDIX A:</b>	<b>LABEL</b>	<b>69</b>
	POSITIONING OF EXTERNAL LABELS	70
<b>APPENDIX B:</b>	<b>STANDARDS</b>	<b>71</b>
	LASER STANDARDS	71
	CE COMPLIANCE	71
	FCC COMPLIANCE	71
<b>APPENDIX C:</b>	<b>AREX SAFETY CONSIDERATION ACCORDING EN ISO 13849-1:2008</b>	<b>73</b>
	SAFETY FUNCTIONS OF AREX	75
<b>APPENDIX D:</b>	<b>NOTE ABOUT LASER</b>	<b>76</b>
	LASER SAFETY	76
	LASER RADIATION	77
	ABSORPTION OF LASER RADIATION	78
	CLASSIFICATION AND DANGER LEVEL	78
	RADIATION VIEWING CONDITIONS	79
	DIRECT VIEWING OF THE LASER BEAM	79
	DIRECT VIEWING OF THE BEAM AFTER MIRROR REFLECTION	79
	DIRECT VIEWING OF THE BEAM OUTPUT BY AN OPTICAL FIBER	79
	DIRECT VIEWING OF THE BEAM AFTER FOCUSING	79
	SCATTERED VIEWING OF THE BEAM AFTER FOCUSING	79
	DNRO DETERMINATION AND O.D. OF PROTECTION GOGGLES	80
	EYES AND SKIN RISKS	82
	GENERAL SAFETY REGULATIONS	82
	COLLATERAL RISK	82
<b>APPENDIX E:</b>	<b>SOFTWARE UPGRADE</b>	<b>84</b>
<b>APPENDIX F:</b>	<b>RECOVER THE SYSTEM USING USB RECOVERY DISK</b>	<b>87</b>
<b>APPENDIX G:</b>	<b>MECHANICAL DRAWINGS</b>	<b>93</b>
<b>FIGURES</b>		<b>95</b>

## 1 CONTENTS OF THE PACKAGING

### 1.1 UNPACKING

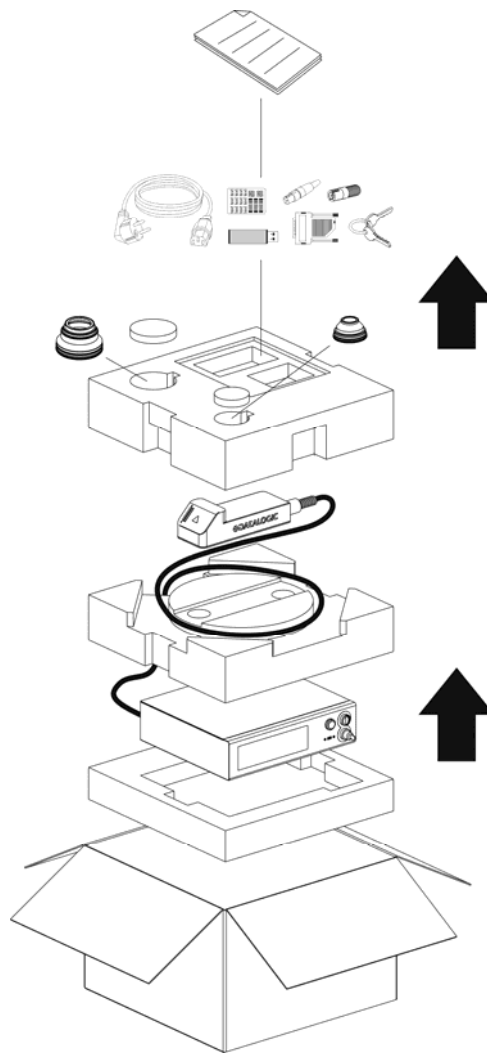
When unpacking the marking system from the shipping carton you should:

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



#### **WARNING!**

Be extremely careful to not damage the connection cable between Scan Head and Rack.



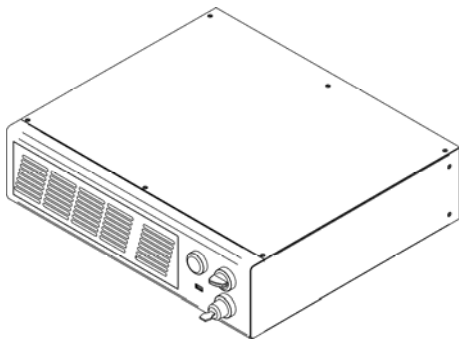
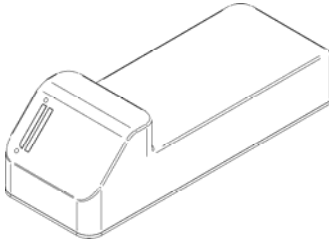

**Figure 2: Unpacking.**

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 section [Technical Support](#) for contact details.

## 1.2 MAIN HARDWARE

 <p><b>Control Rack</b></p>	 <p><b>Scan Head</b></p>	 <p><b>F-Theta</b></p>
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### WARNING!

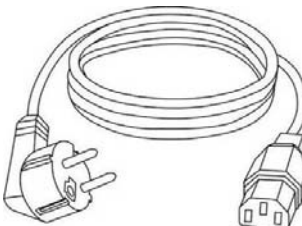
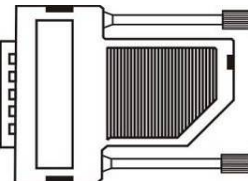

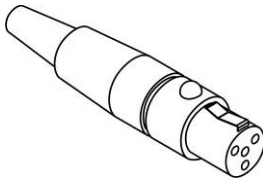


Rack and Scan Head are joined by a connection cable 3 meters long, referred as Head Cable. Rack and Scan Head are **NOT** separable.


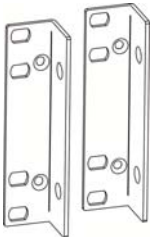
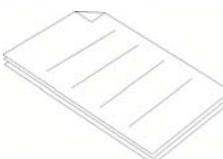
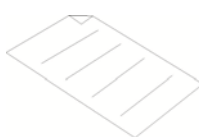
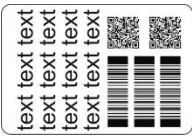


### WARNING!

To avoid damaging or breaking the optical fiber, never subject it to a bending radius below the limits specified in the technical specification table.

## 1.3 CABLE AND ACCESSORIES

 <p><b>Power Supply cable</b></p>	 <p> <b>Command Box Connector (*)</b></p>	 <p> <b>Interlock connector (*)</b></p>	 <p><b>System Keys</b></p>
--	---	--	---

 <p><b>USB flash drive</b></p>	 <p><b>Rack adapters</b></p>	 <p><b>Manuals</b></p>	 <p><b>Test Report</b></p>	 <p><b>Sample Test</b></p>
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\* If this connector is used, the marking system works in **DANGEROUS** condition (MUTING DEVICE).

## 1.4 TRANSPORT

The marking system can be easily lifted up and moved by a single person thanks to its compact size and reduced weight.

**WARNING!**

Rack and Scan Head are joined by a connection cable 3 meters long. Rack and Scan Head are **NOT** separable!

**WARNING!**

To avoid damaging or breaking the optical fiber, never subject it a bending radius below the limits specified in the technical specification table.

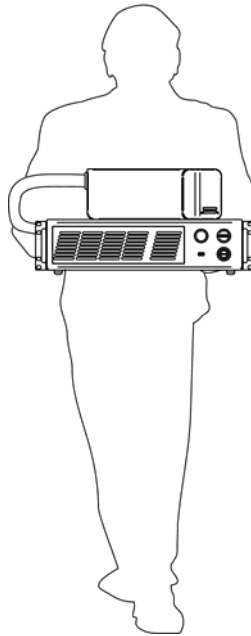


Figure 3: Transport.

**WARNING!**

The Arex marking system is a delicate optical device, avoid damaging it with shock and vibrations.

**WARNING!**

Be extremely careful to not damage the connection cable between Scan Head and Rack.

## 1.5 ON MOISTURE CONDENSATION

If the marking system is brought directly from a cold to a warm location, moisture may condense inside or outside the marking system. This moisture condensation may cause a malfunction of the marking system.

**If moisture condensation occurs**

Turn off the marking system and wait about 1 hour for the moisture to evaporate.

**Note on moisture condensation**

Moisture may condense when you bring the marking system from a cold place into a warm place (or vice versa) or when you use the marking system in a humid place as shown below.

**How to avoid moisture condensation**

When you bring the marking system from a cold place into a warm place, put it in a plastic bag and seal it tightly. Remove the bag when the air temperature inside the plastic bag has reached the ambient temperature (after about 1 hour).

## 1.6 FIXING AND POSITIONING

The marking system must be positioned in a safely manner and the precautions listed below must be followed:

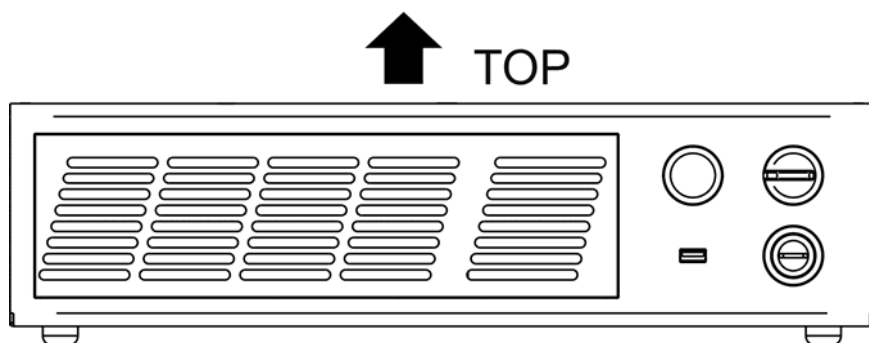
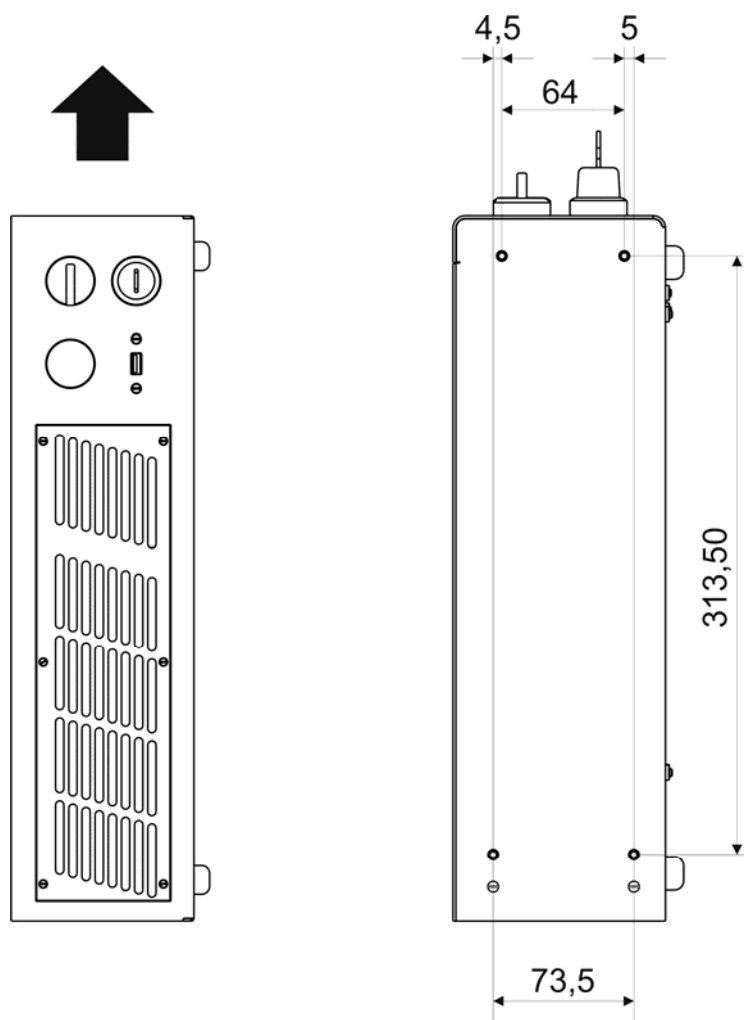


Figure 4: Positioning rack.



\*: DIMENSIONS ARE IN MILLIMETRES

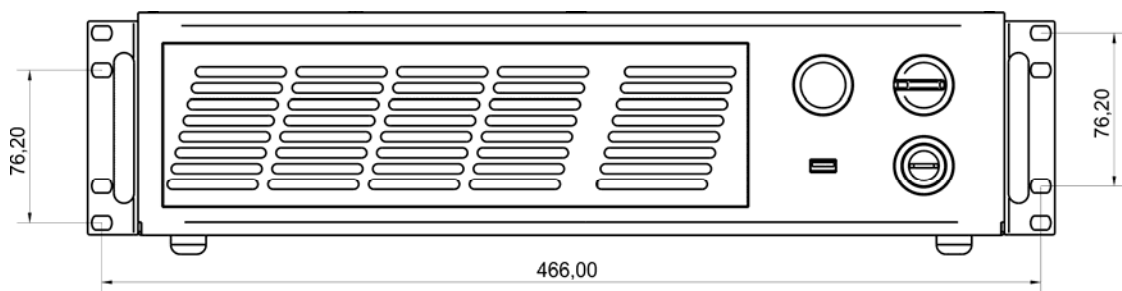
Figure 5: Vertical positioning (need additional fixing).



### WARNING!

DO NOT fix the marking system in manner not shown in figure.

The marking system can be fitted inside a special rack cabinet equipped with special support shoulders and handles, available on request. The figure below shows the mounting points for mounting in rack (rack handles available as accessory):



\*: DIMENSIONS ARE IN MILLIMETRES

**Figure 6: Fixing points on shrug rack (cabinet assembly).**



**NOTE:**

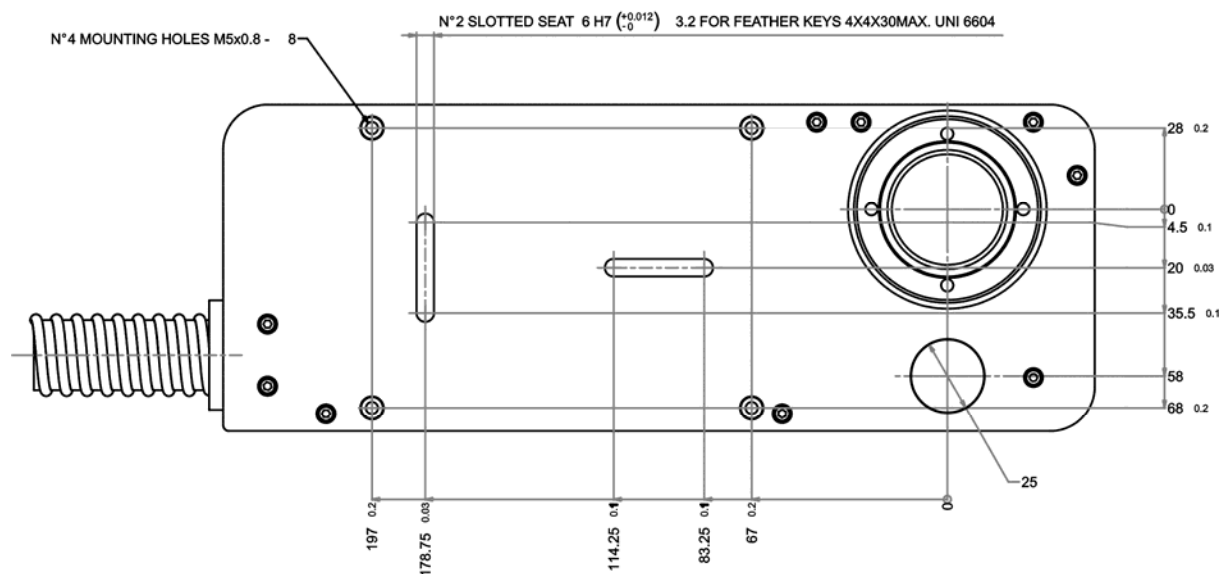
In order to prevent marking distortions, install a vibrometer on the base of the piece to be marked and check for the absence of vibrations during the marking process.



**NOTE:**

It is recommended to install the resonator on a micrometer positioning Z-axis system!

The Scan Head must be fixed to a suitable base (not supplied by Datalogic Automation S.r.l.) using the four M5 threaded holes and the two slotted seats:



\*: DIMENSIONS ARE IN MILLIMETRES

**Figure 7: Fixing points on Scan Head (vertical mount).**

The Scan Head unit, just like the control rack, must be safely positioned and fixed to a stable surface, vibration-free. The Scan Head can be fixed either vertically or horizontally. In order to prevent marking distortions, avoid any vibration between Scan Head and piece to be marked.



**WARNING!**

It is very important to secure the laser 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.

## 1.7 INSTALLATION ENVIRONMENT

The control rack must be installed in a suitable environment in order to allow proper air flow passage and correct housing of the cables.

Arex is an air cooled marking system: an adequate air flow is necessary to guarantee its correct cooling. Installation must not slow or stop the flow of air cooling. Moreover, do not install a heat source near.

Clean air filter when it is dirty. If the air filter is dirty, the air-flow might become not sufficient to ensure correct cooling and might stop marking operation. Clean or exchange air filter periodically.

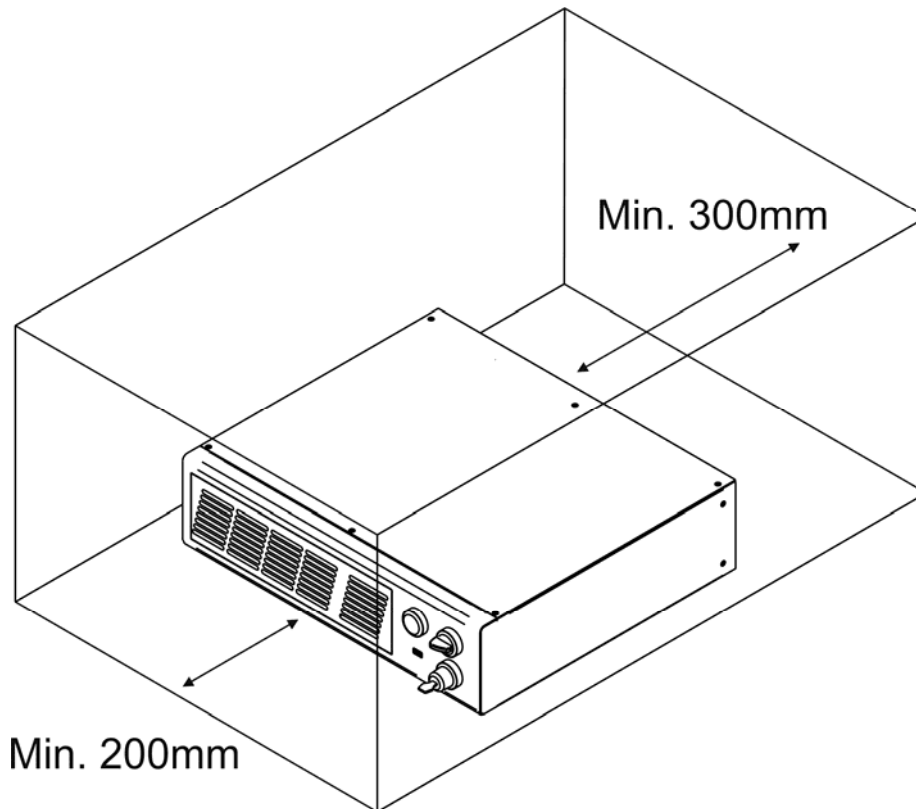


Figure 8: Rack installation environment.



### WARNING!

**DO NOT** place heavy objects on top of rack!

## 1.8 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.



### WARNING!

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

## 2 TECHNICAL SPECIFICATIONS


**NOTE:**

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


**WARNING!**

**Arex** is a **CLASS 4 LASER PRODUCT** and it is the responsibility of the OEM/system integrator to provide the safety completeness to be ready-to-use.

### 2.1 TECHNICAL CHARACTERISTICS

#### CONTROL RACK MECHANICAL CHARACTERISTICS

Weight	16 Kg
Height	111 mm
Width	430 mm
Depth	370 mm
IP Rating	IP21

#### SCAN HEAD MECHANICAL CHARACTERISTICS

Weight	3 Kg*
Height	90 mm*
Width	112 mm
Depth	300 mm
IP Rating	IP54

\* without F-Theta scan lens


**NOTE:**

**Refer to Datalogic's website for detailed drawings.**



**STORAGE AND TRASPORTATION CONDITIONS**

Storage temperature	-10° to 60°C (14° to 140°F)
Shock and vibrations	MIL 810E "CAT 1 Basic Transportation"
Package Drop Test	60 cm

**WARNING!**

This product includes precision optical parts; avoid vibration and shocks: marking quality may deteriorate.

**ENVIRONMENTAL OPERATING CONDITIONS**

	<b>AREX 30W</b>	<b>AREX 50W</b>
Environmental temperature	5°C to 40°C (41° to 104°F)	5°C to 35°C (41° to 95°F)
Humidity	< 90% without condensation	
Altitude	< 2000 m	
Pollution Degree	2	
Overvoltage Category	II	

**ELECTRICAL POWER SUPPLY**

Input Voltage	100 to 240 Vac	100 to 240 Vac
Input Current	3 to 1,25A max	3,3 to 1,4A max
Max Power	300W	330W

**PERFORMANCE**

<b>Arex Model</b>		<b>30W</b>	<b>50W</b>
<b>LASER SOURCE</b> (specification @25°C)			
Laser Type		Class 4 Pulsed Fiber Laser	
Average Power	W	30	50
Pulse energy (max)	mJ	1	
Peak power (max)	kW	11	10
Central emission wavelength	nm	1060 - 1080	
Repetition Rate	kHz	30 ÷ 200	50 ÷ 200
Laser aiming beam		Class 2M ≤ 1mW @ 660nm	
Cooling		Forced Air	
Noise	dB(A)	< 70 at 1 meter	

**OTHER**

HEAD CABLE minimum bending radius	150 mm (fixed installation) 300 mm (mobile installation)
Marking head cable length	3 meters
Laser Focus Beam	Class 2 : 1 mW @ 635 nm
Beam deflection	High speed galvanometer scanning system
Marking Speed <sup>1</sup>	Up to 2000 mm/sec -500 car/sec
MOF (Marking on the fly)	YES [constant speed or encoder]
Line speed - Productivity <sup>2</sup>	Up to 75 m/min – 3 Pcs/Sec
Marking Control and Software	EMC embedded control and Lighter Suite
Communication	RS232, Ethernet (TCP/IP 10, 100 Mbit), digital I/O

<sup>1</sup> May vary: measured with f= 160mm

<sup>2</sup> Single line string, Roman-s font

## 2.2 DESCRIPTION OF THE LASER MODULES

### 2.2.1 SCAN HEAD

A description of the main parts of the Scan Head unit is provided here below:

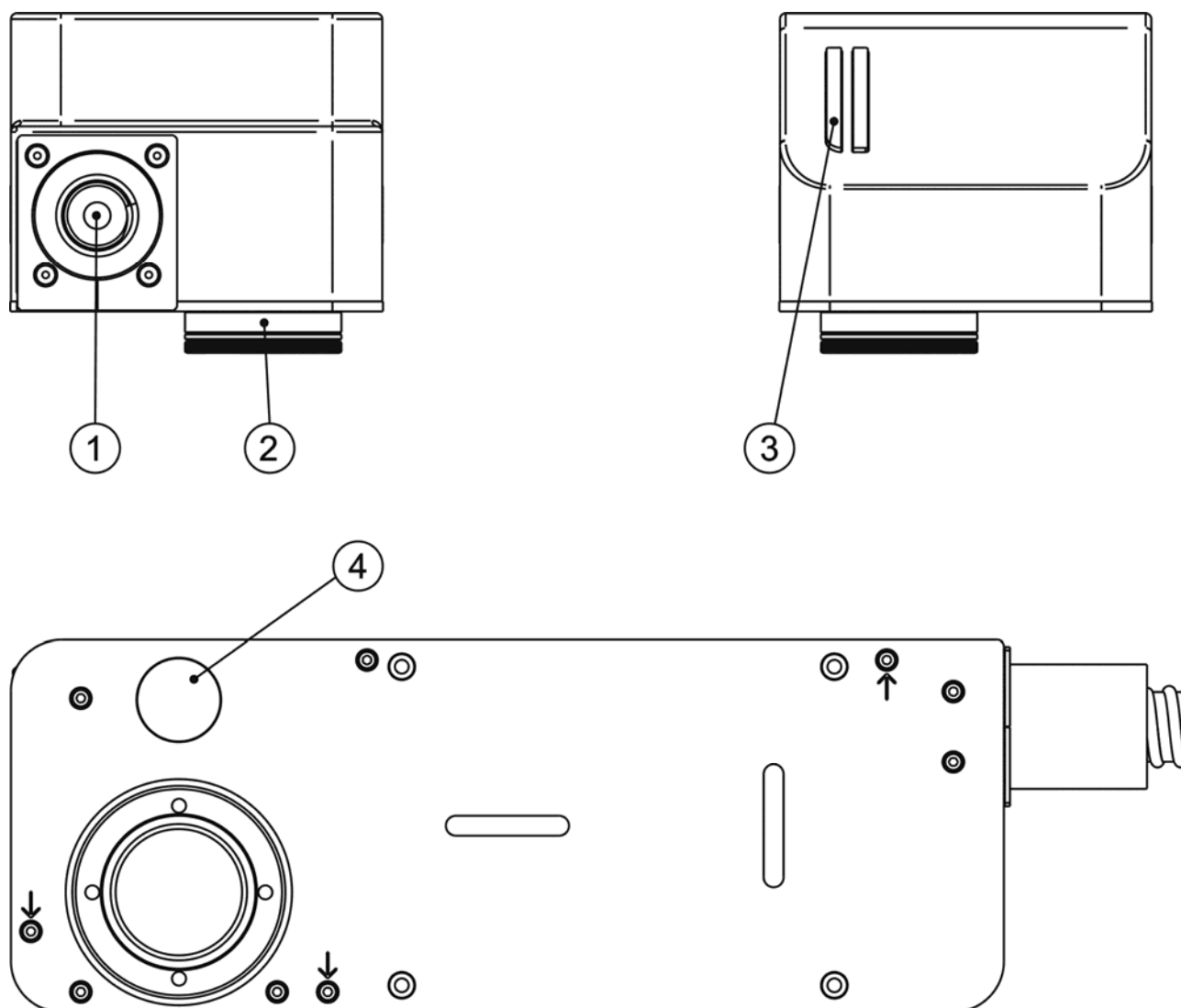
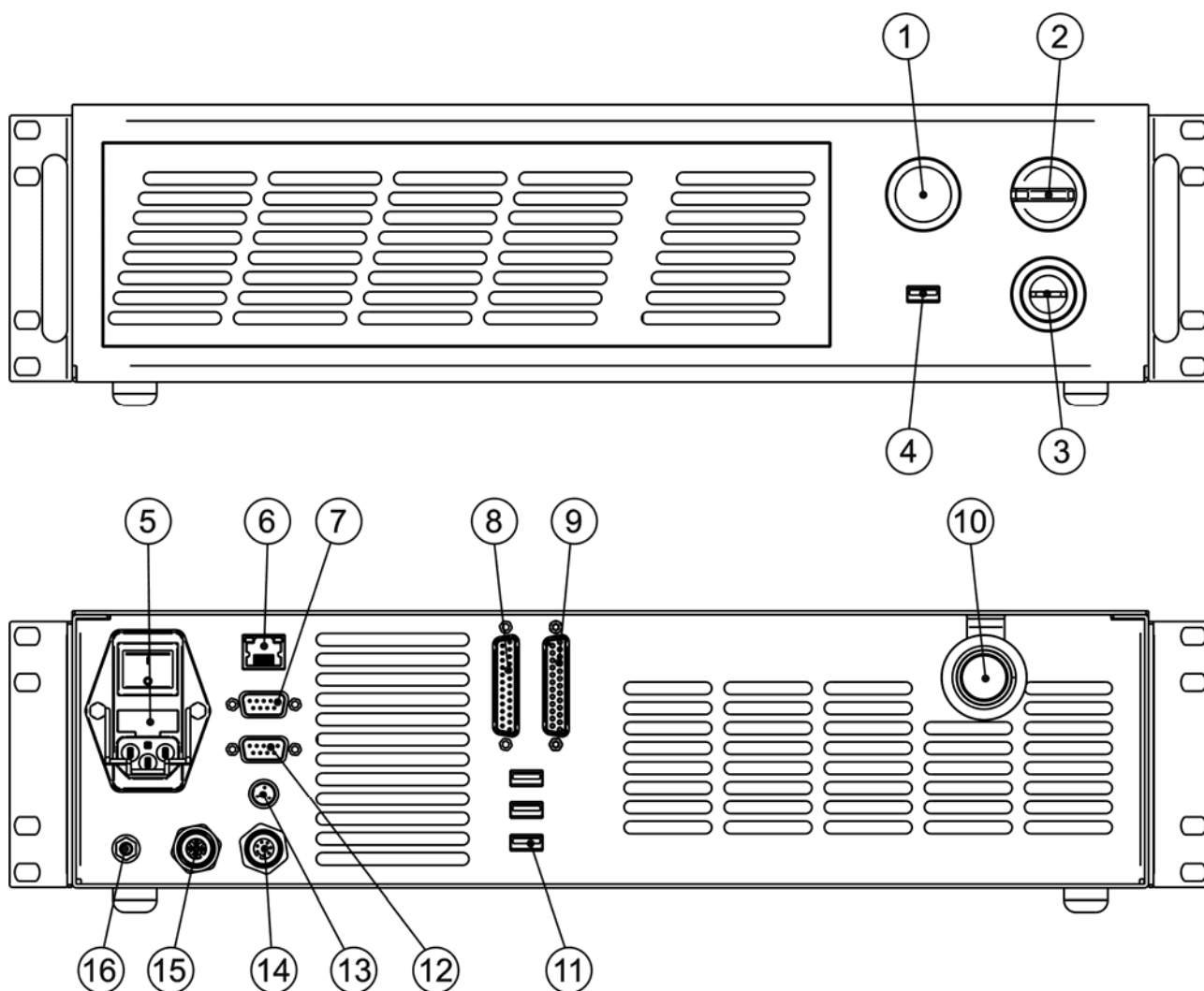


Figure 9: Scan Head overview

1) Main connection Rack-Scan Head	3) Status LED bar
2) F-Theta Scan Lens	4) Focusing Beam output

## 2.2.2 CONTROL RACK

The control rack is described here below in order to provide the right information for proper installation:



**Figure 10: Control rack overview.**

1) Status LED	9) I/O connector (axes control)
2) Enable selector	10) Main connection to Scan Head
3) Key selector	11) 3x USB connectors
4) USB connector	12) RS232 connector
5) Mains power supply connection	13) Interlock connector
6) LAN connector	14) Photocell connector
7) VGA connector	15) Encoder connector
8) Command Box connector (Laser control)	16) Earth ground

## 2.3 MARKING AREA SPECIFICATION

Datalogic provides a wide range of F-Theta scan lenses to be attached 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; 2D matrix; etc.) to be marked with customer need, over the material processing, and fit the standard Datalogic Scanning Head; further solutions about different models of lenses and scanning heads will be considered upon request.

