

USER'S MANUAL



> Ulyxe™

 DATALOGIC



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Ulyxe™ User's Manual

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821001974 rev. D

SYMBOLS

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:



Generic Warning:

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



Electricity Warning:

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



Laser Warning:

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



Fire Warning:

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



Notice:

Notes, usage tips, or additional information.



Note:

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

REVISION INDEX

Revision	Date	Number of added or edited pages
A	2008-04-17	Release
B	2009-02-19	Complete Revision for Ulyxe 2.0
C	2009-09-30	Datalogic Automation layout
D	2010-03-11	Standards References
E	2010-09-23	Environmental Declaration Windows [®] 7 compatibility
821001970	2011-09-07	General Review
821001971 rev. A	2012-09-14	Appendix A
821001972 rev. B	2014-10-31	12, 23, Appendix E
821001973 rev. C	2016-06-13	General Review
821001974 rev. D	2017-06-06	ii



NOTE:

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

FOREWORD

Information included in 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 an Ulyxe™ 1PWX-T10 marking system in Class 4 configuration.

In addition to being professionally trained in their role, personnel assigned to work on the marking system must be informed and made acquainted with the risks inherent 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 PERSONNEL**

responsible for the electrical, mechanical and optical maintenance and adjustment of the marking system.



WARNING!

Datalogic shall not be held responsible for any non-conforming use of marking system of its manufacture.



NOTE:

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

PATENTS

See www.patents.datalogic.com for patent list.

This product is covered by one or more of the following patents:
Utility patents: IT1366132, US7480318

OVERVIEW

We are satisfied of your choice for a Datalogic product and especially for an “ALL IN ONE” compact system made from experience years in laser marking field.

The marking system Ulyxe™ belongs to a Diode Pumped Solid State (DPSS) Q-switched side pumped laser category.

It's simple and compact design conveys a versatile, intuitive and easy product to integrate due to its advanced technology.

Easy to use, it can be the best investment to entry in the laser world without compromises about performance and to obtain excellent markings.

The marking system includes all necessary to operate, a laser source DPSS Q-switched, a galvanometer scanning head, digital power controls, cooling system and monitoring functions. Entire unit and its mechanical base are covered by a high technology polyurethane plastic top.

The user can easily interacts and monitors laser status and its functions with an easy use of a LCD Touch Screen control display.

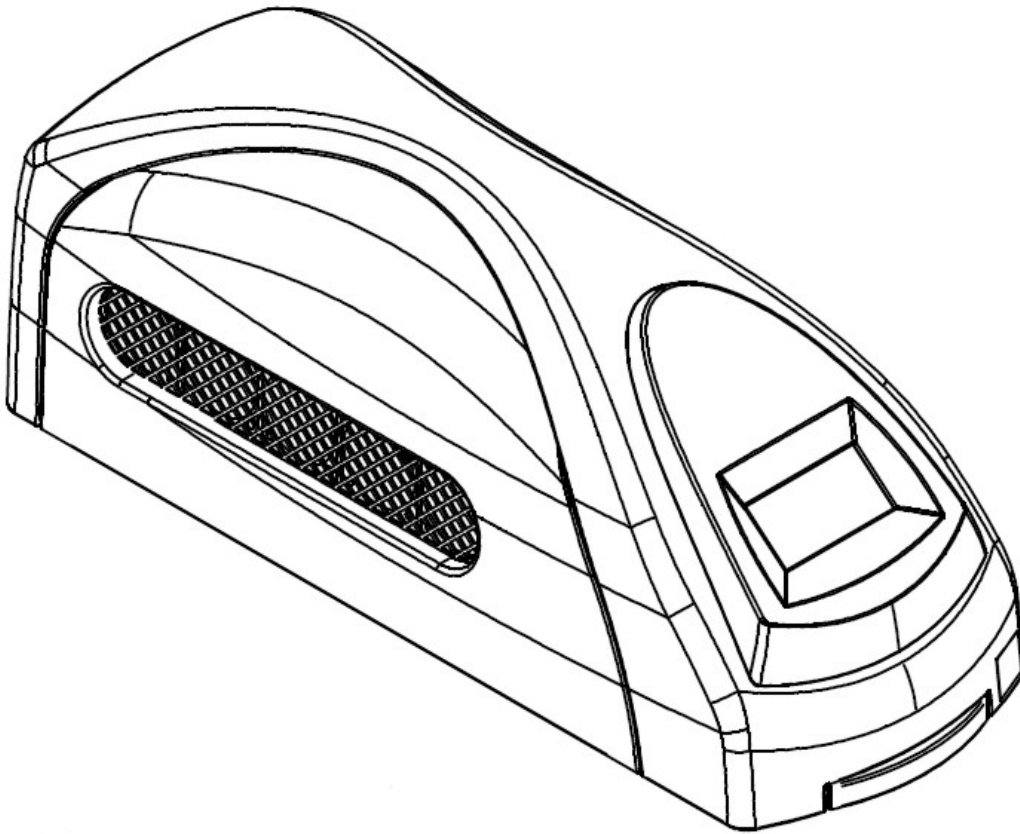


Figure 1: Overview.



WARNING!

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

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 declines any and all responsibility for work carried out on live parts by untrained or unauthorized personnel.



WARNING!

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

Datalogic declines any responsibility and liability for irregular and improper use of the laser system which it manufactures.



WARNING!

These marking system actuation is demanded to the system integrator.

USB 2.0 ADVICE

Ulyxe™ exclusively works via USB 2.0 Full Speed only. Certain hardware configurations and certain operative systems do not fully support the requested connection.

It is suggested to perform the following checks:

- Use only USB cables certified “HIGH SPEED” or quality “USB2.0” cable, not longer than 2 meters.



- Avoid using any kind of extension cable or any HUB on the cable path.
- Verify the compatibility of the operative system.
- Some computers support only one USB2.0 at a time. On those systems, the use of other devices (USB memories, external HD, etc.) can disconnect the Ulyxe™ peripheral devices (in particular it is observed that any USB 2.0 peripheral connected for last in temporal order isn't recognized from O.S.)

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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 box containing the accessories
- Carefully remove the marking system from the packaging using both hands

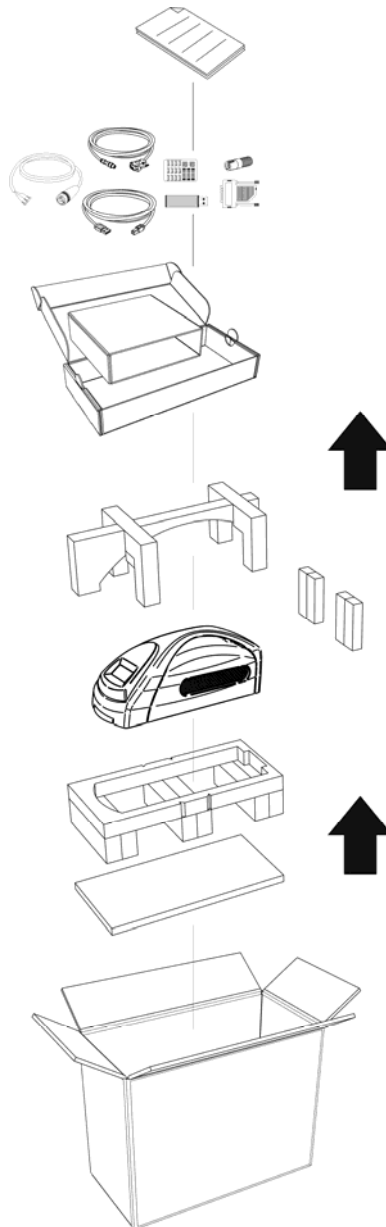


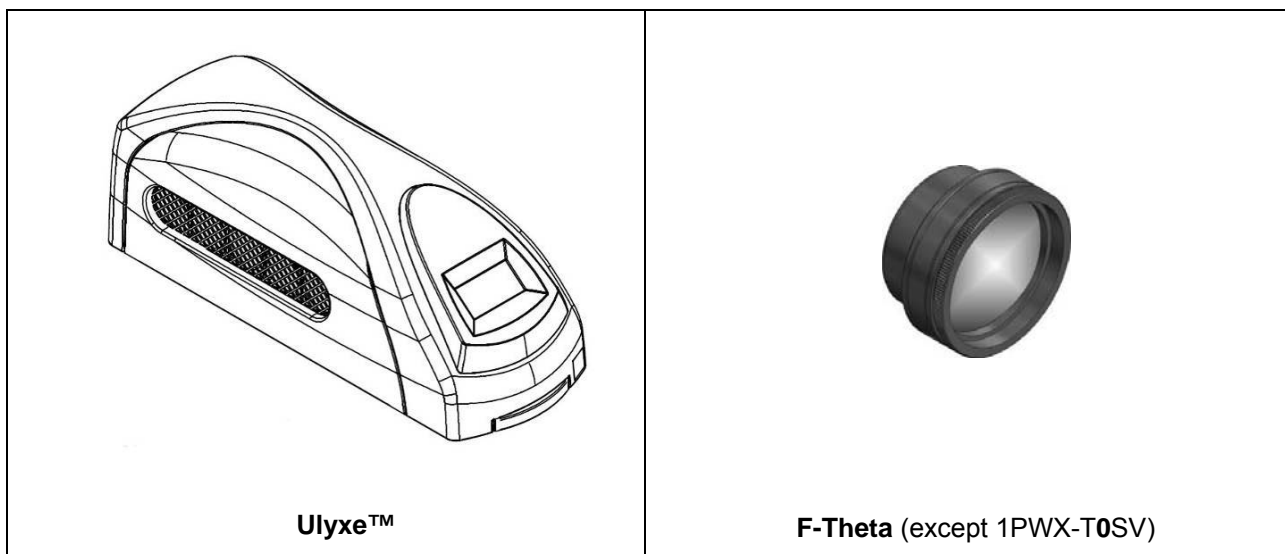
Figure 2: Unpacking.

Before installing or operating the marking system, you should:

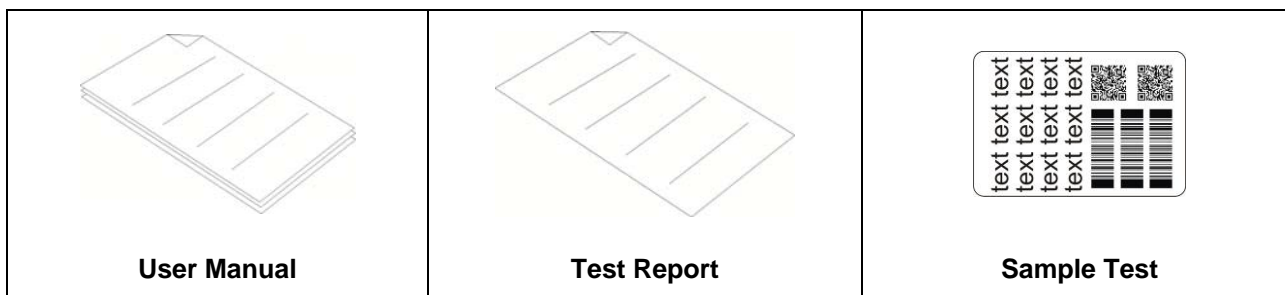
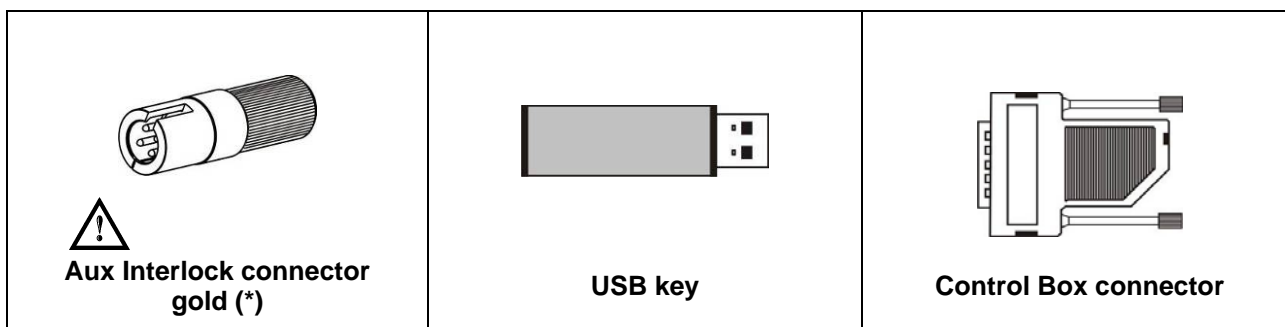
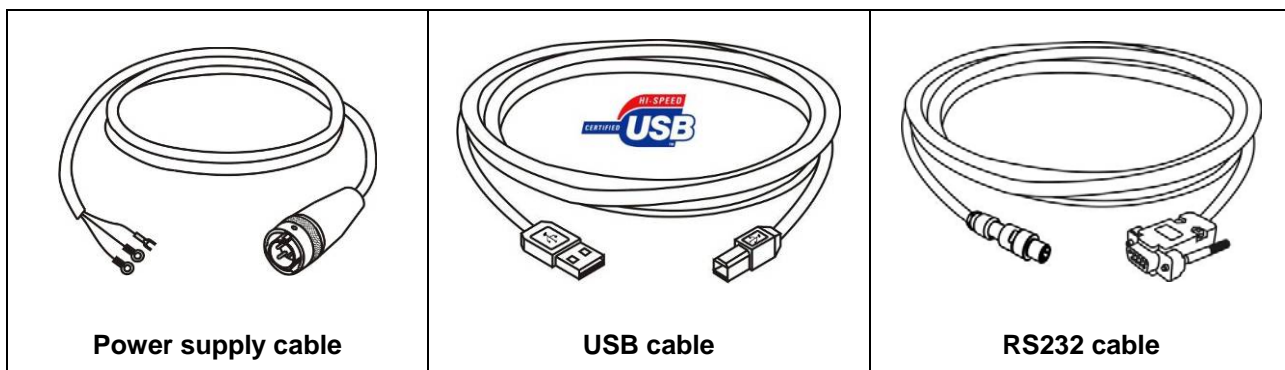
- Inspect the shipping container for damage
- Inspect the marking system for signs of damage
- Confirm that the shipping carton contains all items on the shipping inventory list including any accessories

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 chapter 6 for contact details.

1.2 MAIN HARDWARE



1.3 CABLE AND ACCESSORIES



* 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.

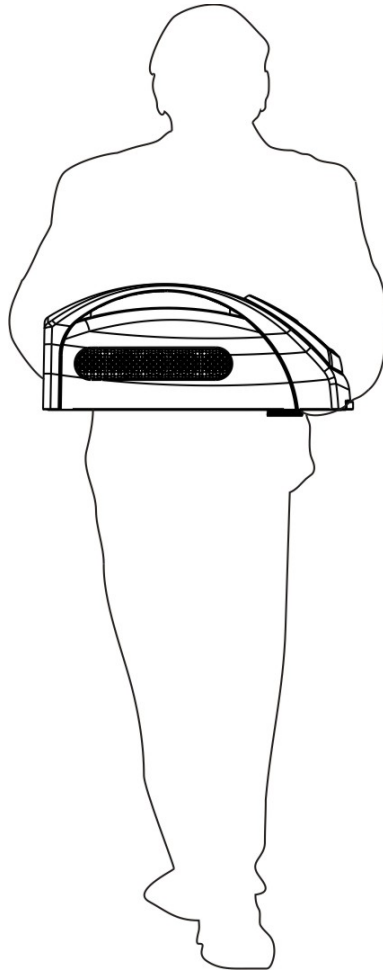


Figure 3: Transport.



WARNING!

Ulyxe™ is a delicate optical laser marking system, avoid damaging it with shock and vibrations.

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

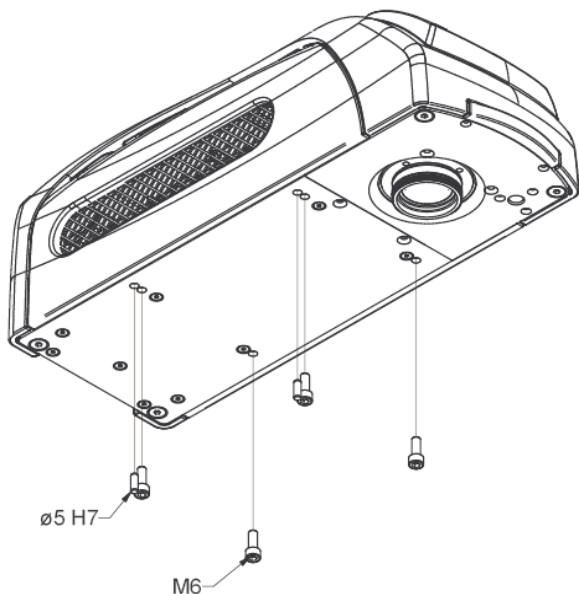
Moisture may condense when you bring the marking system from a cold place into a warm place (or vice versa) or when you use the marking system in a humid place as shown below.

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

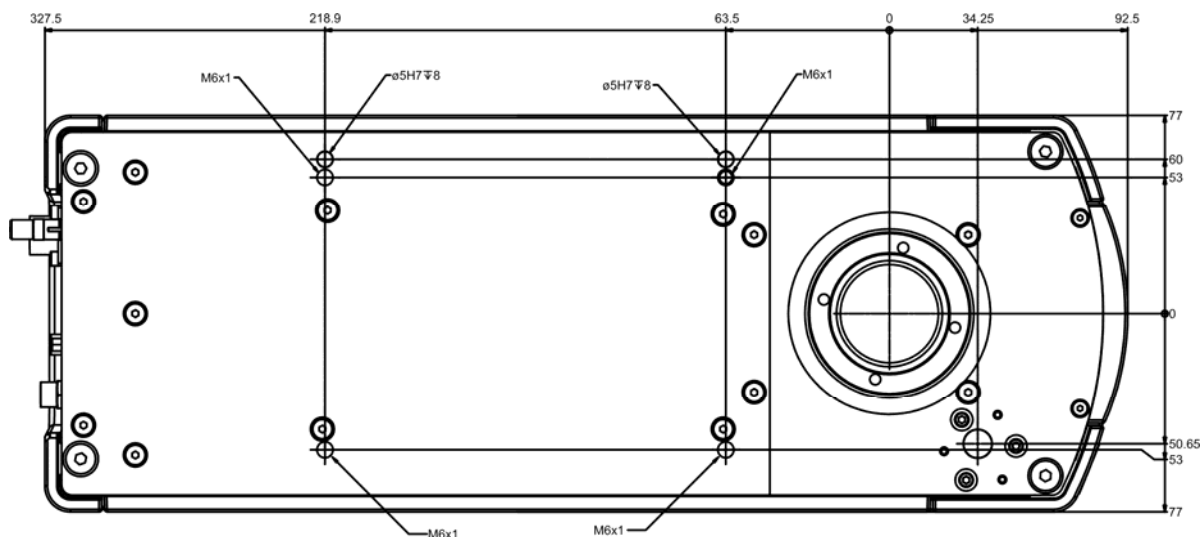
The marking system need to be positioned in safety mode and fixed on an appropriate plan, and absolutely with no vibrations.



Ulyxe™ is equipped with 4 threaded holes and 2 fixing pins.

Screws	M6
Fixing pins	Ø5 H7

Figure 4: Fixing points.



