



LIGHT FOR ART



laser systems for restoration



THE GROUP

Hi-Tech Company

Hi-Tech industrial group operating in the opto-electronic field with proprietary technology and knowhow developed in over 30 years of experience

International Group

More than 30 companies active worldwide in complementary markets and in many application segments. Listed in the New Stock Exchange of Milan (TechSTAR:El.En.) and on NASDAQ in New York (CYN)

Leading position in the global market

Since its foundation El.En. has continuously increased its turnover thanks to established presence in 5 continents

Worldwide distribution network

Over than 800 employees in the world and more than 35,000 laser sources sold



Technological innovation for cultural heritage conservation



El.En. Laser over Florence (homage to Arnolfo di Cambio, Dani Karavan, June 1999)



The conservation of memory...

innovation in the service of mankind

Light for Art, a sector in the El.En. group, specializes in laser systems for the preservation and restoration of art works. We combine the group's philosophies of embracing new technological challenges with the desire to safely preserve the artistic traditions of the past. Preserving cultural heritage and innovation for the betterment of humankind, are the two ideas at the heart of Light for Art's mission. Building on research dedicated to conservation and historic preservation, El.En. has designed tools that give art the original beauty that time and pollution have concealed.

There are four **main advantages** in using laser technology

Minimal invasiveness: the laser is characterized by the absence of physical contact between the instrument and the surface to be treated; it does not require the use of chemicals or of abrasive materials.

High degree of control: the removal of the degradation layer affects only a few microns thickness per pulse.

Selectivity: materials absorb the optic radiation of solid-state lasers (Nd:YAG) according to their color, which makes the action of the laser even more selective

High precision: the cleaning process affects only the area illuminated by the laser beam, which may be defined depending on the actual needs. There is no effect on adjacent materials.



EOS COMBO



Rome, Catacombs of Saint Domitilla, wall paintings



Pompei (NA), Villa of the Mysteries, wall paintings

The **Eos Combo**, the result of a collaboration between El.En. and the Consiglio Nazionale delle Ricerche (CNR), combines two temporal regimes in one system. By pressing a key you can move from the Short Free Running (SFR) mode, with a pulse duration ranging from 30 to 110 microseconds, to the Long Q-switch (LQS) regime with 100ns pulses. This versatility allows the treatment of a wide variety of materials, such as **stones, metals, wall paintings, wood, ceramics.** The system was tested under the most difficult field conditions and, thanks to its sealed laser head, demonstrates high reliability. The **Eos Combo**, employing new optical fibers, combines manageability and performance, guaranteeing the conservator the optimization of costs and results.

System Features

Wavelength	1064 nm
Pulse duration	SFR mode: 30-110 μ s LQS mode: 100 ns
Maximum energy per pulse:	SFR mode: 2J LQS mode: 150mJ
Energy	SFR mode: selectable between 200-1400 mJ (step100 mJ) 1600-1800-2000 mJ LQS mode: 150 mJ (1 pulse), 300 mJ (2 pulses), 450 mJ (3 pulses)
Repetition frequency	selectable between single pulse, 1÷10Hz, 15Hz, 20Hz 30 Hz
Spot	2.5 - 6 mm
Beam delivery	two 1000 μ m optical fibres, 3 and 10m long
Handpiece	variable focus, with beam guide
Beam profile	homogeneous
Aiming beam	diode laser 3 mW (635 nm)
Mains supply	230 V - 50/60 Hz, 12 A
Dimensions	33x95x75 cm
Weight	80 Kg
Laser shutter	controlled by footswitch on demand: handpiece fingerswitch
Cooling circuit	sealed with heat exchanger (air/liquid)