The table below lists the standard F-Theta scan lenses currently available:

F-Theta Scan Lens diameter: M39			
F-Theta Scan Lens		$f = 160S$	$f = 254S$
Working Distance	mm	$183 \pm 5$	$280 \pm 4$
Fixing Distance	mm	$197 \pm 6$	$300 \pm 5$
Marking Area	mm <sup>2</sup>	85 x 85	100 x 100

F-Theta Scan Lens diameter: M85				
F-Theta Scan Lens		$f = 160L$	$f = 254L$	$f = 330L$
Working Distance	mm	$176 \pm 2$	$296 \pm 5$	$388 \pm 6$
Fixing Distance	mm	$212 \pm 3$	$367 \pm 6$	$471 \pm 7$
Marking Area	mm <sup>2</sup>	100 x 100	170 x 170	210 x 210



### NOTE:

Definition of Marking Area: *square marking field within which power is > 95% respect to power in center.*



### WARNING!

This product was designed to use only certain configurations of F-Theta lens and marking field. If your needs are not satisfied by current available F-Theta lens configurations please contact Datalogic for a solution. The use of other F-Theta lenses or operation outside the specified marking field for a certain F-Theta lens configuration can lead to damage of F-Theta lens, scanning head or laser source. Such damage is not covered by warranty!



### WARNING!

For each F-Theta lens configuration Datalogic recommends the use of certain adapter. This adapter ensures that residual back reflections caused by F-Theta lens do not damage optics of the scanning head. The removal of such adapter or its incorrect use (for example incomplete threading, use of another F-Theta lens adapter, etc.) can lead to damage of the F-Theta lens, scanning head or laser source. Such damage is not covered by warranty!



**NOTE:**

Working Distance is defined as the distance between the center of the marking area (defined in the focal plane) and the last mechanical edge of the F-Theta Scan Lens. Refer to the following figure.

**WD:** Working Distance

**FD:** Fixing Distance

**MA:** Marking Area

**AB:** Aiming beam

**FB:** Focusing beam

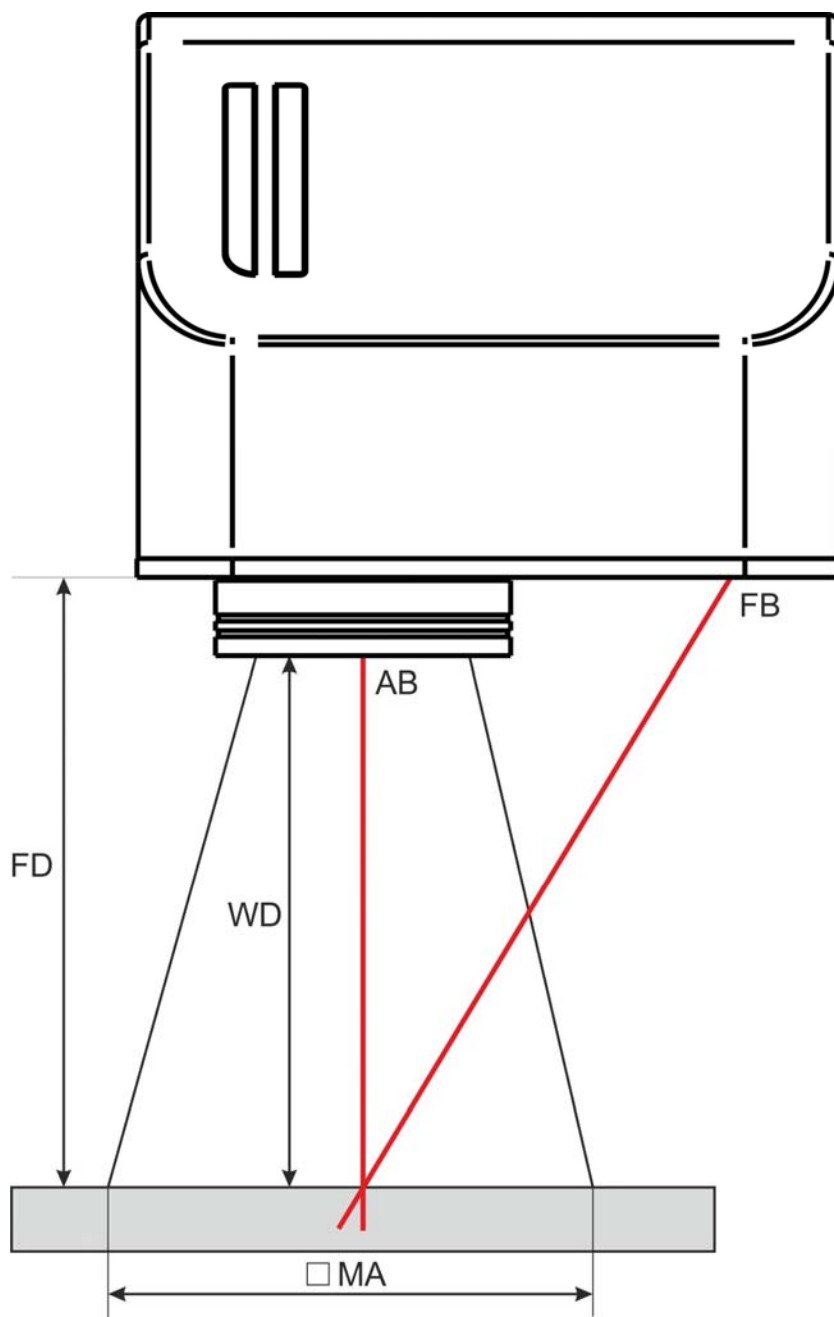


Figure 11: Working distance.



**NOTE:**

For systems equipped with standard Small F-Theta Scan Lens (M39) the focus condition is obtained by matching the Aiming Beam with the Focusing beam.

## 2.4 CONNECTORS SPECIFICATIONS

### 2.4.1 INTERLOCK CONNECTOR

Interlock **disables** the Class4 laser source inside the laser system. Interlock internal circuit is designed to comply with the single fault condition.

PIN	SIGNAL	TYPE	DESCRIPTION	FUNCTIONAL DIAGRAM
1	VCC_INT_IN_A	OUTPUT	24V DC reference for interlock IN signal A	
2	INT_IN_A	INPUT	Interlock IN signal A	
3	GND_INT_IN_B	GND	Ground reference for interlock IN signal B	
4	INT_IN_B	INPUT	Interlock IN signal B	

PIN 1- PIN 2	PIN 3- PIN 4	MARKING FUNCTIONALITY	STATUS
CONTACT OPEN	CONTACT OPEN	NOT POSSIBLE	SAFE CONDITION
CONTACT CLOSED	CONTACT OPEN	NOT POSSIBLE	DANGEROUS CONDITION
CONTACT OPEN	CONTACT CLOSED	NOT POSSIBLE	DANGEROUS CONDITION
CONTACT CLOSED	CONTACT CLOSED	POSSIBLE	DANGEROUS CONDITION



#### WARNING!

In order to **NOT DAMAGE** the interlock circuitry, we recommended using “dry circuit” (zero voltage) switches or relay circuitry.

#### PANEL CONNECTOR

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

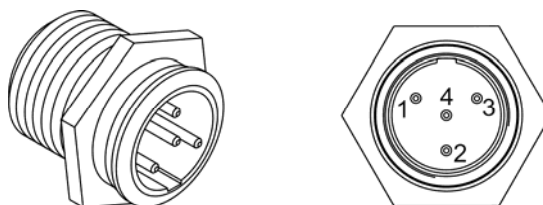


Figure 12: Male panel plug cod. TB4M (front view).



#### NOTE:

See appendix D about the compliance to EN ISO 13849-1:2008.

## PLUG CONNECTOR

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

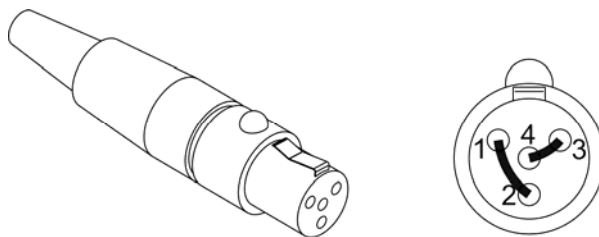


Figure 13: Female cable mount connector cod. TA4FX (solder view).



### WARNING!

If the interlock gold connector is used, the marking system is in **DANGEROUS** condition. (MUTING DEVICE)



### NOTE:

To restore the marking system it is necessary to repeat the “*Turning on sequence*” without shutting down the system. See [Chapter 4.1](#) for more details.

## 2.4.2 COMMAND BOX CONNECTOR (LASER CONTROL)

Panel socket SUB-D, 25 positions, female.

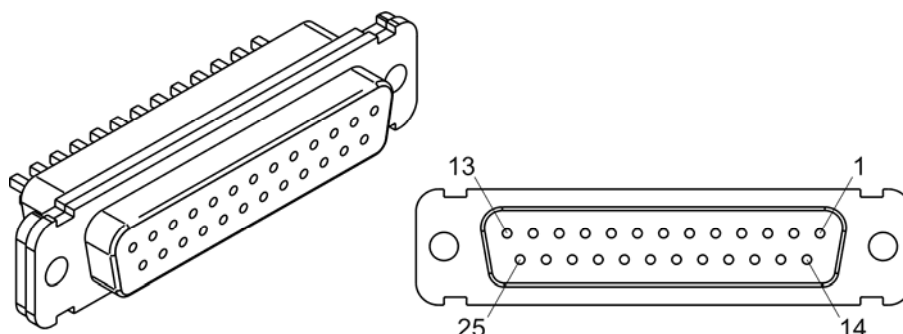


Figure 14: Female panel socket SUB-D 25 (front view).

PIN	SIGNAL	TYPE (***)	DESCRIPTION
1	12V_ENABLE_B	Output power supply	12Vdc power supply available for ENABLE B (max 250mA)
2	EXT_ENABLE_B	Digital Input	Secondary external enable signal (see <a href="#">paragraph 2.4.2.1</a> ) - 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 for drive input logical HIGH (max 250mA)
5	EXT_12V	Output power supply	Auxiliary 12Vdc power supply available for drive input logical HIGH (max 250mA)
6	EXT_12V	Output power supply	Auxiliary 12Vdc power supply available for drive input logical HIGH (max 250mA)
7	12V_ENABLE_A	Output power supply	12Vdc power supply available for ENABLE A (max 250mA)
8	EXT_ENABLE_A	Digital Input	Primary external enable signal (see <a href="#">paragraph 2.4.2.1</a> ) - 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) (see <a href="#">paragraph 2.4.2.4</a> ) - ON during marking process
10	CONNECTOR PRESENCE	Digital Input	This signal is used to check the presence of the command box connector (see <a href="#">paragraph 2.6</a> ) - HIGH level: normal operation; - LOW level or disconnected: laser source faulty
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 <a href="#">paragraph 2.4.2.4</a> ) - HIGH level pulsed signal start the marking process
12	EXT_KEY	Digital Input	External key signal (see <a href="#">paragraph 2.4.2.2</a> ) - 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 <a href="#">paragraph 2.4.2.4</a> ) - HIGH level pulsed signal start the marking process



14	RESERVED	Digital Input	DO NOT CONNECT
15	RESERVED	Digital Input	DO NOT CONNECT
16	RESERVED	Digital Input	DO NOT CONNECT
17	END	Digital Output	This signal is used to know if the marking process is finished: (see <a href="#">paragraph 2.4.2.4</a> ): - ON at the end of marking process
18	POWER_ON	Digital Output	This signal is used to know if the system is already warmed up: (see <a href="#">paragraph 2.4.2.3</a> ) - 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 booting up state or in error state: (see <a href="#">paragraph 2.4.2.3</a> ) - ON during BOOTING UP - ON in case of system error
21	GND	Ground	Ground reference
22	ENABLE_OUT	Digital Output	This signal is used to know if the system is ready to emit laser radiation: (see <a href="#">paragraph 2.4.2.3</a> ) - ON when the system is in READY state
23	SW_READY (*)	Digital Output	This signal is used to know if a document, sequence or script is loaded and ready to be executed: - ON when a document or a sequence is running in AUTO MODE (**) or WORK MODE (**) (SW_READY COMPATIBILITY (**) = true) - ON when a document or a sequence is running in AUTO MODE (**) and laser in READY state (SW_READY COMPATIBILITY (**) = false) - ON when a script is running in AUTO MODE (**) and "IoPort.setReady (true)" function is used
24	GND	Ground	Ground reference
25	GND	Ground	Ground reference

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

(\*\*) refers to Lighter user's manual

(\*\*\*) refer to [paragraph 2.5](#)



**NOTE:**

Connection example in [paragraph 2.6](#).

## 2.4.2.1 ENABLE SIGNAL'S SCHEME (COMMAND BOX CONNECTOR)

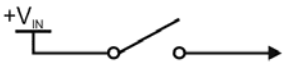
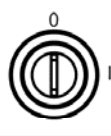
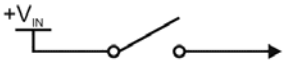
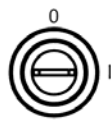
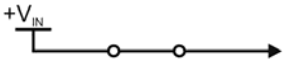

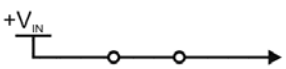

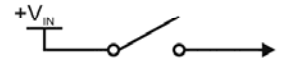
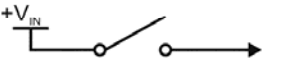
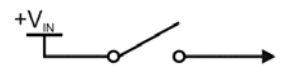
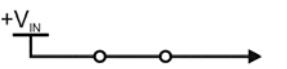
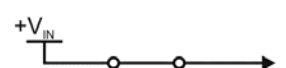
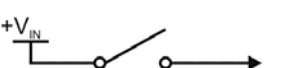


ENABLE		
EXT_ENABLE (A+B)*	FRONT PANEL ENABLE	
		ENABLE CONTACT IS OFF
		ENABLE CONTACT IS OFF
		ENABLE CONTACT IS OFF
		ENABLE CONTACT IS ON
* EXT_ENABLE_A	* EXT_ENABLE_B	DOUBLE ENABLE CONTACT (EN60825-1 COMPLIANT)
 PIN 8	 PIN 2	EXT_ENABLE CONTACT IS OFF
 PIN 8	 PIN 2	EXT_ENABLE CONTACT IS OFF
 PIN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

Figure 15: Enable signal's scheme

### 2.4.2.2 KEY SIGNAL'S SCHEME (COMMAND BOX CONNECTOR)

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

Figure 16: Key signal's scheme

### 2.4.2.3 LASER CONTROL SIGNALS TIMING

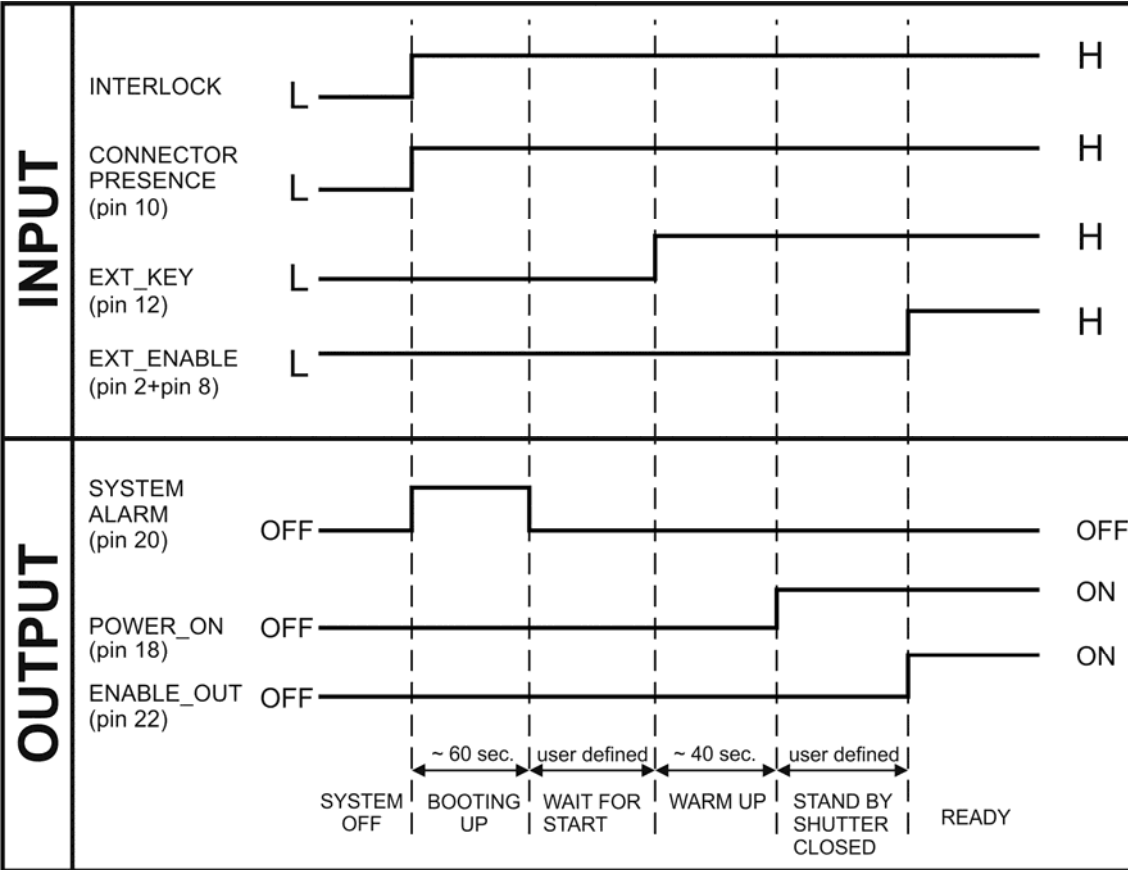
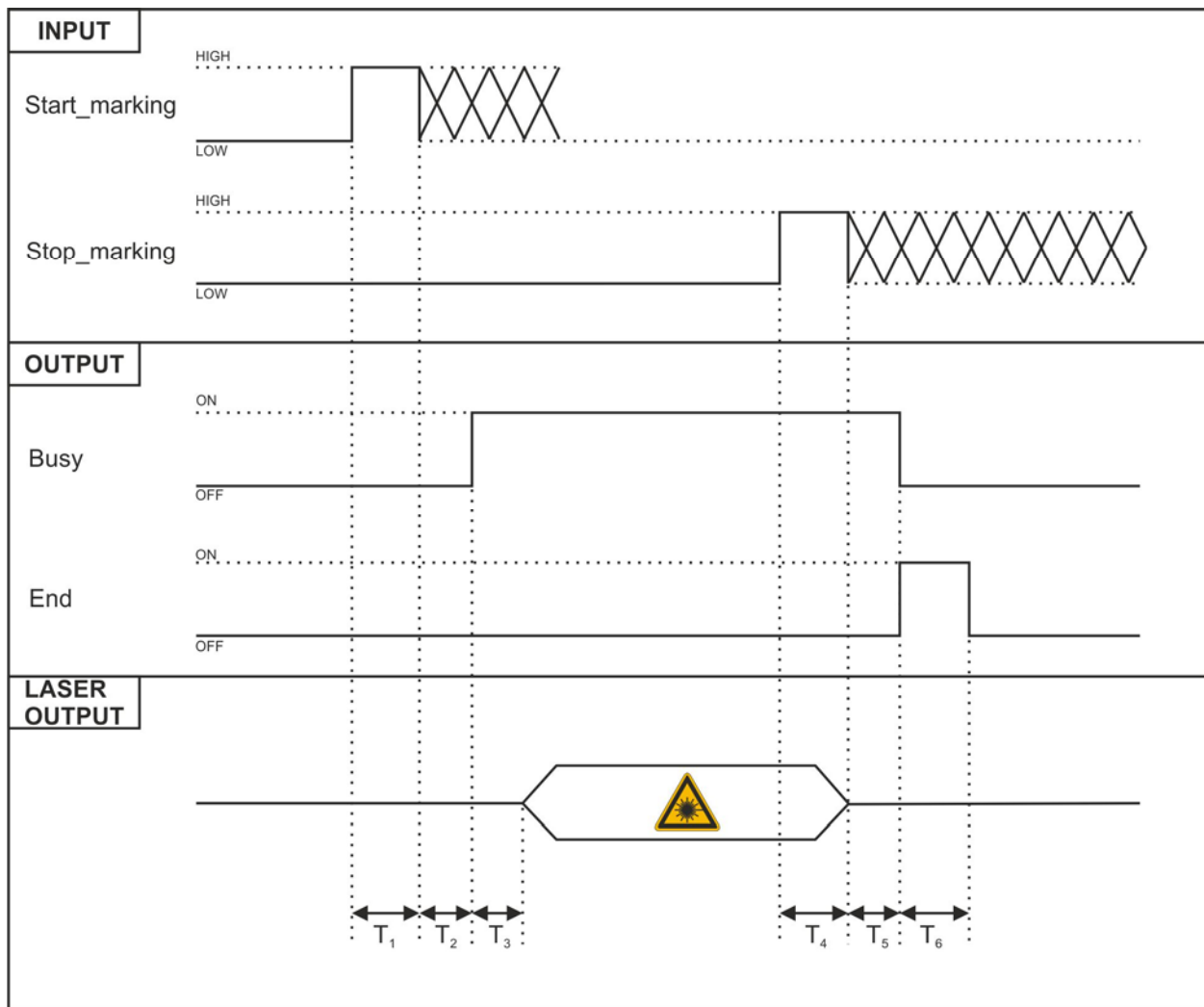


Figure 17: Timing control signals

### 2.4.2.4 MARKING PROCESS SIGNALS TIMING

The following diagram illustrates the possible timings and settings of these signals:



**Figure 18: Timing signals**

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

$T_1$	Start Time	For setting the minimum acceptable time for the start marking signal
$T_2$	Start Delay	For delaying the start of marking process
$T_3$	Busy Advance	Busy signal corresponding to marking progress
$T_4$	Stop Time	The minimum time for stop signal to stop the marking process
$T_5$	Busy 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.

### 2.4.3 AXES CONNECTOR (I/O CONTROL)

Panel socket SUB-D, 25 positions, male.

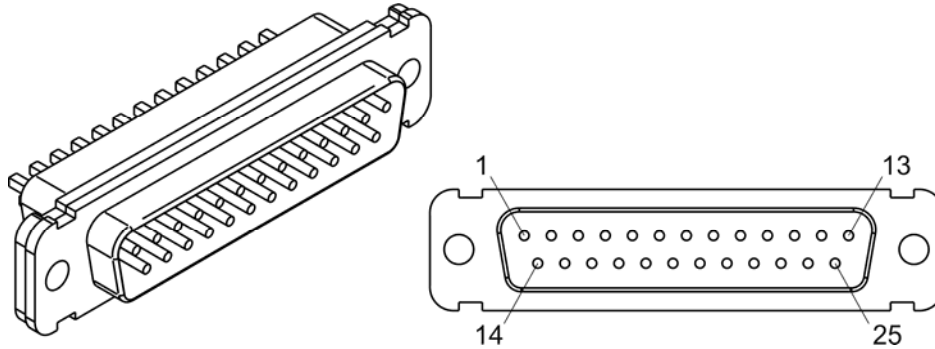


Figure 19: Male panel socket SUB-D 25 (front view).

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. Refer to Lighter user's manual, "Setting the X, Y, Z, and Rotor Axes parameters" to enable/disable Axes and set the Axes properties

(\*\*) see [paragraph 2.5](#)

#### 2.4.4 RS232 CONNECTOR (COM2)

Panel socket SUB-D, 9 positions, male.

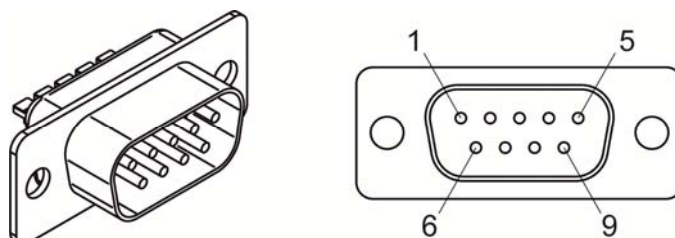


Figure 20: Male panel socket SUB-D 9 (front view).

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

### 2.4.5 ENCODER CONNECTOR

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

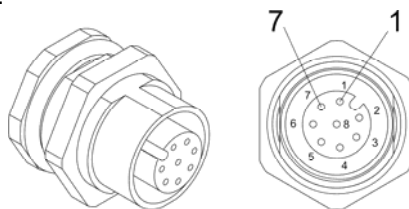


Figure 21: Female panel socket cod. 09-3482-87-08 (front view).

PIN	SIGNAL	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

### 2.4.6 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.

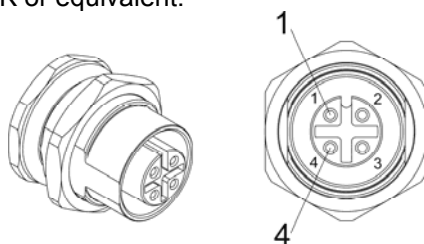


Figure 22: Female panel socket cod. 09-3482-87-04 (front view).

PIN	SIGNAL	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

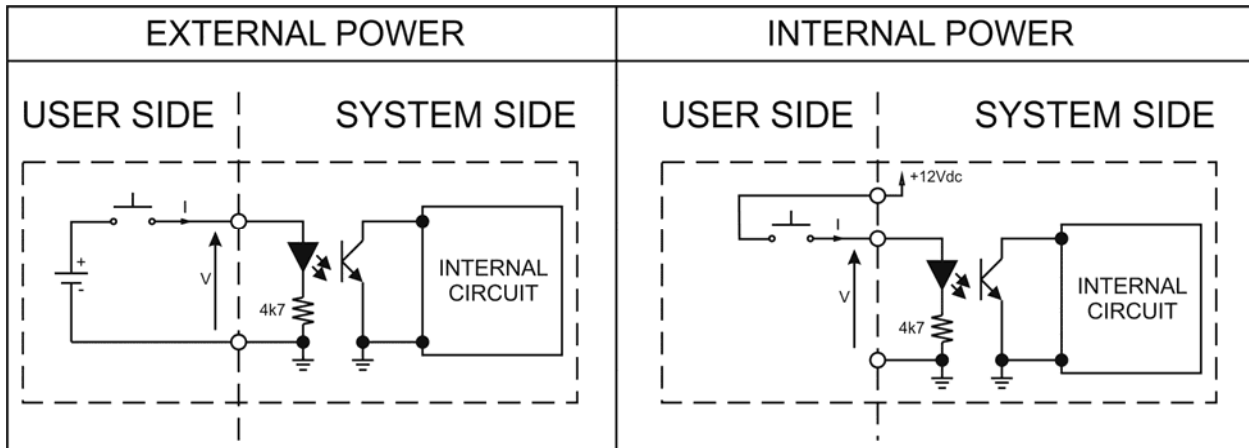


#### WARNING!

For EMC compliance a RICHCO RRC-16-9-28-M2-K5B (or equivalent) must be used.

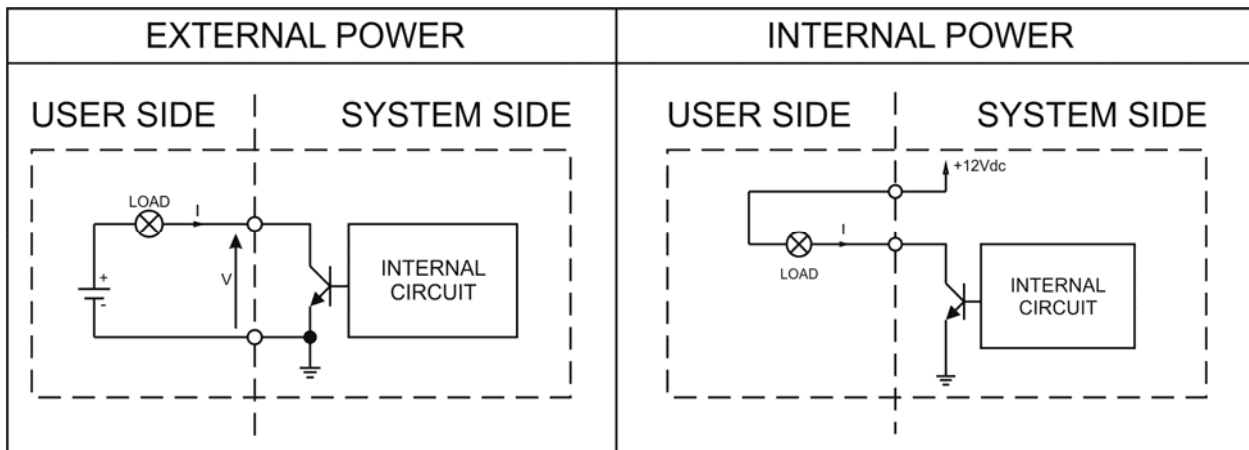
## 2.5 INPUT/OUTPUT SIGNAL SPECIFICATIONS

### DIGITAL INPUT:



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

### DIGITAL OUTPUT:



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



# 2.6 CONNECTION EXAMPLES

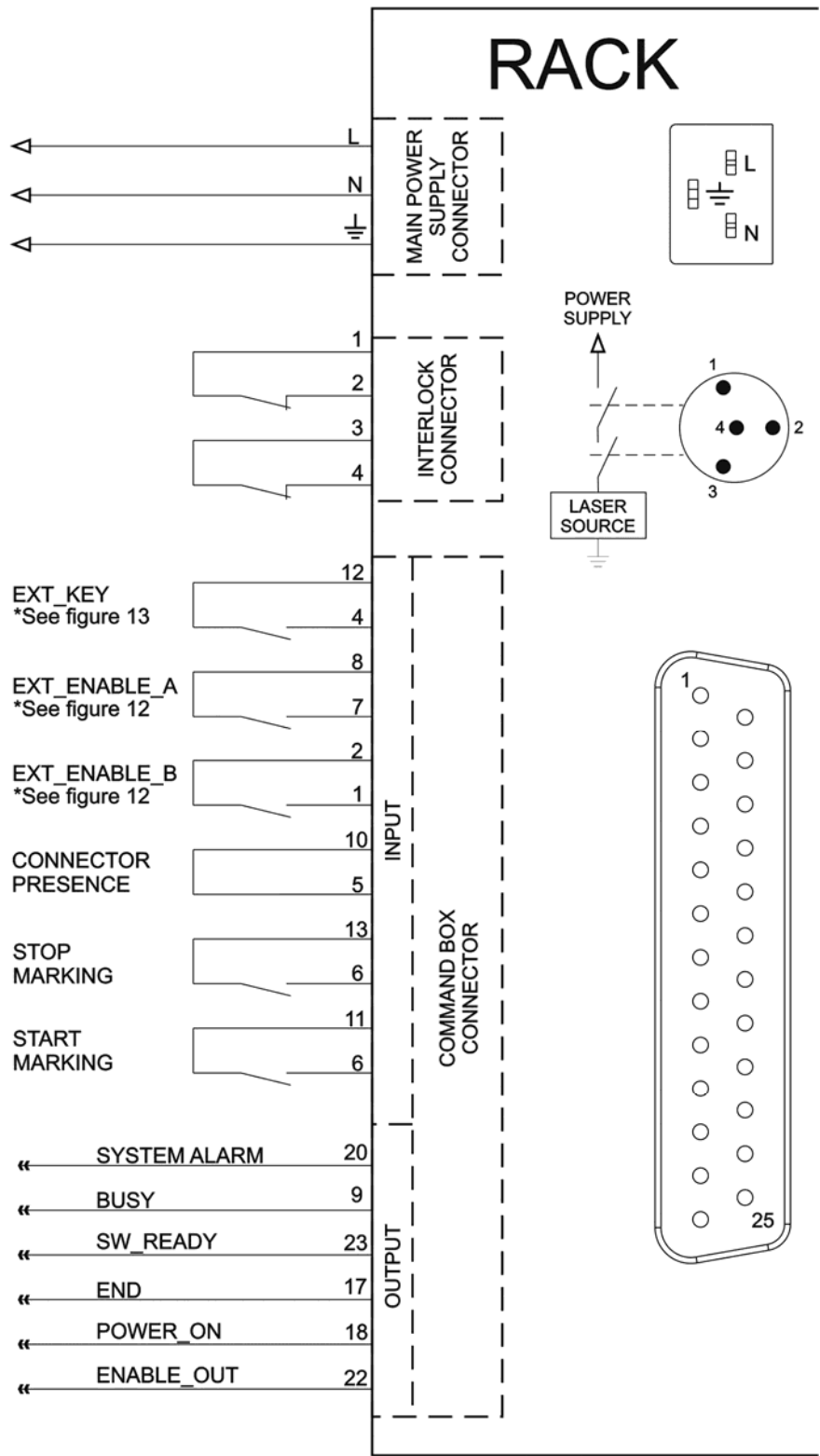


Figure 23: Connection examples.