* DIMENSIONS ARE IN MM

Figure 5: Measures, distance threaded holes and fixing pins drivers.



WARNING!

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



NOTE:

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



NOTE:

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

1.7 INSTALLATION ENVIRONMENT

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

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

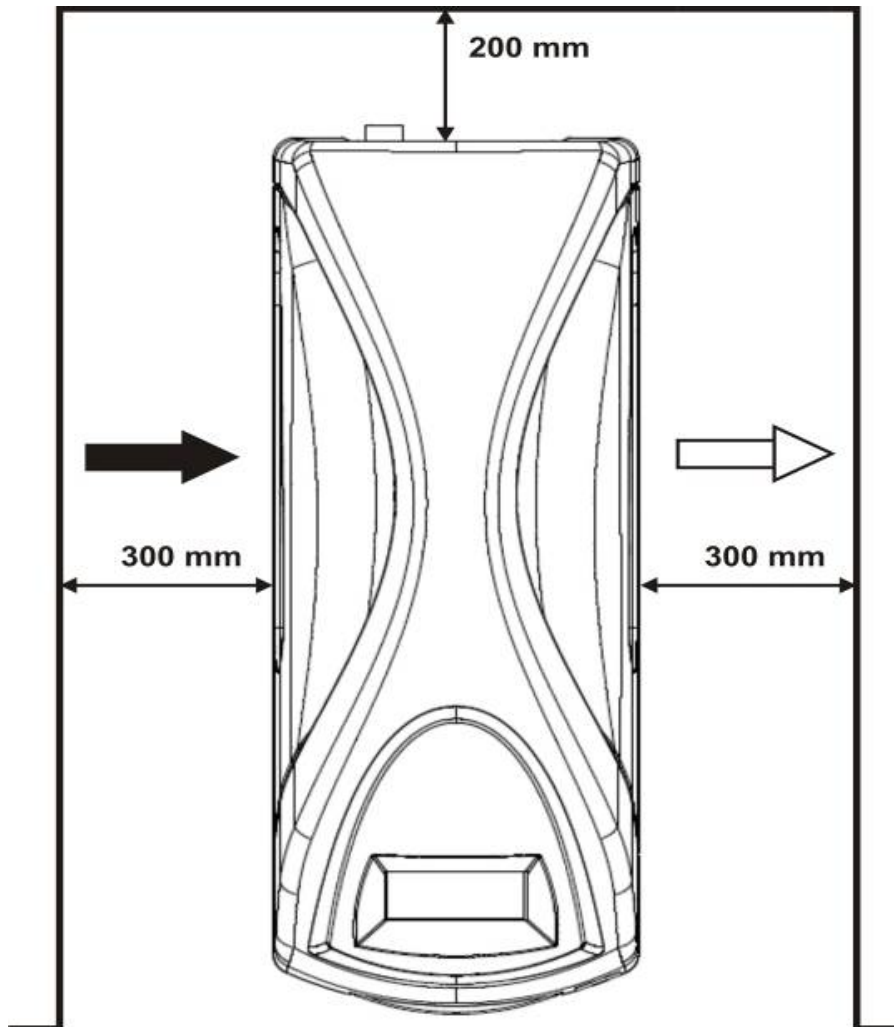


Figure 6: Installation environment.

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 APPENDIXES.



WARNING!

Ulyxe™ 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 SPECIFICATION

MECHANICAL CHARACTERISTICS

Weight	7.8 Kg
Height *	170.5 mm
Width	154 mm
Depth	426 mm
IP Rating	20

* without F-Theta scan lens



NOTE:

Refer to Datalogic's website for detailed drawings.

STORAGE AND TRASPORTATION CONDITIONS

Storage temperature	-5° to 55°C (23° to 131°F)
Shock and vibrations	The components are not designed to withstand shocks and vibrations



WARNING!

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

ENVIRONMENTAL OPERATING CONDITIONS

Environmental temperature	15°C to 35°C (59° to 95°F)
Humidity	< 90% without condensation
Altitude	< 1000 m
Suspended matter	< 3 mg/m ³
Pollution Degree	2
Overvoltage Category	II

ELECTRICAL POWER SUPPLY

Input Voltage	24V DC
Input Current	13 A max
Max Power	300 W

PERFORMANCE

LASER MARKER SOURCE (typical values @ 25°C)		
Laser Type		Class 4 DPSSL (Diode Pumped Solid State Laser)
Average Power @ reference Rep Rate (50kHz) ¹	W	6.5
Pulse energy (max) @ reference Rep Rate (15kHz)	mJ	0.30
Central emission wavelength	nm	1064
Repetition Rate	kHz	15 ÷ 200
Laser aiming beam		Class 2 <1mW @ 630-670nm
Focus aiming beam		Class 2 <1mW @ 630-670nm
Cooling		Forced Air
Noise	dB(A)	< 70 @ 1 meter

OTHER		
Marking Speed	mm/s	Up to 5000 mm/s
Char Marking Speed ²	char/s	Up to 275 char/s @ 2000 mm/s
Software Control		Lighter Suite
Communication		1x USB (type B), RS232, digital I/O

¹ Without F-Theta

² h char=1mm in Roman-S Level100% f=40kHz F-Theta160S on TESA label

2.2 DESCRIPTION OF THE LASER MODULES

A description of the main parts of the marking system is provided here below:

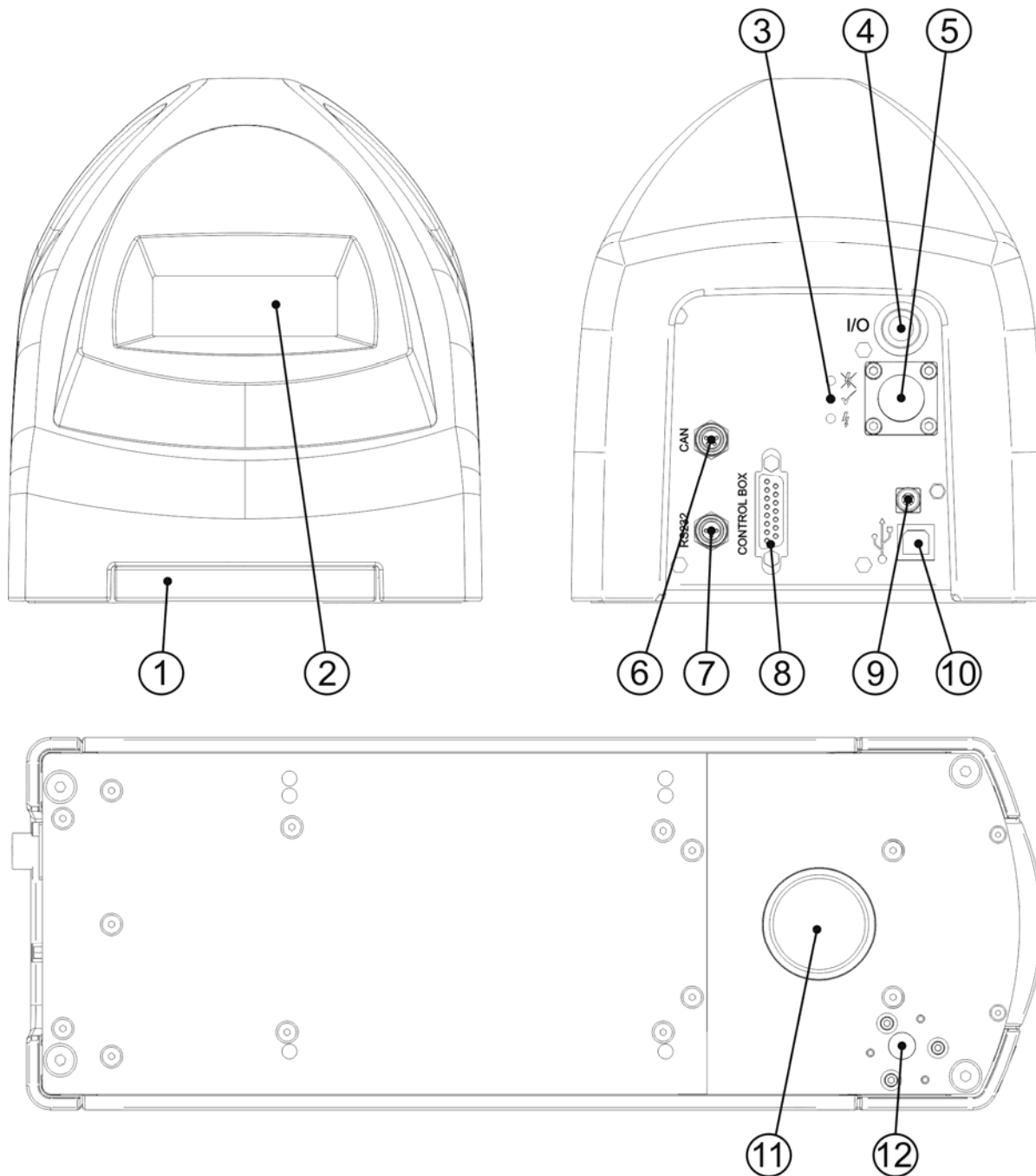


Figure 7: Marking system view.

1) Status LED bar	7) RS232 port
2) Touch Screen LCD display	8) Control Box connector
3) LED indicators	9) Aux interlock connector
4) Main Switch with LED	10) USB port (type B)
5) Power supply connector	11) F-Theta Scan Lens
6) CAN connector	12) Focusing beam

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		<i>f</i> = 100S	<i>f</i> = 160S	<i>f</i> = 254S
Working Distance (WD)	mm	114	178	282
Marking Area (MA)	mm ²	50 x 50	100 x 100	140 x 140



NOTE:

Definition of Marking Area: *square marking field measured on black anodized aluminium plate.*



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

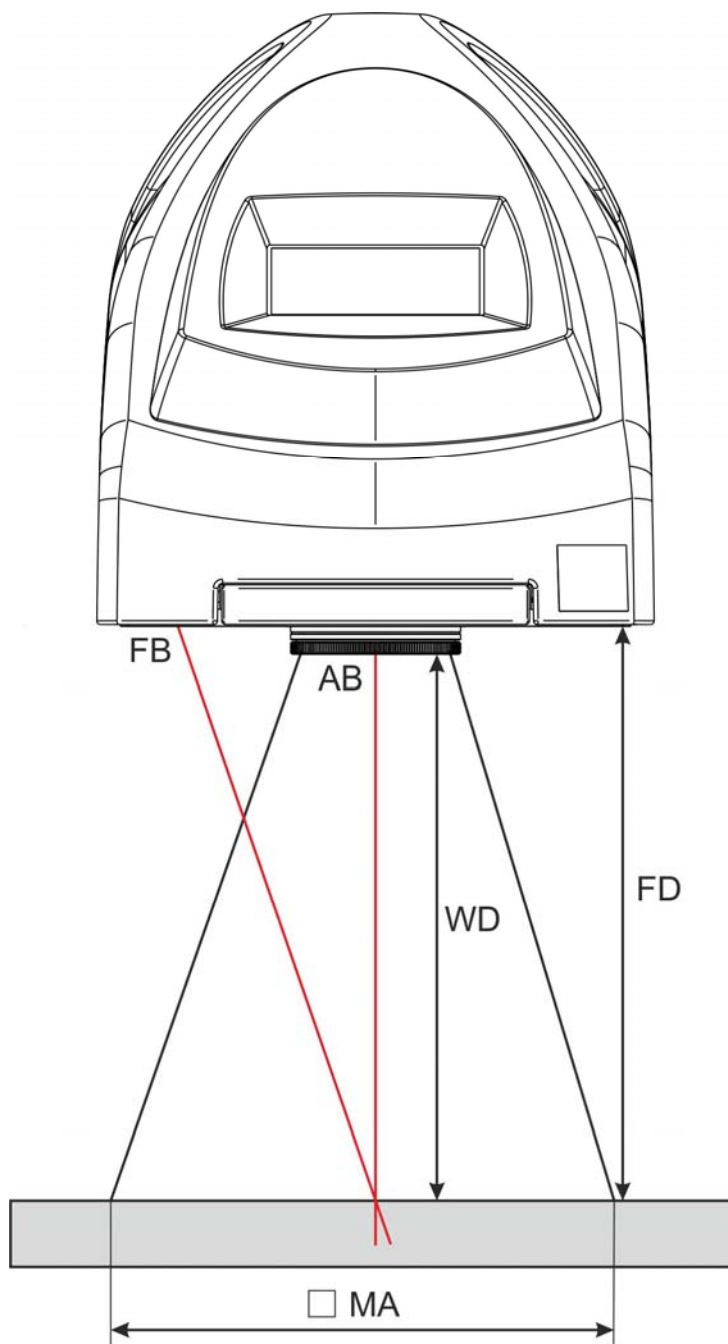


Figure 8: Marking Area.



NOTE:

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

2.4 CONNECTORS SPECIFICATIONS

2.4.1 AUX INTERLOCK CONNECTOR

Aux interlock **disables** the Class 4 laser source inside the marking system.

PANEL CONNECTOR

Type BINDER 719 series panel mount connector, 4 positions.



Figure 9: Female panel socket cod. 09-9766-30-04 (front view).

PIN	SIGNAL	TYPE	DESCRIPTION	FUNCTIONAL DIAGRAM
1	VCC	OUTPUT	5V DC for INTERLOCK signal	
2	INTERLOCK	INPUT	INTERLOCK signal	
3	GND	GROUND	DO NOT CONNECT	
4	N.C.	-	NOT USED	

PLUG CONNECTOR

Connector type BINDER 719 series, 4 positions.

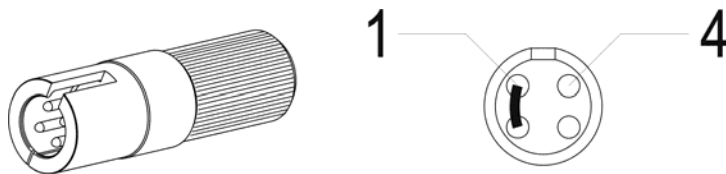


Figure 10: Male plug connector cod. 09-9767-00-04 (front view).



WARNING!

If the Aux 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 CONTROL BOX CONNECTOR (LASER CONTROL)

Panel socket Sub-D, 15 positions, female.

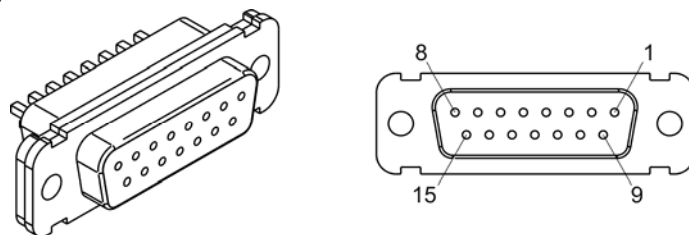


Figure 11: Female panel socket Sub-D15 (front view).

PIN	SIGNAL	TYPE (***)	DESCRIPTION
1, 2	5VDC	Output power supply	Auxiliary 5V DC power supply available for drive input logical HIGH (max 200mA)
3	SHUTTER EN	Digital Input	External “ <i>Shutter Enable</i> ” signal (see paragraph 2.4.2.1): - HIGH level: Shutter opened - LOW level or disconnected: Shutter closed
4	START (*)	Digital Input	This signal is used to start to the marking process when a document or a sequence is running in AUTO MODE (**) or WORK MODE (**) (see paragraph 2.4.2.2): - HIGH level pulsed signal start the marking process
5	STOP (*)	Digital Input	This signal is used to stop the marking process (see paragraph 2.4.2.2): - HIGH level pulsed signal stop the marking process
6	READY (*)	Digital Output	This signal is used to know if a document, sequence or script is loaded and ready to be executed: - ON when a document or a sequence is running in AUTO MODE (**) or WORK MODE (**) (SW_READY COMPATIBILITY (**) = true) - ON when a document or a sequence is running in AUTO MODE (**) and laser in READY state (SW_READY COMPATIBILITY (**) = false) - ON when a script is running n AUTO MODE (**) and “IoPort.setReady (true)” function is used
7	BUSY (*)	Digital Output	This signal is used to know if the current spooler is executing (marking in progress) (see paragraph 2.4.2.2): - ON during marking process
8	END (*)	Digital Output	This signal is used to know if the marking process is finished (see paragraph 2.4.2.2): - ON at the end of marking process
9	RESERVED	CAN_PWR	DO NOT CONNECT
10	KEY	Digital input	External <i>KEY</i> signal (see paragraph 2.4.2.1): - HIGH level: system enabled; - LOW level or disconnected: system disabled
11	RESERVED	CAN_H	DO NOT CONNECT
12	SHUTTER OPEN/ALARM	Digital Output	This signal is used to know if the system is ready to emit laser radiation (see paragraph 2.4.2.1): - ON when the system is in <i>READY</i> state
13	RESERVED	CAN_L	DO NOT CONNECT
14	RESERVED	CAN_GND	DO NOT CONNECT
15	GROUND	Ground	Ground

(*) refers to Lighter user’s manual “Setting I/O parameters” paragraph to set the signal properties

(**) refers to Lighter user’s manual

(***) refers to paragraph 2.5



NOTE:

Connection example in paragraph 2.6.

2.4.2.1 LASER CONTROL SIGNALS TIMING

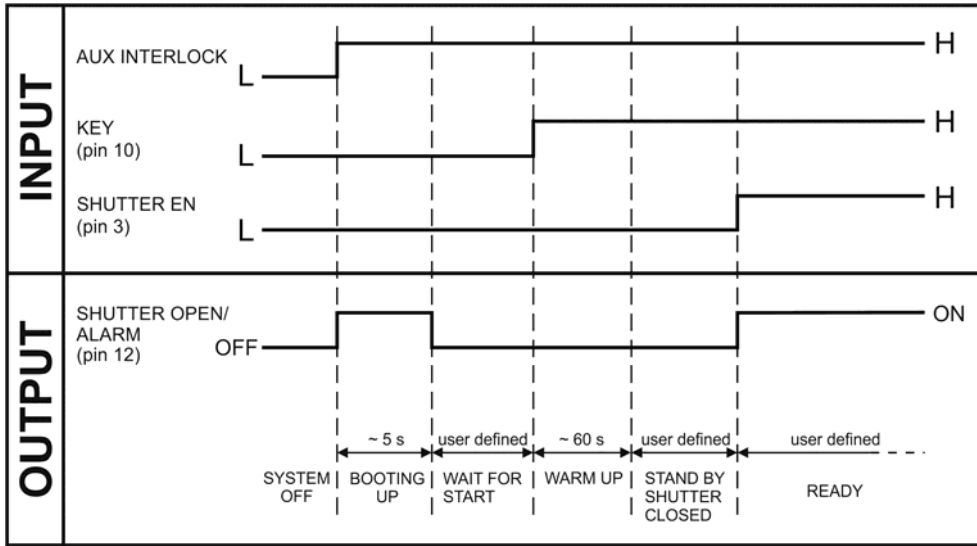


Figure 12: Timing control signals

2.4.2.2 MARKING PROCESS SIGNALS TIMING

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

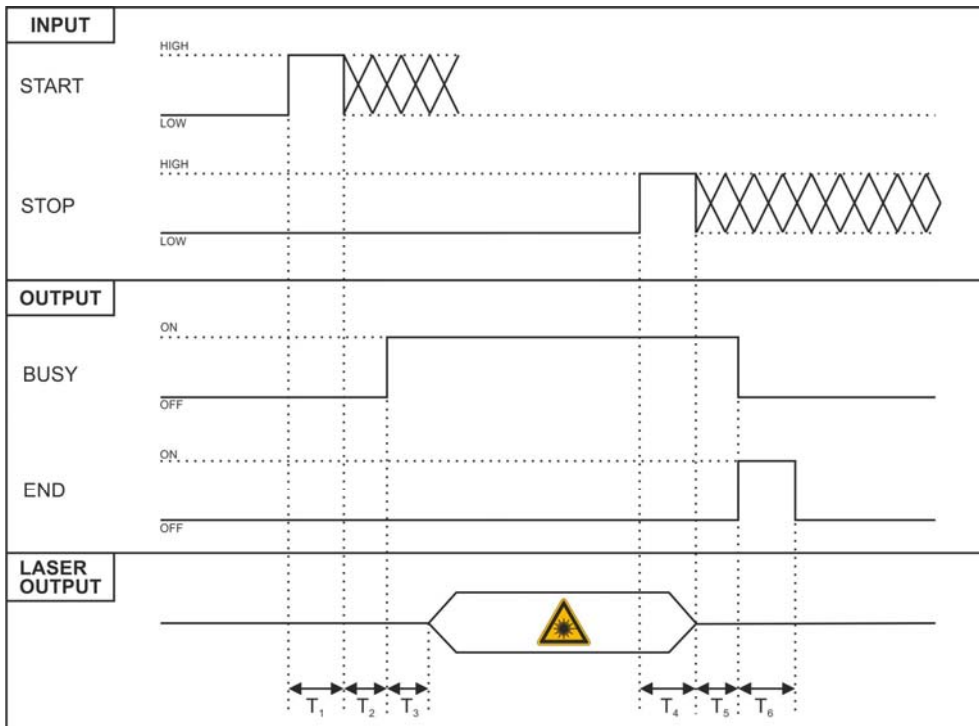


Figure 13: Timing signals.