THUNDER COMPACT

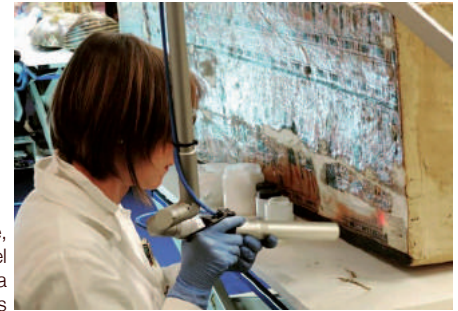
Thunder Compact is the new product of Quanta System which follows the success of Thunder Art. This new laser system is still capable of delivering a maximum energy of around 1 J at 1064 nm but its size has been significantly reduced to make the machine easier to be transported and lifted. **Thunder Compact**, despite having reduced dimensions, allows a quick and effective cleaning also of large surfaces. The system is suitable for the cleaning of **stuccos, wood, textiles, glass, stones** thanks also to the presence of both the infrared wavelength at 1064 nm and the visible light at 532 nm. The latter is particularly useful for the removal of biological encrustations.

This system offers a modern and user-friendly touch screen interface and the possibility to choose between the footswitch and the fingerswitch to operate the laser.

Featuring two wavelengths, Thunder Compact has been designed to provide laboratories with a reliable tool performing even more brilliantly.



Patan (Nepal),
Royal Palace,
stone gate



Musée du Cinquantenaire,
Bruxelles and Istituto Europeo del
Restauro, Ischia
Egyptian sarcophagus

System Features

Wavelength	1064 nm and 532 nm
Pulse duration	around 6 ns
Maximum energy per pulse:	900mJ @ 1064nm, 400mJ @ 532nm
Repetition frequency	max 10 Hz
Spot	10 mm
Beam delivery	7 mirrors articulated arm
Handpiece	fixed focus
Beam profile	gaussian
Aiming beam	present
Mains supply	230 V - 50/60 Hz - 10 A
Dimensions	24x79x92 cm
Weight	60 Kg
Laser shutter	controlled either by trigger on the handpiece or by footswitch
Cooling circuit	water to air heat exchanger

EOS 1000 LQS

The Eos 1000 LQS adopts the particular Long Q-switch pulse length (100ns), specially designed and tested for the cleaning of the gilded bronze frieze of the Gates of Paradise, by Lorenzo Ghiberti, from the Baptistry in Florence. Since its initial application on this masterpiece its use spread to a wide range of applications that make the EOS 1000 LQS an extremely versatile system for the restorers thanks, in part, to its small size and light weight. The EOS 1000 LQS is suitable for highly accurate cleaning of **metal and gilded surfaces, frescoes and painted surfaces, wood, valuable stone artifacts**. The laser beam is delivered through a 3 m (optional 10 m) optical fiber and a handpiece with variable focus.



Parma,
National Archeological Museum,
Head of Antoninus Pius,
gilded bronze



Florence, Baptistry,
Gates of Paradise, gilded bronze

System Features

Wavelength	1064 nm
Pulse duration	100 ns
Maximum energy per pulse:	130 mJ
Energy	selectable between: 130 mJ (1 pulse), 250 mJ (2 pulses), 380 mJ (3 pulses)
Repetition frequency	selectable between: single pulse, 1÷10Hz, 15Hz, 20Hz
Spot	2.5 - 6 mm
Beam delivery	1000 µm optical fibre 3 m long (10 m optional)
Handpiece	variable focus, with beam guide
Beam profile	homogeneous
Aiming beam	diode laser 3 mW (635 nm)
Mains supply	230 V - 50/60 Hz, 8.5 A
Dimensions	23x65x68 cm
Weight	40 Kg
Nd:YAG laser shutter	pedal-controlled by the operator on demand: handpiece fingerswitch
Cooling circuit	sealed with heat exchanger (air/liquid)



EOS QS

EOS QS is the latest product from El.En's R&D team. EOS QS is a result of the decision to create laser systems with two possible pulse durations that are therefore more flexible and usable in many different cleaning applications. This system combines a Short Free Running regime (pulses from 30 to 110 μ S) with a Q-switch pulse (duration 15ns), and energy output up to 140 mJ. The system is compact and lightweight and the beam delivery through a 1500 μ m optical fiber allows freedom of movement and ease of use. Thanks to this versatility EOS QS allows the cleaning of stones, metals, wood, gilt objects, frescoes and painted surfaces.