**NOTE:**

See appendix D about the compliance to EN ISO 13849-1:2008.

## 3 INSTALLATION AND SET UP

### 3.1 CONNECTIONS

The marking system connecting is described here below. Follow the connecting operations as described.

**WARNING!**

Rack and Scan Head are joined by a connection cable 3 meters long. Rack and Scan Head are **NOT** separable!

**CAUTION:**

Connect the marking system to other parts **WITHOUT** voltage in order to avoid risks for the operator and for the laser source.

#### 3.1.1 COMMAND BOX CONNECTOR CONNECTION

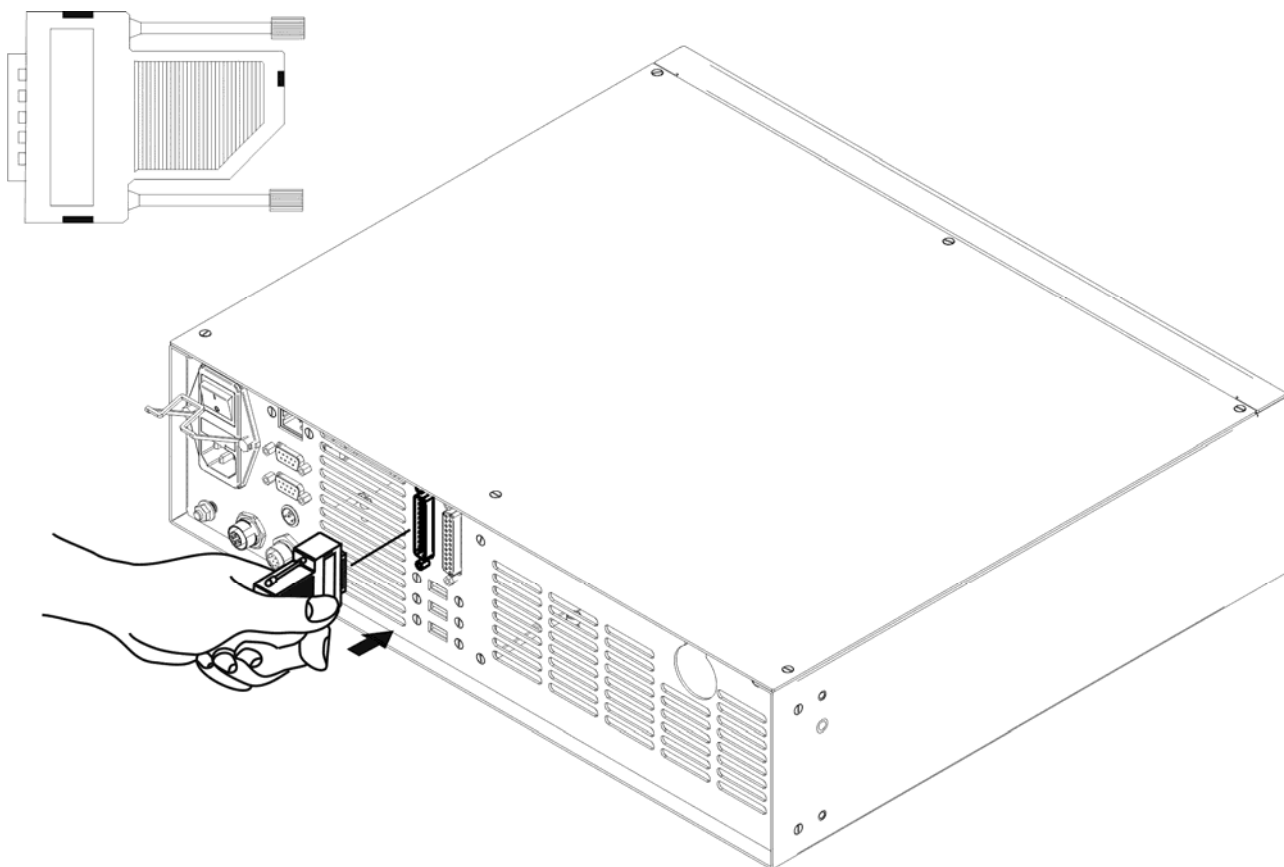


Figure 24: Connecting Command Box connector.

**NOTE:**

The Command Box connector must always be inserted in order to use Enable and Key on the front panel of the rack.

### 3.1.2 INTERLOCK CONNECTOR CONNECTION

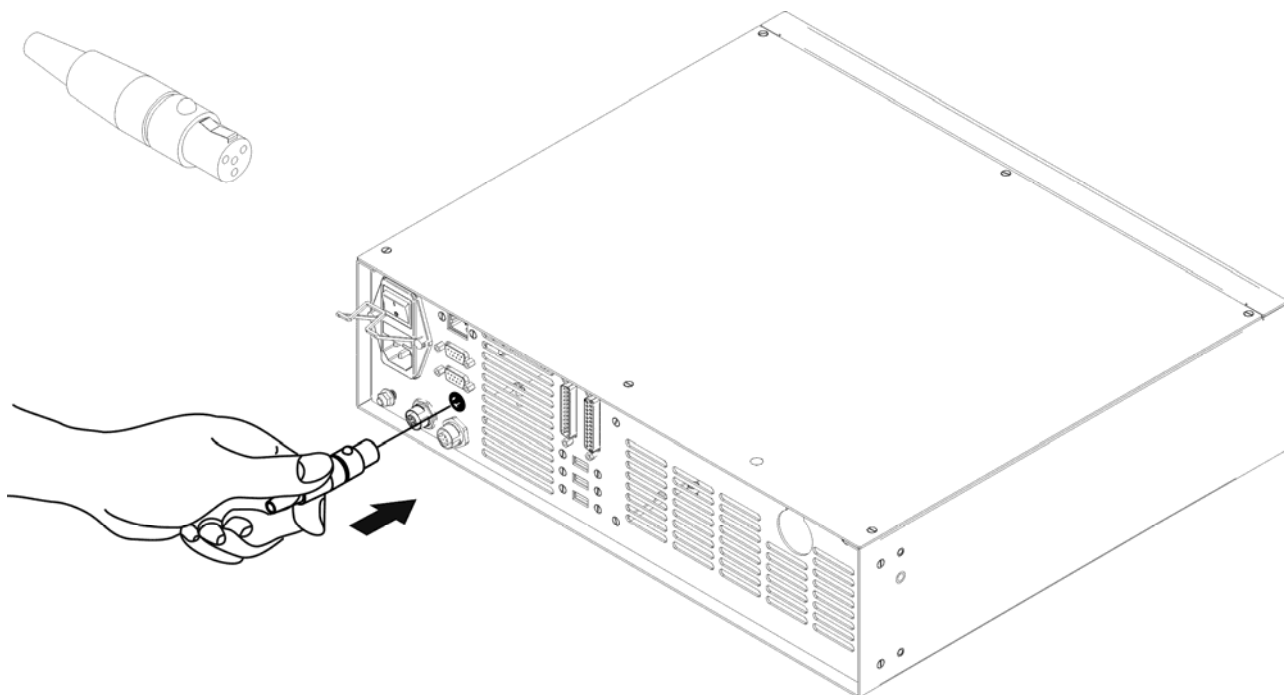


Figure 25: Connecting interlock connector.



#### **WARNING!**

If the interlock gold connector is used, the marking system is in **DANGEROUS** condition. (MUTING DEVICE)



#### **NOTE:**

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



#### **NOTE:**

See appendix D about the compliance to EN ISO 13849-1:2008

### 3.1.3 POWER SUPPLY CABLE CONNECTION

Connecting power supply cable.

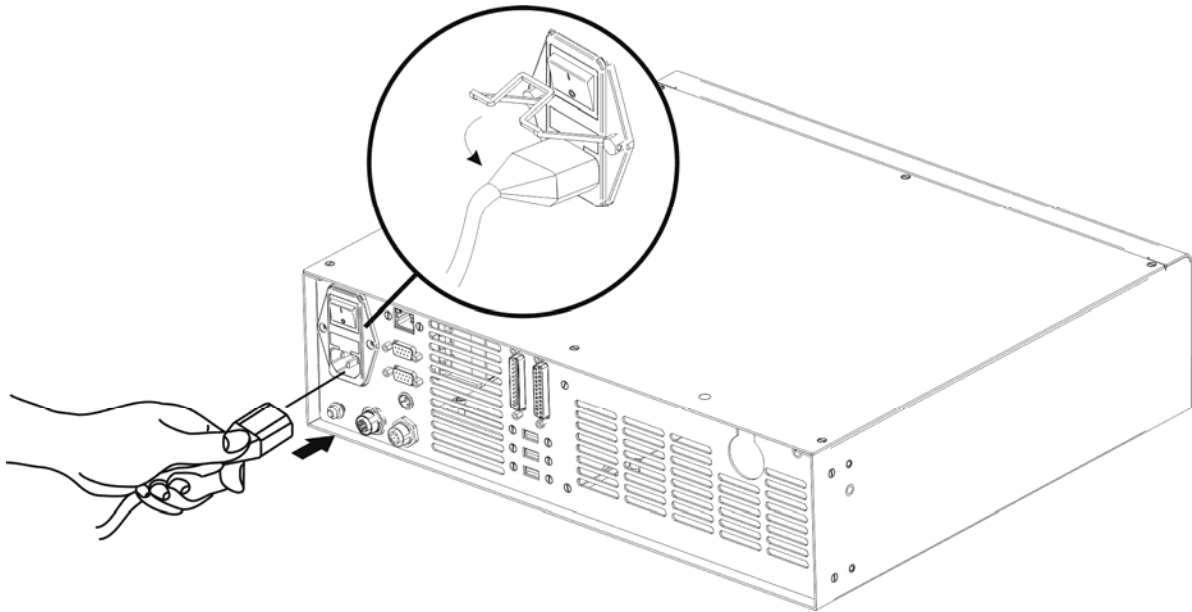


Figure 26: Connecting power supply cable.

**NOTE:**

Lock the plug with the retaining clamp to avoid accidental disconnection.

### 3.1.4 GROUND CONNECTION

To ensure high electrical noise immunity it is strongly recommended to connect the chassis to earth plant.

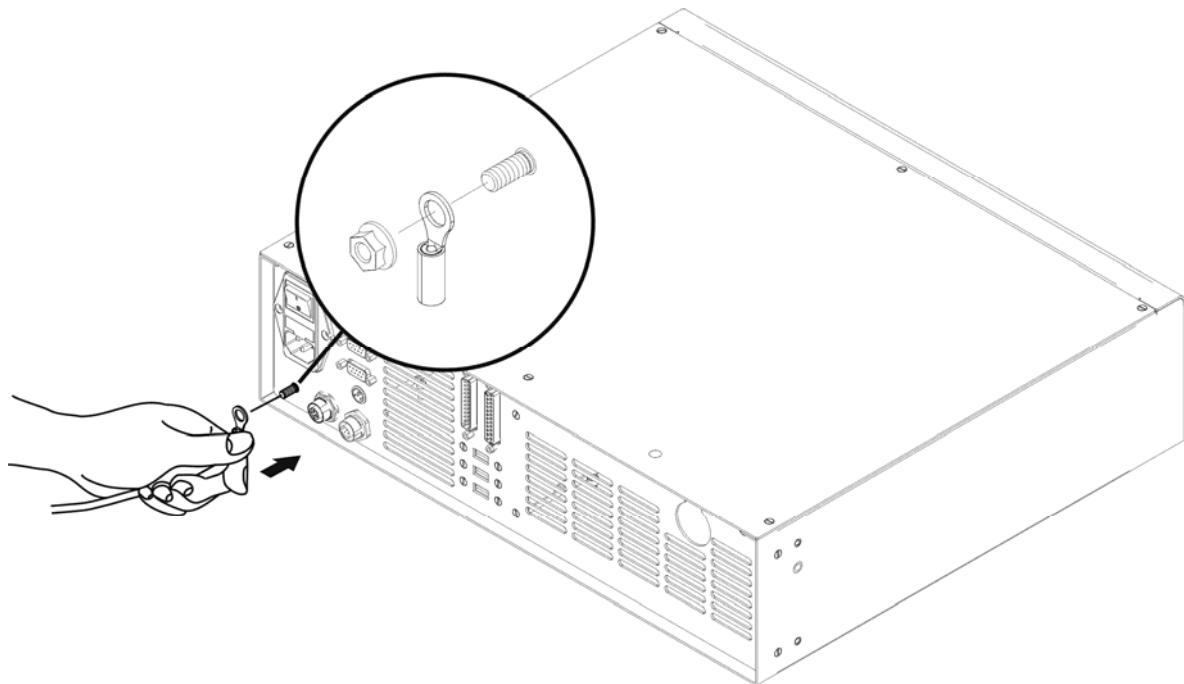


Figure 27: Ground connection.

### 3.1.5 LOCAL MODE CONNECTION

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

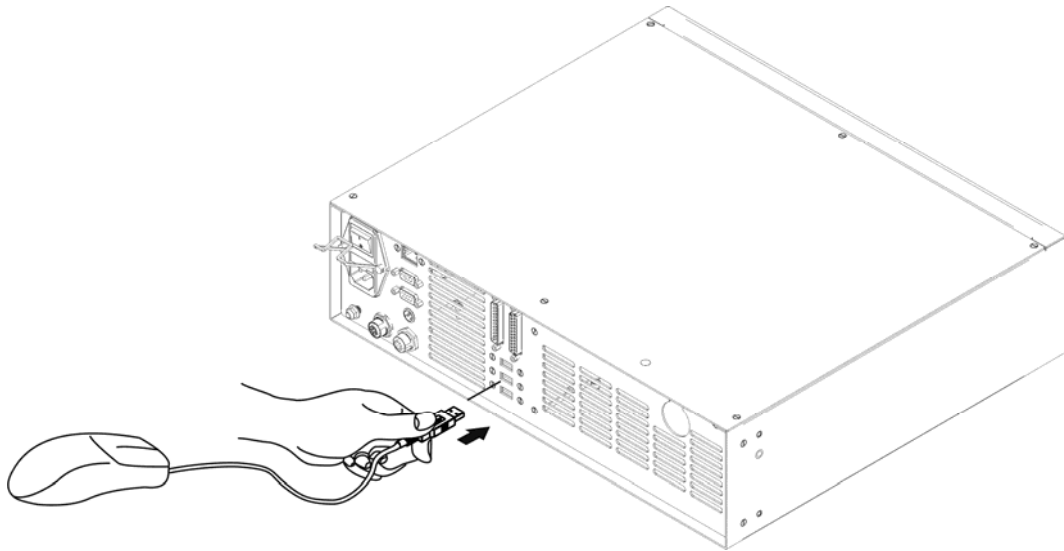


Figure 28: USB mouse connection.

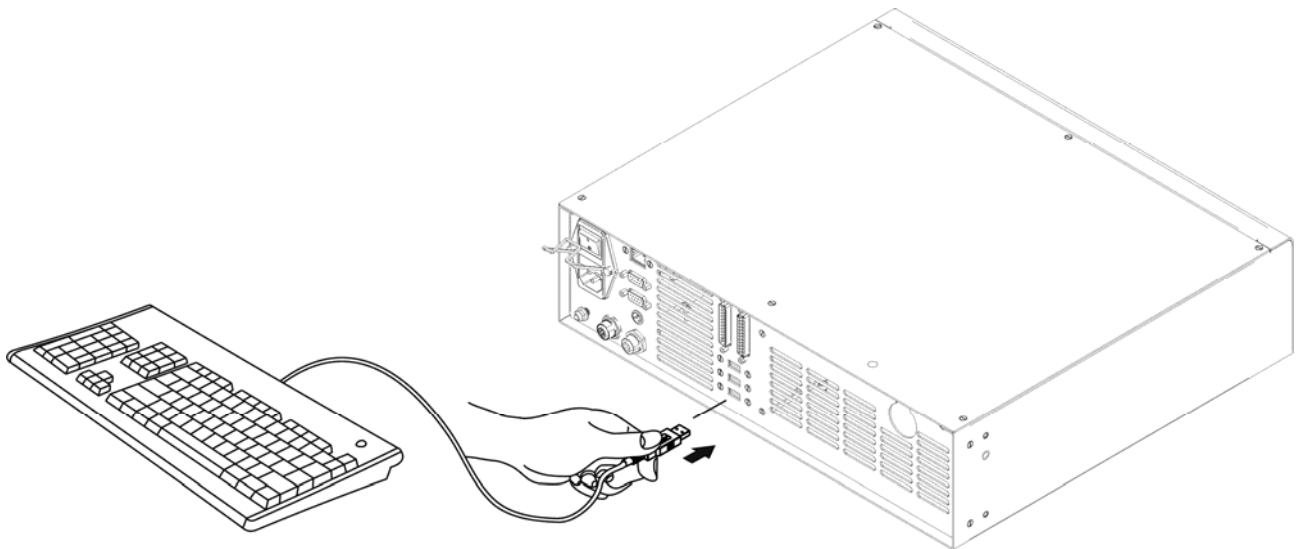


Figure 29: USB keyboard connection.

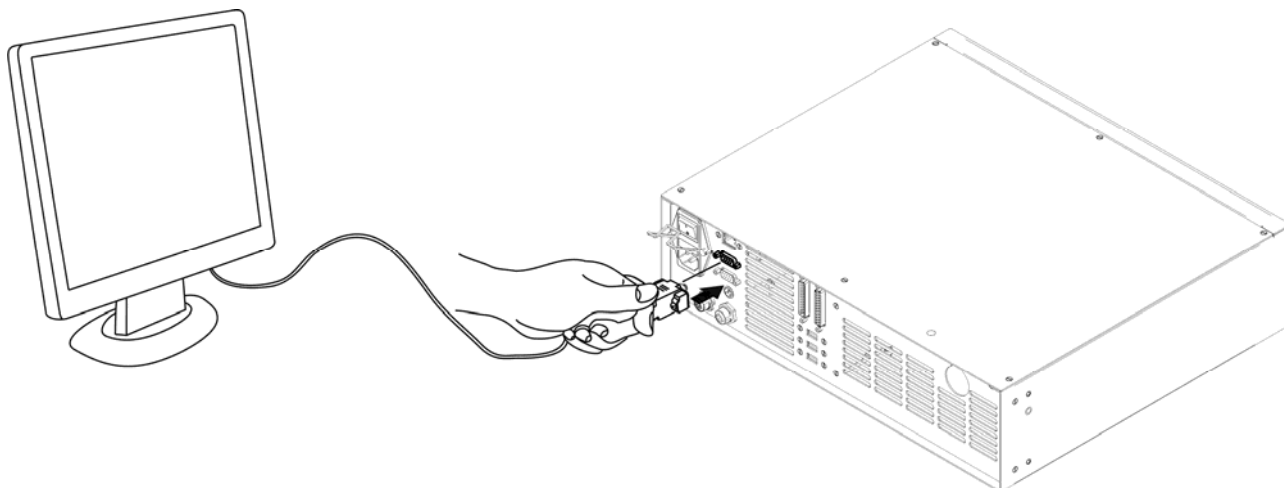


Figure 30: VGA monitor connection.



**NOTE:**

Minimum resolution 800 x 600.

### 3.1.6 REMOTE MODE CONNECTION

To use the marking system in “Remote Control” mode it is necessary to connect a network cable:

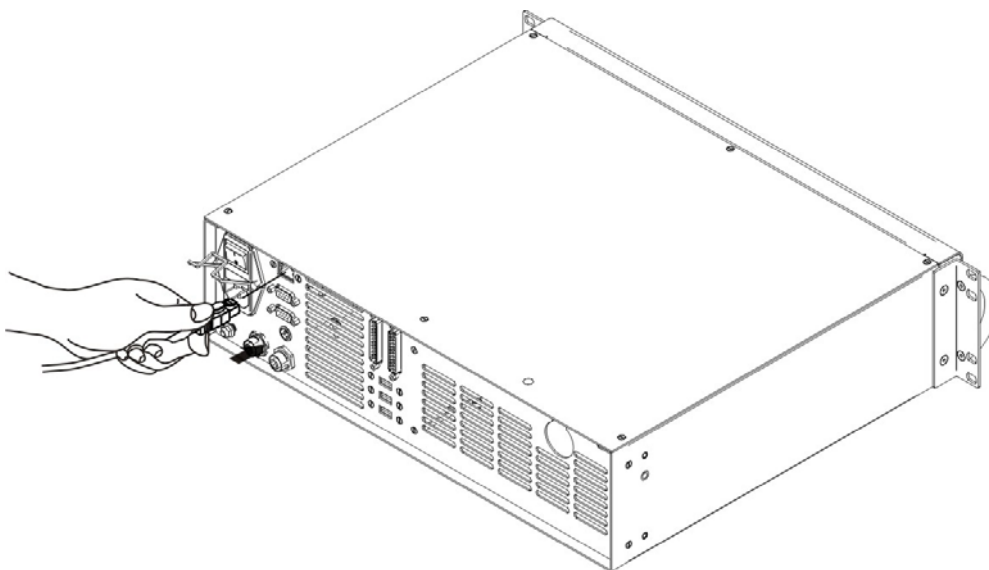


Figure 31: RJ45 Ethernet connection.

**NOTE:**

The system LAN is configured by default with a fixed IP Address and Subnet Mask:

- Default IP address: 192.168.0.10
- Default Subnet Mask: 255.255.255.0

See [chapter 5.2](#) in order to change LAN configuration.



**NOTE:**

Ethernet TCP/IP 10, 100 Mbit.



## 4 USE AND OPERATION

### 4.1 TURNING ON SEQUENCE

**1<sup>ST</sup>:** 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. Check that “KEY” and “ENABLE” commands on the rack front panel are disabled. (see [figures 15-16](#))

**2<sup>ND</sup>:** turn on the main switch in the back of the control rack:

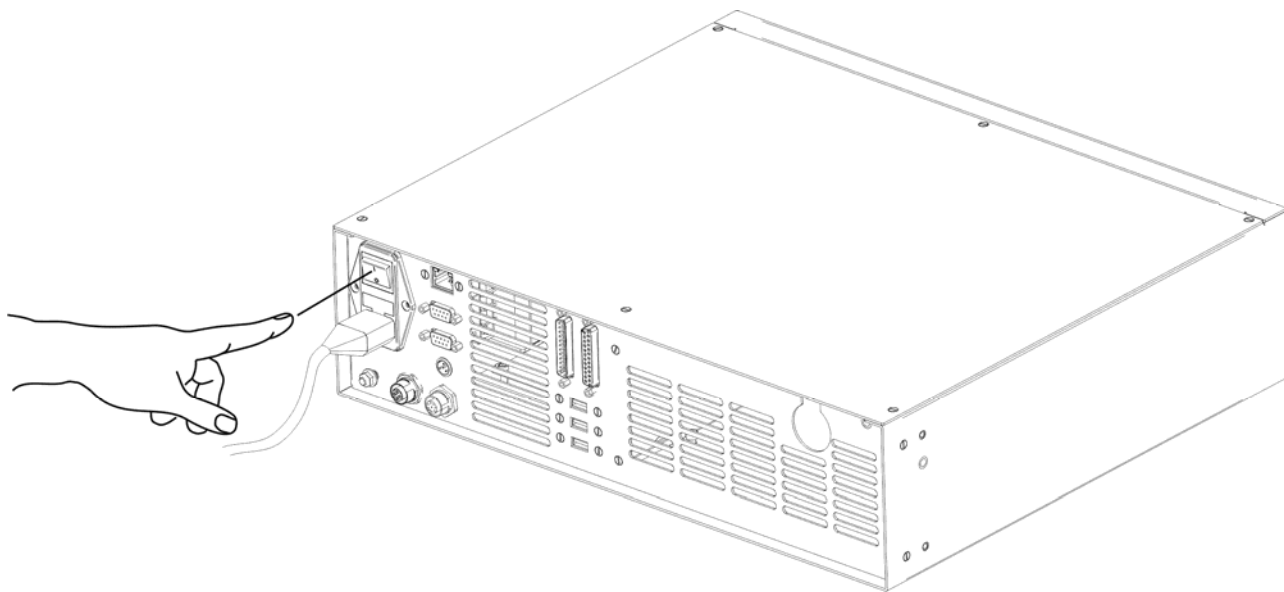


Figure 32: Power on.

During booting-up, status LED on the rack front panel and the LED bar on Scan Head will be blinking green.

**3<sup>RD</sup>:** wait the end of the booting-up. The status LED on the rack and the LED bar on the Scan Head will be steady green.

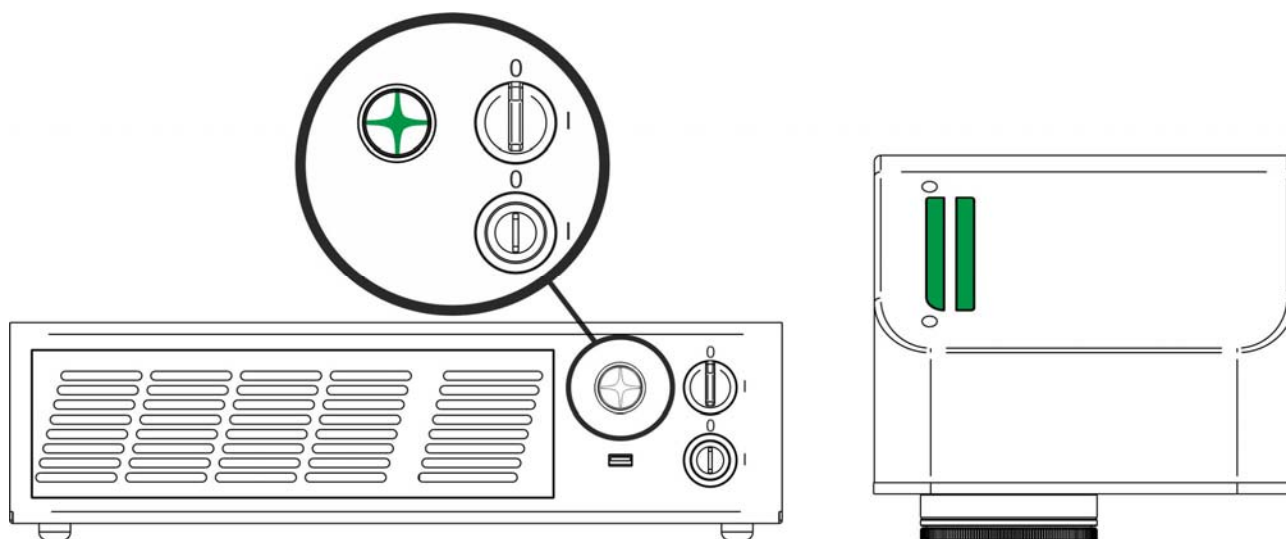
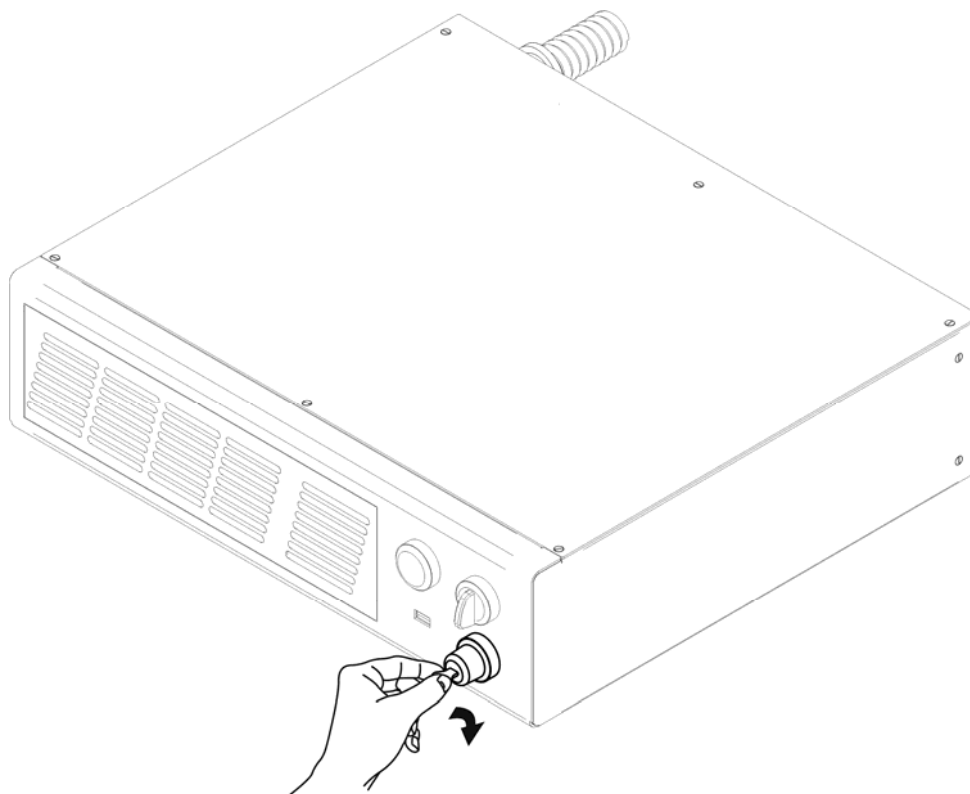


Figure 33: Status LED display.