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

- T_1 Start Time For setting the minimum acceptable time for the start marking signal
- T_2 Start Delay For delaying marking *START*
- T_3 Busy Advance *BUSY* signal corresponding to mark progress
- T_4 Stop Time The minimum time for *STOP* signal to stop the marking process
- T_5 Busy Delay For delaying the Laser *END* signal with respect to laser emission
- T_6 End Time For setting the Laser *END* activation time

2.4.3 POWER SUPPLY CONNECTOR

Panel socket SOURIAU TRIM TRIO 4 positions.

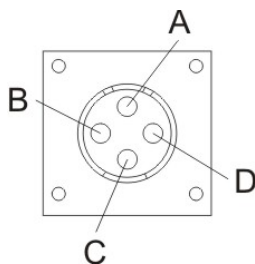


Figure 14: Female panel socket cod. UT0010-4SH (front view).

PIN	SIGNAL	TYPE	DESCRIPTION
A	+24V	Power supply input	Power supply input +24V DC (13A MAX)
B	0V	Power supply input reference	Power supply input reference
C	FG	Earth	Earth connection
D	N.C.	-	NOT USED

2.4.4 POWER SUPPLY CABLE

Male plug connector SOURIAU TRIM TRIO 4 positions, 3 meter length.



Figure 15: Male plug connector cod. UT0610-4PH (front view) and wiring.

2.4.5 RS232 CONNECTOR

Connector type BINDER 768 series, 3 positions.

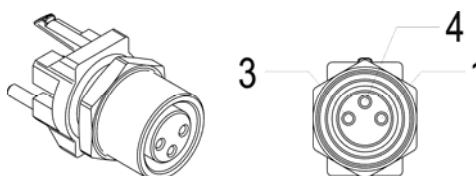
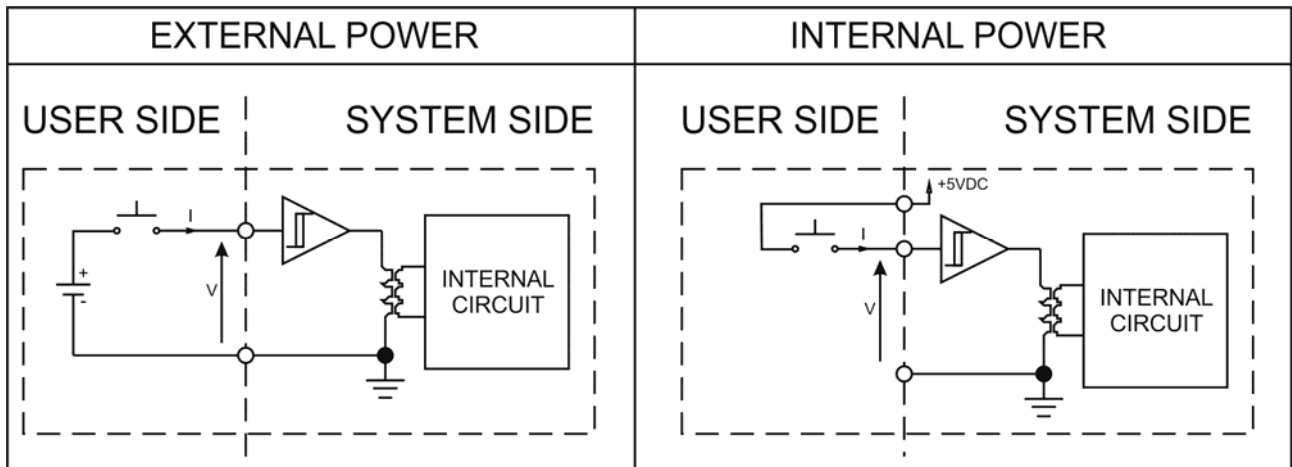


Figure 16: Female panel socket cod. 99-3412-281-03 (front view).

PIN	SIGNAL	TYPE	DESCRIPTION
1	TXD	Output	Transmit Data
4	RXD	Input	Receive Data
3	GND	Ground	Ground reference

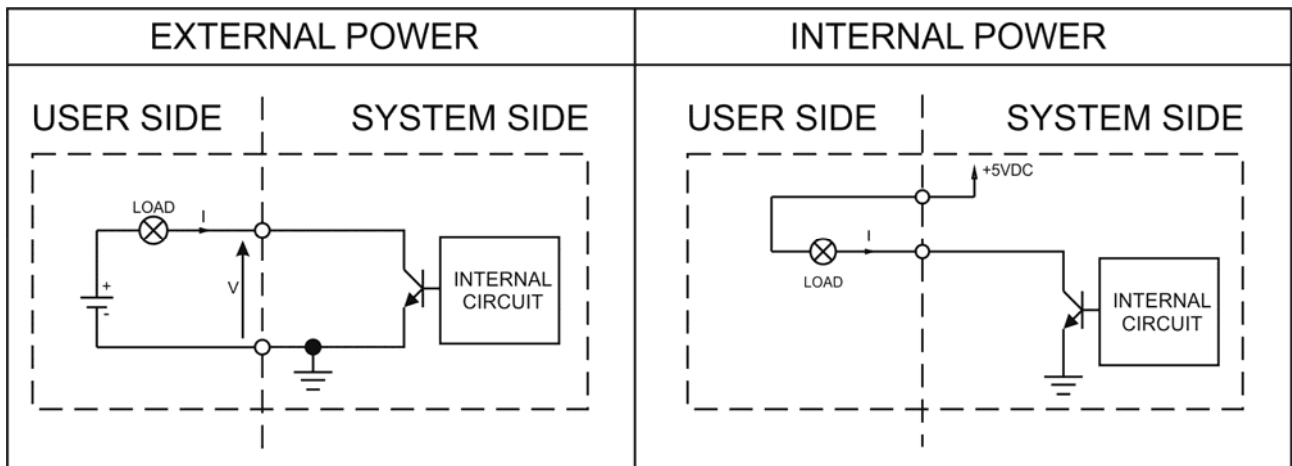
2.5 INPUT/OUTPUT SIGNAL SPECIFICATIONS

DIGITAL INPUT:



Type	Digital Isolator		
V_{max}	7.0 V DC		
I_{max}	1 mA @ 5 V DC		
Pulse Width	≥ 1 ms (debounce)		
	MIN	TYP	MAX
INPUT Logic LOW	0.0 V DC	0.0 V DC	1.0 V DC
INPUT Logic HIGH	3.5 V DC	5.0 V DC	7.0 V DC

DIGITAL OUTPUT:



Type	Darlington open collector low-side		
V_{max}	50 V DC		
I_{max}	150 mA		
$V_{saturation}$	< 0.5 V DC		
Leakage current	< 5 μ A		
OUTPUT State ON	$V \leq 0.3$ V DC; $I \leq 150$ mA		
OUTPUT State OFF	$V \leq 5.0$ V DC; $I \leq 5$ μ A		

2.6 CONNECTION EXAMPLE

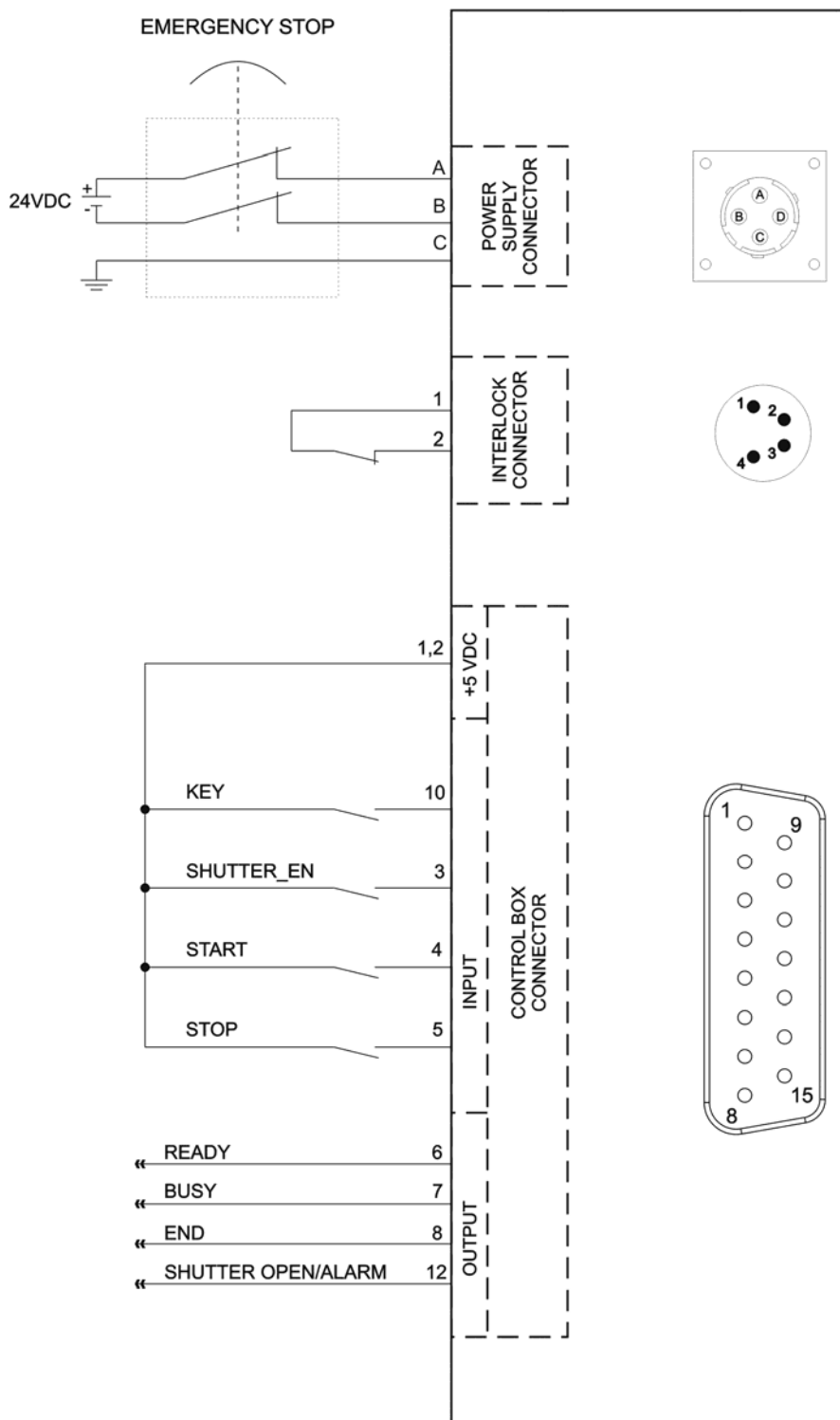


Figure 17: Connection example.



WARNING!

It is important to install an **emergency circuit** able to cut 24V DC power supply voltage (or indirectly on 110/220V AC) switching off **Ulyxe™** entirely. This safety circuit needs to be installed from qualified personnel only.

EXAMPLE OF CONNECTION TO PLC

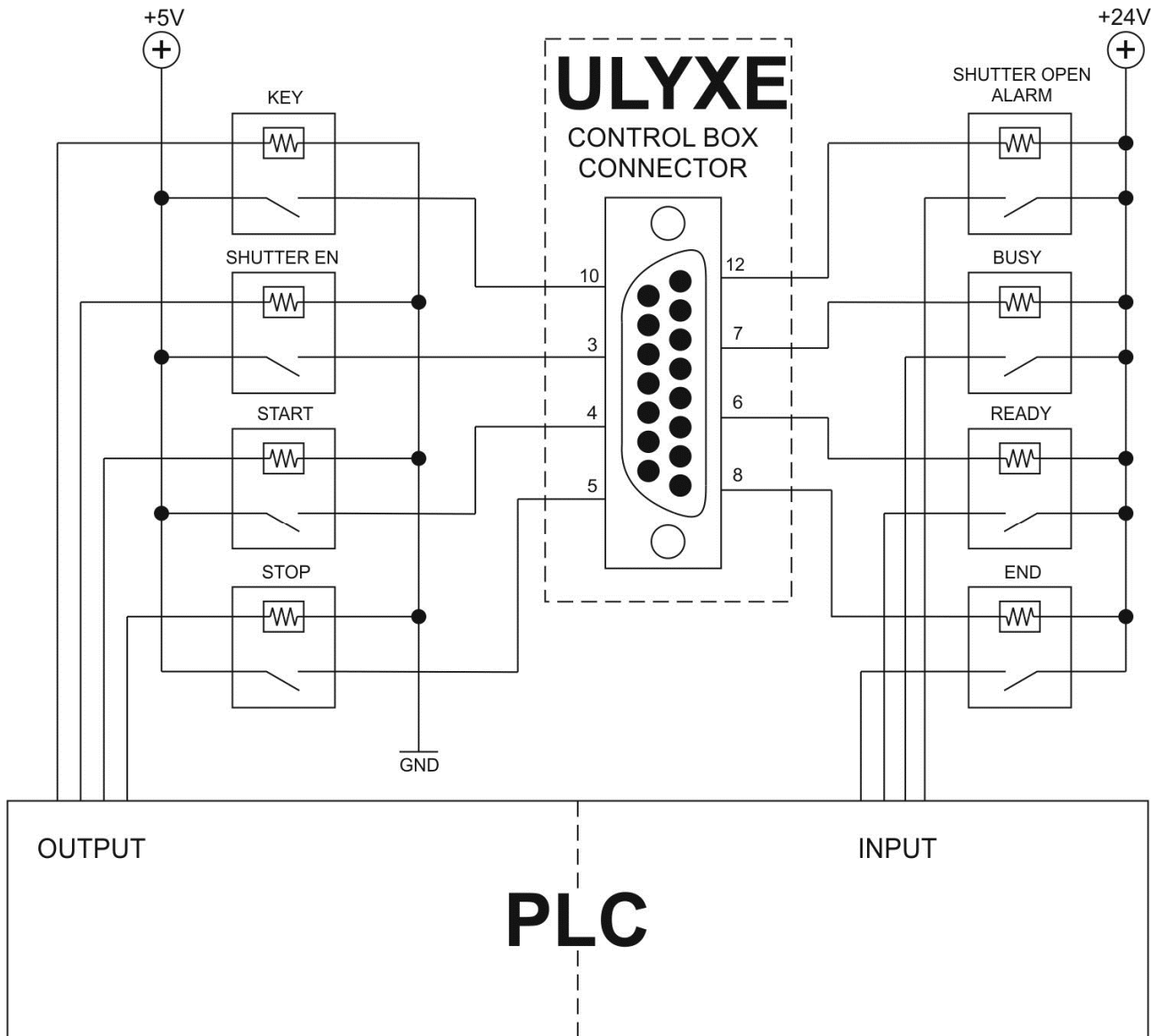


Figure 18: Example of connection to PLC.

3. INSTALLATION AND SET UP

3.1 LIGHTER SUITE INSTALLATION

Lighter Suite software need to be installed on a PC or a laptop that will be used with Ulyxe™ by an USB 2.0 connection. To be able to install and operate with Lighter Suite on PC following minimal requirements are needed:

Processor	32 bit (x86) processor or 64 bit (x64) at 1GHz or highest
Operative System	Windows® XP SP3 Professional; Windows® Vista Business, Enterprise or Ultimate; Windows® 7 Professional or Enterprise, Windows® 8 Pro or Enterprise, Windows® 10 Pro or Enterprise
RAM Memory	1 Gb (32 bit) or 2 Gb (64 bit)
Hard Disk	1 Gb of free space on hard disk (32 bit) or 2 GB (64 bit)
Graphic card	Minimal resolution 800 x 600 (1280 x 1024 recommended)
USB	USB 2.0
Furthers	RS232 serial port



WARNING!

Connect **Ulyxe™** to PC through USB cable only **after** Lighter Suite software installation. **DO NOT CONNECT** USB cable until it is not required from installer.



NOTE:

Ulyxe™ works only and exclusively with USB 2.0 Full Speed device connections. For any further information consult USB 2.0 ADVICE chapter.

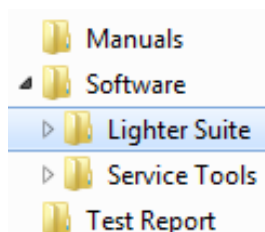


NOTE:

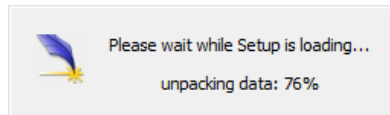
Administrator rights are required for Microsoft® Windows® 7/8/10.