Amatrice (RI),
Church of Saint Francis
stone gate

System Features

Wavelength	1064 nm
Pulse duration	SFR mode: 30-110 μ s QS mode: 15 ns
Maximum energy per pulse:	SFR mode: 1J QS mode: 140mJ
Energy	SFR mode: selectable between 50-500 mJ (step 50 mJ), 600 ÷ 1000 mJ (step100 mJ) QS mode: 10 ÷ 140 mJ (step10 mJ)
Repetition frequency	selectable between single pulse, 1 ÷ 10Hz, 15Hz, 20Hz
Spot	2.5 - 6 mm
Beam delivery	1500 μ m optical fibre, 3 m long
Handpiece	variable focus, with beam guide
Beam profile	homogeneous
Aiming beam	diode laser 3 mW (635 nm)
Mains supply	230 V - 50/60 Hz, 8.5 A
Dimensions	23x65x68 cm
Weight	45 Kg
Nd:YAG laser shutter	pedal-controlled by the operator on demand: handpiece fingerswitch
Cooling circuit	sealed with heat exchanger (air/liquid)

LIGHT BRUSH 2



Pisa, Monumental Cemetery,
Wall paintings



Removal of old varnish
from a painting

Light Brush 2 is an Er:YAG laser system optimised for the cleaning of artworks. Er:YAG laser cleaning is based on the strong absorption of the 2940 nm wavelength from superficial layers containing OH bonds. Studies shown indeed that Er:YAG laser exposure on a surface dampened with a liquid containing – OH groups effectively removes old varnish and other encrustations without inducing unwanted chemical or physical changes on the original surface. For this reason, **Light Brush 2** is particularly suitable for the removal of overpaintings and varnishes from wall and easel paintings.

Light Brush 2 is an innovative tool for restorers thanks to variable energy emission from 50 mJ to 500 mJ and to the pulse duration optimised for the cleaning of Cultural Heritage.

System Features

Wavelength	2940 nm
Pulse duration	Very Short mode: around 150 µs Short mode: around 250 µs
Maximum energy per pulse:	500 mJ
Energy	Very Short mode: selectable from 50 to 300 mJ (step 50 mJ) Short mode: selectable from 100 to 500 mJ (step 50mJ)
Repetition frequency	1, 2, 3, 5, 10 e 20 Hz
Spot	2 mm
Beam delivery	7 mirrors articulated arm
Handpiece	fixed focus
Aiming beam	diode laser 680 nm
Mains supply	230 V - 50/60 Hz, 8.5 A
Dimensions	145x23x65 (HxLxD) cm
Weight	47 Kg
Laser shutter	controlled by a footswitch
Cooling circuit	water to air heat exchanger



WIRELESS REMOTE CONTROL



Always intent on solving operating problems onsite, E.En. has now developed the Bluetooth control panel for its laser systems for conservation. This ergonomic tool has been especially designed and manufactured to integrate flexibility with functionality, combining all the advantages of laser systems with optical fiber beam delivery. By using the wireless remote control, the restorer no longer needs to move the laser system. Once the laser is switched on, all the necessary operations are set by the wireless remote control panel. The long battery life allows the Bluetooth control panel to function well beyond standard working hours.

System Features

System	Bluetooth
Max. use range	10 meters
Connection possibility	open
Adjustable parameters in real time	frequency, energy, emission mode
Battery life	more than 24 hours (internal rechargeable Ni-MH battery)
Battery charger	inbuilt
Weight	200 g

It does not interfere with any other electronic device, including wireless

FINGERSWITCH

All systems with optical fiber laser beam delivery have the option of being equipped with a finger switch on the handpiece that replaces the footswitch. This solution can be useful in particular working conditions on scaffolding or at sites where access is difficult.





El.En. S.p.A.
Via Baldanzese 17
50041 Calenzano
FIRENZE
Tel +39.055.8826807
Fax +39.055.8832884
conservazione@elen.it
www.elengroup.it
www.elengroup.com