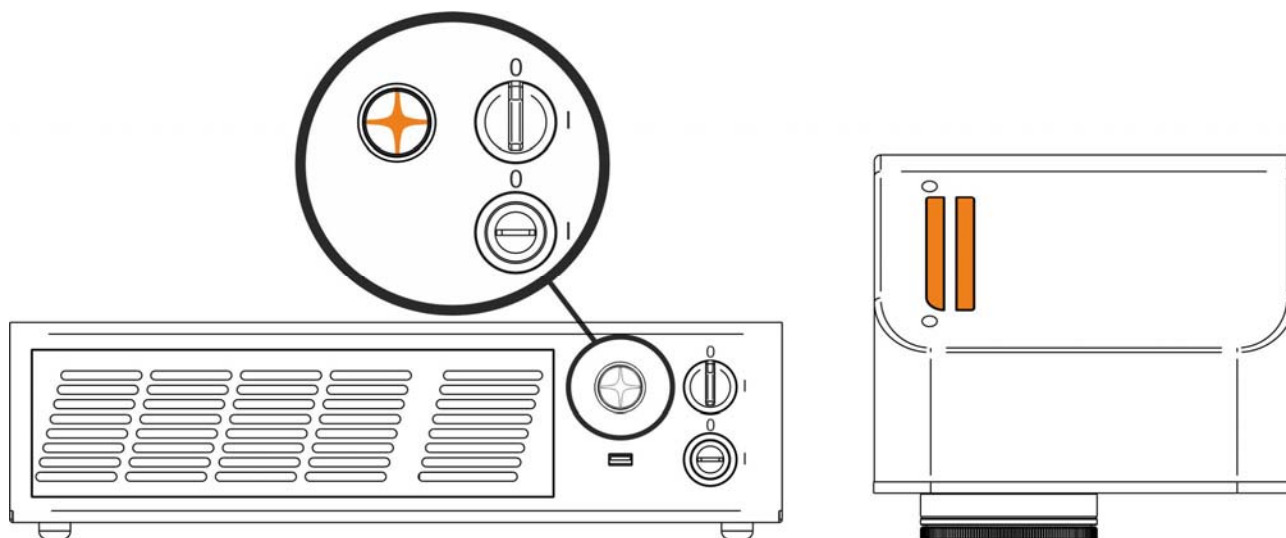
4<sup>TH</sup>: activate the command “KEY”, by rotating it clockwise:



**Figure 34: Enable command KEY.**

When the “KEY” command is enabled, the status LED on the rack and the status LED bar on the Scan Head will be blinking orange for about 20 sec. (laser source warm-up).

5<sup>TH</sup>: wait the end of the laser source warm-up. The status LED on the rack and the LED bar on the Scan Head will be steady orange.



**Figure 35: Status LED display.**



6<sup>TH</sup>: activate the “*ENABLE*” command by rotating it clockwise:

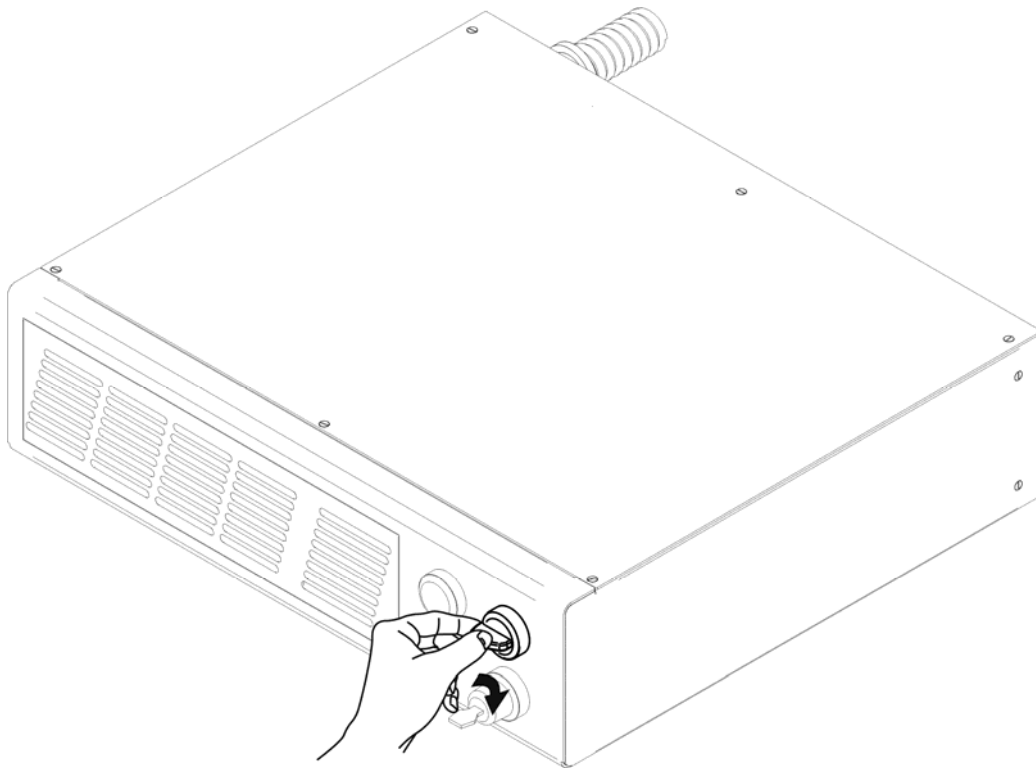


Figure 36: Enable command *ENABLE*.

The marking system is ready to mark. The status LED on the rack and LED status bar on the Scan Head will turn red.

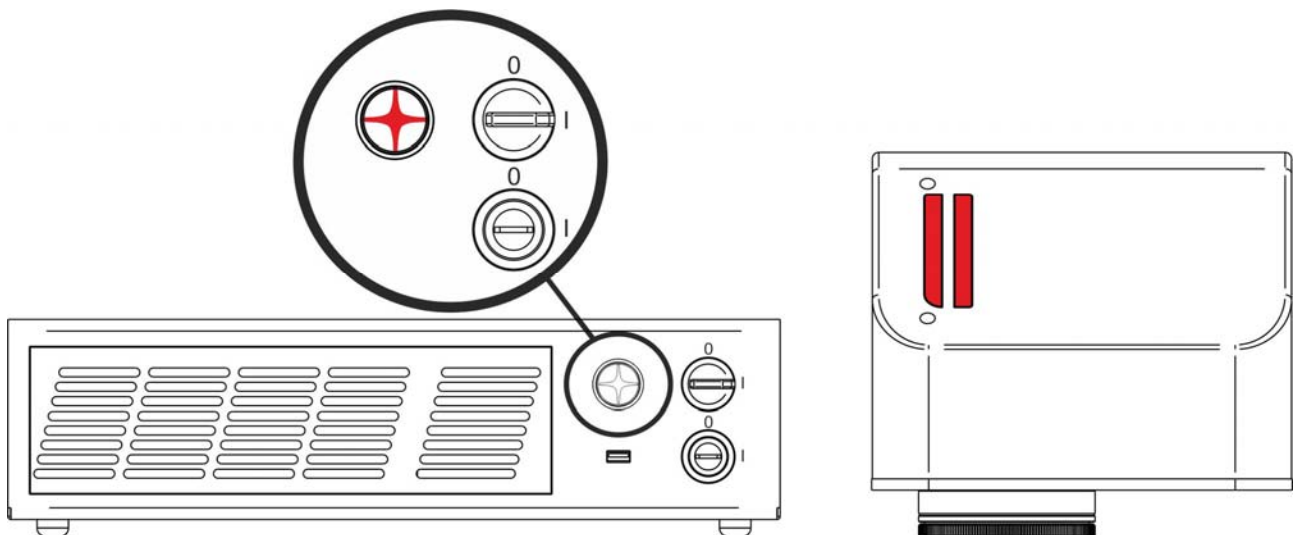


Figure 37: Status LED display.

**RESUME TABLE**

STATUS	STATUS LED	INPUT STATUS (*)		OUTPUT STATUS (*)	
SYSTEM BOOTING UP	BLINKING GREEN (1Hz)	KEY ENABLE	LOW LOW	ALARM POWER ON ENABLE OUT	ON OFF OFF
WAIT FOR START	STEADY GREEN	KEY ENABLE	LOW LOW	ALARM POWER ON ENABLE OUT	OFF OFF OFF
WARMING UP	BLINKING ORANGE (1Hz)	KEY ENABLE	HIGH LOW	ALARM POWER ON ENABLE OUT	OFF OFF OFF
STANDBY SHUTTER CLOSED	STEADY ORANGE	KEY ENABLE	HIGH LOW	ALARM POWER ON ENABLE OUT	OFF ON OFF
READY	STEADY RED	KEY ENABLE	HIGH HIGH	ALARM POWER ON ENABLE OUT	OFF ON ON

STATUS	STATUS LED	OUTPUT STATUS (*)	
WARNING INVALID START SEQUENCE	BLINKING ORANGE (2Hz)	ALARM POWER_ON ENABLE_OUT	OFF OFF OFF
SYSTEM ERROR	BLINKING RED (2Hz)	ALARM POWER_ON ENABLE_OUT	ON OFF OFF

(\*) See [paragraph 2.4.2](#) for more information.

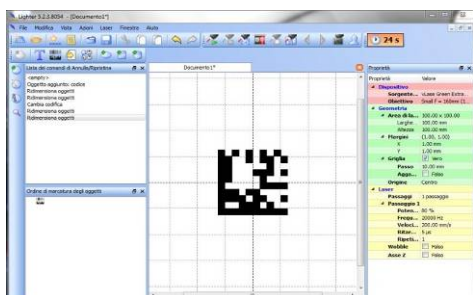
**4.1.1 ADVICE ON USING THE SYSTEM**

If the marking system is used in manual mode you need to connect Command Box connector as described before. In this way you are able to control the marking system directly on rack front panel.

If the marking system is used in automatic mode it is recommended to enable permanently KEY and ENABLE commands positioned on rack front panel and to use remote signals (EXT\_KEY and EXT\_ENABLE) available on Command Box connector. This part is supplied with the product and you can connect external controls wiring connector contacts following pins description on next chapter.

## 4.2 LOCAL MODE OPERATIONS

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



+



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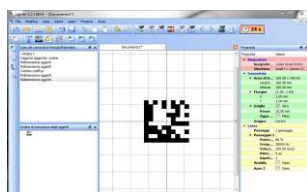
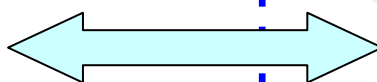
SW Editor  
SW Engine  
Correction Matrix  
Laser Control  
Galvo Control

## 4.3 REMOTE MODE OPERATIONS

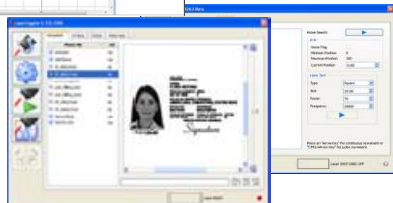
Keyboard, mouse and monitor are not necessary in this configuration.



LAN



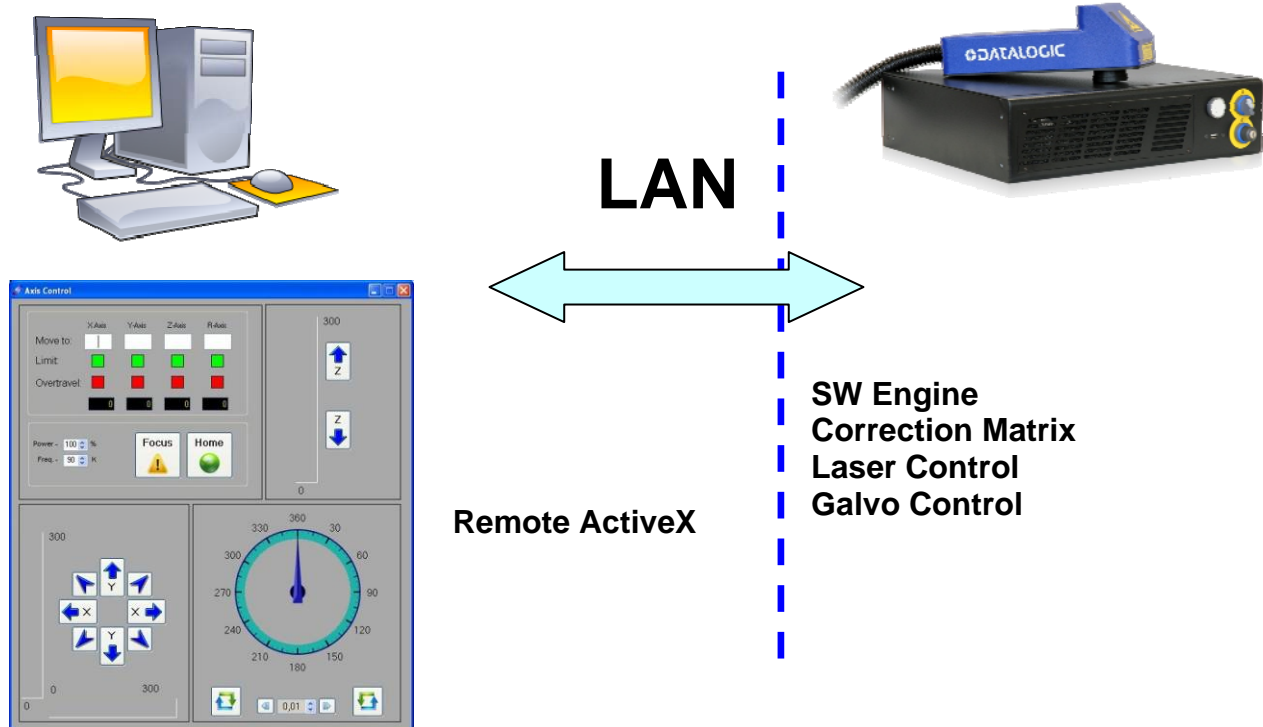
SW Editor  
Remote SW Engine  
Remote Active-X



SW Engine  
Correction Matrix  
Laser Control  
Galvo Control

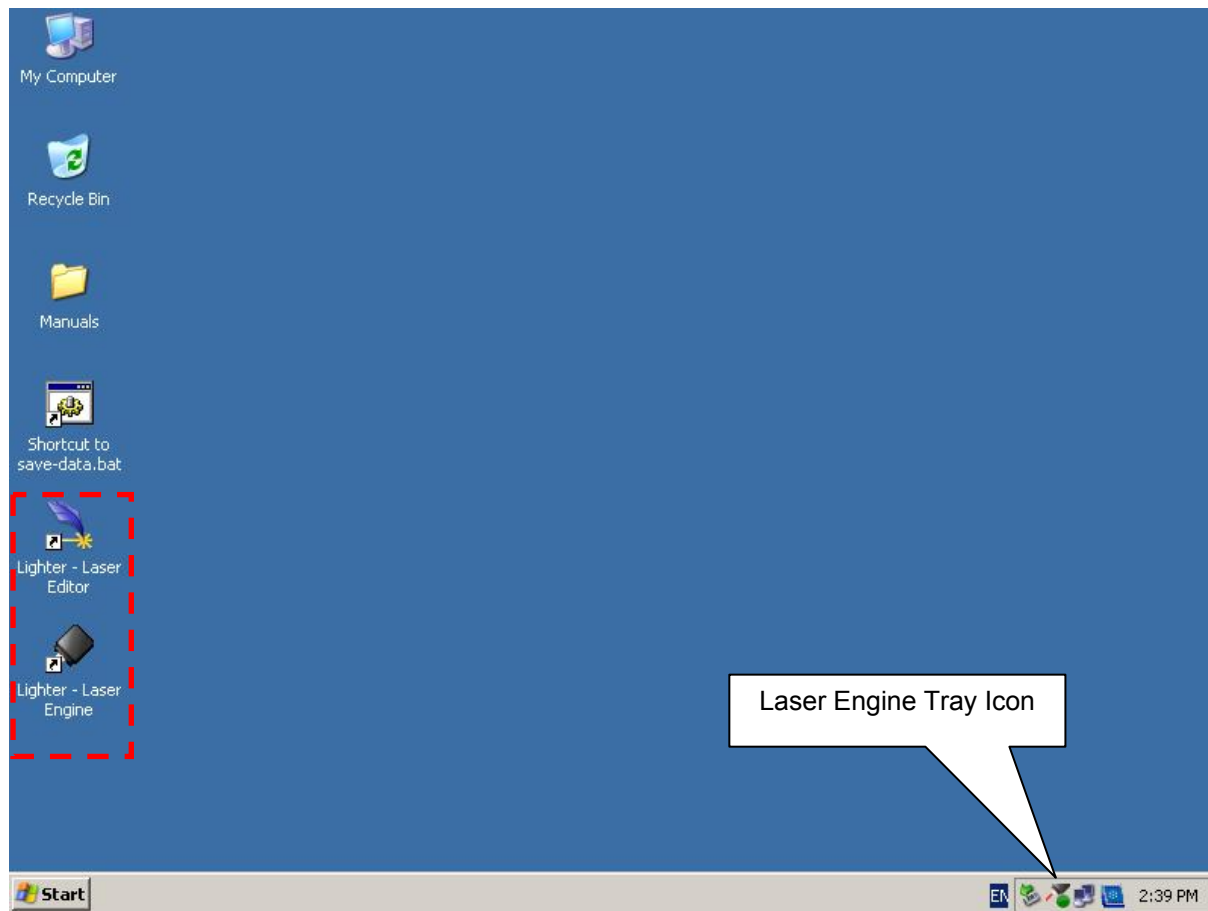
New IP ActiveX allows OEM integrators and end-users to create customized Applications and User Interfaces via Ethernet.



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.



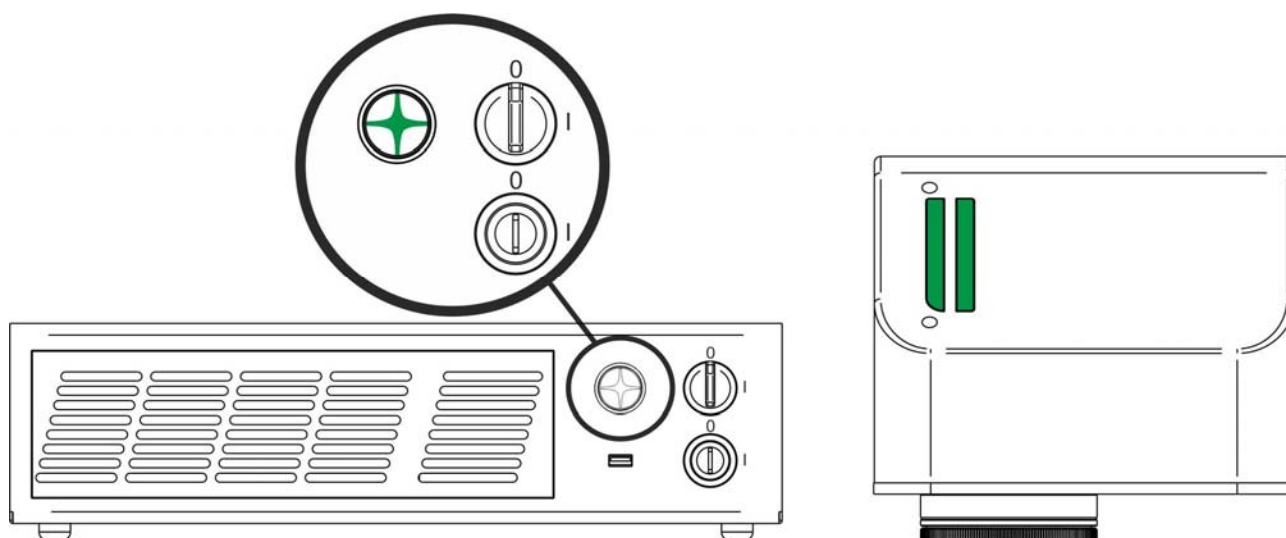
## 4.4 OPERATING IN LOCAL MODE

Connecting monitor, mouse and keyboard to the system ([paragraph 3.1.5](#)) allows the operator to access the console which contains the instruments to operate with laser.



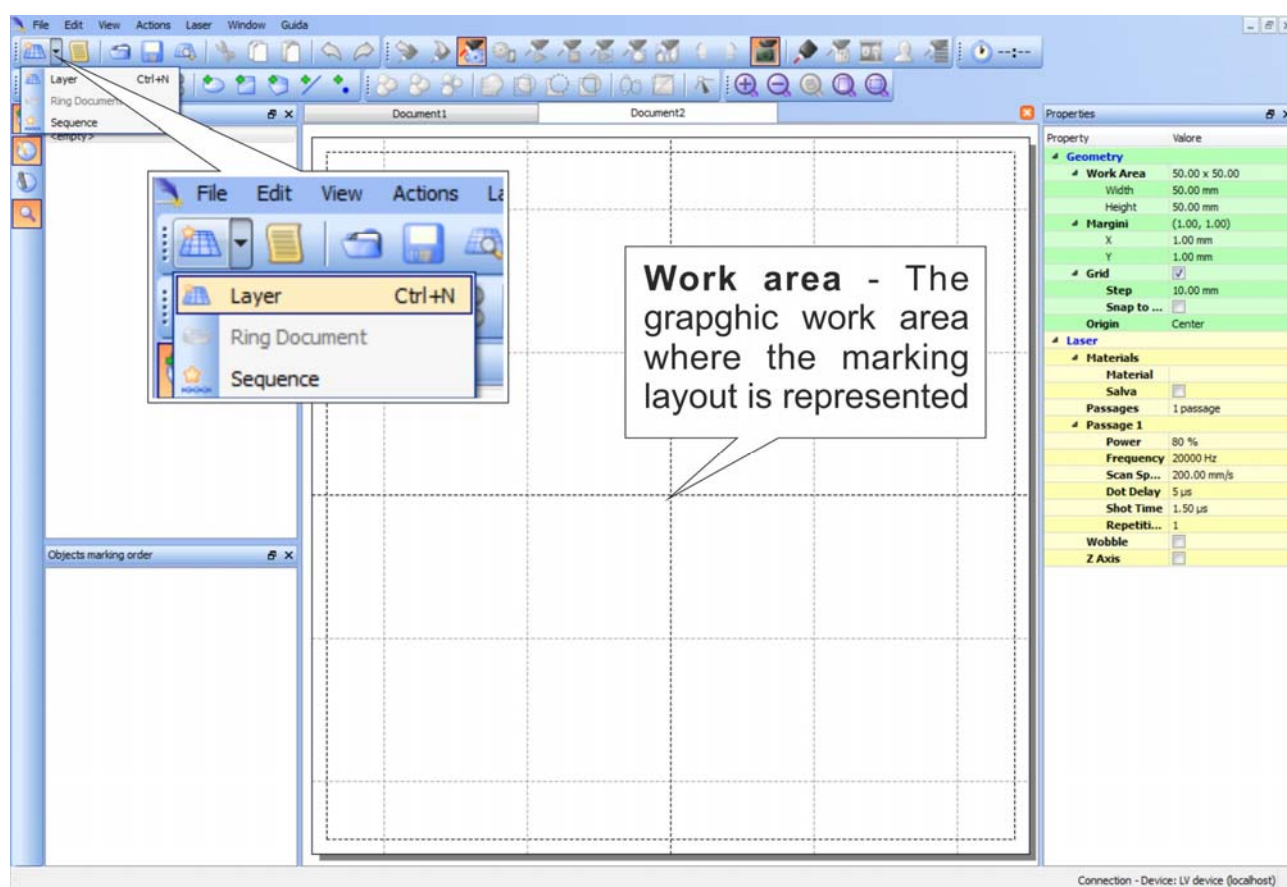
 <p>Lighter - Laser Editor</p>	<p>Laser Editor is a software that allows to easily mark or engrave product identification information such as 2D matrix codes, barcodes, text, alpha-numeric serial numbers, date codes, part numbers, graphics and logos in any production environment.</p> <p>With Laser Editor you can:</p> <ul style="list-style-type: none"> <li>○ edit graphic layouts</li> <li>○ set laser parameters</li> <li>○ set marking system configuration</li> <li>○ control the integrated I/O module for axis management</li> <li>○ create automated procedures</li> <li>○ create programs using Lighter programming language</li> </ul>
 <p>Lighter - Laser Engine</p>	<p>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.</p> <p>With Laser Engine you can:</p> <ul style="list-style-type: none"> <li>○ monitor the system status</li> <li>○ select a saved document, display limits using a red laser pointer, watch the marking preview and do marking tests</li> <li>○ switch between Manual/Auto mode (engraving operations controlled by operator or external signals)</li> </ul>

### 4.4.1 HOW TO CREATE AND EDIT YOUR FIRST GRAPHIC DOCUMENT



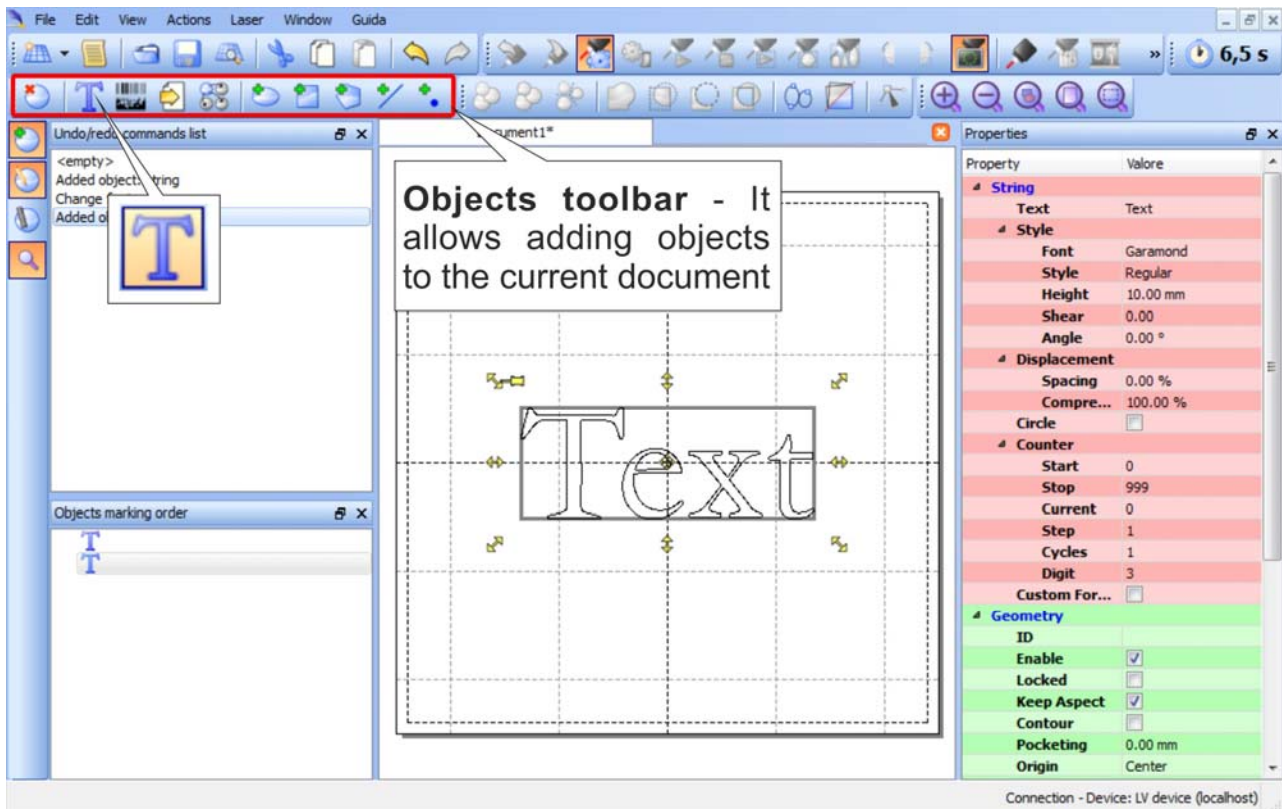
Double click on Laser Editor icon to start the layout editor application

Click on the document type selector and choose *Layer*:

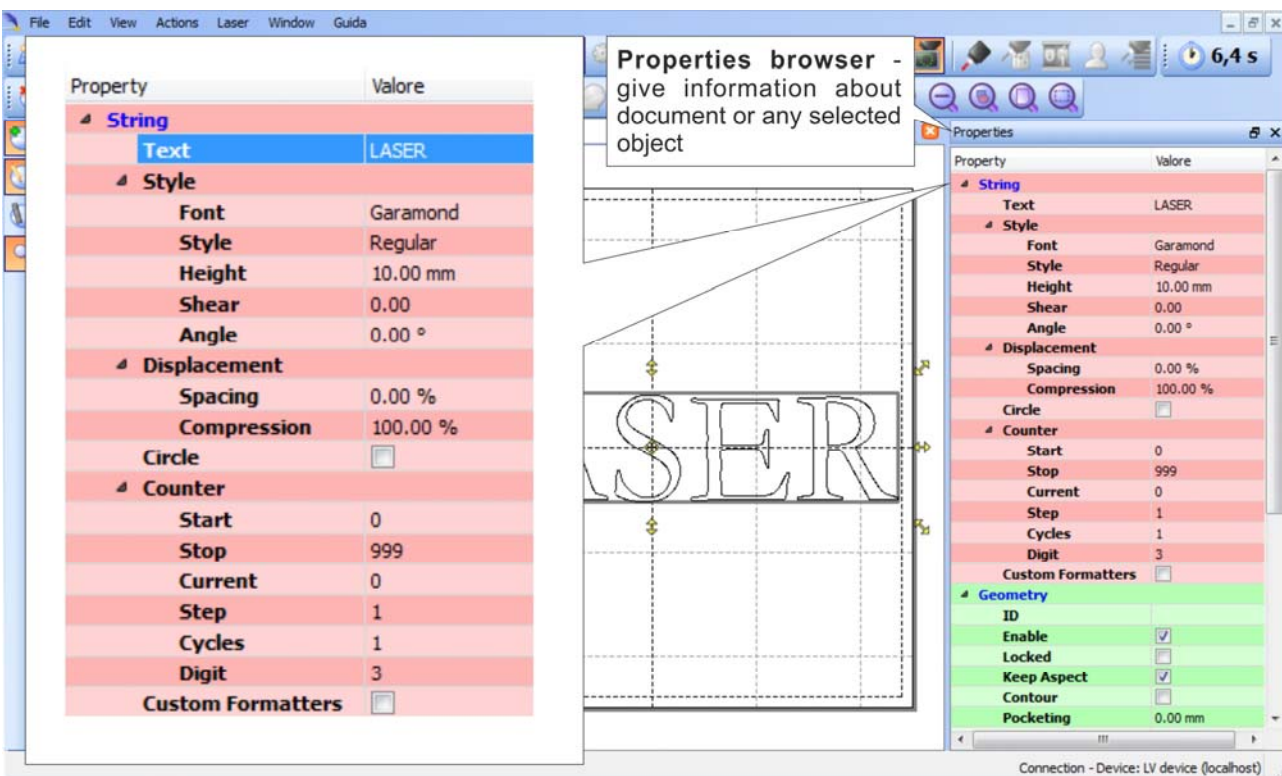




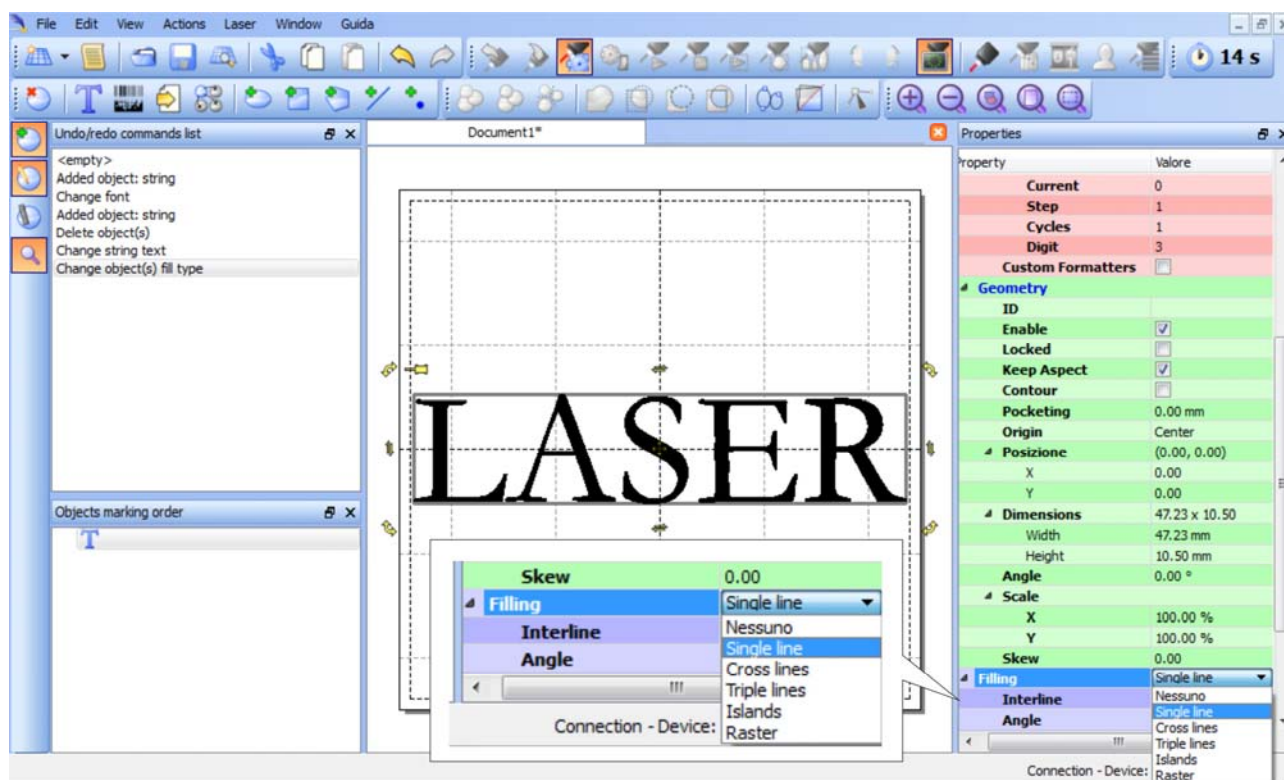
Click on the *Text String* icon in the Object toolbar to add a string object to the layer:



Edit String properties such as value, font, style, etc. using the *Properties* browser.