Lighter Suite installer executable file is located on USB key supplied with the marking system. Proceed following below instructions:

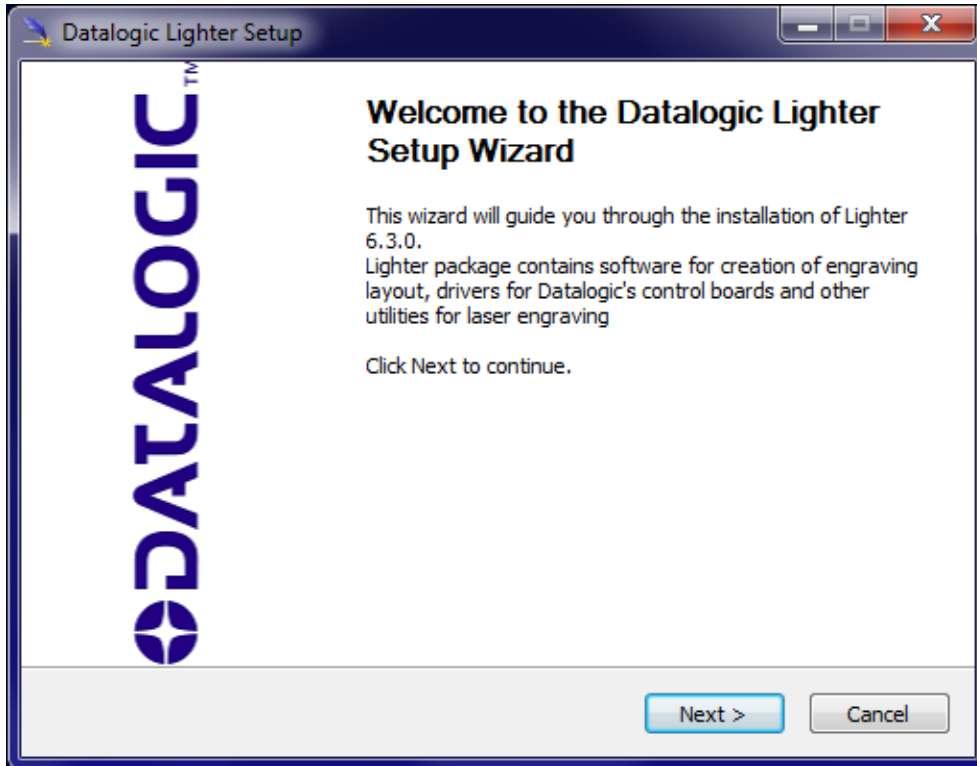
- 1) Insert USB key on the PC that will be used to drive the Ulyxe™;
- 2) Run **Lighter Suite** executable installer located on the USB pen drive:



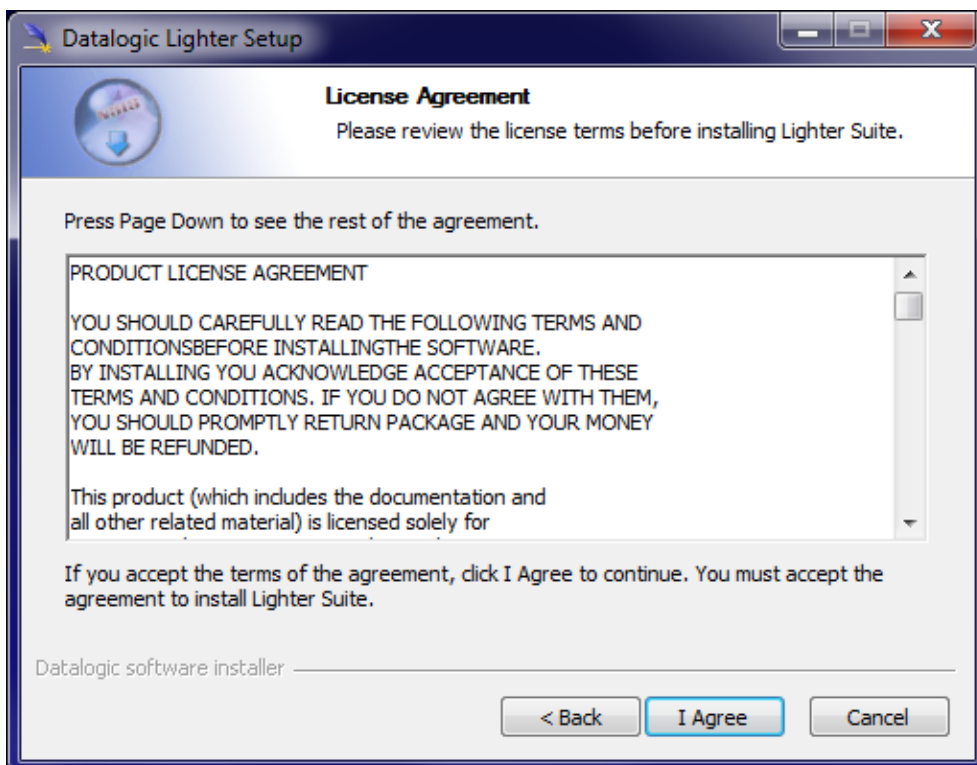
3) Wait while Setup is loading:



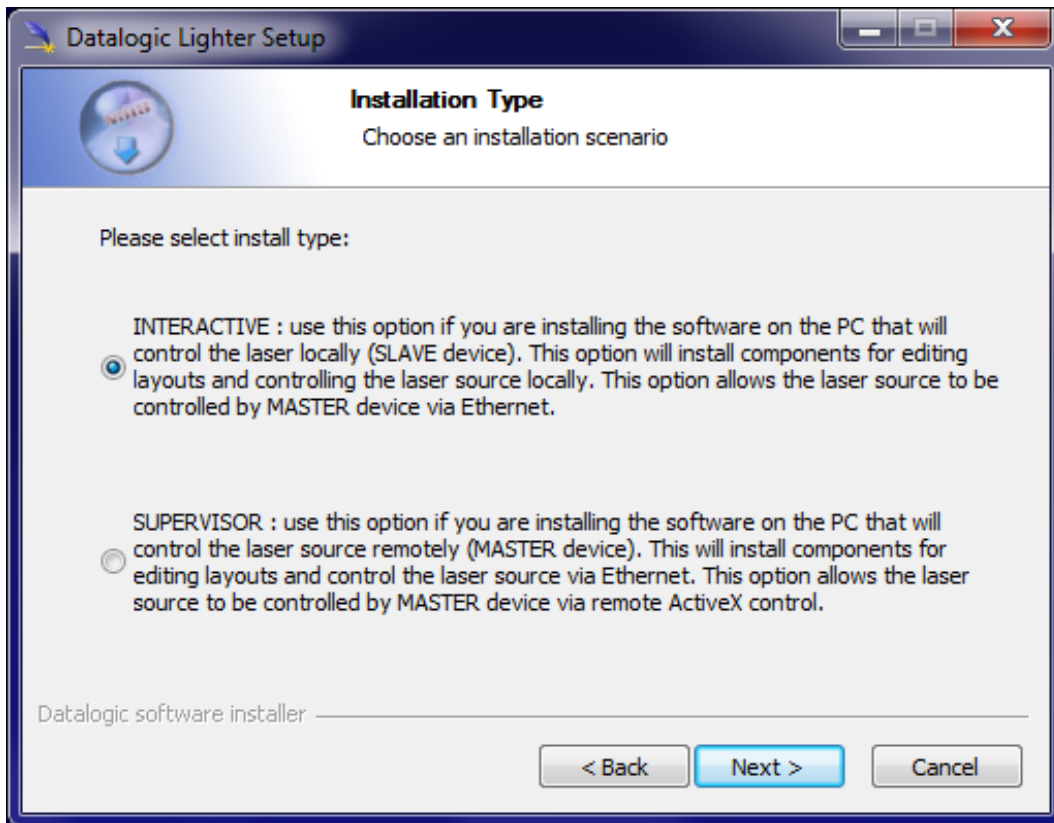
4) Press **Next** to continue:



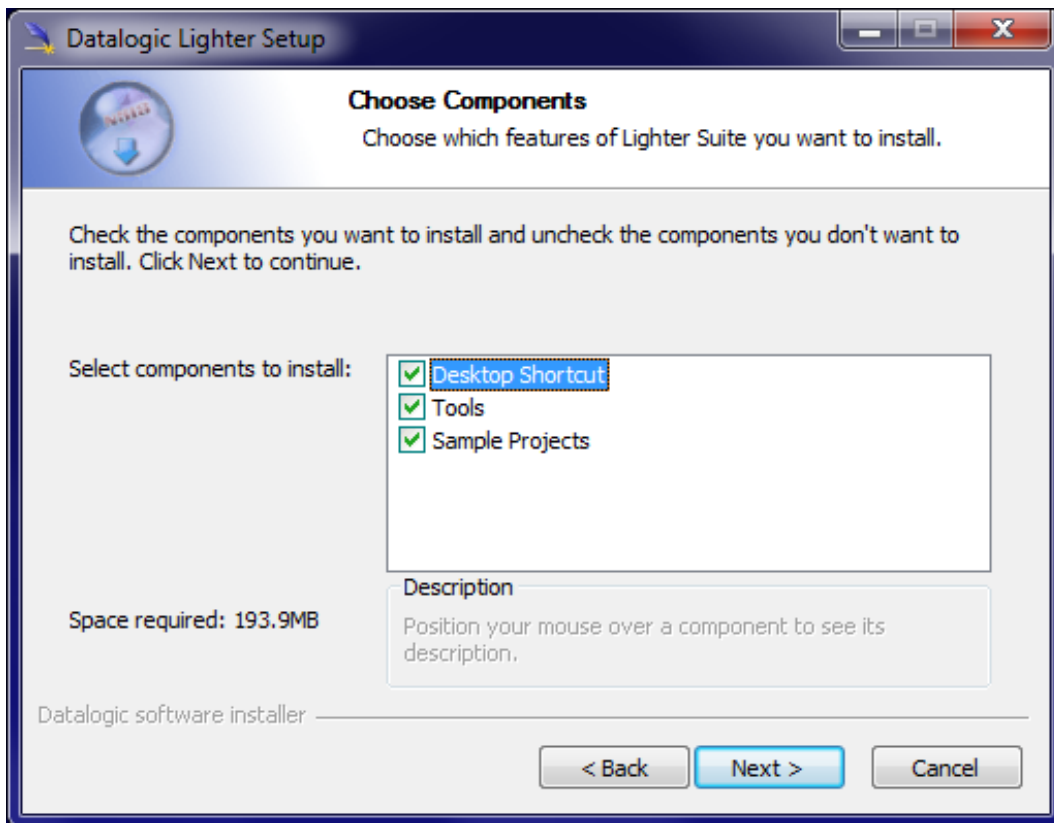
5) Press **I Agree** to accept licence agreement:



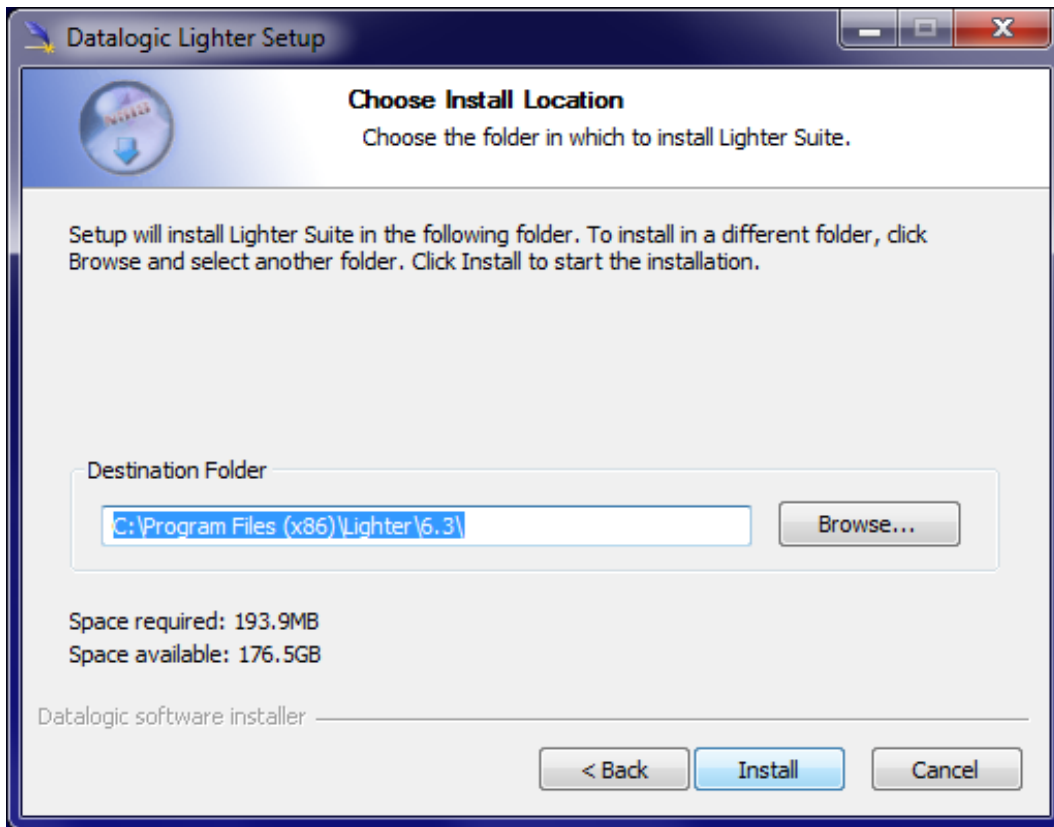
6) Select “**INTERACTIVE**” installation type press **Next** to continue:



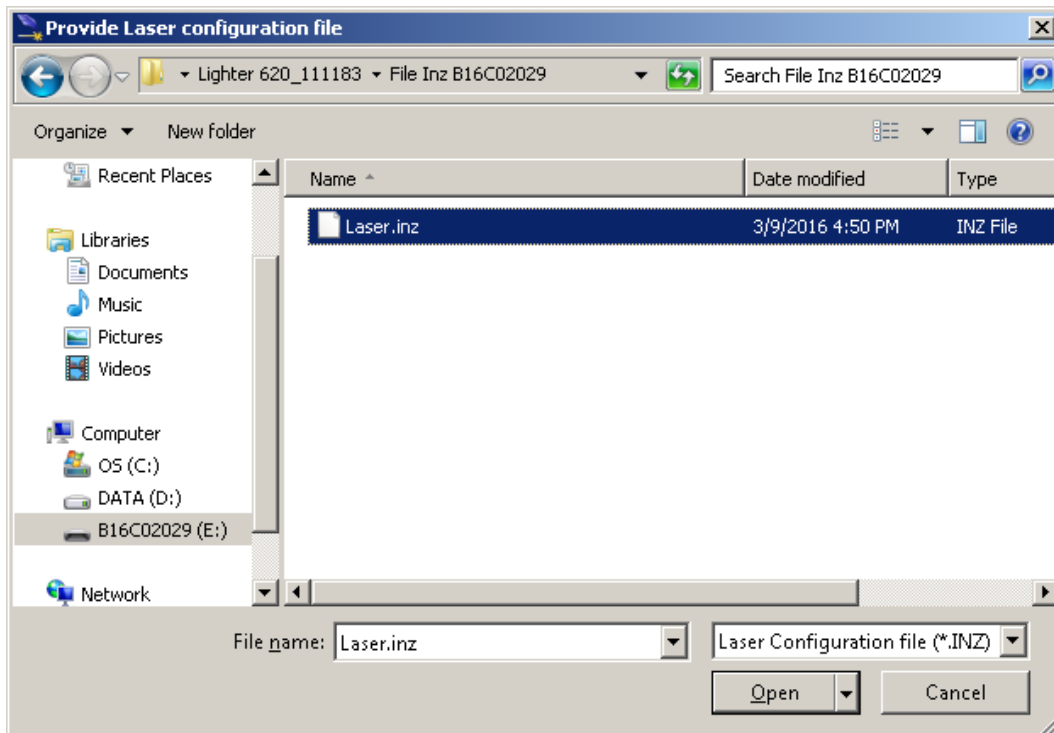
7) Select the components to install and press **Next** to continue:



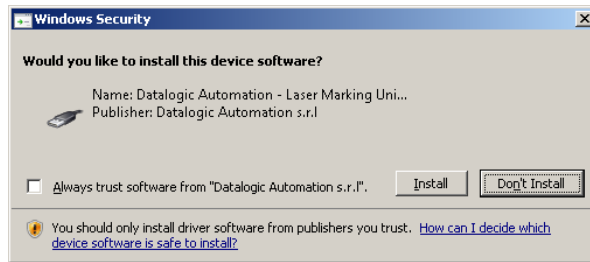
8) Choose the destination folder and press **Install** to continue:



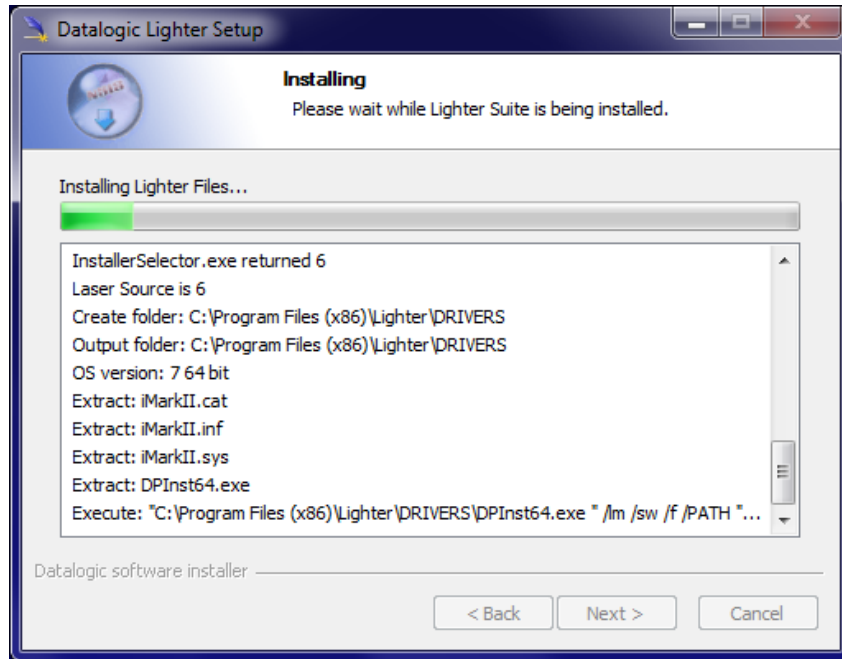
9) Provide laser configuration file located on USB pen drive supplied with equipment and press **Open** to continue:



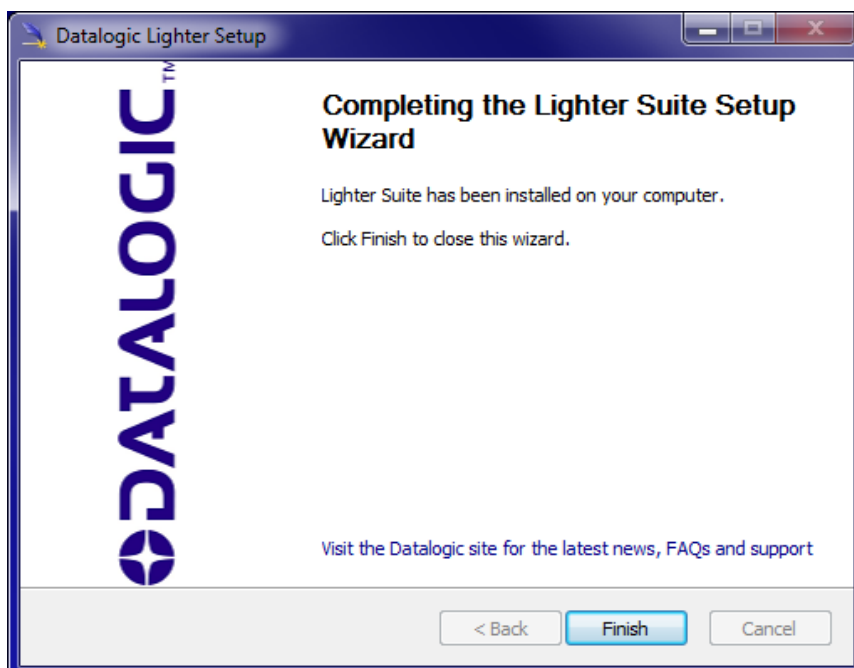
10) Microsoft® Windows® will ask you to install the device driver; press **Install** to continue:



11) Wait while Lighter Suite is installing:



12) Press **Finish** to complete the installation:



3.2 CONNECTIONS

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



WARNING!