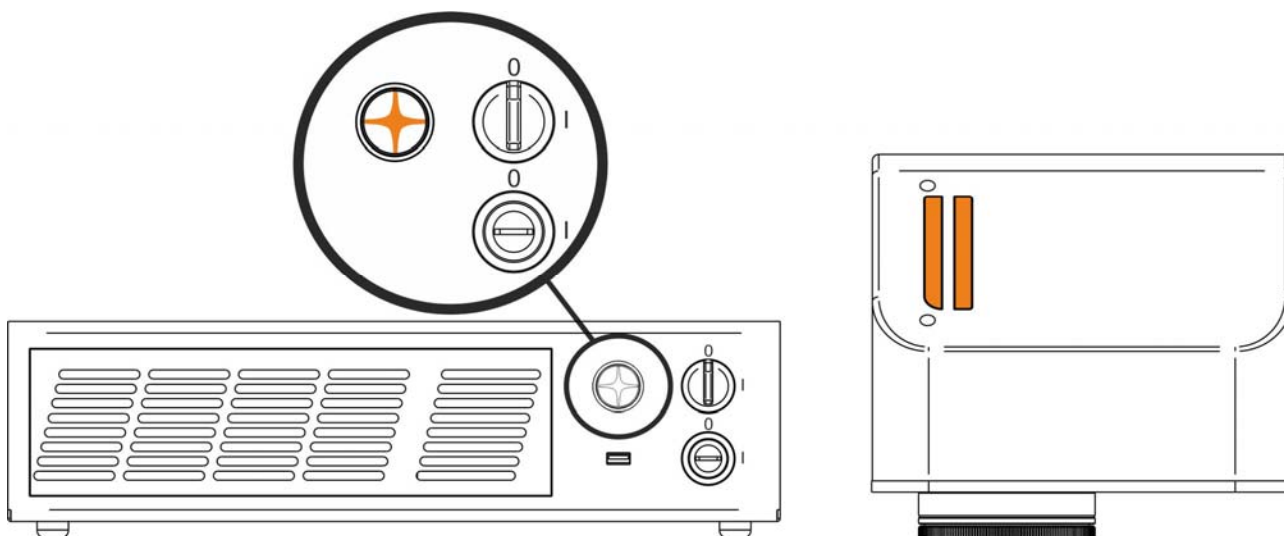


Edit Filling properties such as filling type, interline, etc. using the *Properties browser*.

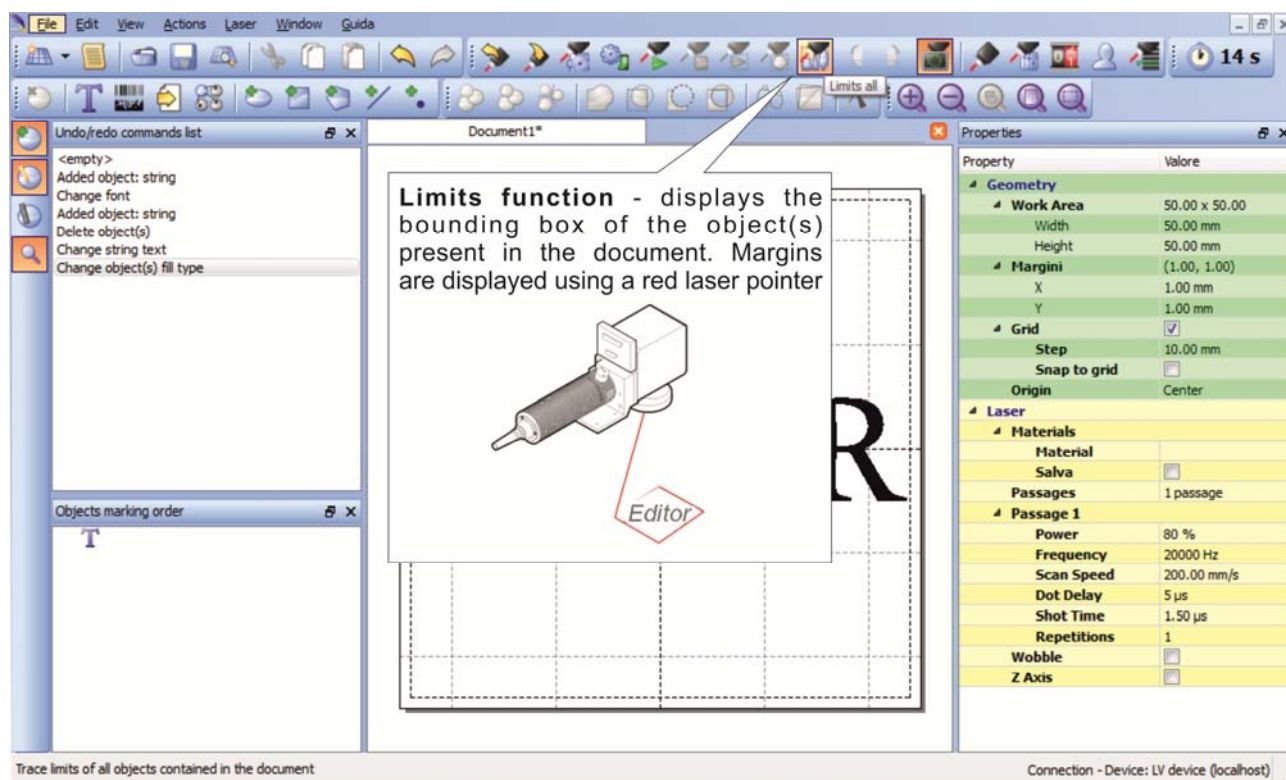




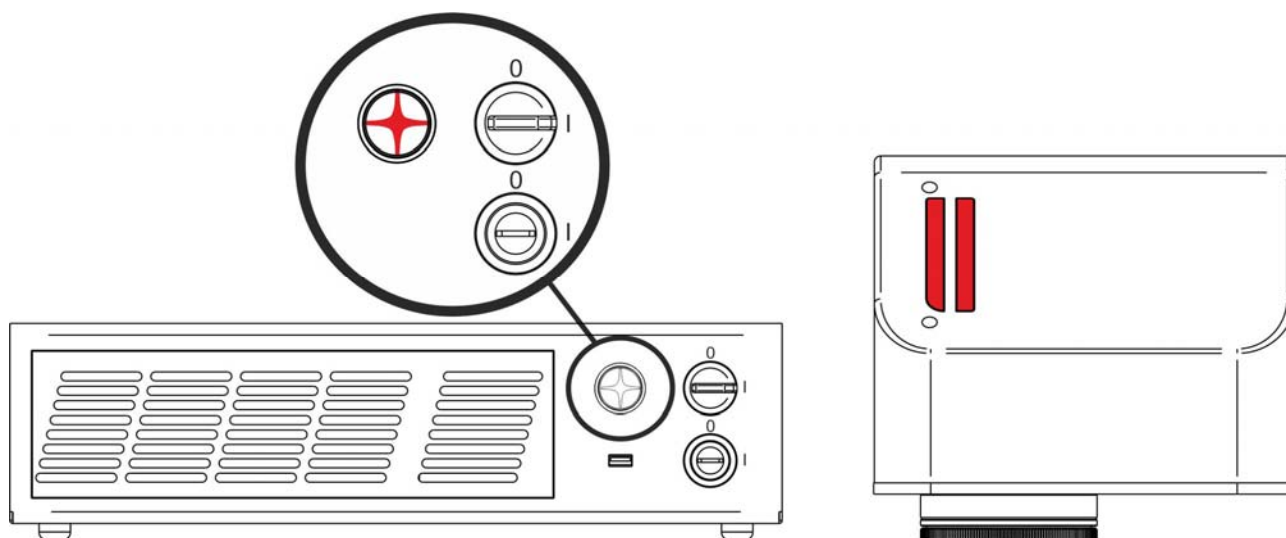
## 4.4.2 HOW TO TEST AND ENGRAVE YOUR DOCUMENT



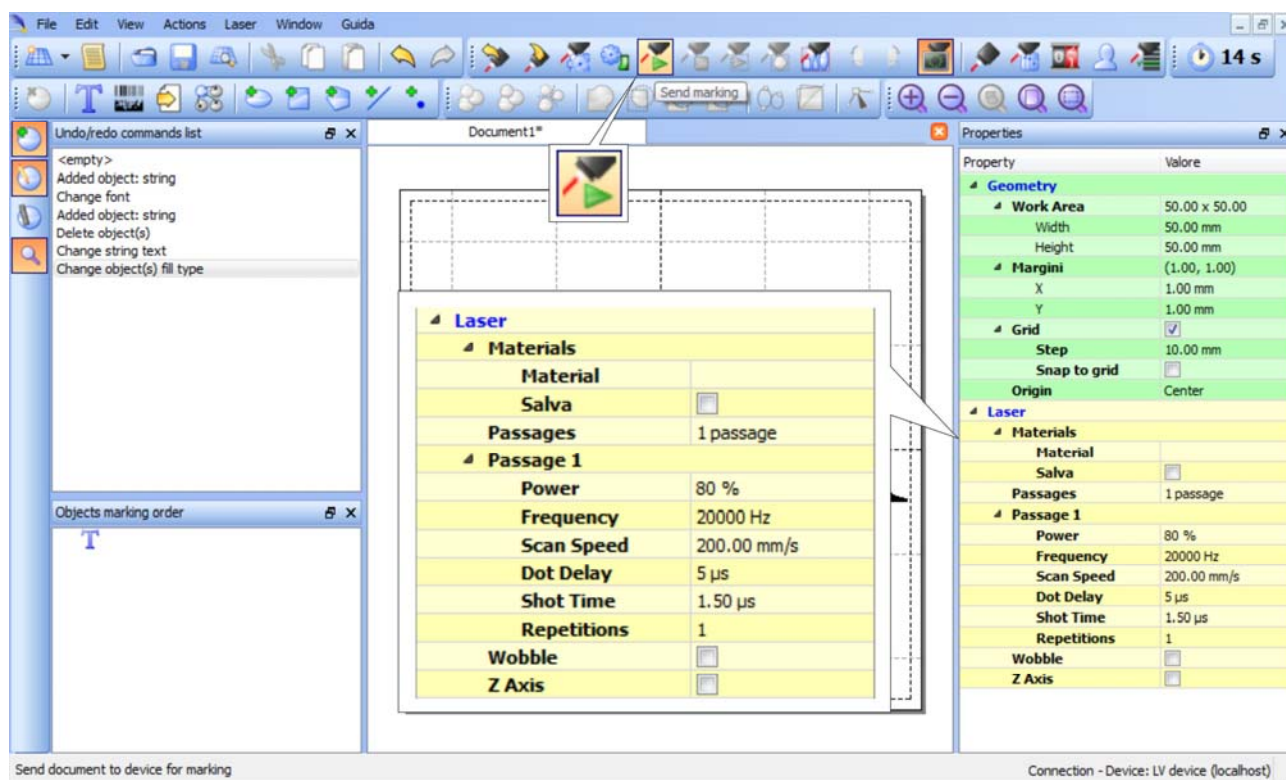
Press *Limits All* button in the *Laser Toolbar* to adjust the object position in the marking field:



Adjust the Laser parameters using the *Properties* browser



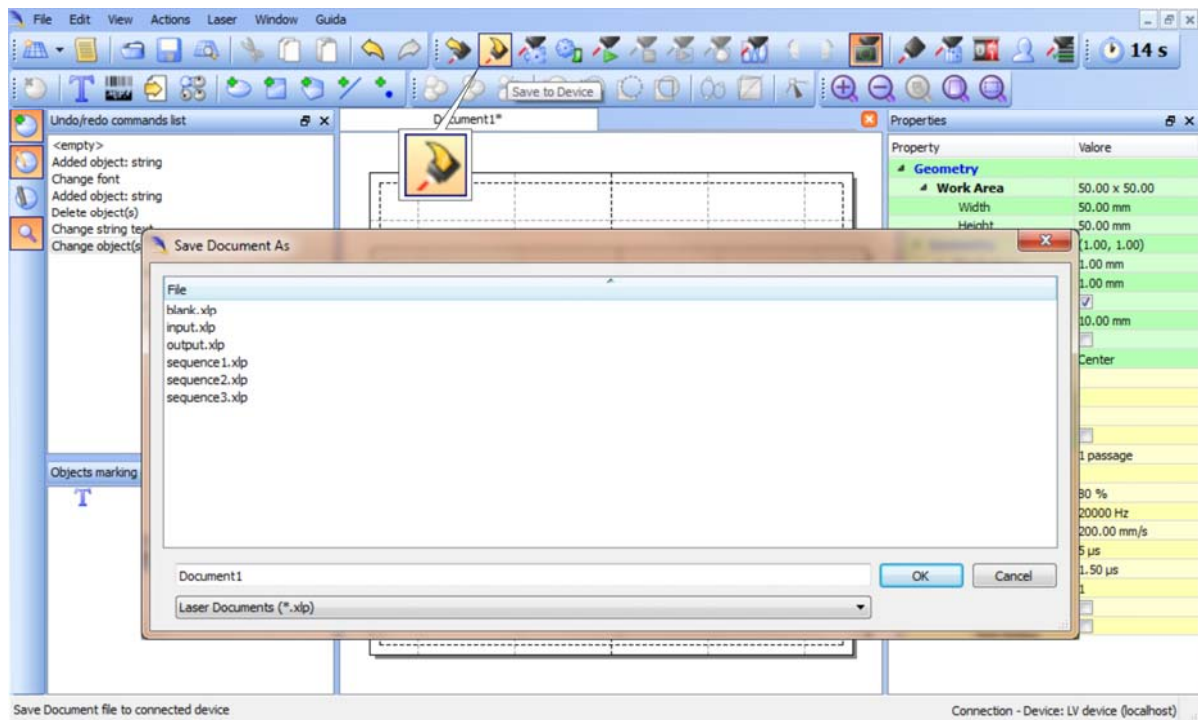
Press *Send Marking* button in the *Laser Toolbar* to start the marking process:



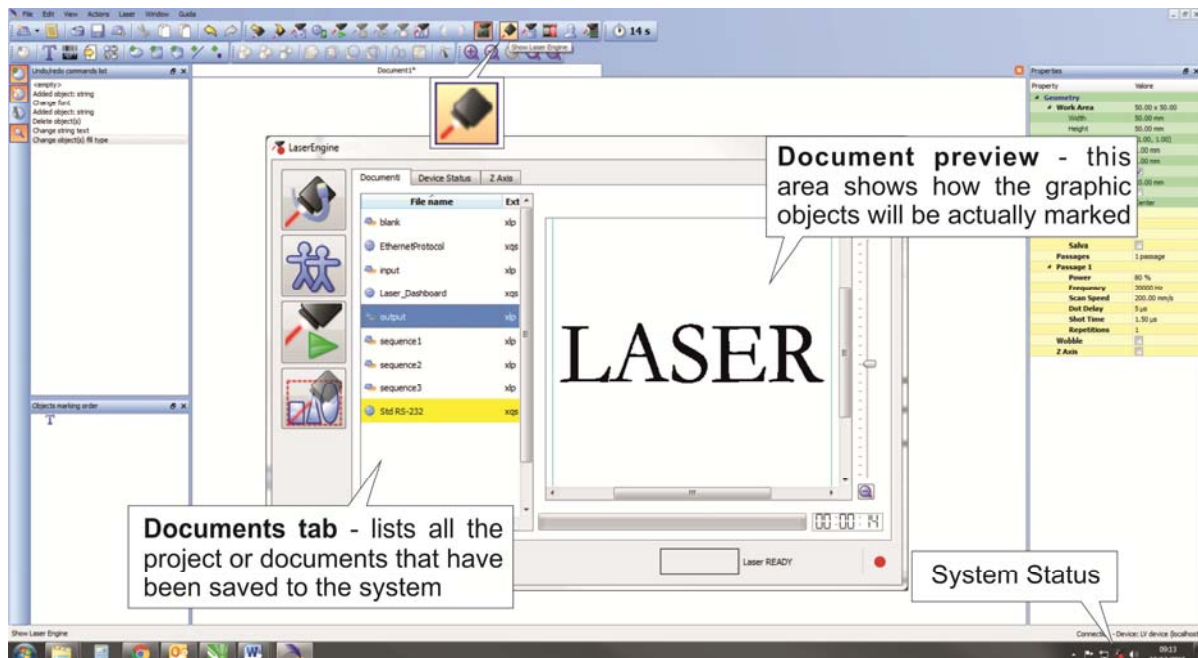
### 4.4.3 HOW TO USE EXTERNAL SIGNALS TO ENGRAVE YOUR DOCUMENT

Automate the marking process allowing documents to be 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 device memory:



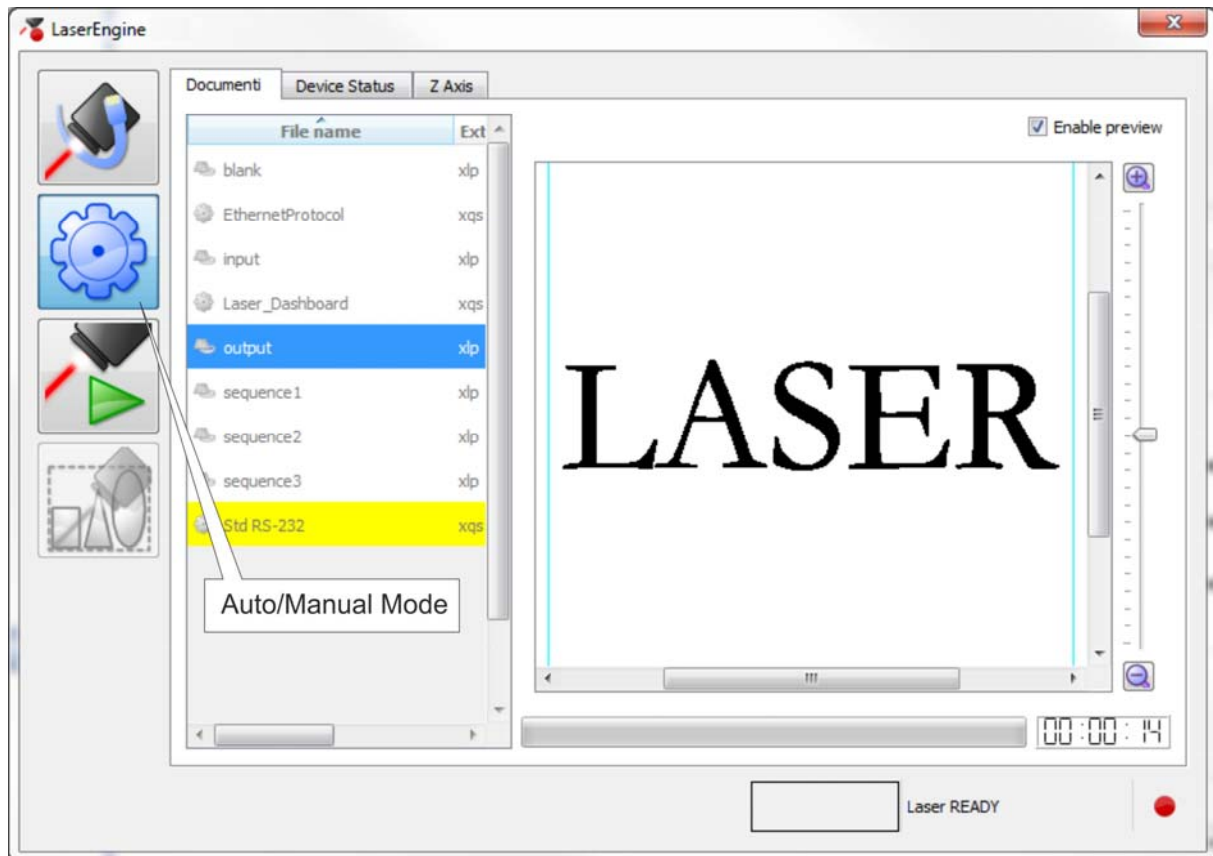
Click on *Show Laser Engine* button to display Laser Engine window:



*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:



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



## 5 CUSTOMIZE THE SYSTEM'S SOFTWARE

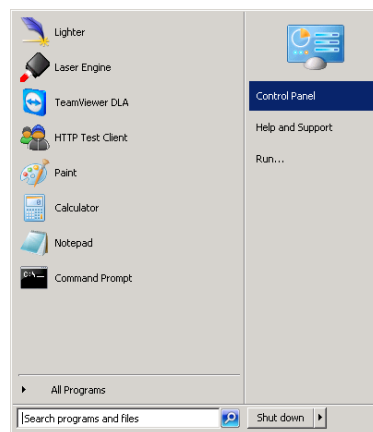
### 5.1 CHANGE O.S. LANGUAGE AND KEYBOARD LAYOUT

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.

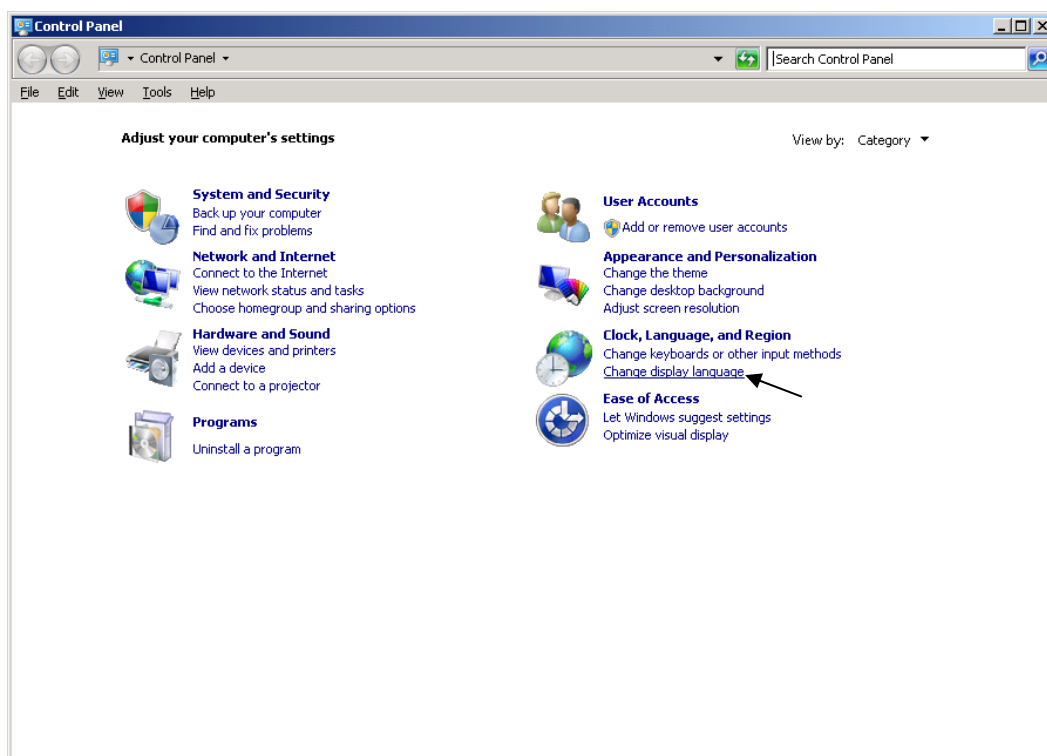
**NOTE:**

In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system ([paragraph 3.1.5](#)).

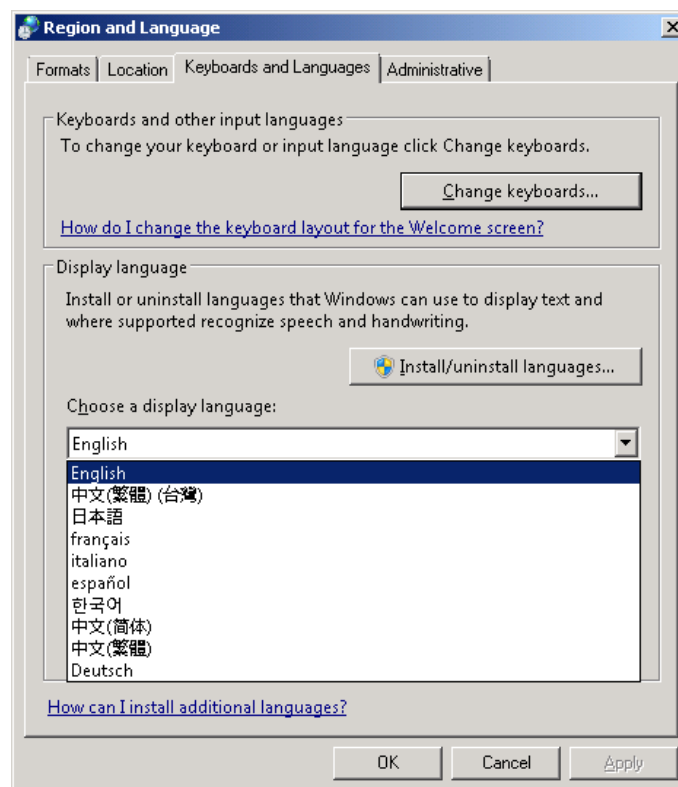
- Turn OFF and ON the marking system and wait the end of the booting-up (the status LED on the rack and on the scan head must be steady green)
- From the main screen click on *START/Control Panel*



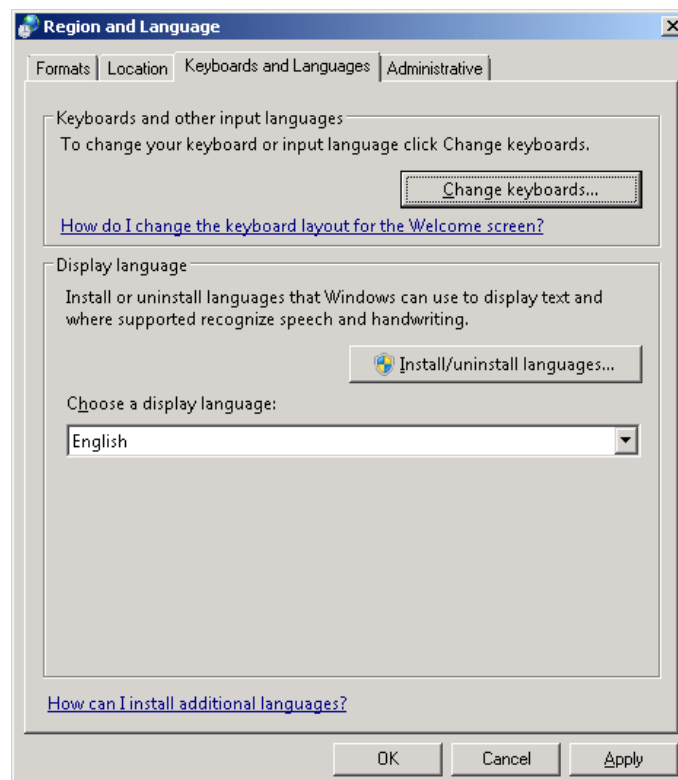
- Select *Change display language*:



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

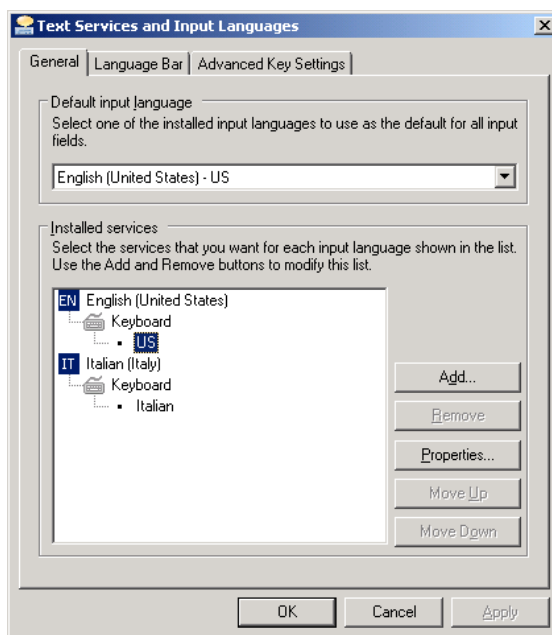


- Select *Change keyboards* to change your keyboard or input language:





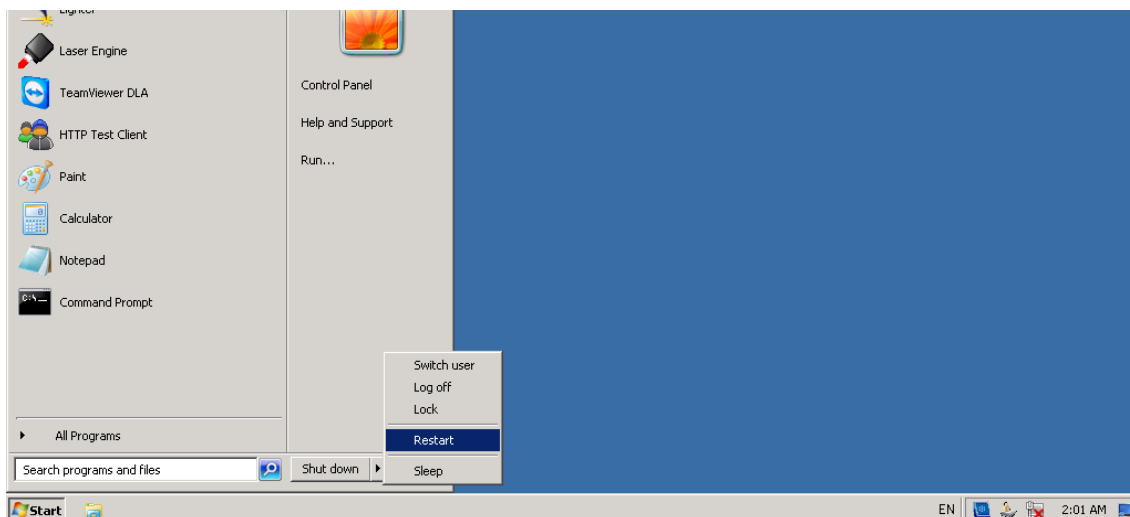
- Select now input languages and press **OK**:



- Close all the open screens 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:

**WARNING!**

**DO NOT** turn off the system while Windows® restarts.

## 5.2 CHANGE THE LAN CONFIGURATION AND IP ADDRESS

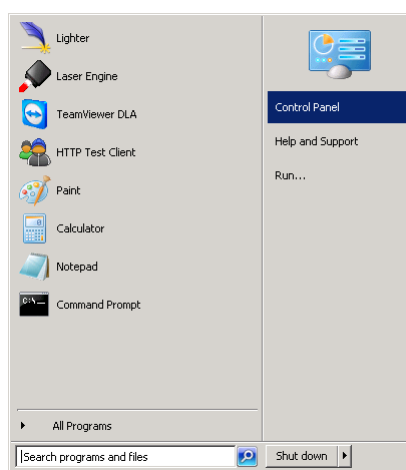
The system allows you to change the LAN configuration and IP address.



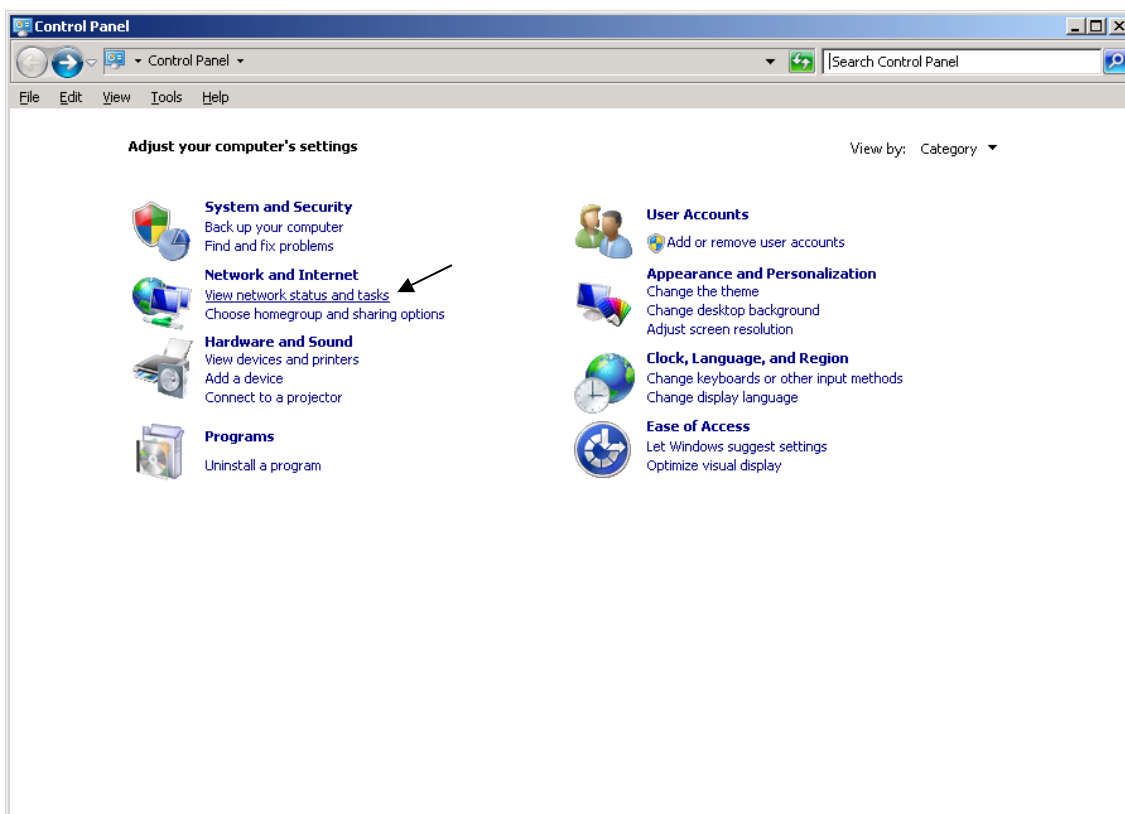
### NOTE:

In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system ([paragraph 3.1.5](#)).

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

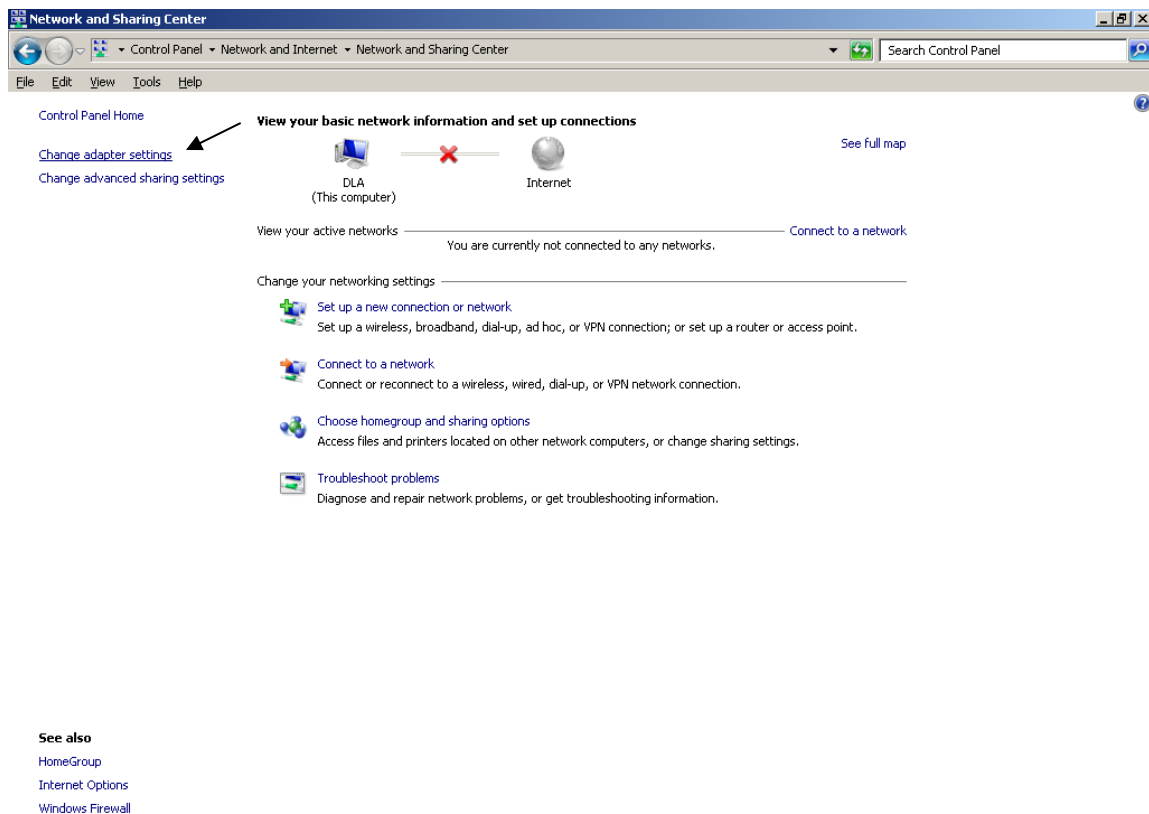


- Select *View network status and task*:

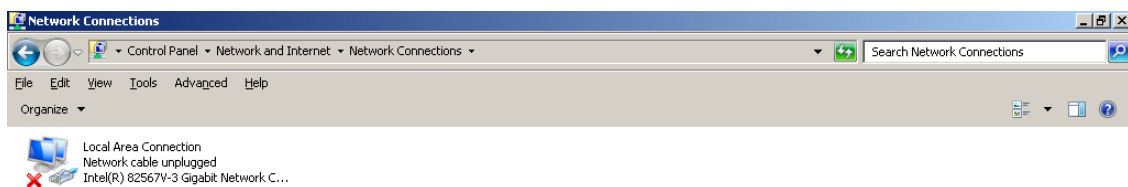




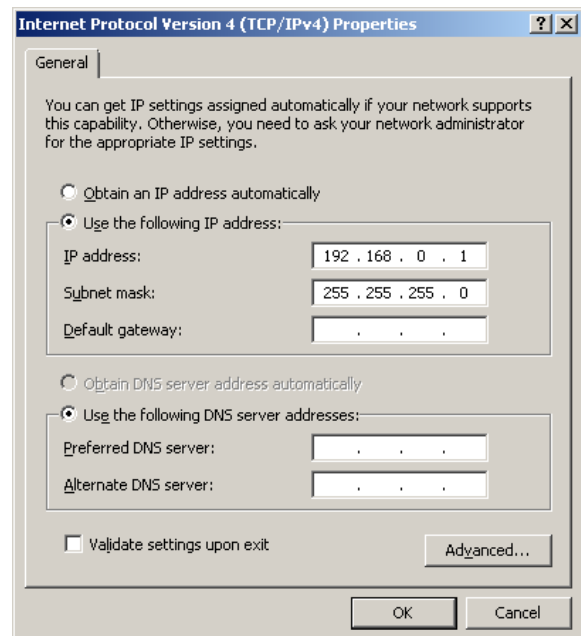
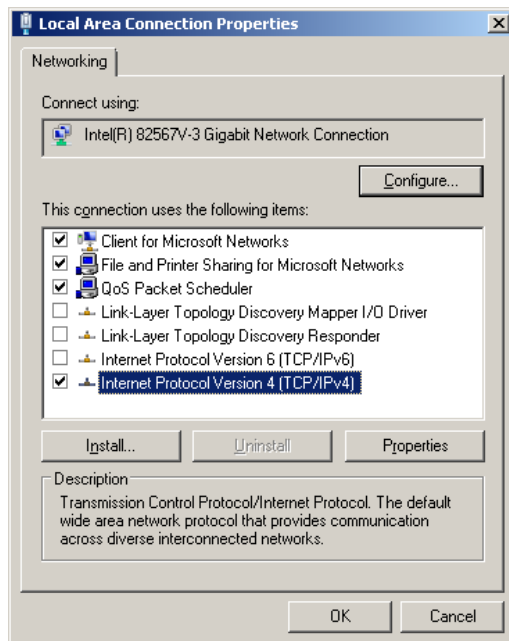
- In the Network and Sharing Center screen select *Change adapter settings*:



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



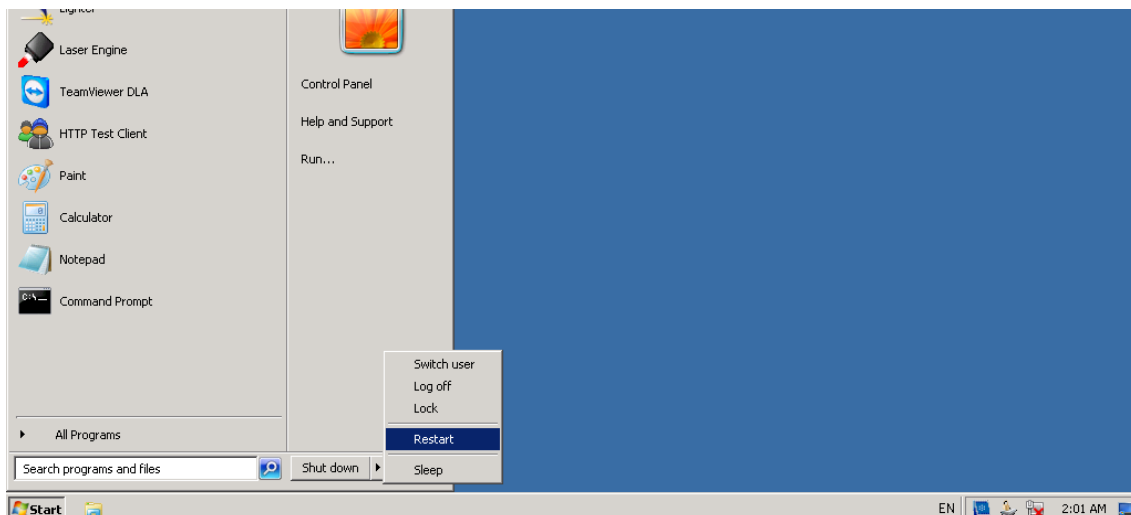
- In the Local Area Connection Properties screen double click on *Internet Protocol Version 4 (TCP/IPv4)*
- In the Internet Protocol Version 4 (TCP/IPv4) Properties you can change the IP address and configuration



- Close all the open screens 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:



## WARNING!

DO NOT turn off the system while Windows® restarts.

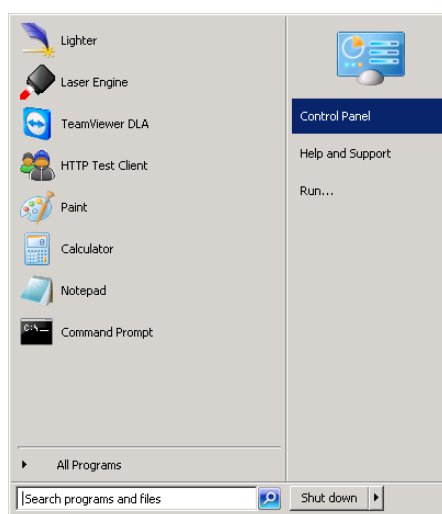
### 5.3 CHANGE THE VIDEO SETTING

The system allows you to change the Video setting.

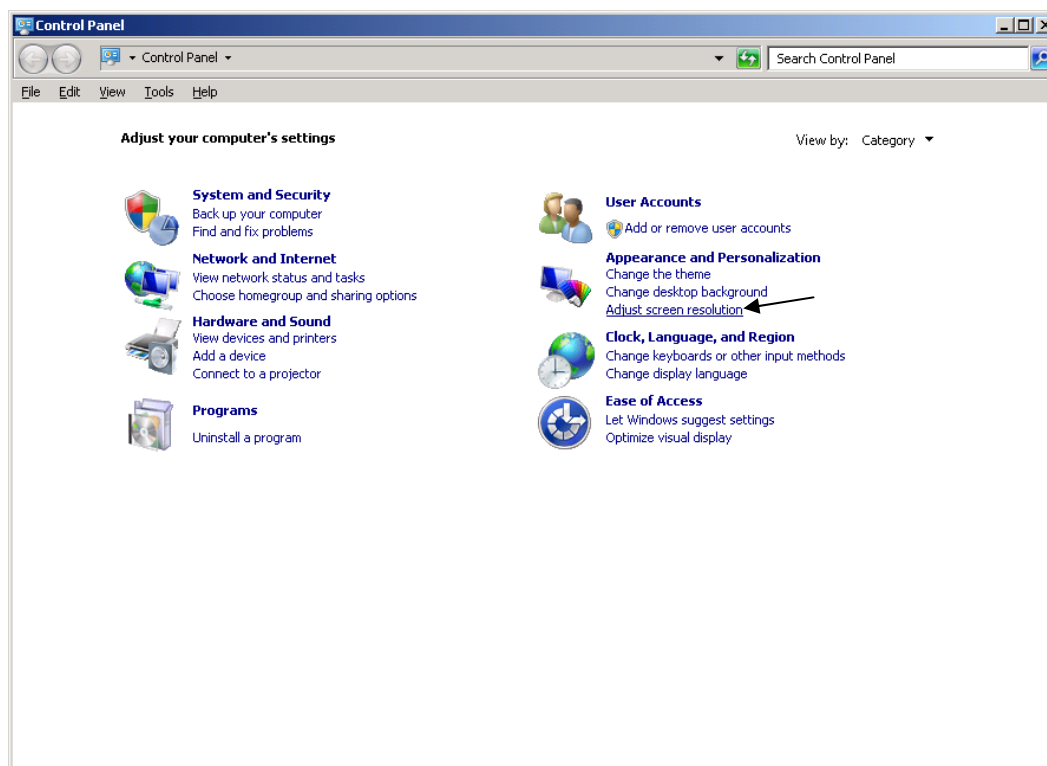
**NOTE:**

In order to perform this setting it is necessary to connect mouse, keyboard and monitor to the marking system ([paragraph 3.1.5](#)).

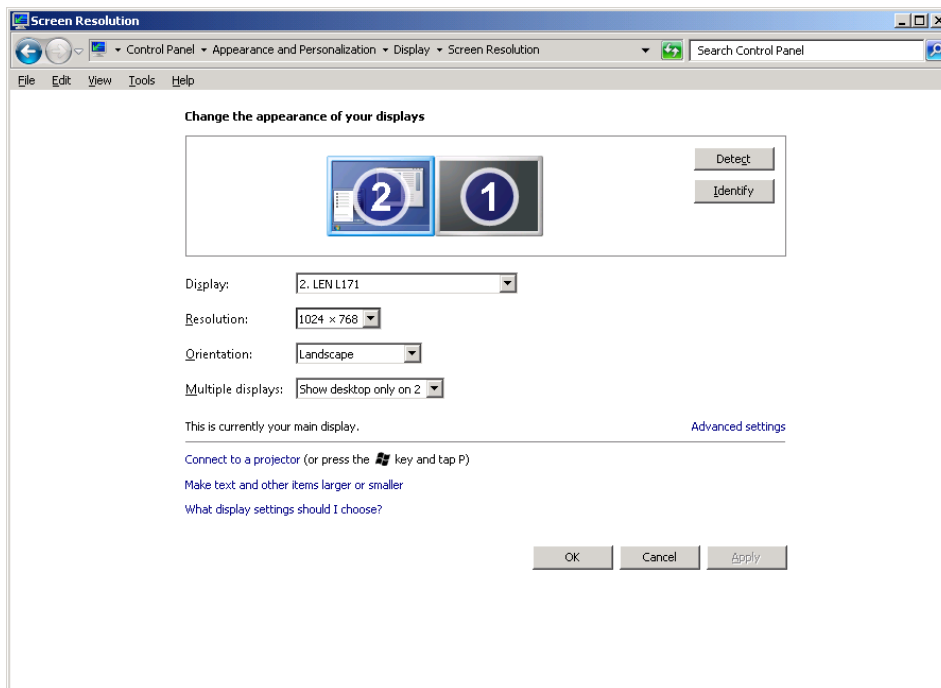
- Turn OFF and ON the marking system and wait the end of the booting-up (the status LED on the rack and on the scan head must be steady green)
- From the main screen click on *START/Control Panel*



- Select *Adjust screen resolution*:



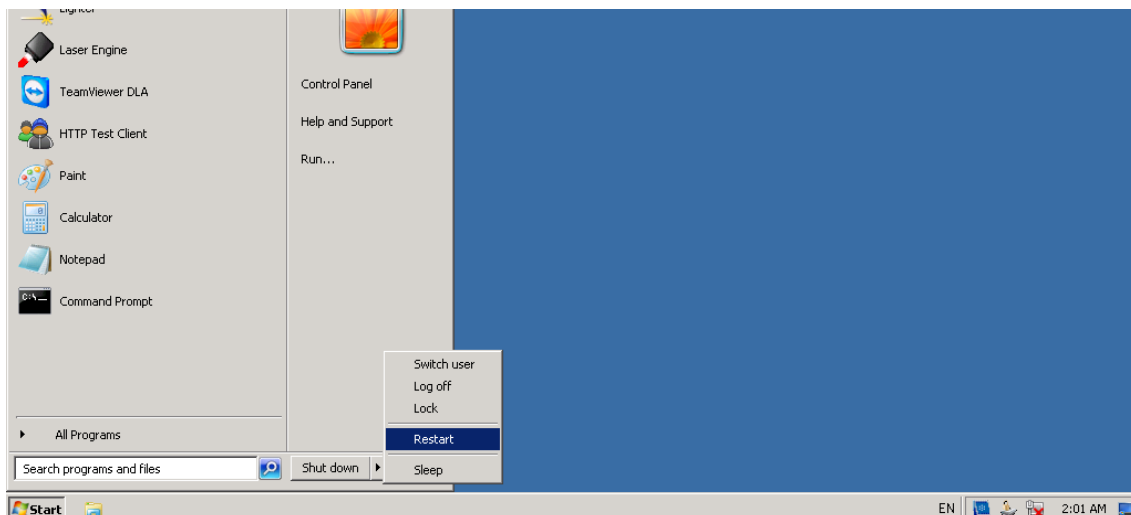
- In the Screen Resolution window select the desired Screen resolution and Color quality:



- 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:



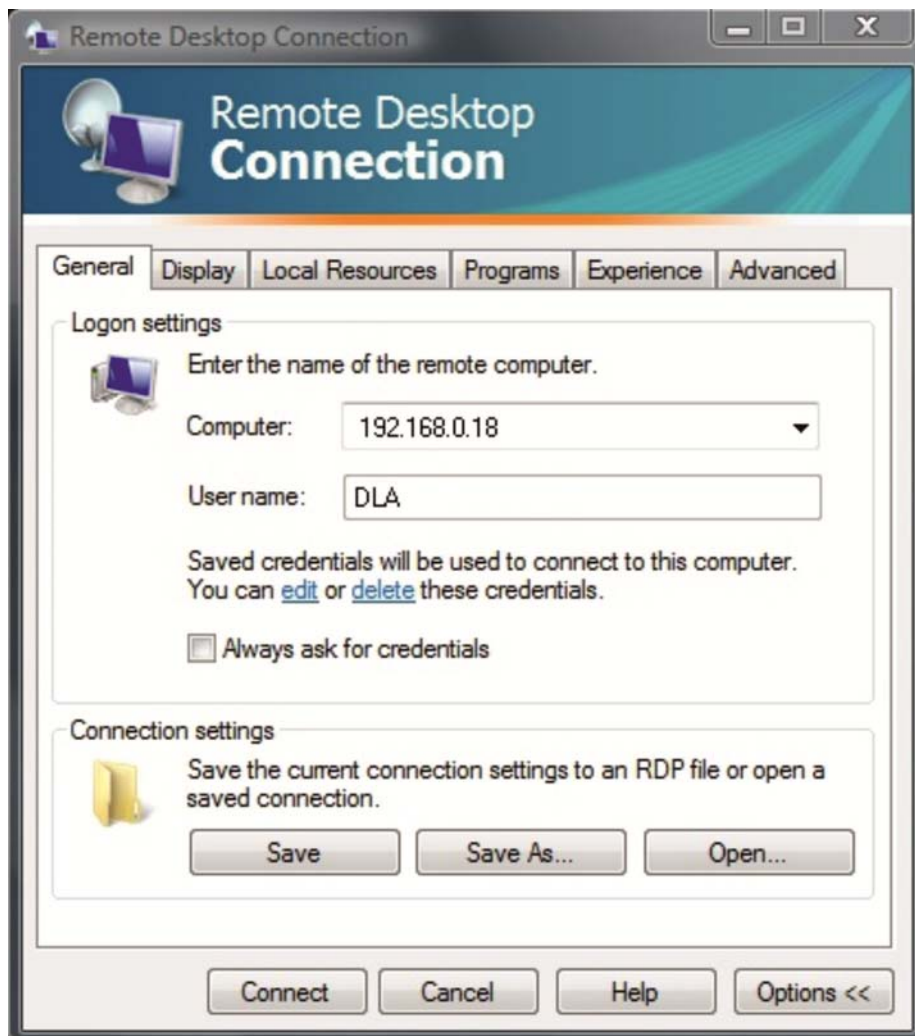
## WARNING!

**DO NOT** turn off the system while Windows® restarts.

## 5.4 REMOTE DESKTOP CONNECTION

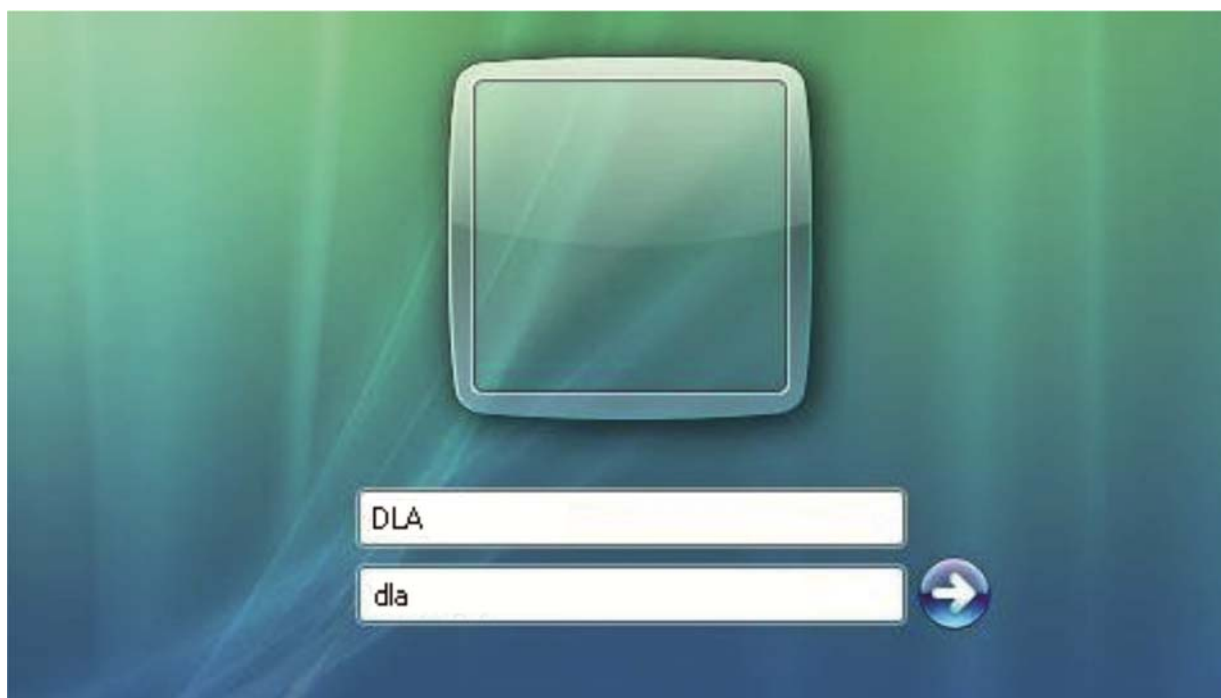
To connect the marking system to a remote Windows® based computer, follow these steps:

- 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.

## 6 ACCESSORIES

The accessories listed here below are described for information purposes only, and are not necessarily included in the packaging. The minimum contents of the packaging include the main hardware, cables and keys. For additional information, please refer to [paragraph 1.2](#).

### 6.1 CONTROL BOX

Control and command device able to manage:

- Warmup the system
- Open the shutter and enable laser emission
- Start and Stop the marking process
- Show the marking process status
- Show the system error status

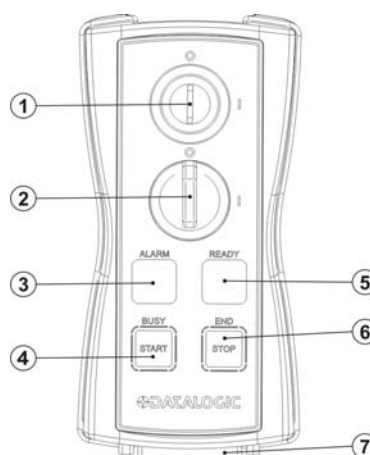
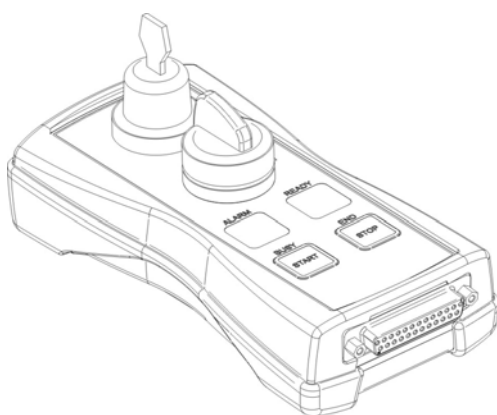


Figure 38: Control Box (Ordering no: 985330031).

1	<b>Key selector</b> Selector switch for EXT_KEY control signal
2	<b>Enable selector/ Enable indicator</b> Selector switch for both EXT_ENABLE_A and EXT_ENABLE_B control signals with led indicator for ENABLE_OUT control signal
3	<b>Alarm indicator</b> Led indicator for SYSTEM_ALARM control signal
4	<b>Start button / Busy indicator</b> Pushbutton for START_MARKING control signal with led indicator for BUSY control signal
5	<b>Stop button / End indicator</b> Pushbutton for STOP_MARKING control signal with led indicator for END control signal
6	<b>Ready indicator</b> Led indicator for SW_READY control signal
7	<b>External connector</b> Connection to Command Box connector

\* Refer to Command Box connector ([paragraph 1.4.3](#)) for detailed control signal's description.