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



WARNING!

Connect **Ulyxe™** to PC through USB cable only **after** Lighter Suite software installation.

3.2.1 CONTROL BOX CONNECTOR CONNECTION

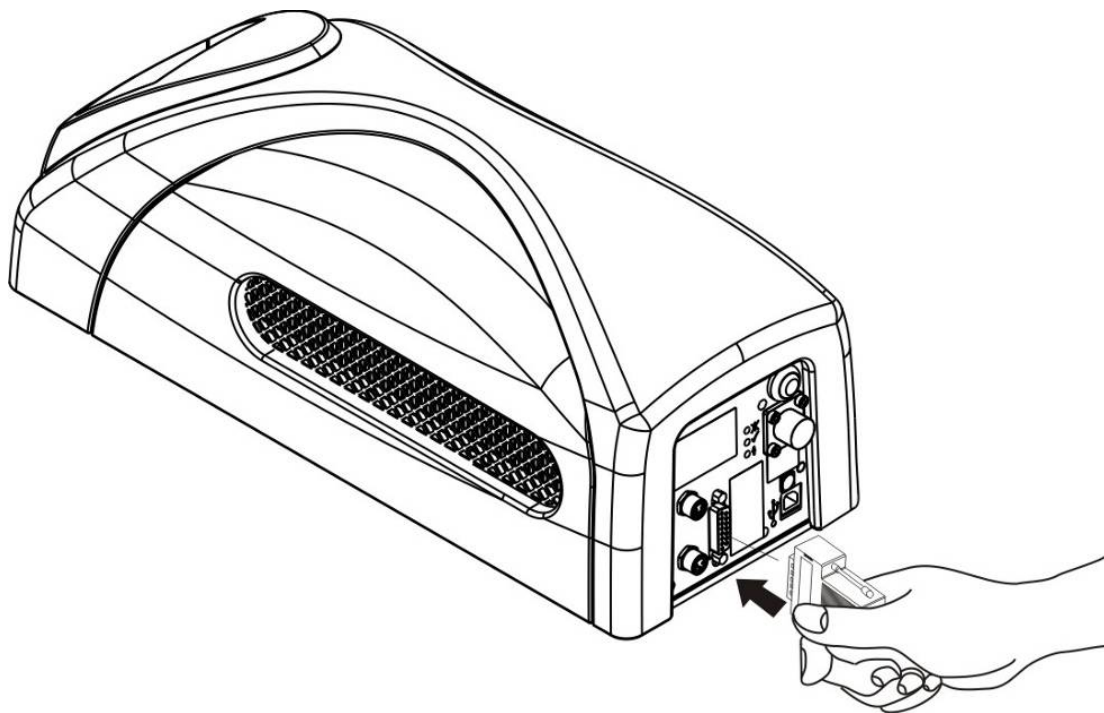


Figure 19: Connecting Control Box connector.



NOTE:

The Control Box connector must always be inserted and wired properly in order to use the marking system. If this connection is not present the marking system goes in error status. In option it is possible to use Control Box accessory (see chapter 5.1 – Accessories)



NOTE:

Refer to paragraph 2.6 for a connection example of the Control Box Connector.

3.2.2 AUX INTERLOCK CONNECTION

Plug Aux interlock connector to marking system.

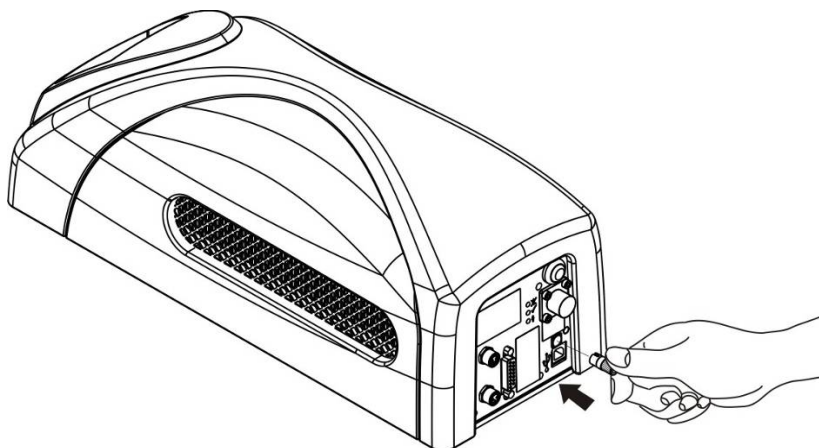


Figure 20: Connecting Aux interlock connector.



WARNING!

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



NOTE:

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

3.2.3 POWER SUPPLY CABLE CONNECTION

Connect power supply cable to Ulyxe™. Check connector right orientation and plug in. Once plugged in check also right coupling between two connectors parts.

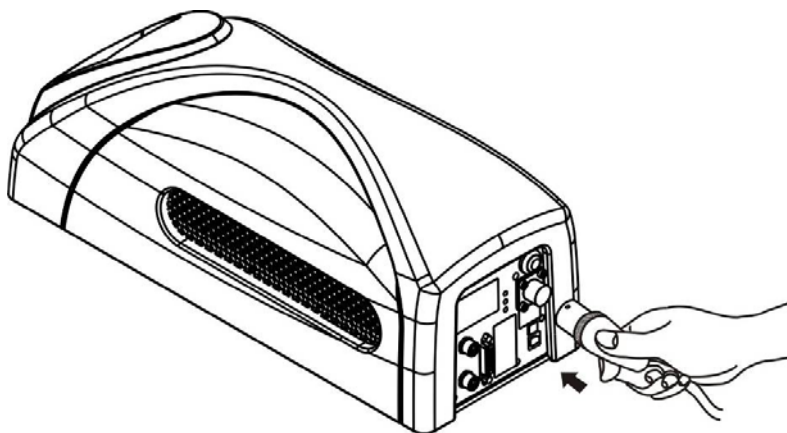


Figure 21: Power Supply cable plug in.



WARNING!

Ulyxe™ needs a **safety circuit** for emergency. Consult chapter 2.6 for more details.



WARNING!

Ulyxe™ needs a 24V DC stabilized supply voltage 13A max current absorption. It is suggested to use **BOXED POWER SUPPLY KIT** option. See chapter 5 for further information.

3.2.4 USB CABLE CONNECTION



WARNING!

Connect **Ulyxe™** to PC through USB cable only **after** Lighter Suite software installation.

Plug USB cable first on Ulyxe™ marking system side

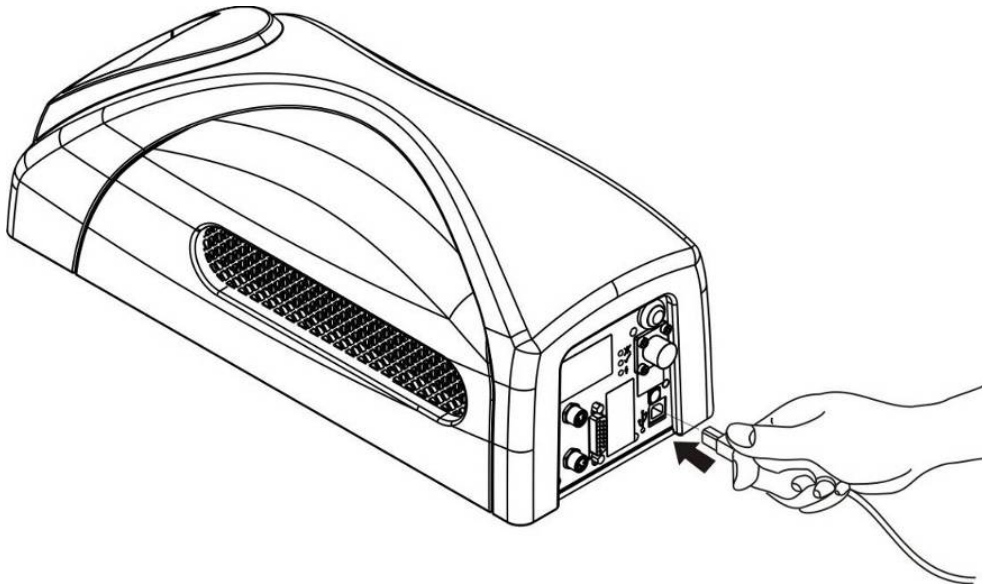


Figure 22: Plug USB cable Ulyxe™ side.

Plug USB cable to PC side

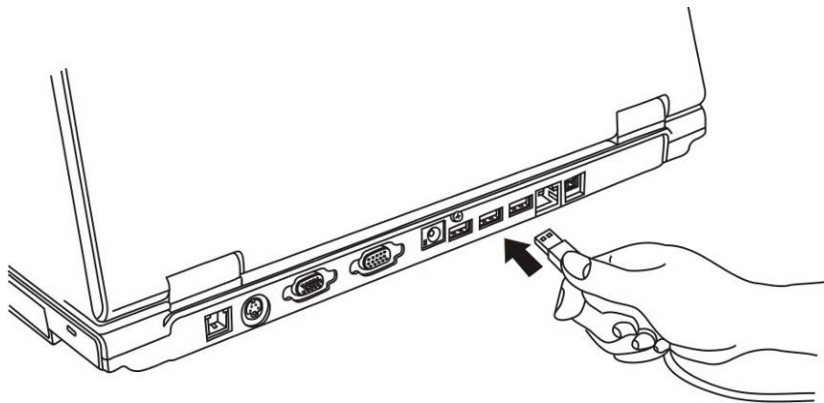
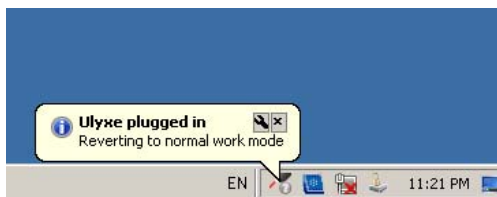


Figure 23: Plug USB PC side.

Wait while Microsoft® Windows® is installing marking system drivers

A message in the Laser Engine tray icon will advise you that **Ulyxe™ is plugged in**



3.2.5 F-THETA LENS PROTECTION CAP REMOVAL

Remove the F-Theta Lens protection cap before marking operation.

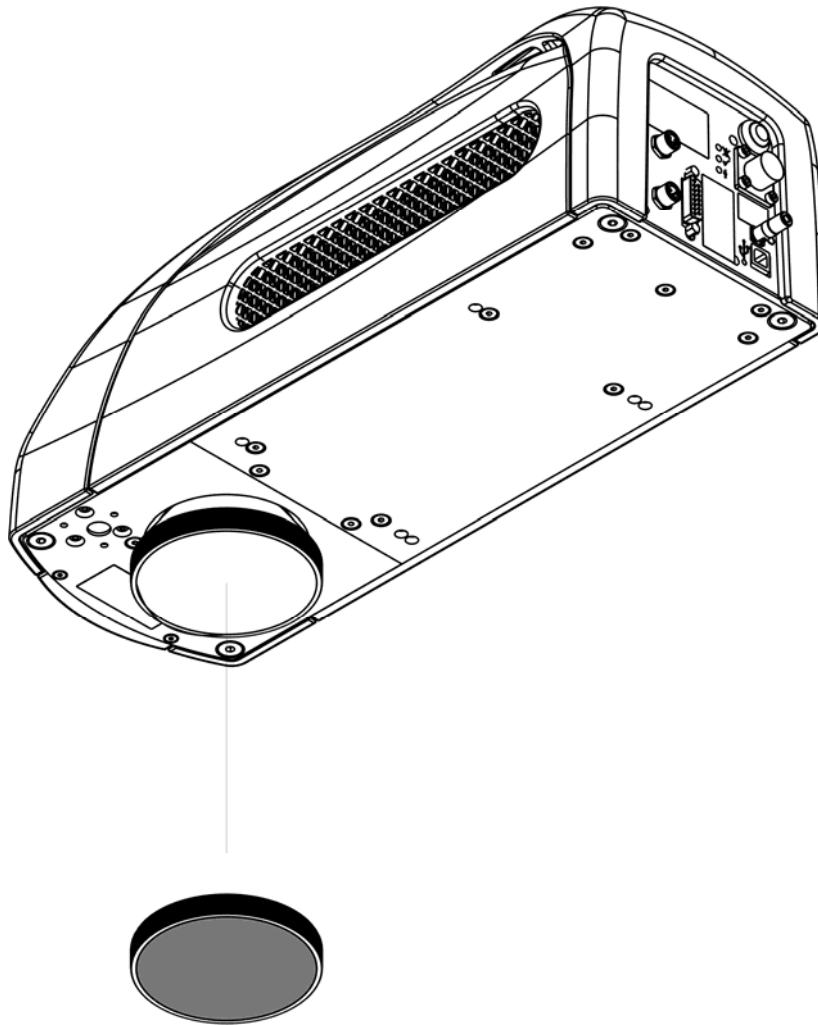


Figure 24: F-Theta Lens protection cap removal.



WARNING!

Marking with the lens protection cap could result in damage to the lens.

4. USE AND OPERATIONS

4.1 TURNING ON SEQUENCE

Before turning on the marking system, be sure that the system is connected as previously described. Check presence of voltage power supply connection, Aux interlock connector, Control Box connector and USB cable. Proceed as follow:

SIGNAL	STATUS
KEY	OFF
SHUTTER EN	OFF

1ST: turn on the main switch in the back of the marking system:

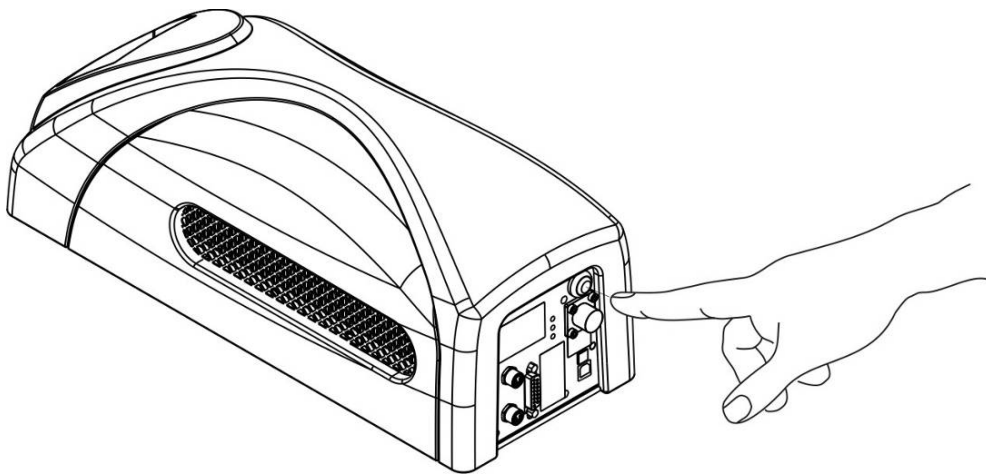


Figure 25: Power on.

If power supply input is correct green LED indicator on back panel will light on otherwise if there is a reversed voltage input red LED indicator on back panel will light on. Refer to troubleshooting paragraph in case of error:

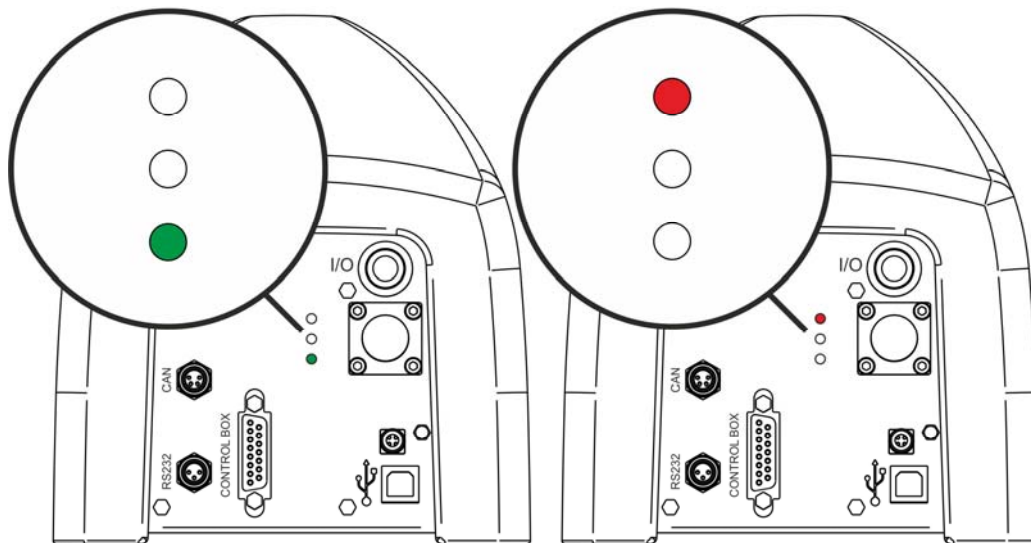


Figure 26: Green and red LED on back panel.

The fans cooling system will be powered on and it will be showed LCD firmware version on display temporarily, then LED bar will be lighted on in orange colour until system power on time will be not completed:



Figure 27: Starting system.

Immediately after LED bar is lighted off Ulyxe™ remains in waiting for *KEY* start mode and power module is off:



Figure 28: Waiting for *KEY* start.

2ND step: activate “*KEY*” signal to start Ulyxe™ and wait for system warm up. During this operation LED bar will come green blinking.

SIGNAL	STATUS
KEY	ON
SHUTTER EN	OFF

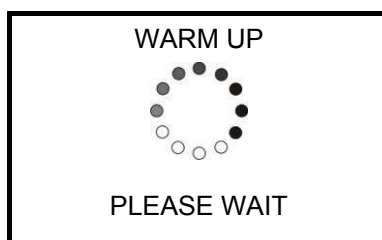


Figure 29: Waiting for warm up.

Once warm up is completed the LED bar comes steady green and the marking system is ready to use:



Figure 30: System waiting *ENABLE* command.

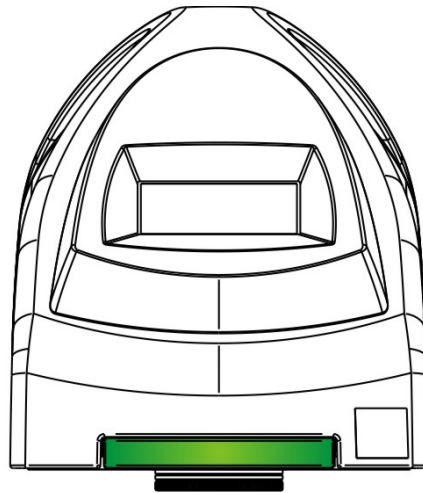


Figure 31: LED bar green: stand-by system status.



NOTE:

If aiming and focusing beam laser diodes setup are in automatic mode they'll be light on.



NOTE:

Ulyxe™ is ready for operation. See chapter 4.2 for Touch Screen display functions.



NOTE:

For information about use of **Lighter** software, see related manual.

3RD step: activate “SHUTTER EN” signal to open mechanical Shutter. LED bar comes steady orange. “ALARM” signal will be active and yellow LED indicator on back panel will light on.