#### WARNING!

If the control box is used, the marking system works in **DANGEROUS** condition.

## 6.2 MARKING ON FLY KIT

The marking on fly kit is available on request. Kit includes: encoder, photocell, cables and plastic reflectors.

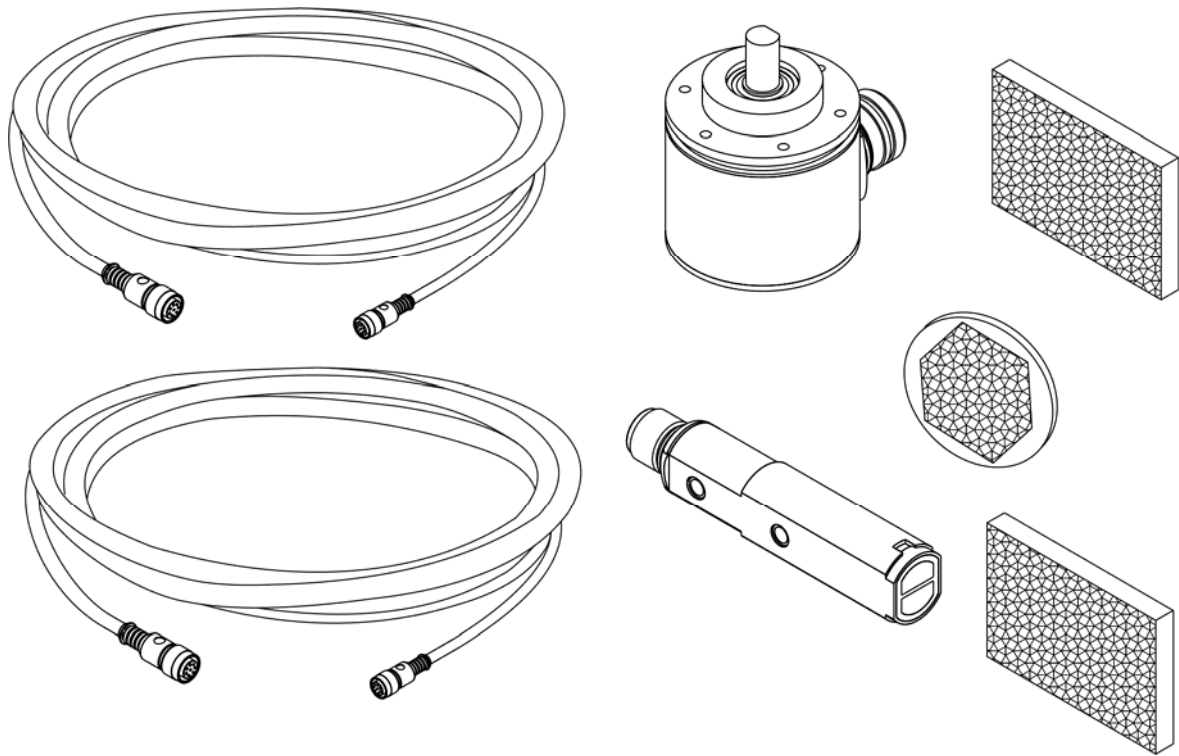


Figure 39: Kit MOF (Ordering no: 985330027).

## 6.3 RACK HANDLES

Handles for rack fastening are available on request.

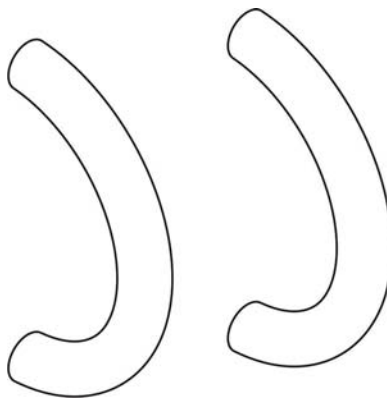


Figure 40: Handles rack.



## 7 TECHNICAL SUPPORT

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### 7.1 SEALS

Several seals have been applied to the marking system.

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.



---

**WARNING!**

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 marking system before the machine it is intended for, has been **declared in conformance** with statutory Directives.

---



---

**WARNING!**

Access to the internal parts of the control rack 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!

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**WARNING!**

Access to the internal parts of the scan head 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!

---

## 7.2 MAINTENANCE

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

The maintenance activities must be done in compliance with the 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 / Clean	Weekly: wipe gently with a dry cloth (or soaked in high purity isopropyl alcohol) or clean it with air blowing
Rack Air filters	Clean / Replace	Every 3 months (according to the environment and frequency of use)

### 7.2.1 F-THETA SCAN LENS CLEANING PROCEDURE

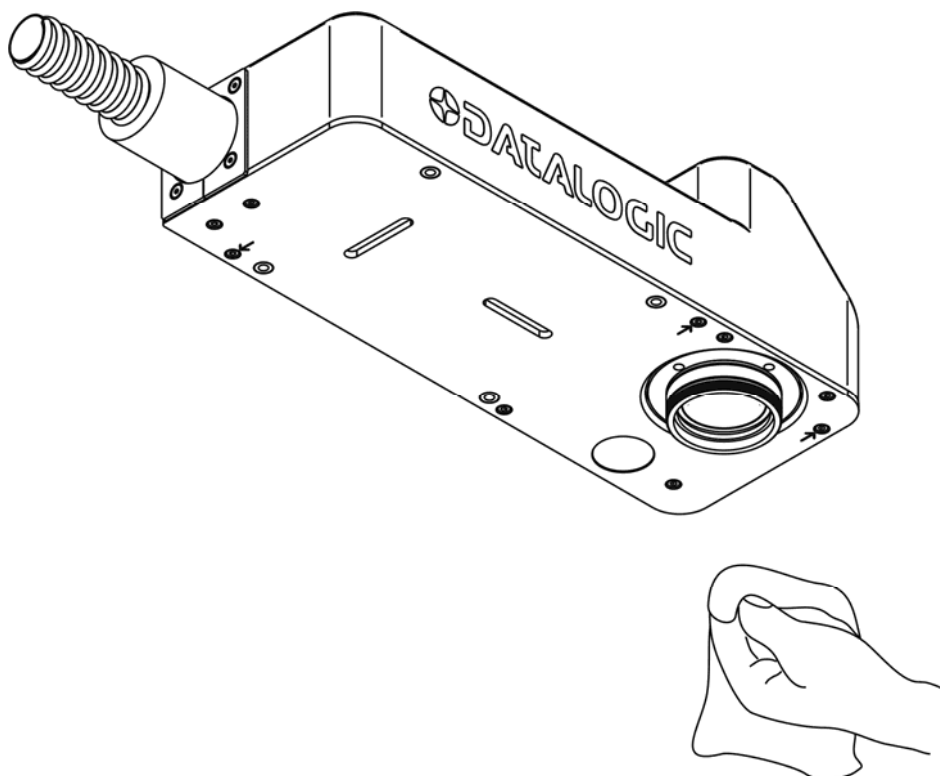


Figure 41: Cleaning F-Theta lens.



#### **WARNING!**

Before cleaning the F-Theta scan lens, the marking system **MUST** be in set **SAFE** mode:

- 1- Disable enable A and enable B
- 2- Disable interlock A and interlock B

## 7.2.2 AIR FILTER CLEANING PROCEDURE

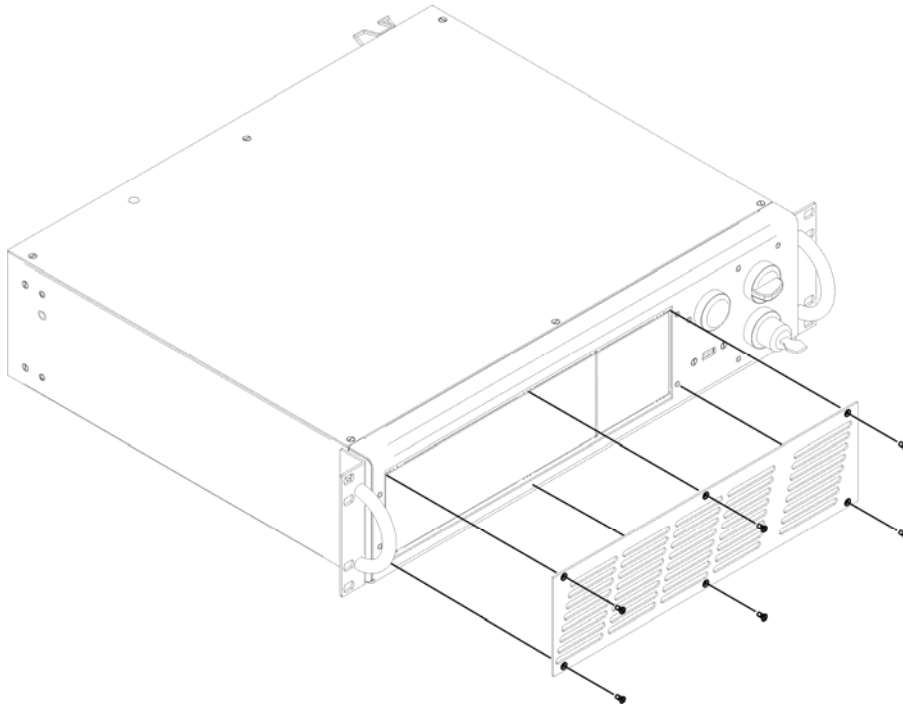


Figure 42: Removal of air filter.



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**WARNING!**

In order to set the marking system in **SAFE** mode, disconnect AC power cable before starting this operation!

---

1. Turn off key switch on controller unit
2. Disconnect AC power cable
3. Loosen screws of front panel and remove them
4. Remove filter
5. Clean filter with air blow or with neutral detergent and air-dry it
6. Reinstall the filter and protective cover



---

**WARNING!**

**DO NOT** install wet filter!

---

7. If filter cannot be cleaned, replace the filter
8. Suitable filters are available as spare parts

## 7.3 PRODUCT SUPPORT AND CUSTOMER SERVICE

### Warranty Information

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

### Product Support

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

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

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

### Product Support and Customer Service Contacts

#### Product Support

[support-dla-lasermarking@datalogic.com](mailto:support-dla-lasermarking@datalogic.com)

Tel: +39 051-6765611

#### Customer Services

[service-dla-lasermarking@datalogic.com](mailto:service-dla-lasermarking@datalogic.com)

Tel: +39 0331-918001

#### Company Web Site










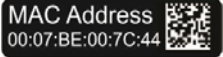

[www.datalogic.com](http://www.datalogic.com)

Or contact your local distributor

### Sales and Customer Service Contacts

<b>IT Corporate Office</b> <b>Datalogic Automation S.r.l.</b> Via Lavino, 265 40050 Monte San Pietro (BO) Italy Tel: +39 051-6765611 Fax: +39 051-6759324	<b>US Corporate Office</b> <b>Datalogic Automation Inc.</b> 511 School House Road Telford, PA 18969-1196 USA Tel: +1 800-BAR-CODE Fax: + 215-799-1646
<b>Laservall China Co. Ltd.</b> 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	<b>Datalogic Automation PTY Ltd</b> Unit 130, 45 Gilby Rd Mount Waverley, VIC 3149 Australia Tel: +61 3/9558 9299 Fax: +61 3/9558 9233

## APPENDIX A: LABEL

LABEL	DESCRIPTION
	Identification label 30W
	Identification label 50W
	Warning logotype (Laser)
	Laser Label (Scan Head)
	Aperture Label
	Label for non-interlock protective housing
	Caution, possibility of electric shock
	Generic Warning
	USB plug
	MAC Address
0 - I	KEY/ENABLE Positions
COMMAND BOX	Command Box connector
AXES (I/O)	Control Axes connector
INTERLOCK	Interlock connector
LAN	LAN connector
RS232	RS232 connector
VGA	VGA connector
PHOT	Photocell connector
ENC	Encoder connector
 2xT5A	Fuses

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

# POSITIONING OF EXTERNAL LABELS

Positioning of labels on the control rack:

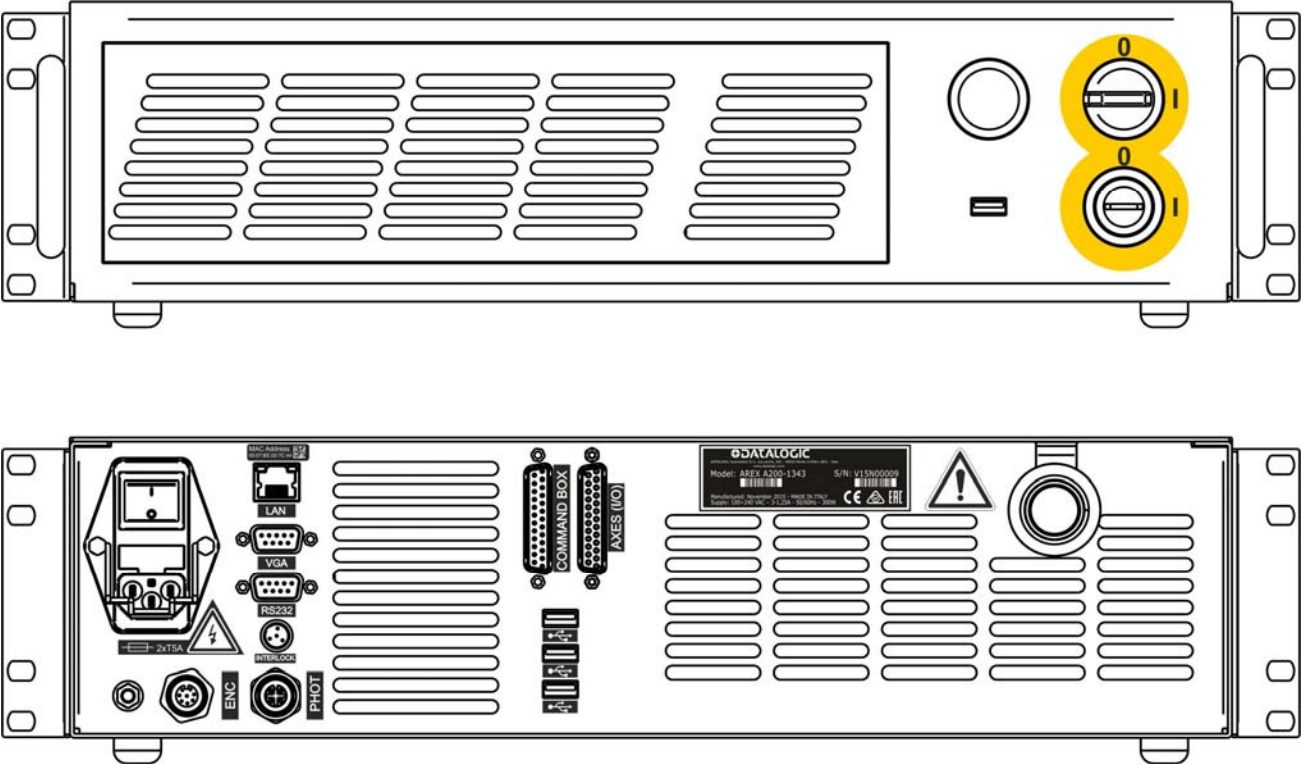


Figure 43: External labels rack location.

Positioning of labels on the Scan Head:

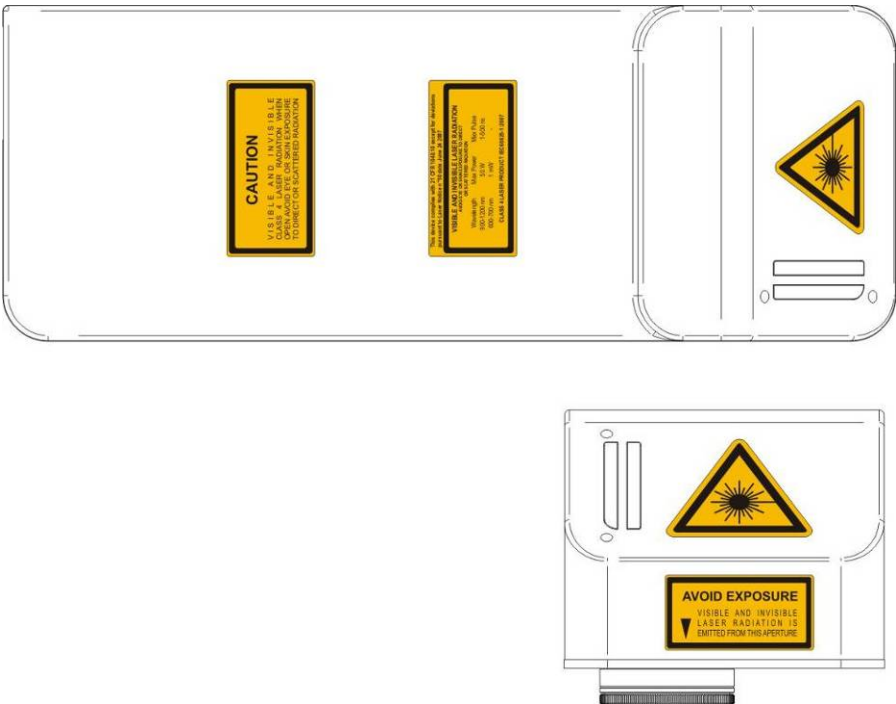


Figure 44: External labels Scan Head location.

## APPENDIX B: STANDARDS

---

### LASER STANDARDS

The marking system is designed to comply with the applicable sections of these laser standards:

EU : EN60825-1

USA : 21 CFR 1040.10

The marking system is classified as Class 4 Laser Product.

Datalogic Automation S.r.l., as manufacturer of marking system, provides a laser 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 machine.

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

CE marking states the compliance of the product with essential requirements listed in the applicable European directive.

Since the directives and applicable standards are subject to continuous updates, and since Datalogic promptly adopts these updates, therefore the EU declaration of conformity is a living document.

The EU declaration of conformity is available for competent authorities and customers by Datalogic commercial reference contacts.

Since 20<sup>th</sup> April 2016 the main European directives applicable to Datalogic products require to include an adequate analysis and assessment of the risk(s). This evaluation was carried out in relation to the applicable points of the standards listed in the Declaration of Conformity.

Datalogic Automation products are mainly designed for integration purposes, into more complex systems. For this reason it is under the responsibility of the system integrator to do a new risk assessment regarding the final installation.



---

#### 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 system.

This system complies with PART 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This system may not cause harmful interference, and (2) this 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 system is operated in a commercial environment. This marking system generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this marking system in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



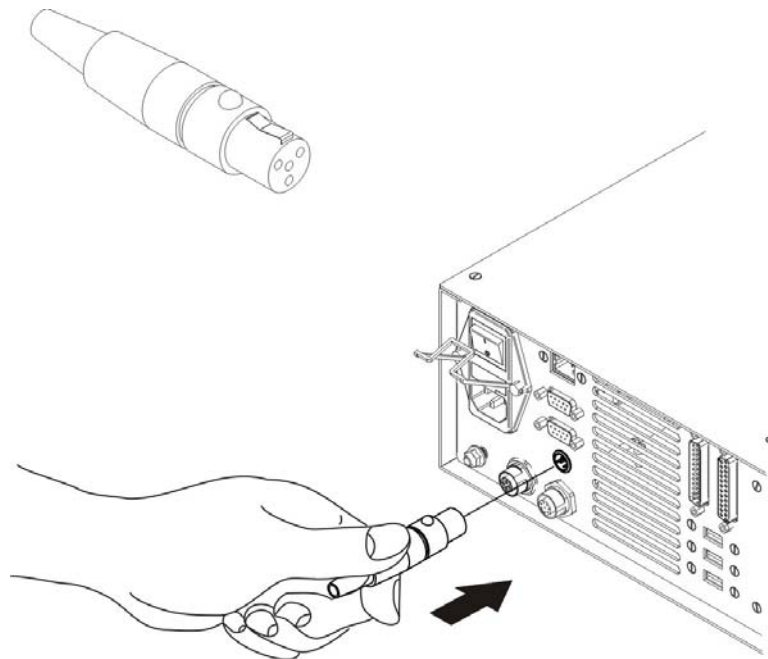
## APPENDIX C: AREX SAFETY CONSIDERATION ACCORDING EN ISO 13849-1:2008

The interlock connector located to the rear of the AREX laser marking system is the interface of the internal safety-related parts of control system (SRP/CS). With appropriate use of safety external components AND the application of the suggested maintenance, the SRP/CS of the machine that uses AREX as components will result in Safety Category 3, PL c.

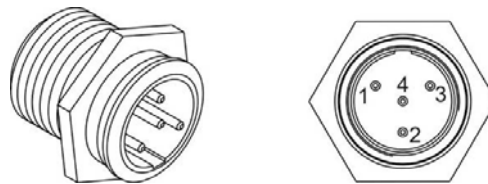
Interlock is used to put the marking system in a safe operating mode because the action is to remove the power to the laser source.

According to Category 3, AREX interlock is made by two separate channels, referred as INTERLOCK A and INTERLOCK B. For a normal operation INTERLOCK A signal must be short circuited to its reference VCC\_INT\_A and INTERLOCK B signal must be short circuited to its reference GND.

The opening of at least one channel causes the power removal from the internal laser source. The response time from full laser emission to zero emission is < 5ms.

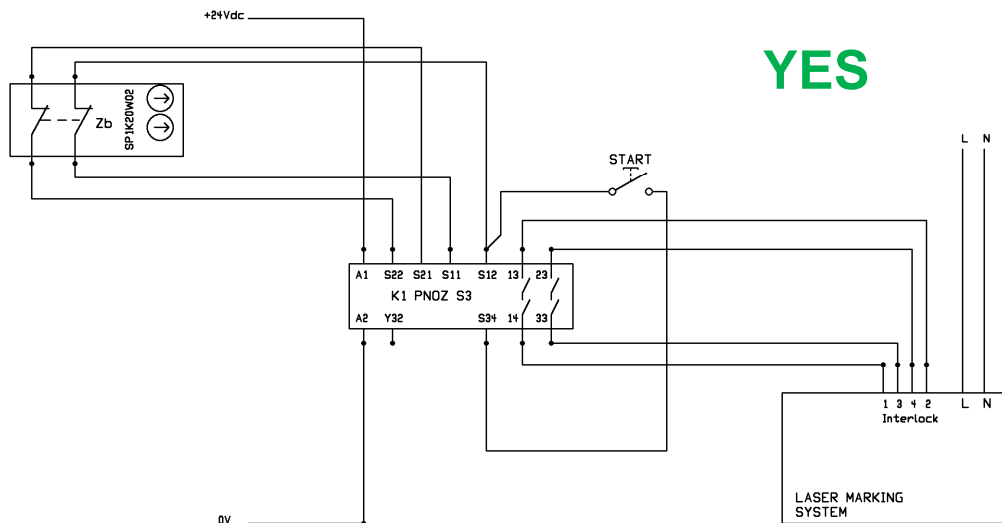


The connector's pin-out description is:



PIN	SYMBOL	TYPE	DESCRIPTION
1	VCC_INT_A	OUTPUT	24V DC reference for interlock signal A
2	INTERLOCK A	INPUT	Interlock signal A
3	GND	GND	Ground reference for interlock signal B
4	INTERLOCK B	INPUT	Interlock signal B

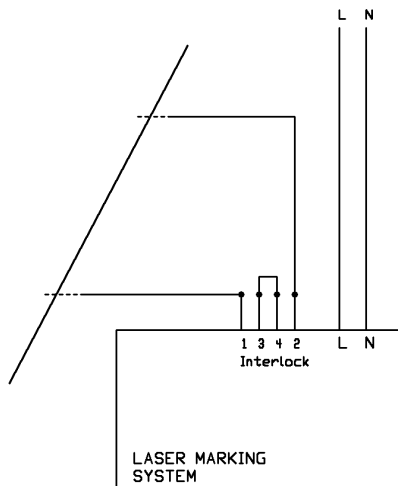
The following diagram is an example of the correct connection between the interlock connector and a safety relay:



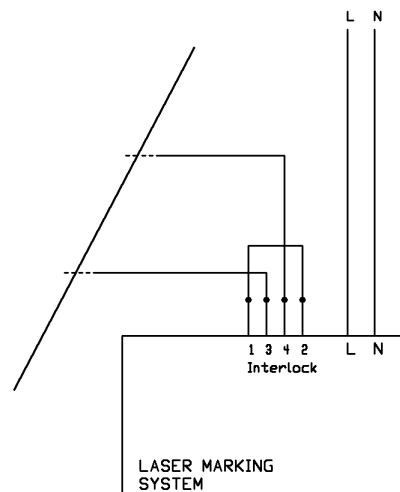
The minimum requirement for safety relay is Cat.3 PL d.

Do not by-pass one of the two interlock channel:

NO



NO



### Maintenance:

The functionality of each interlock channel should be checked every **100** working hours following this procedure:

- 1 – set the system in “laser ready” status
- 2 – open only INTERLOCK A channel
- 3 – check of INTERLOCK A channel is OK if the system goes into “interlock error status” and the noise produced by the fans is lower
- 4 – do the same for INTERLOCK B channel
- 5 – final check is OK if both interlock channels are OK. If Final Check is not OK, and the root cause is due to AREX, the unit should be returned to the manufacturer or authorized repair center. To manage this issue, please contact your supplier of the system.

### General information:

Safety MUST be a part of our conscience.

The safety devices fulfill their safety function only if they are correctly installed, in accordance with the Standards in force.

If you are not certain to have the expertise necessary to install the marking system in the correct way, Datalogic Automation Technical Support is at your disposal to carry out the installation.

## SAFETY FUNCTIONS OF AREX

AREX provides inputs and actuators to implement the following safety functions:

- SF.1 ENABLE (e.g. no IR laser output if "EXT\_ENABLE\_A" or "EXT\_ENABLE\_B" are disabled, where "disabled" means contacts open)
- SF.2 INTERLOCK (e.g. no IR laser output if "INTERLOCK A" or "INTERLOCK B" are disabled, where "disabled" means contacts open)

These functions has been evaluated according to UNI EN ISO 13849-1. The results are:

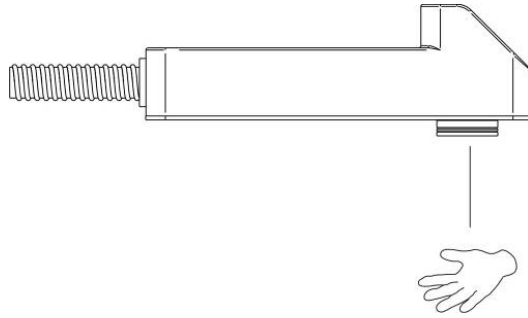
- SF.1:
  - Category: B
  - MTTFd <10 years
  - DC: none according category
- SF.2:
  - Category: 3
  - MTTFd = 113 years (dop=365days, hop=24h, Tcycle=1800s)
  - DC: because AREX doesn't provide feedbacks, a measure of fault detection must be included in the process. The estimate for DC is 0% to 99% depending on the application. This measure alone is not sufficient for the PL "e". If it is executed a test every 100 working hours, then DC=60%.
  - Response time: 5ms

## APPENDIX D: NOTE ABOUT LASER

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### LASER SAFETY

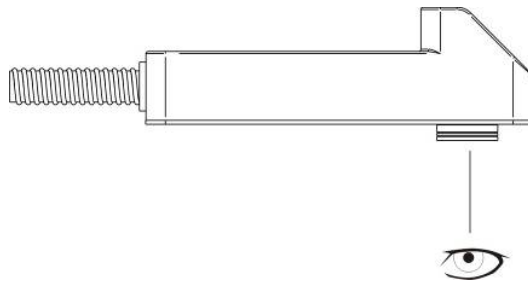
The following information is provided in compliance with regulations set by International Authorities, and it refers to proper use of the marking system.



#### **WARNING!**

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

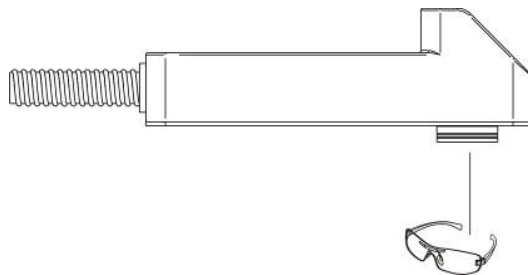
---



#### **WARNING!**

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

---



#### **WARNING!**

Wear safety goggles while using the marking system!

---



#### **NOTE:**

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

---

## LASER RADIATION

Laser radiation is an electromagnetic emission with a micrometric wavelength which ranges from the long infrared (CO<sub>2</sub> Laser), close infrared (Yd fiber, Nd:YAG, Nd:YVO<sub>4</sub>), visible (He:Ne or Argon) and ultraviolet (excimer laser).

It should be considered non-ionizing Radiation. In Arex marking system, the emission of a light is stimulated by “optical pumping” generated by a Diode Laser. 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 radiation of Arex marking system is invisible 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.



---

### WARNING!

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 wavelength is placed in long infrared, and is therefore invisible, thus it is not clear where reflected beams are aimed.



---

### WARNING!

**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.



---

### WARNING!

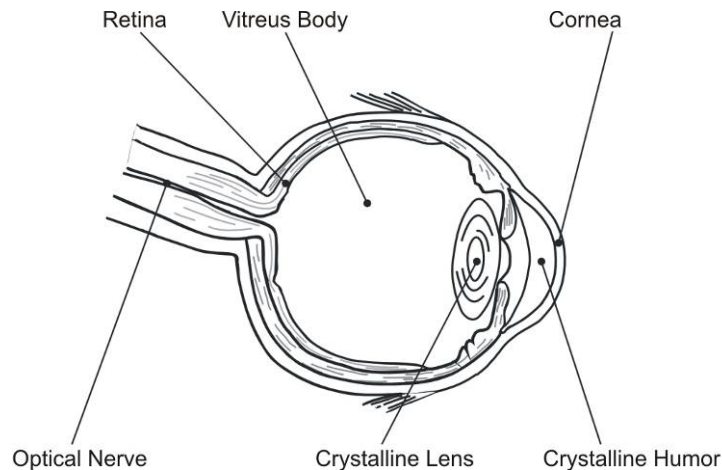
This marking system is classified as **class 4**. Class 4 includes lasers which can produce risks, not only from **direct** or **reflected** radiation, but also from **scattered** radiation! The laser sources may be a significant risk for the skin and risk of burning flammable materials.

---

## 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. Thus Arex laser radiation (1070 nm wavelength) is included in this range and **leads to direct Retina exposure!**

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 45: 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<sup>E6</sup> 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 Laser sources 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.