SIGNAL	STATUS
KEY	ON
SHUTTER EN	ON

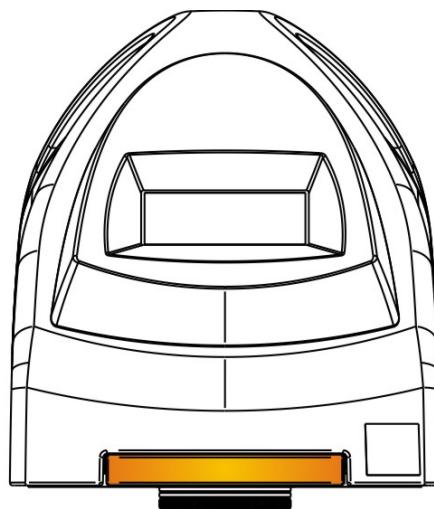


Figure 32: LED bar orange: system ready for marking.

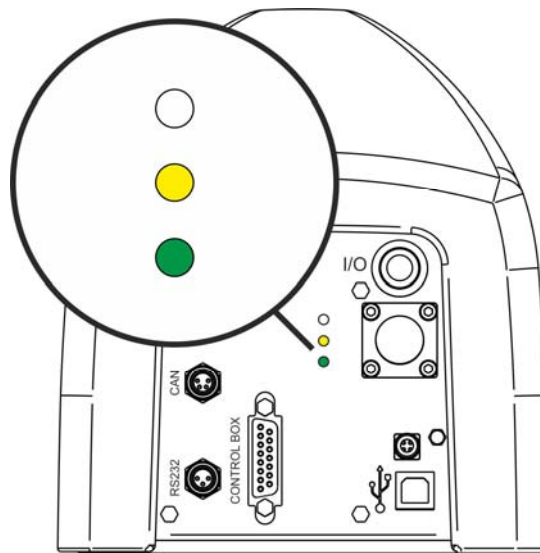


Figure 33: Yellow LED indicator on back panel.



WARNING!

The marking system is **READY** to mark!



NOTE:

If aiming and focusing beam laser diodes setup are in automatic mode they'll be light off.

If marking operation starts LED bar comes steady red and on display will be showed laser emission status:

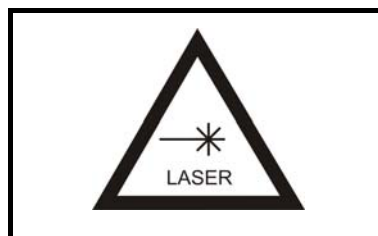


Figure 34: Laser emission.

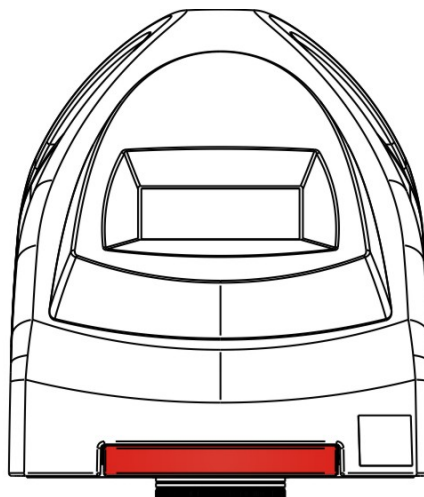


Figure 35: Red LED bar: laser emission.

4.2 DISPLAY

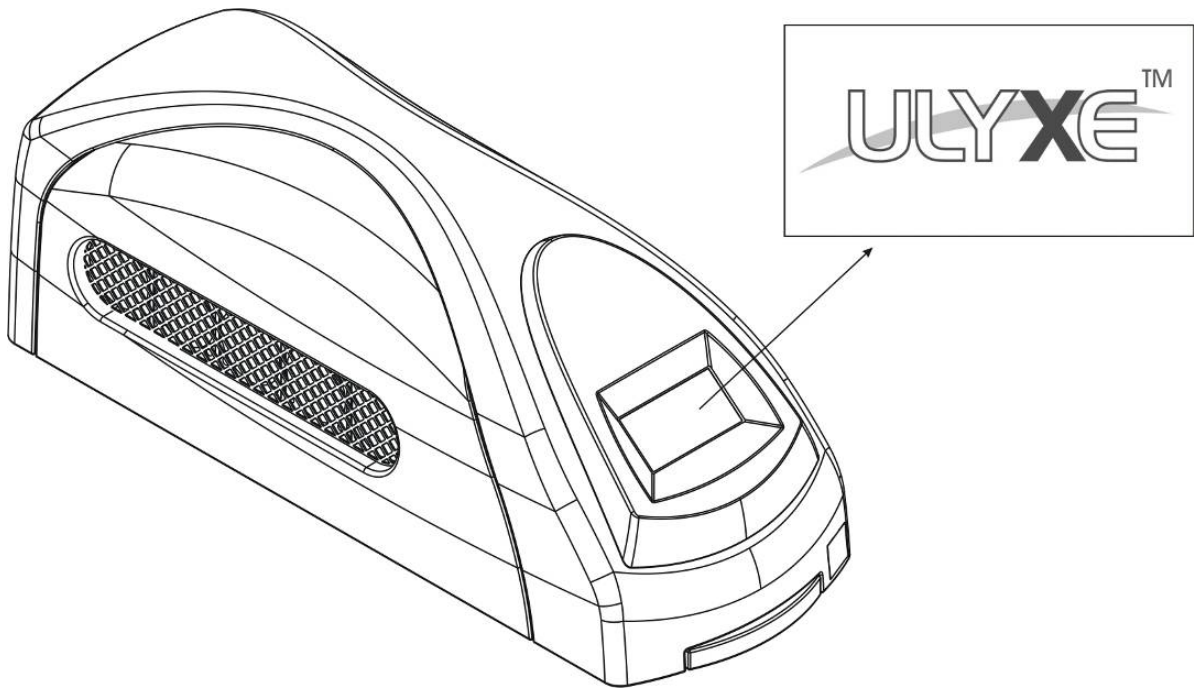


Figure 36: Display Ulyxe™.

Selection areas Touch Screen:

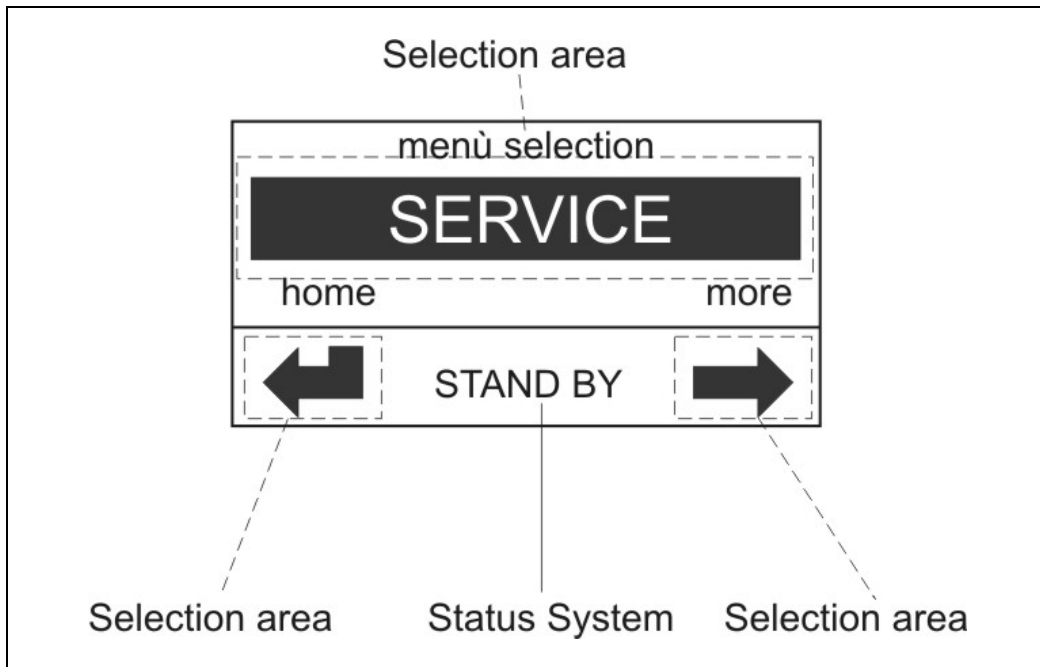


Figure 37: Selection areas Touch Screen.

From display main window where it shows "SYSTEM READY" it is possible to access to a menu list with more options to select and view as showed in figure.

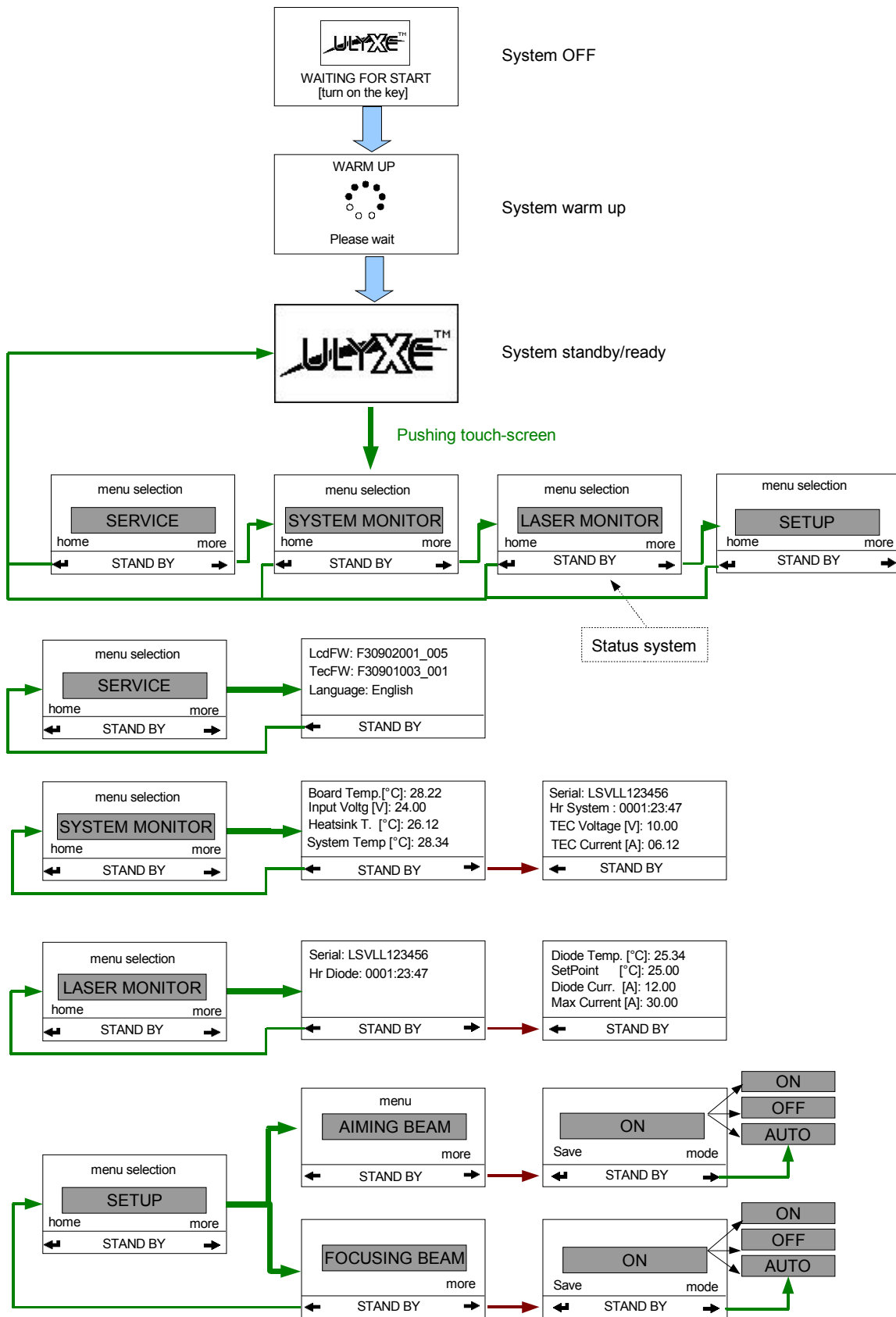
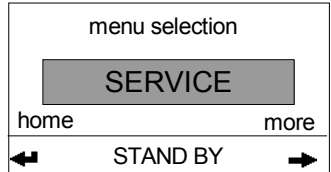
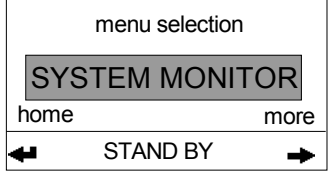
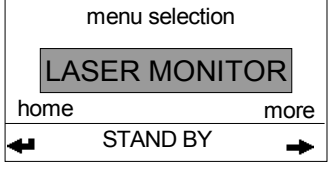
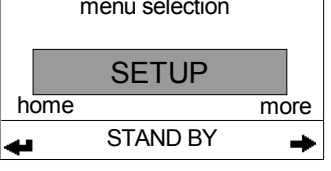
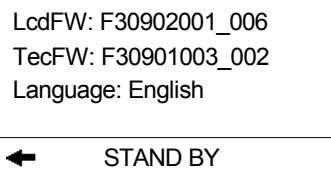
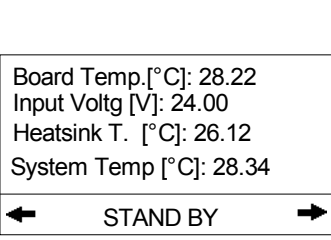
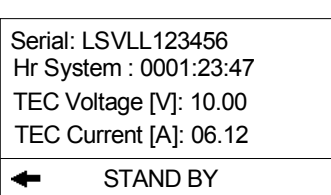
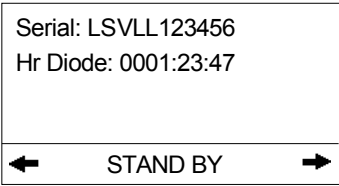
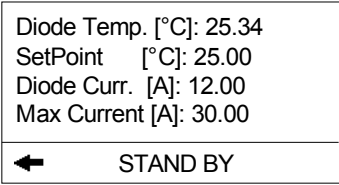
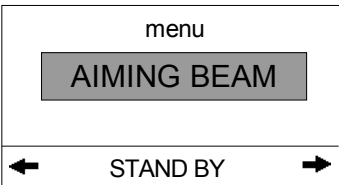
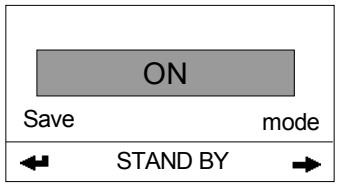
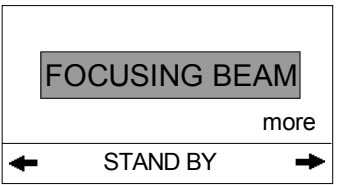


Figure 38: Display Touch Screen menu.

	<p>Selection menu to display general SERVICE.</p> <ul style="list-style-type: none"> • Press the middle area to select it and display the information. • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to access the next selection menu.
	<p>Selection menu to display SYSTEM MONITOR.</p> <ul style="list-style-type: none"> • Press the middle area to select it and display the data. • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to access the next selection menu.
	<p>Selection menu to display LASER MONITOR.</p> <ul style="list-style-type: none"> • Press the middle area to select it and display the data. • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to access the next selection menu.
	<p>Selection menu to display the SETUP.</p> <ul style="list-style-type: none"> • Press the middle area to select it and display the settings. • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to access the next selection menu.
	<p>Data contained in the SERVICE menu.</p> <ul style="list-style-type: none"> • LcdFW: FW version of the LCD card. • TecFW: FW version of the power mainboard. • Language: language automatically selected through the setting on Lighter. If the language is not recognized, it is set on English. • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo.
	<p>Information contained in the SYSTEM MONITOR menu (1 of 2).</p> <ul style="list-style-type: none"> • Board Temp. [°C]: Temperature of the mainboard for the power section. • Input Voltage [V]: Input power voltage measured on the mainboard. • Heatsink T. [°C]: Central heatsink temperature. • System Temp. [°C]: Environment temperature measured inside the system (at the cooling fans inlet). • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to access the following information.
	<p>Information contained in the SYSTEM MONITOR menu (2 of 2).</p> <ul style="list-style-type: none"> • Serial: System serial number, visible on the outside label too. • Hr System: Total time elapsed with system in operation [hh:mm:ss] • TEC voltage [V]: Voltage on the Peltier module • TEC Current [A]: Current on the Peltier module • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo.

	<p>Information contained in the LASER MONITOR menu (1 of 2).</p> <ul style="list-style-type: none"> • Serial: Laser Diode serial number. • Hr Diode: Total time elapsed with laser diode in emission [hhhh:mm:ss] • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to access the following information.
	<p>Information contained in the LASER MONITOR menu (2 of 2).</p> <ul style="list-style-type: none"> • Diode Temp. [°C]: Temperature measured on the laser diode • SetPoint [°C]: Set-point temperature of the laser diode • Diode Current [A]: Current measured on the laser diode • Max current [A]: Max. admissible current on the laser diode • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo.
	<p>Selection menu to set the aiming laser diode.</p> <ul style="list-style-type: none"> • Press the middle area to select it and display the settings. • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to switch to the focusing diode.
	<p>Selection menu to set the red diode.</p> <ul style="list-style-type: none"> • Press the bottom left arrow to confirm the setting and return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to change the operating mode (ON/OFF/AUTO). ON: always on; OFF: always off; AUTO: on when system is in stand-by status.
	<p>Selection menu to set the focusing diode.</p> <ul style="list-style-type: none"> • Press the middle area to select it and display the settings. • Press the bottom left arrow to return to the main screen with the Ulyxe™ logo. • Press the bottom right arrow to switch to the pointer diode.

5. 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.

5.1 CONTROL BOX

Ulyxe™ control and command device to manage laser power on, to open Shutter and laser enable, to *START* and *STOP* marking and to show system status.

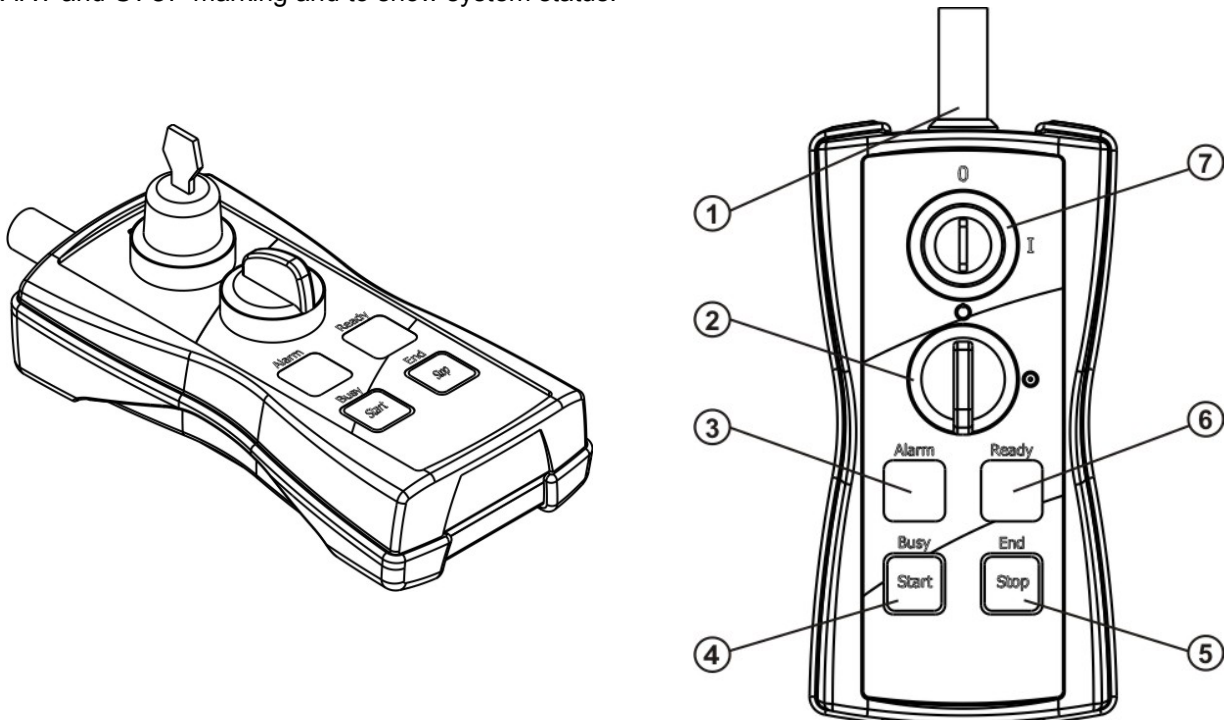


Figure 39: Control Box (Ordering no: 985330001).