---

### **WARNING!**

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

---

## **RADIATION VIEWING CONDITIONS**

The Laser output by the Scan Head is to be considered as a highly collimated and intense monochromatic light source. Due to these characteristics it can be seen as a “point 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 OUTPUT BY AN OPTICAL FIBER**

This happens if an Optical Fiber disconnects from the Scan Head. Viewing of the beam is dangerous up to a significant distance. Filters and Goggles do not ensure safety.

### **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 Arex is showed in the next paragraph.**



---

#### **WARNING!**

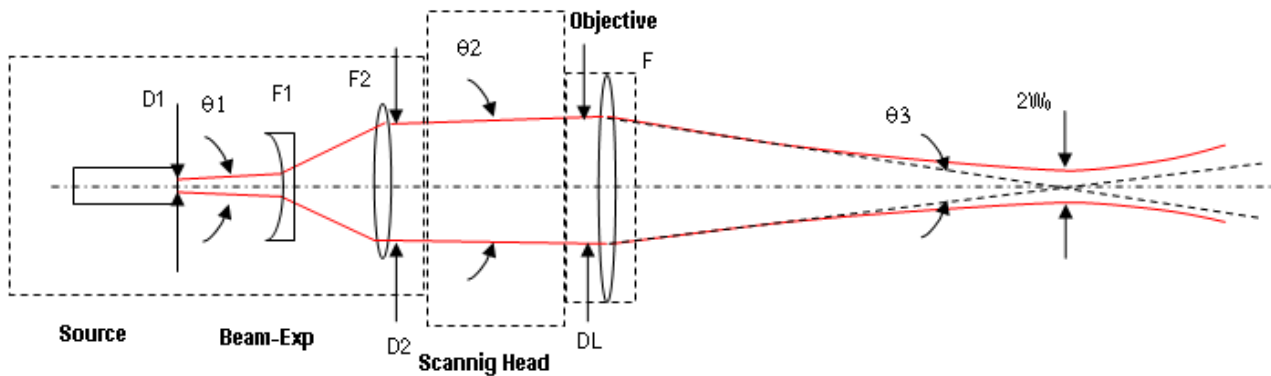
Always use goggles with conformity certificate.

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

---

## DNRO DETERMINATION AND O.D. OF PROTECTION GOGGLES

In order to determinate the characteristics of the protection goggles, it is essential to determine the characteristics of the radiation, knowing its optical path, the dimensions of the beam and its divergence.



It is very important to know the real divergence of the beam in output from the focalization scan lens (F-Theta).

With all these optical data it is possible to calculate the nominal distance of optical risk (NOHD) and the optical density (OD) requested to the protection filters of the laser radiation.

**Calculations have been done following the CEI EN 60825-1 (2014) Normative regarding nominal distance and optical risk in the worst condition and in case of accident exposure of 10s for direct radiation and 100s for diffused radiation.**

Wavelength	RIF	1070 nm ( $\pm 10$ nm) 1120 nm (Raman emission)
Laser Type		Q-Switched fiber laser
Observation type		Direct radiation
Pulse energy		1 mJ @ 20 kHz
Pulse duration		100 ns
Beam Diameter at F-Theta lens exit	DL	$\sim 6.0$ mm
Beam divergence on the lens	$\theta_2$	0.8 mrad
Focal of the F-Theta lens	F	160 mm
Real divergence after the lens	$\theta_3$	31,2 mrad
Exposure time		10 s
Max beam scanning angle		$\pm 20^\circ$ each axis



### ACCIDENTAL CONDITION OF VISION OF THE DIRECT REFLECTED RADIATION

Assuming a direct exposure of 10 sec at a nominal distance of 0,5 m (worst case considered), with F-Theta Scan Lens 160mm model installed, it is possible to calculate the suitable optical density OD) for safety goggles.

The OD (Optical Density ) in last column assures the reduction of laser radiation below max acceptable exposure.

**OD**= log (H/EMP) where EMP is the Maximum Permissible Exposure and H is the radiant exposure.

Source	DNRO (Nominal Ocular Hazard Distance)	OD (Optical Density)
Arex Marker 30W	31,6 m	> 4.19
Arex Marker 50W	40,8 m	> 4.41

### SCALE INDEX OF THE PROTECTION GOGGLES FILTER

The scale index L of the filters indicates the stability to the radiation, that means the ability of the filter to maintain its characteristics unchanged.

This stability is certified by the producer according to the UNI EN 207.

It is then necessary to verify that the scale index of the adopted filter is stable for this period and foreseen an adequate over dimensioned in order to make sure that it could last longer than the accidental exposure period.

In case of exposure at 0,5 m for 10 sec, the suggested optical density for safety goggles is CLASS L4.

## 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 the 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 RISK

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.



---

### WARNING!

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 was designed for.



---

### WARNING!

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

---



---

### WARNING!

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.



---

**WARNING!**

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

---

For example, during the intended use of the marking system, if a material being processed undergoes alterations and produces irritating and/or toxic fumes, it may be necessary to remove the fumes from processing before releasing them into the air.

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



---

**WARNING!**

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

---



---

**WARNING!**

When processing **flammable material**, such as plastic, since there is a **fire danger**, it is indispensable to follow the instructions provided by the manufacturer when the marking system is commissioned and follow the instructions in the **Collateral Risks** section.

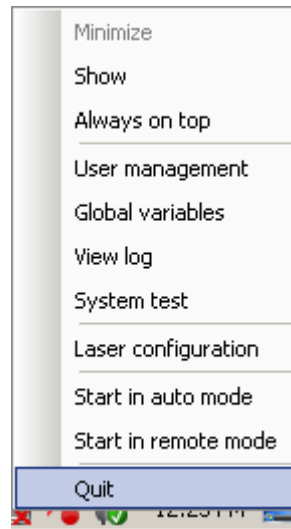
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## APPENDIX E: SOFTWARE UPGRADE

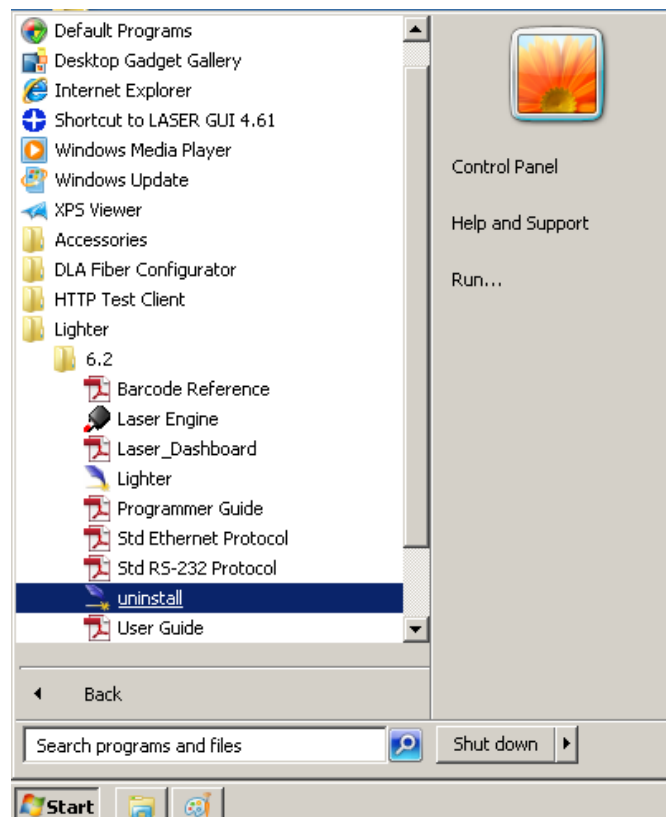
---

This document describes how to update SW version:

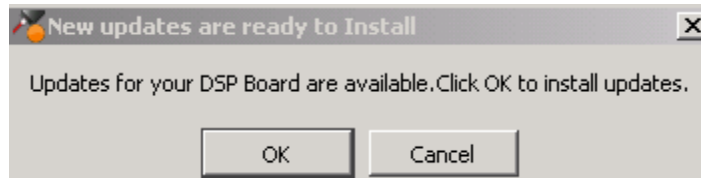
1. Close the Lighter and Laser Engine (Click on “QUIT”)



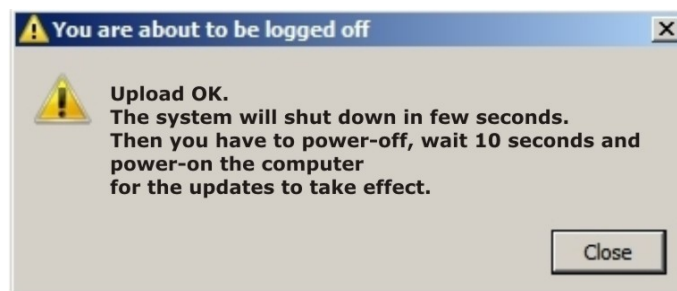
2. Do Lighter “UNINSTALL”: you cannot run the new installer before having removed the old SW version



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



---

**NOTE:**

**DO NOT** restart or turn off the system!

---

- 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



---

**NOTE:**

**DO NOT** restart or turn off the system!

---

- 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** able to restore the system to the factory settings. The **USB recovery disk** should be used if the *Operating System is corrupted* or disks are *corrupted*.



### WARNING!

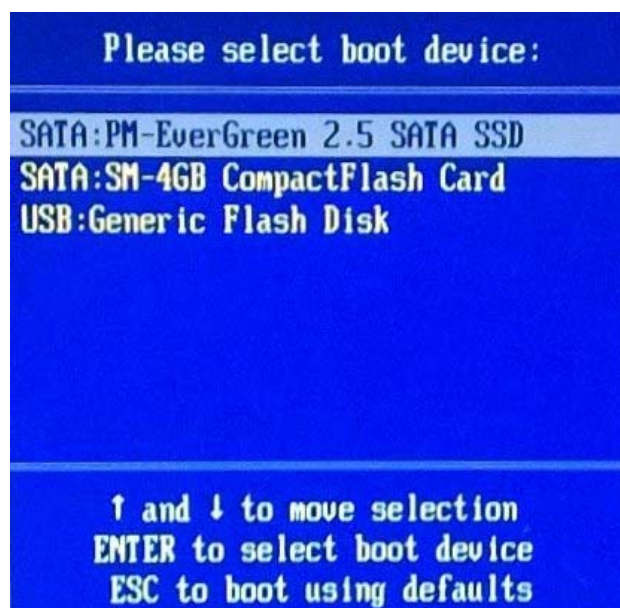
All the existing data in the system will be overwritten. All existing data will be lost!

STORAGE CONFIGURATION	
<b>C:\ drive: <i>CF disk</i> (compact flash)</b> <ul style="list-style-type: none"><li>○ Operating system</li><li>○ Lighter Suite</li></ul>	<b>D:\ drive: <i>SSD disk</i> (solid state disk)</b> <ul style="list-style-type: none"><li>○ Lighter DATA folder: configuration files, license, layouts, projects, sequences, etc</li></ul>
	

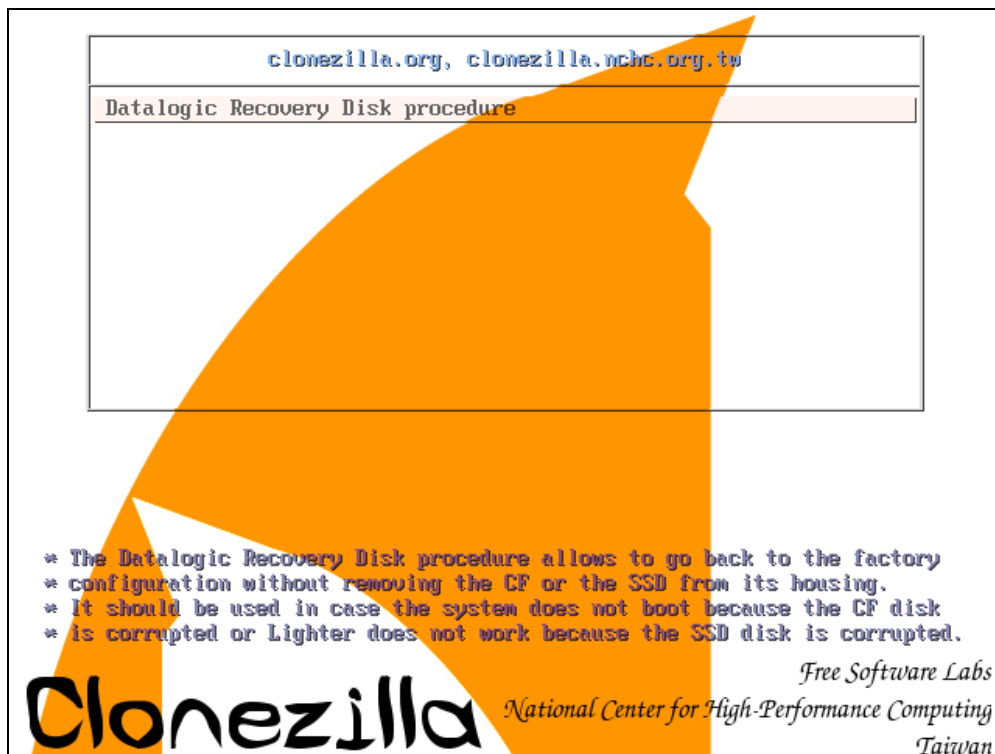
The recovery procedure requires the **USB recovery disk** which is included in the standard equipment.

#### Procedure:

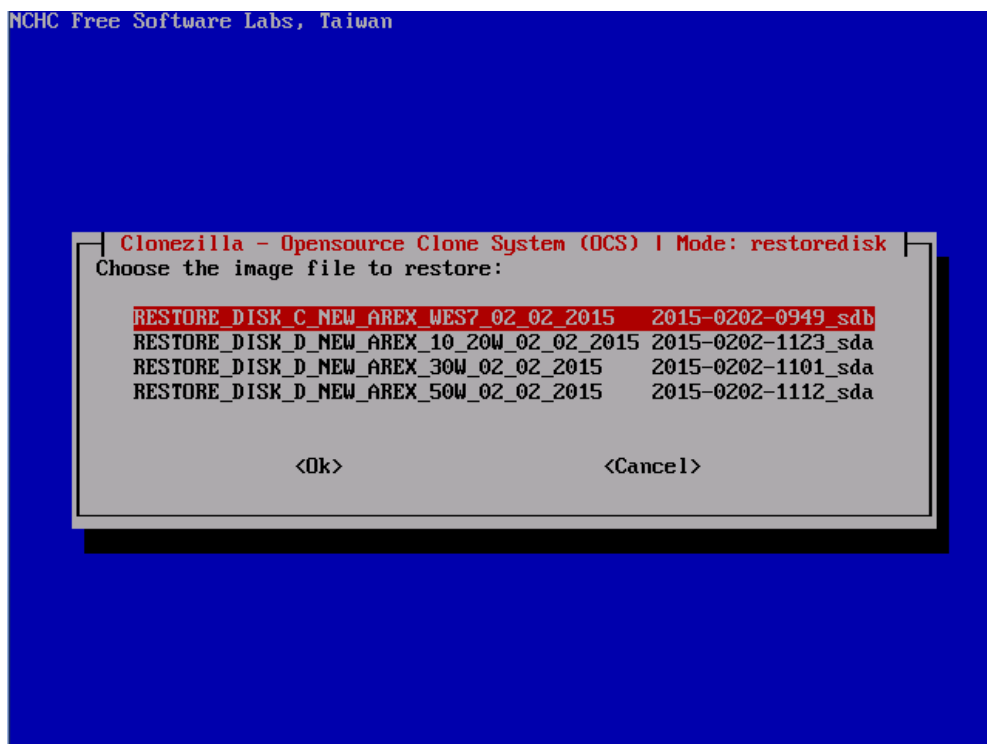
- Turn **OFF** the marking system
- Insert the **USB recovery disk** provided with the marking system in the USB port
- Turn **ON** the marking system and press **F11** key to enter **Boot Device** menu
- Select the **USB** device in the list and press **ENTER** key



- The system will restart and **Clonezilla live** will boot from the USB disk
- **Datalogic Recovery Disk procedure** screen will appear



- Press **ENTER** key to continue
- Choose **RESTORE\_DISK\_C\_NEW\_AREX\_WES7** to restore **disk C:** and press **ENTER** key.





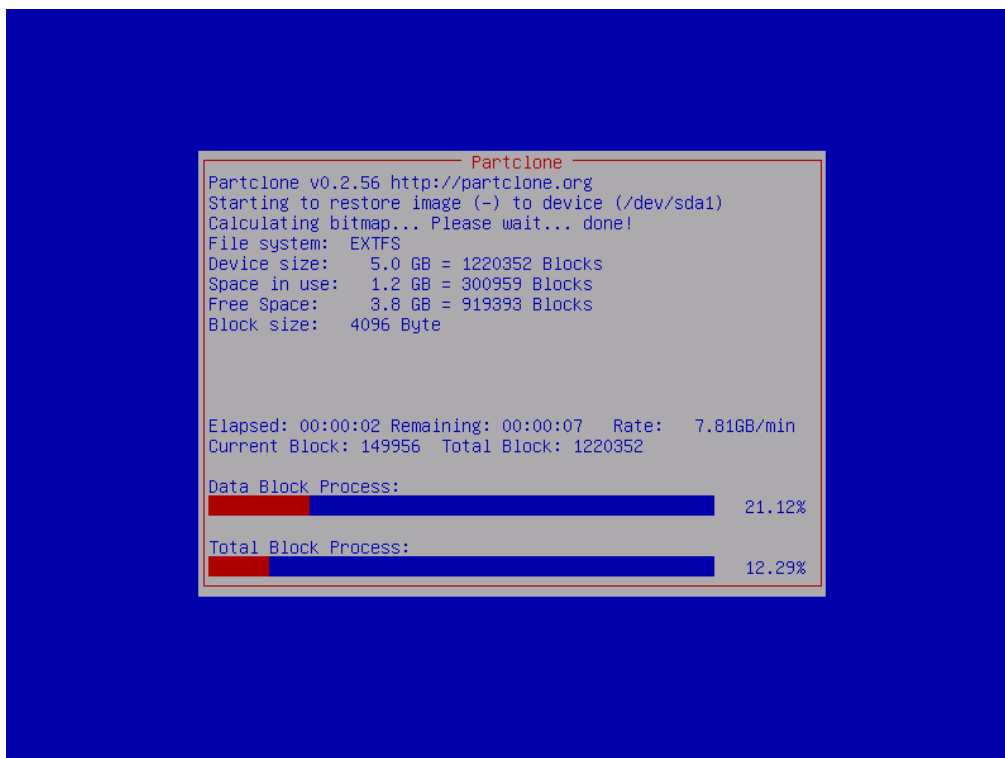
- Choose **Compact Flash disk drive** as target disk and press **ENTER** key
- Clonezilla will ask you to **confirm twice**:
  - **Press Y** key and then **ENTER** key to confirm the 1st time
  - **Press Y** key and then **ENTER** key to confirm the 2st time

```

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

```

- **Wait** for the end of the procedure (about 10 minutes):



The screenshot shows a terminal window titled "Partclone" with the following text:

```

Partclone v0.2.56 http://partclone.org
Starting to restore image (-) to device (/dev/sda1)
Calculating bitmap... Please wait... done!
File system: EXTFS
Device size: 5.0 GB = 1220352 Blocks
Space in use: 1.2 GB = 300959 Blocks
Free Space: 3.8 GB = 919393 Blocks
Block size: 4096 Byte

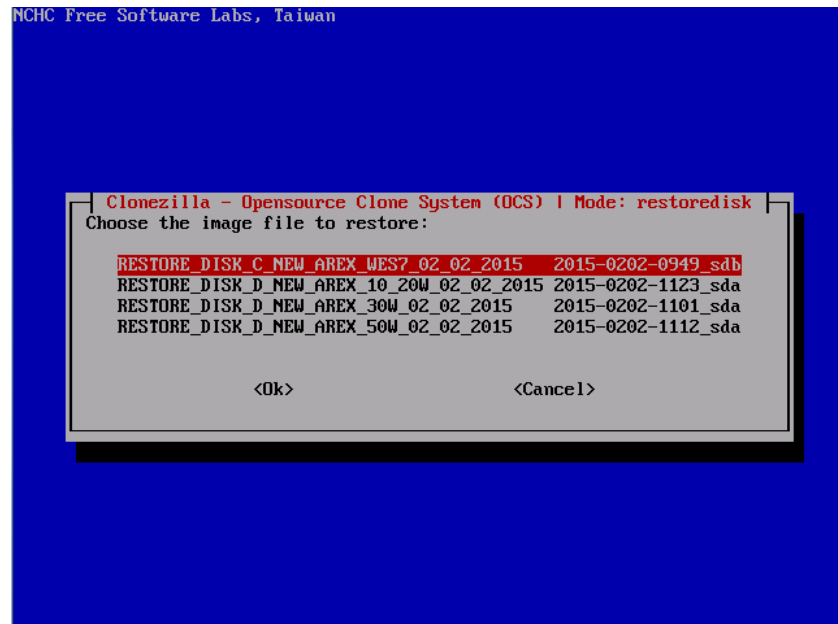
Elapsed: 00:00:02 Remaining: 00:00:07 Rate: 7.81GB/min
Current Block: 149956 Total Block: 1220352

Data Block Process:
[Progress Bar] 21.12%

Total Block Process:
[Progress Bar] 12.29%

```

- Press **ENTER** key to continue
- Choose **(3) Start over**
- Choose the right image to restore **disk D:** between that listed below:
  - **AREX 30W** -> **RESTORE\_DISK\_D\_NEW\_AREX\_30** and press **ENTER** key
  - **AREX 50W** -> **RESTORE\_DISK\_D\_NEW\_AREX\_50** and press **ENTER** key



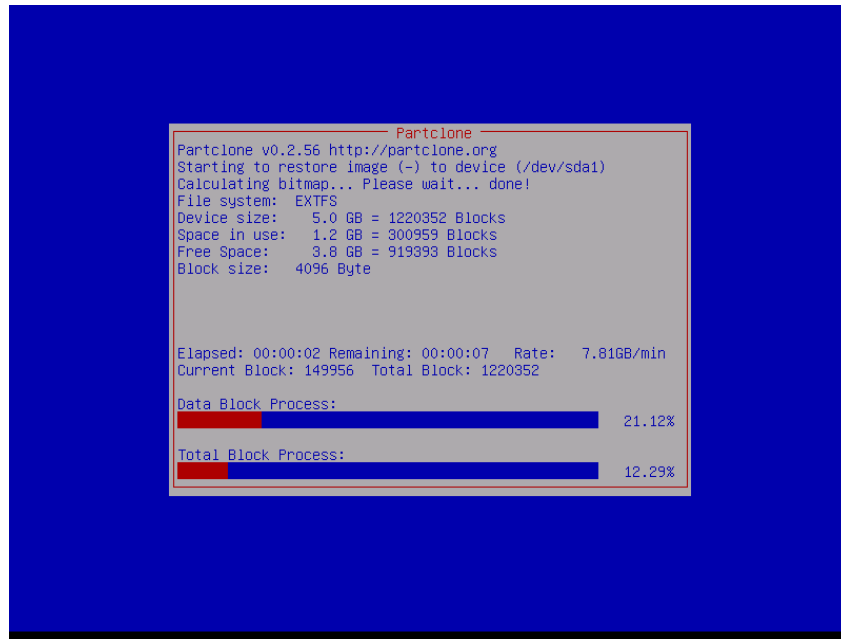
- Choose **SSD disk drive** or **Flash Disk drive** to restore **disk D:** and press **ENTER** key
  - Clonezilla will ask you to **confirm twice**:
    - **Press Y** key and then **ENTER** key to confirm the 1st time
    - **Press Y** key and then **ENTER** key to confirm the 2st time

```

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

```

- **Wait** for the end of the procedure (about 2 minutes):



- Press **ENTER** key to continue
- **Choose (0) Power off** to exit Clonezilla
- **Wait** until the shutdown process is done (black screen)
- **Turn OFF** the system using the main switch
- **Remove the USB recovery disk** from the USB port

## 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:



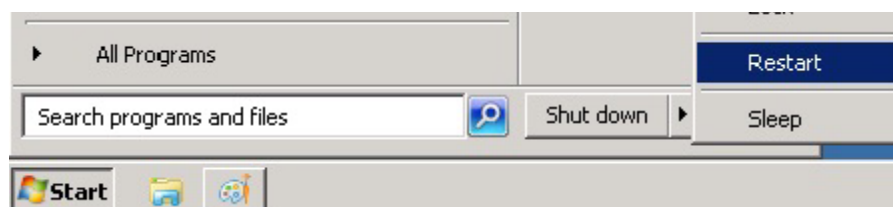
- Press **OK** to continue
- Recreate the Lighter user database **double click** on file C:\user\_db.bat



- 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



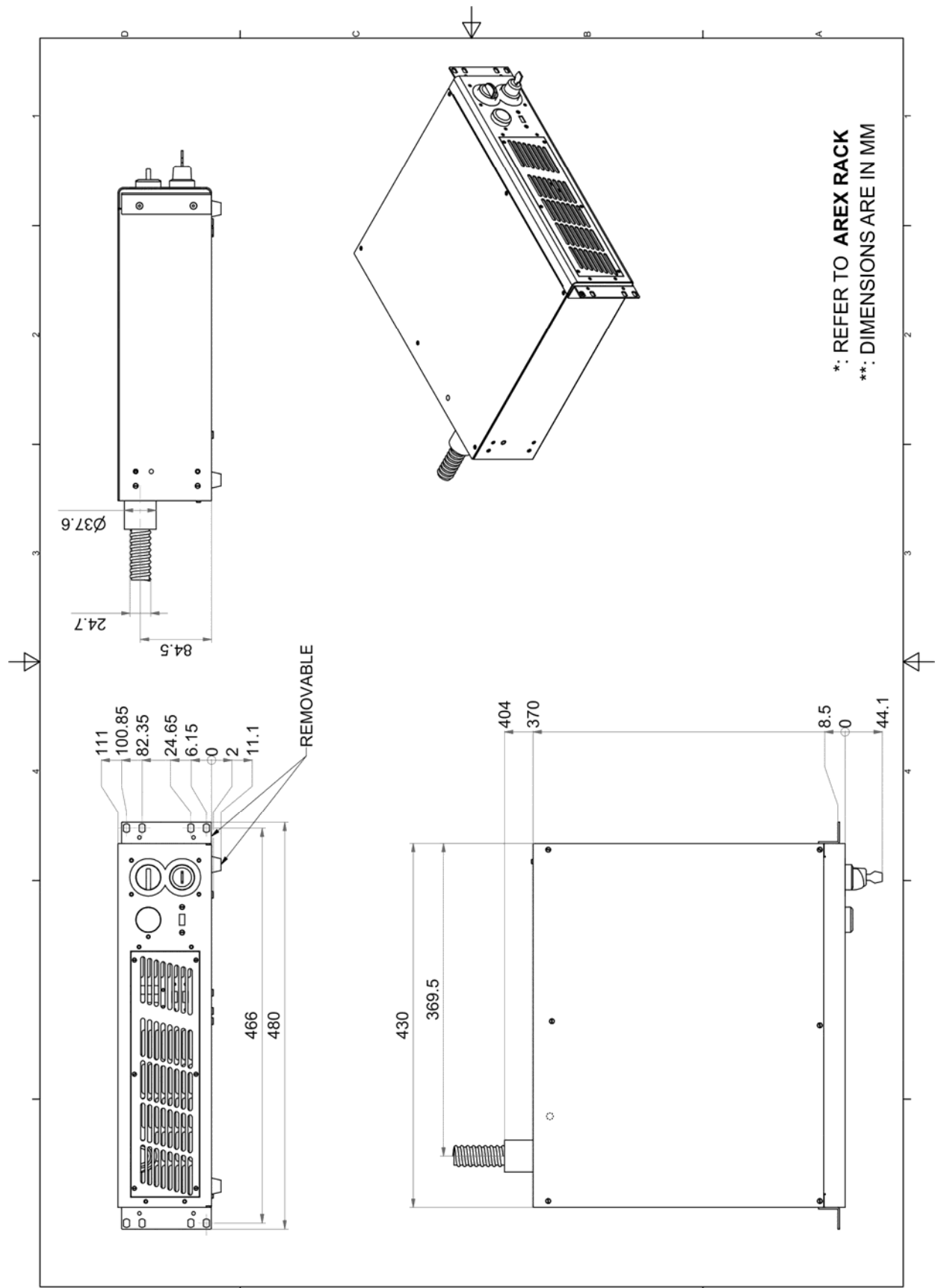
- **Restart** Windows®:



### WARNING!

**DO NOT** turn off the system while Windows® restarts.

# APPENDIX G: MECHANICAL DRAWINGS





# FIGURES

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Figure 1: Arex Control Rack and Scan Head. ....	vii
Figure 2: Unpacking.....	10
Figure 3: Transport. ....	12
Figure 4: Positioning rack. ....	13
Figure 5: Vertical positioning (need additional fixing).....	13
Figure 6: Fixing points on shrug rack (cabinet assembly).....	14
Figure 7: Fixing points on Scan Head (vertical mount). ....	14
Figure 8: Rack installation environment. ....	15
Figure 9: Scan Head overview .....	18
Figure 10: Control rack overview.....	19
Figure 11: Working distance.....	21
Figure 12: Male panel plug cod. TB4M (front view).....	22
Figure 13: Female cable mount connector cod. TA4FX (solder view). ....	23
Figure 14: Female panel socket SUB-D 25 (front view). ....	24
Figure 15: Enable signal's scheme.....	26
Figure 16: Key signal's scheme.....	27
Figure 17: Timing control signals.....	27
Figure 18: Timing signals .....	28
Figure 19: Male panel socket SUB-D 25 (front view). ....	29
Figure 20: Male panel socket SUB-D 9 (front view). ....	30
Figure 21: Female panel socket cod. 09-3482-87-08 (front view).....	31
Figure 22: Female panel socket cod. 09-3482-87-04 (front view).....	31
Figure 23: Connection examples.....	33
Figure 24: Connecting Command Box connector. ....	34
Figure 25: Connecting interlock connector.....	35
Figure 26: Connecting power supply cable. ....	36
Figure 27: Ground connection.....	36
Figure 28: USB mouse connection.....	37
Figure 29: USB keyboard connection.....	37
Figure 30: VGA monitor connection. ....	38
Figure 31: RJ45 Ethernet connection.....	38
Figure 32: Power on. ....	39
Figure 33: Status LED display. ....	39
Figure 34: Enable command KEY. ....	40
Figure 35: Status LED display.....	40
Figure 36: Enable command ENABLE.....	41
Figure 37: Status LED display.....	41
Figure 38: Control Box (Ordering no: 985330031). ....	63
Figure 39: Kit MOF (Ordering no: 985330027).....	64
Figure 40: Handles rack. ....	64
Figure 41: Cleaning F-Theta lens.....	66
Figure 42: Removal of air filter. ....	67
Figure 43: External labels rack location.....	70
Figure 44: External labels Scan Head location. ....	70
Figure 45: Eyeball section. ....	78



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