1	I/O connection Connection to Ulyxe™ Control Box connector
2	SHUTTER ENABLE Selector switch with LED indicator to open Shutter
3	ALARM LED indicator LED indicator for marking system in "READY" state
4	START marking & BUSY LED indicator "START" marking command pushbutton with "BUSY" LED indicator
5	STOP marking & END LED indicator "STOP" marking command pushbutton with "END" LED indicator
6	READY LED indicator "READY" for marking LED indicator
7	KEY Selector "KEY" to enable the marking system



WARNING!

If the Control Box is used, the marking system works in **DANGEROUS** condition.

5.2 POWER SUPPLY ULYXE™ FAMILY

AC/DC stabilized power supply with front cover, power inlet plug, power on mains witch and cables.

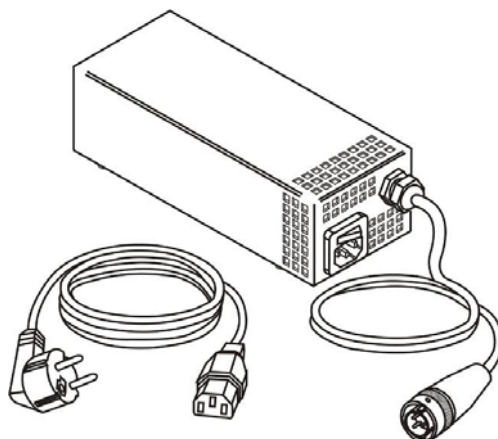


Figure 40: Power supply Ulyxe™ family (Ordering no: 985340000).

LAMBDA HWS300-24	
Output voltage	24V DC, 14A (≈ 300W), Ripple Noise 150mV
Input voltage	85-265 V AC (47-63Hz)
Size	61 x 82 x 165 mm
Withstand Voltage	Input to ground 2.5kV AC, Input to Output 3kV AC, Output to ground 500V AC
Isolation voltage	>100MΩ, Output to ground 500V DC
Mark	CE Mark
EMI compliance	EN55011 / EN55022, FCC, VCCI Class B
Immunity compliance	IEC61000-4-2, -3, -4, -5, -6 (Level 3), -8 (Level 4), -11
Safety Agency Approvals	UL60950-1, CSA60950-1, EN60950-1, EN50178, UL508

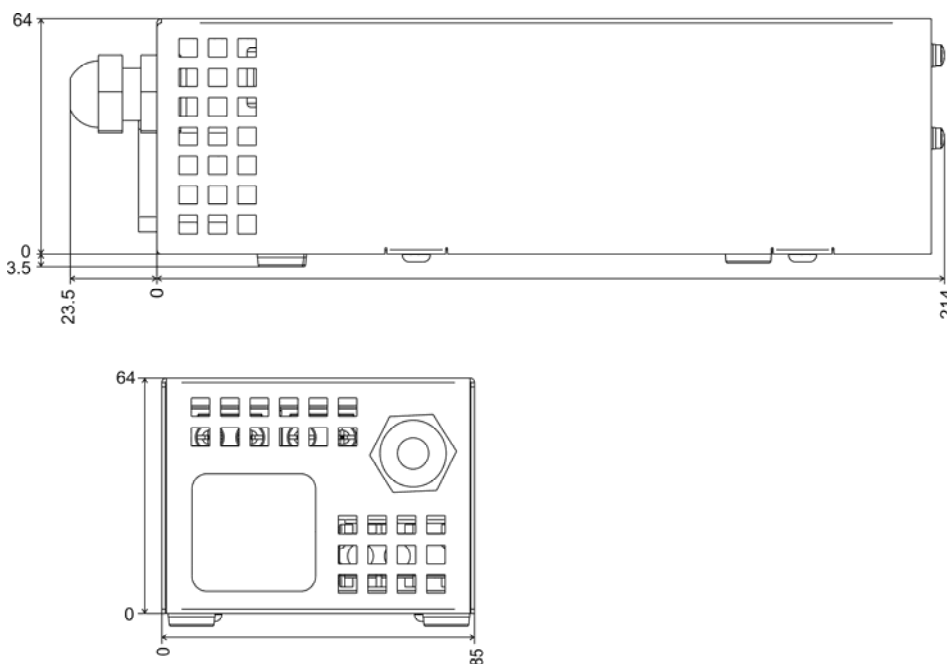


Figure 41: Power supply overall dimensions.

6. TECHNICAL SUPPORT

6.1 SEALS

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. 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 shall not be held liable for work on electrically charged parts by inadequately trained personnel!



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 shall not be held liable for work on parts by inadequately trained personnel!

6.2 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 respect of law prescriptions regarding the safety rules during the operations.

The following parts/functions have to be controlled:

MAINTENANCE PROGRAM

COMPONENT OR FUNCTION	TYPE OF OPERATION	INTERVALS
F-Theta Scan Lens	Check / Clean	Weekly: wipe gently with a dry cloth (or soaked in high purity isopropyl alcohol) or clean it with air blowing
Fan and heat exchanger unit	Check	Every 3 months (according to the environment and frequency of use)

6.2.1 F-THETA SCAN LENS CLEANING PROCEDURE

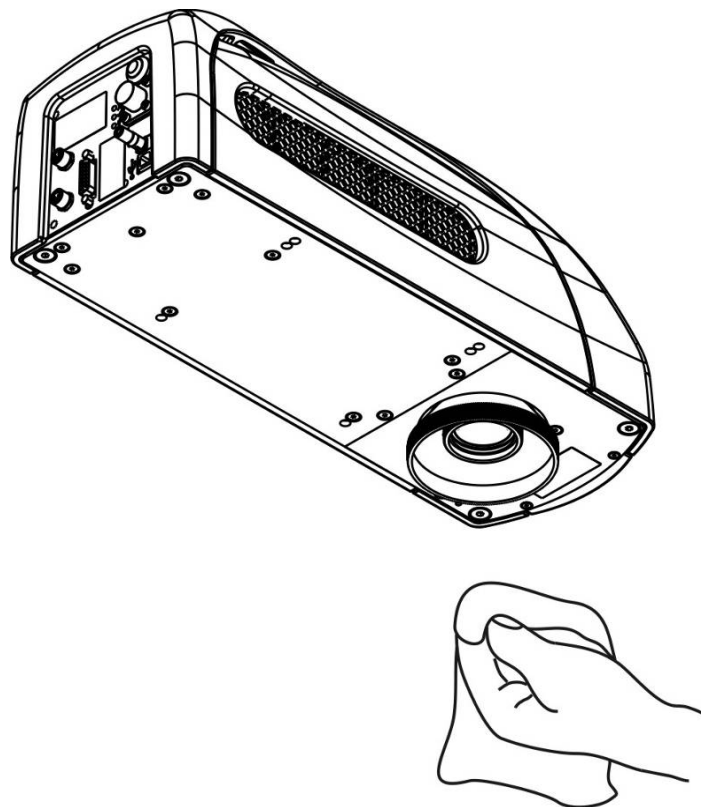


Figure 42: Cleaning laser output.



WARNING!

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

- 1- Disable Aux interlock.

6.3 TROUBLESHOOTING

Problems may occur while the marking system is in operation due to malfunctions or simple oversights. In both cases, the display will show messages referred to the type of problem detected. In case of Hardware error, Ulyxe™ shuts off automatically without signalling the error. Power off the marking system upstream before you perform any recovery operation.

The operating limits of Ulyxe™ are subdivided into hardware values and software values. If a software limit is reached, the marking system stays on, the power section is turned off and an error message is displayed. If a hardware limit is reached, the marking system goes into a protection status and shuts off automatically. In this case, the type of error can be identified only if the malfunction is listed in the following table.

	SW LIMIT	HW LIMIT
Laser diode MAX temperature	35°C	40°C
Laser diode MIN temperature	10°C	--
Heat sink MAX temperature	60°C	--
Converter MAX temperature	65°C	72°C
MAX environment temperature	40°C	45°C
MIN environment temperature	10°C	0°C
Laser diode MAX current	25A - 31A	38.5V
Laser diode MAX voltage	2.5V	3.5V
Peltier module MAX current	12A	15A
MIN input voltage	22,5V	--

6.3.1 LIST OF POSSIBLE MALFUNCTIONS

STATUS	CAUSE	ACTION
Red LED bar blinking	An internal error has occurred and the system is in software protection mode	Check the error message shown on the display and refer to paragraph 6.3.2 for the recovery procedures
Orange LED bar blinking	Warning status. The display shows "DISABLE SHUTTER" because start sequence is wrong	If the marking system was powered on with the signal <i>Shutter En</i> active disable it. Ulyxe™ will automatically go into stand-by mode if the <i>KEY</i> signal is activated, otherwise into system-off status
		If <i>Shutter En</i> is already disabled: Ulyxe™ does not supply external power onto I/O connector (Control Box). Make sure that there is 5V DC voltage between pin 1 and pin 15 of connector Control Box. If there is, make sure the command signals are connected and in compliance. If there is no voltage, call technical assistance
Green LED bar blinking	The marking system is in <i>warm-up</i> mode because the <i>KEY</i> command has been enabled	Wait for the pre-heating phase to finish before carrying out any other operation
ALARM output signal in OFF mode	The marking system is not in <i>READY</i> mode	Put the marking system in <i>READY</i> mode. Contact technical assistance if the problem persists

The marking system turns off when powered on	The marking system goes into hardware protection mode because a parameter does not comply with specifications	Check compliance with the stated specifications (input voltage, environment temperature, etc.) Cut off power supply to the Ulyxe™ and wait 30/60 minutes before restarting. Contact technical assistance if the problem persists
The marking system turns off after turning the key	The marking system goes into hardware protection mode due to a protection in the power system	Check compliance with the stated specifications (laser diode temperature and current, etc.) Cut off power supply to the Ulyxe™ and wait 30/60 minutes before turning it back on. Contact technical assistance if the problem persists
The marking system turns off during regular operation	The marking system goes into hardware protection mode due to a system malfunction	Make sure the Aux interlock connector is present. Cut off power supply to the Ulyxe™ and turn it back on
		Check compliance with the stated specifications (input voltage, environment temperature, etc.) Cut off power supply to the Ulyxe™ externally and wait 30/60 minutes before restarting. Contact technical assistance if the problem persists
The USB connection is not working	No connection between PC and Ulyxe™	Make sure the right Ulyxe™ USB driver as well as the connection cable are present. Please refer to section "USB 2.0 ADVICE" for additional info
The LCD does not work	No power on the display	Make sure the marking system is turned on. Contact technical assistance if the problem persists
The marking system does not turn on	The input power is not right or the internal board is broken	Make sure the <i>Reverse Voltage</i> back panel LED is active and exchange the power supply cable pins because they are reversed. Contact technical assistance if the problem persists
Laser beam emitted with Shutter open with no emission commands	The internal RF Q-switch may be damaged or misaligned, or its RF driver is not working properly	Check to see if you can solve the problem decreasing thermalization value on Lighter laser settings. Contact technical assistance if the problem persists
The laser beam and the pointer one do not move correctly during emission	The laser beam galvo mirrors are not driven correctly due to internal damage	Contact technical assistance if the problem persists

6.3.2 ERROR MESSAGES

ERROR MESSAGE	CAUSE	ACTIONS
<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DIODE MAX CURRENT FAULT</p> <p>SHUT DOWN AND RESTART</p> </div>	<p>The laser diode max current software level was exceeded. The value is displayed in the Max. Current field in the LASER DATA section.</p>	<p>Turn off, wait 30/60 minutes and restart. Read the value displayed in the <i>Diode Current</i> field in the LASER MONITOR section and check to see if it exceeds the Max. Current value. In case the problem occurs, carry out the data log with the service tool and contact technical assistance.</p>
<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DIODE HIGH TEMP FAULT</p> <p>SHUT DOWN AND RESTART</p> </div>	<p>The laser diode max temperature software level was exceeded. The value is set at 35°C. The system cuts off the current on the diode and tries to bring the laser diode to the proper temperature.</p>	<p>Turn off, wait 30/60 minutes and restart. Make sure that the cooling fans unit is working properly and that the fans are not obstructed in any way. Read the value displayed in the <i>Diode Temp.</i> field in the LASER MONITOR section and check to see if it deviates from the Set-point value. In case the problem occurs, carry out the data log with the service tool and contact technical assistance.</p>
<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DIODE LOW TEMP FAULT</p> <p>SHUT DOWN AND RESTART</p> </div>	<p>The laser diode temperature has fallen below the minimum temperature software level. The value is set at 10°C. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the laser diode temperature controller is out of control.</p>	<p>Turn off, wait 30/60 minutes and restart. Make sure the room temperature complies with the specifications. Read the value displayed in the <i>Diode Temp.</i> field in the LASER MONITOR section and checks to see if it deviates from the Set-point value. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>DIODE OUTPUT PROTECTION</p> <p>SHUT DOWN AND RESTART</p> </div>	<p>The laser diode voltage software level was exceeded. The value is set at 2.5V. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the laser diode may be broken, its contacts not connected properly or the internal card malfunctioning.</p>	<p>Turn off, wait 30/60 minutes and restart. In case the problem re-occurs, carry out the data log with the service tool and contact technical assistance.</p>
<div style="border: 1px solid black; padding: 5px; text-align: center;"> <p>TEC CURRENT FAULT</p> <p>SHUT DOWN AND RESTART</p> </div>	<p>The Peltier module current software level was exceeded. The value is set at 12A. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the Peltier module may be broken, its contacts not connected properly or the internal card malfunctioning.</p>	<p>Turn off, wait 30/60 minutes and restart. Read the value displayed in the <i>TEC Current</i> field in the SYSTEM MONITOR section. In case the problem re-occurs, carry out the data log with the service tool and contact technical assistance.</p>

<p style="text-align: center;">TEC OUTPUT VOLTAGE FAULT</p> <p style="text-align: center;">SHUT DOWN AND RESTART</p>	<p>The Peltier module voltage software level was exceeded. The value is set at 10V and it is displayed in the <i>TEC Voltage</i> field in the SYSTEM DATA section. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the internal card is malfunctioning.</p>	<p>Turn off, wait 30/60 minutes and restart. Read the value displayed in the <i>TEC Voltage</i> field in the SYSTEM MONITOR section. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<p style="text-align: center;">PWM CARD TEMPERATURE FAULT</p> <p style="text-align: center;">SHUT DOWN AND RESTART</p>	<p>The temperature software level on the power section of the internal card was exceeded. The value is set at 65°C. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the internal heat cannot be dissipated. The problem may be caused by critical environmental conditions (high outside temperature, insufficient air flowing into the fans, etc.) or the internal dissipation is not efficient (poor thermal contact between the internal devices).</p>	<p>Turn off, wait 30/60 minutes and restart. Make sure the environmental conditions comply with specifications. Read the value displayed in the <i>Card Temp.</i> field in the SYSTEM MONITOR section, checking to see if it quickly reaches 65°C. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<p style="text-align: center;">HEAT SINK HIGH TEMP FAULT</p> <p style="text-align: center;">SHUT DOWN AND RESTART</p>	<p>The temperature software level on the central heat sink was exceeded. The value is set at 60°C. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the internal heat cannot be dissipated. The problem may be caused by critical environmental conditions (high outside temperature, insufficient air flowing into the fans, etc.) or by a malfunction of the cooling fans.</p>	<p>Turn off, wait 30/60 minutes and restart. Make sure the environmental conditions comply with specifications. Read the value displayed in the <i>Heat sink T.</i> field in the SYSTEM MONITOR section, checking to see if it quickly reaches 60°C. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<p style="text-align: center;">SYSTEM HIGH TEMP FAULT</p> <p style="text-align: center;">SHUT DOWN AND RESTART</p>	<p>The environment temperature software level was exceeded. The value is set at 40°C. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the internal heat cannot be dissipated.</p>	<p>Turn off Ulyxe™ and make sure the environment temperature complies with the specifications before you turn it back on. Read the value displayed in the <i>System Temp.</i> field in the SYSTEM MONITOR section, checking to see if it is near the 40°C limit. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>

<p style="text-align: center;">SYSTEM LOW TEMP FAULT</p>	<p>The environment temperature has fallen below the minimum temperature software level. The value is set at 10°C. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since there is a risk of damaging the optical parts.</p> <p>Fans are maintained ON to try to back to right temperature the marking system.</p>	<p>Turn off and make sure the environment temperature complies with the specifications before you turn it back on. If it is first installation wait 30/60 minutes until turn on again. Read the value displayed in the <i>System Temp.</i> field in the SYSTEM MONITOR section, checking to see if it is near the 10°C limit. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<p style="text-align: center;">INTERLOCK DISCONNECTED</p> <p style="text-align: center;">SHUT DOWN AND RESTART</p>	<p>The Aux interlock connector or its closed contact is not present upon turning on the system. The entire internal electronics is disabled.</p>	<p>Turn off and restore the Aux interlock connector before you restart the marking system. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<p style="text-align: center;">SHUTTER FAULT</p> <p style="text-align: center;">SHUT DOWN AND RESTART</p>	<p>The internal Shutter does not work properly. Its position is wrong. The system turns off the entire power section (laser diode, Peltier module, RF driver, etc.) since the system may emit an unwanted laser beam. The problem may be caused by a malfunction of the Shutter or of its position sensor, or the internal card may be malfunctioning.</p>	<p>Turn off, wait 30/60 minutes and restart. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<p style="text-align: center;">DISABLE SHUTTER</p>	<p>A wrong power on sequence was carried out. The system was started with the <i>Shutter En</i> active.</p>	<p>Disable the <i>Shutter En</i> signal and the system will return to its proper operating status.</p> <p>In case the Shutter is not disabled, contact technical assistance.</p>
<p style="text-align: center;">CAN CONNECTION ERROR</p>	<p>The CAN communication between the internal cards is not working properly.</p> <p>The problem may be caused by an internal connection or a damaged internal device.</p>	<p>Turn off and restart. In case the problem reoccurs, carry out the data log with the service tool and contact technical assistance.</p>
<p style="text-align: center;">LOW VOLTAGE INPUT</p> <p style="text-align: center;">SHUT DOWN AND RESTART</p>	<p>The inlet power voltage has fallen below the minimum voltage software level. The value is set at 20V DC. The entire internal electronics is disabled.</p>	<p>Turn off and restore the power voltage to 24V DC before you restart. Read the value displayed in the <i>Input Voltage</i> filed in the SYSTEM MONITOR section, making sure that the value displayed is around 24V DC. In case the problem re-occurs, carry out the data log with the service tool and contact technical assistance.</p>

6.4 PRODUCT SUPPORT AND CUSTOMER SERVICE

Warranty Information

Datalogic 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 for advice on further on-site fault diagnosis and/or module return.

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

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 for replacement items. Please take time to complete all return documentation. This can be obtained from Datalogic and accurate details, diagnosis and comments in the documentation can help reduce turnaround time for module repair at Datalogic.

Customer Service Contacts

Product Support

support-dla-lasermarking@datalogic.com

Tel: +39 051-3147011

Customer Services

service-dla-lasermarking@datalogic.com







Tel: +39 0331-918001

Company Web Site

www.datalogic.com

For further contact information see the Contact Us link at www.datalogic.com or contact your local distributor.

APPENDIX A: LABELS IDENTIFICATION

LABEL	DESCRIPTION
	Identification label
	Warning Logotype
	Laser labels ³
	Label for panels
	Aperture label
	USB plug
<p>I/O</p>	Power ON switch
<p>RS232</p>	Serial communication
<p>CAN</p>	CanBus communication
<p>CONTROL BOX</p>	Control Box connector
<p>AUX INTERLOCK</p>	Aux interlock connector

³ Maximum output of laser radiation as per definition 3.55 of IEC60825-1 considering single fault conditions.

LABELS LOCATION

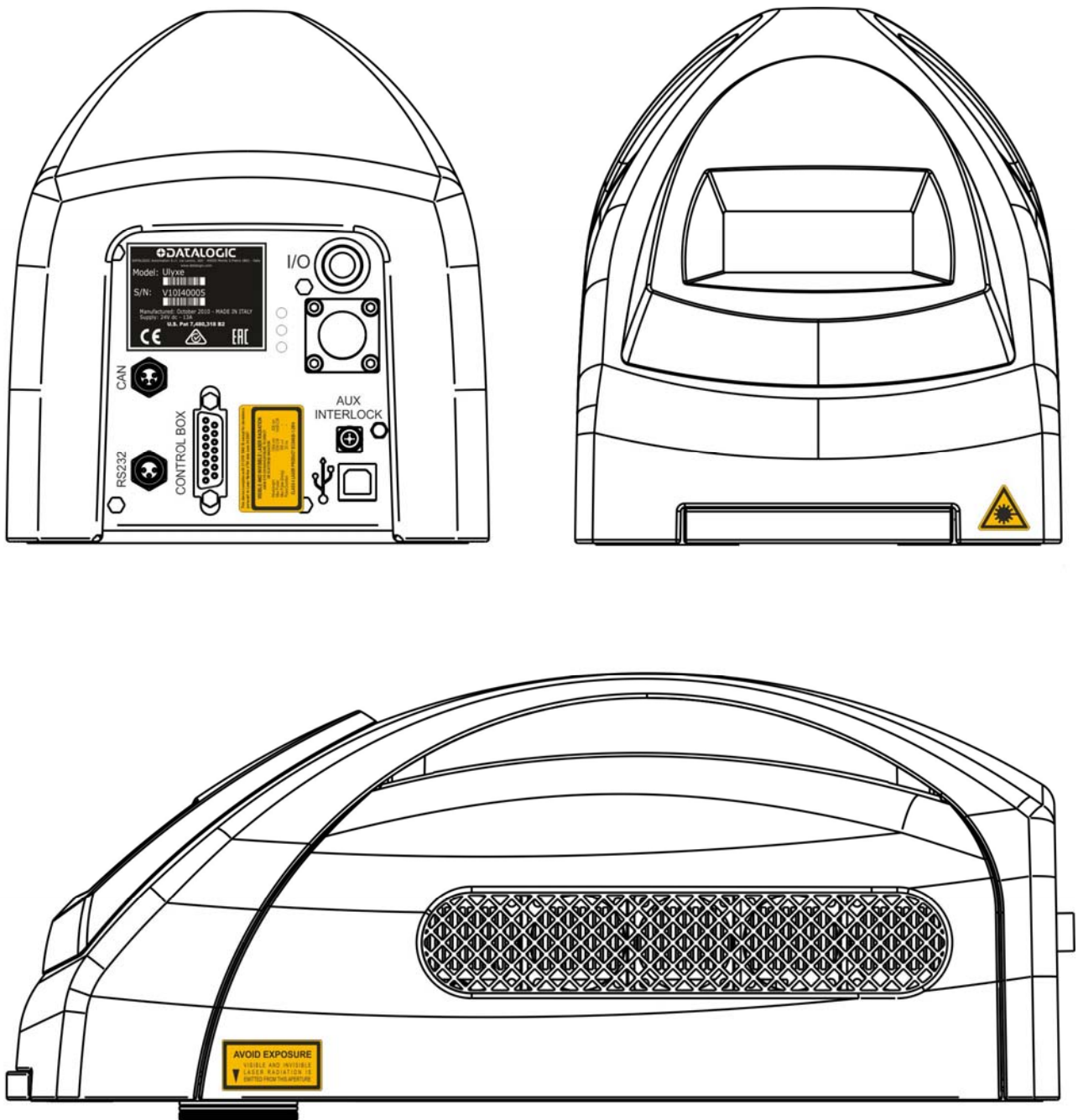


Figure 43: Labels location.

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

Ulyxe™ is classified as Class 4 Laser Product.

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

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

Datalogic 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 20th 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 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.

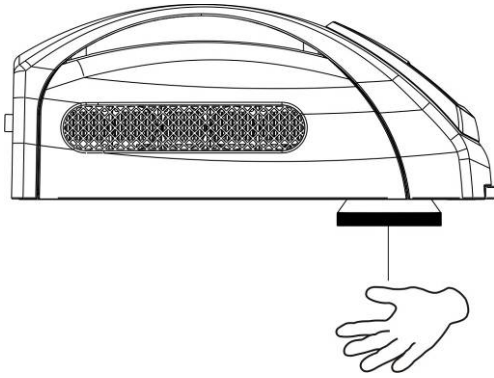
This system complies with PART 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This marking system may not cause harmful interference, and (2) this system must accept any interference received, including interference which may cause undesired operation.

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 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 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: NOTE ABOUT LASER

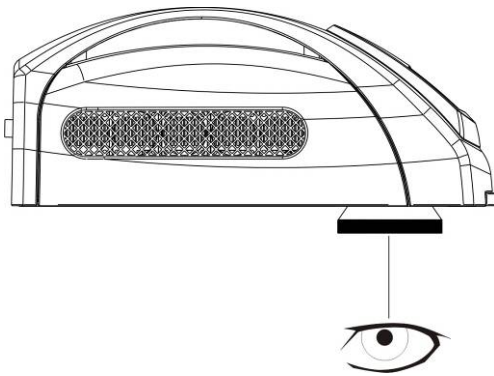
LASER SAFETY

The following information is provided to comply with the rules imposed by International Authorities and refers to the correct use of marking system.



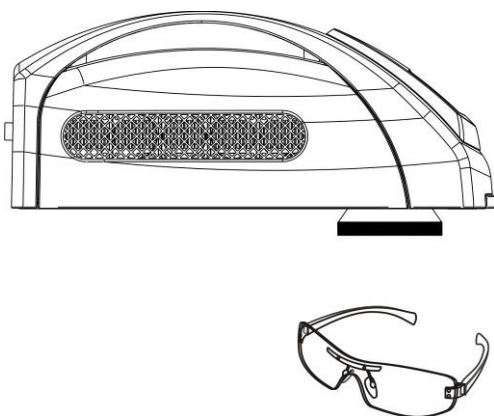
WARNING!

The marking system is a Class 4 laser product. Visible and invisible laser radiation can be diffused. Avoid skin exposure to direct or reflected radiation.



WARNING!

Direct vision of a laser beam may cause irreversible damage to eyes.



WARNING!

Wear protection glasses while using the marking system!



WARNING!

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

LASER RADIATION

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

It should be considered non-ionizing Radiation. In Ulyxe™ marking systems, the emission of a crystal bar 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 Ulyxe™ marking system is invisible, but since it is near the threshold of visibility, 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 system provokes reflected laser light from flat surfaces. Reflected light is potentially dangerous for the eyes and skin. Electromagnetic emission with a micrometric wave length is placed in long infrared, and is therefore invisible, thus it is not clear where reflected beams are aimed.



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 marking systems which can produce risks, not only from **direct** or **reflected** radiation, but also from **scattered** radiation! The marking systems may be a significant risk for the skin and risk of burning flammable materials.

ABSORPTION OF LASER RADIATION

Human skin absorbs electromagnetic radiation in different ways depending on the wave length of the radiation. Both the eye and skin have a “predisposition” for accepting certain wave lengths, and are more unresponsive to absorbing others. In the specific case of the Eye, the Cornea and Crystalline lens let all the wave lengths from 400 to 1400 nm pass and reach the Retina, even with various attenuations. They include the range from visible light to IRA infrared. Thus Nd:YVO₄ laser radiation (1064 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.

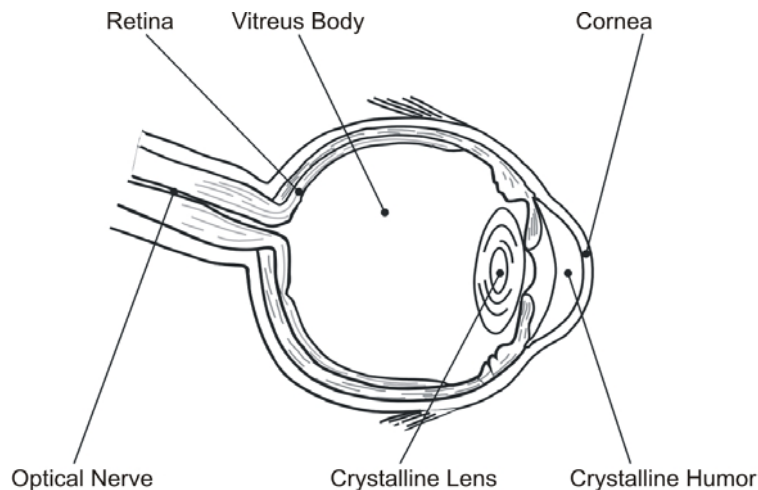


Figure 44: Eyeball section.

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 photochemical effects:

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

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

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

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

CLASSIFICATION AND DANGER LEVEL

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

Lasers which can produce risks, not only for direct or reflected radiation, but also for scattered radiation belong to Class 4. These 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 marking system contains a **Class 4** invisible source.

RADIATION VIEWING CONDITIONS

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

DIRECT VIEWING OF THE LASER BEAM

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

DIRECT VIEWING OF THE BEAM AFTER MIRROR REFLECTION

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

DIRECT VIEWING OF THE BEAM OUTPUT BY AN OPTICAL FIBER

This happens if an Optical Fiber disconnects from the resonator. 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 Nominal Ocular Hazard Distance N.O.H.D. for Ulyxe™ is showed in the next paragraph.



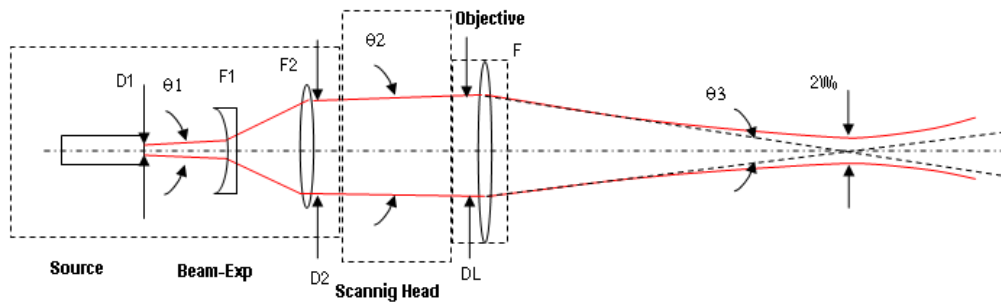
WARNING!

Always use goggles with conformity certificate.

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

REAL N.O.H.D. 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.



In particular, it is very important to know the diameter of the focal spot (which can be identified with beam waist $2W_0$) and the real divergence of the beam in output from the focalization lens.

With all these optical data it is possible to do the calculations of the nominal distance of optical risk and of the optical density requested to the protection filters of the laser radiation.

Calculations have been done following the CEI EN 60825-1 (2014) Normative regarding Nominal Ocular Hazard Distance (N.O.H.D.) in the worst condition and in case of accident exposition of 10 seconds per direct radiation and 100 seconds for diffused radiation.

Laser type	Nd:YVO ₄ : 1064 nm
Application type	Marking
Emission type	Pulsed (Q-Switched)
Observation type	Direct Radiation
Subtended angle of the source	Alpha < alphamin
Pulse energy	350 μJ
Pulse duration	20 ns
Repetition frequency	10 KHz
Beam diameter on the lens	2,5 mm
Beam divergence on the lens	1,5 mrad
Focal of the lens	160 mm
Real divergence after the lens	14 mrad
Exposition time	10 s
Diameter of the focal spot	165 μm

ACCIDENTAL CONDITION OF VISION OF THE DIRECT REFLECTED RADIATION

Distance > 0,5 m and for a maximum exposition period of 10 seconds and supposing that there is a total reflection without attenuation.

O.R.N.D. = 28,5 m

OPTICAL DENSITY OF THE PROTECTION GOGGLES

Case a) Assuming to remove the fix protections and penetrate in the working area to adjust the process maintaining an observation distance Z of at least 0,5 m from the focal point and presupposing an accidental exposition of maximum 10 seconds.

The protection goggles must have such an optical density to bear down the radiation under the maximum permitted value, previously calculated, according to the here below reported calculation:

O.D.= 4,04 @ 1064 nm D.I.R.

Case b) Supposing to remove focusing head to do measurements on beam alignment, maintaining a Z observing distance at least to 0,66 m from laser aperture, and supposing to use a reduction power of 50% and a total accidental reflection for a 10 seconds maximum.

The protection goggles must have such an optical density to bear down the radiation under the maximum permitted value, previously calculated, according to the here below reported calculation:

O.D.= 5,3 @ 1064 nm D.I.R.

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 EN 207 with tests conducted for 10 seconds or 100 pulses.

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 exposition period.

Case a) Htl = 62,6 J/m²

Case b) Htl = 6760 J/m²

To which it respectively corresponds a scale index (tab2 UNI EN 207) **L5** and **L7**.

To satisfy completely all prescriptions need to use a filter with optical density **O.D.>6** and scale index **L=7**.

EYES AND SKIN RISKS

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

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

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

GENERAL SAFETY REGULATIONS

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

Training is essential and must include:

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

COLLATERAL RISKS

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



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 is 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 marking system is commissioned.



WARNING!

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

The most serious collateral risk associated with 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 Laser source, 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.

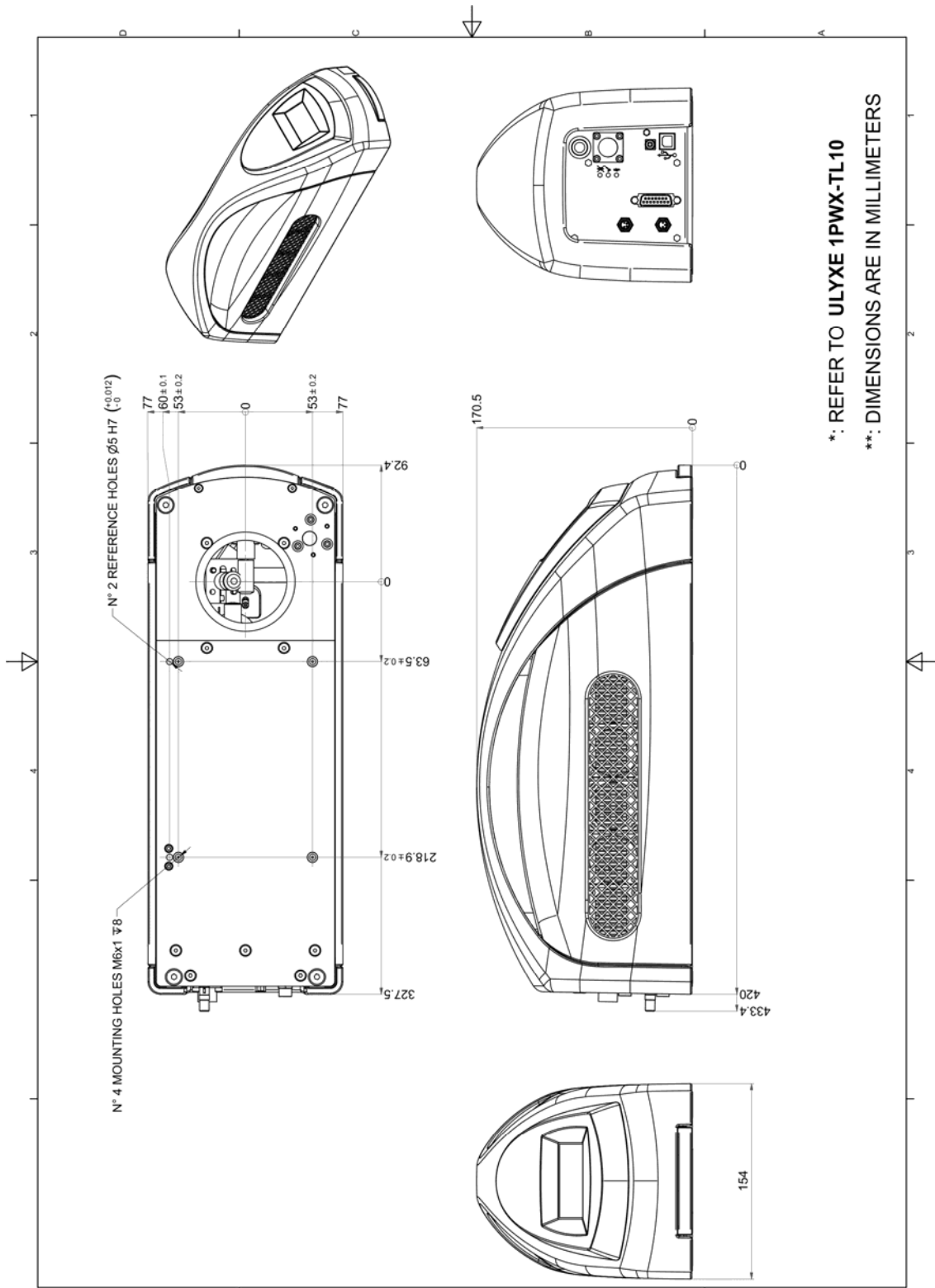
An additional risk may be represented by fire caused by processing materials other than those the equipment was designed for.



WARNING!

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

APPENDIX D: MECHANICAL DRAWINGS



*: REFER TO ULYXE 1PWX-TL10

**.: DIMENSIONS ARE IN MILLIMETERS



NOTE:

Please refer to Datalogic website for detailed drawings.

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