REFERENCE GUIDE

>Laser Marking

⊕DATALOGIC

THE VISION IS YOURS

DATALOGIC: SOLUTIONS FOR INDUSTRIAL AUTOMATION

Datalogic Industrial Automation is an industry-leader in products and solutions for material handling, traceability, inspection and detection applications.

With the acquisitions of Accu-Sort and PPT Vision in 2012, the company offers a comprehensive portfolio of products, technologies and solutions delivered by a team of skilled professionals dedicated to providing superior service to customers.

Datalogic is the partner of choice for organizations in the Industrial Automation market.

Factory Automation

- AUTOMOTIVE
- ELECTRONICS
- FOOD & BEVERAGE
- GENERAL MANUFACTURING
- HEALTHCARE - PHARMACEUTICAL

Transportation & Logistics

- AIRPORTS
- COURIER, EXPRESS PARCEL (CEP)
- POSTAL
- RETAIL DISTRIBUTION

Product portfolio

Datalogic Industrial Automation has the most comprehensive offering of products and solutions for traceability, inspection and detection applications in factory automation and logistics processes: industrial laser scanners, cameras and vision systems, sensors, machine safety devices and laser markers.

Identification

Even the most demanding and efficient automation identification processes can leverage Datalogic Industrial Automation's leadership in the market. We manufacture the world's most comprehensive family of fixed-mount line and omnidirectional scanners.

We also offer the latest CCD vision technology with the world's largest installed base of CCD systems for bar code reading and dimensioning.

All of our AUTO-ID products and solutions leverage the broadest decoding library that has been developed through the years. Datalogic's comprehensive AUTO-ID portfolio is used in a wide range of applications and machines which are behind many of the everyday processes that keeps the global economy running.

Sensors & Safety

Datalogic Industrial Automation offers a best-in-class, comprehensive product portfolio of photoelectric and proximity sensors, rotary encoders, temperature controllers and measurement devices, as well as type 2 and type 4 safety light curtains.

These product lines provide solutions for applications involving color, contrast and luminescence, label detection, dimensional and distance measurement, in addition to machine safeguarding and access control in dangerous areas.

Machine Vision

The Datalogic Industrial Automation machine vision product line encompasses both hardware and software while covering a wide range of performance and price point requirements. The vision portfolio of products and solutions ranges from simple vision sensors to smart cameras and embedded vision systems.

Laser Marking

Laser Marking sources and systems provide value driven marking solutions for automotive, metal tools, medical, electronics and packaging. Datalogic Industrial Automation offers an extensive range of state-of-the-art technology, excellent performance and high reliability marking equipment.

DATALOGIC LASER MARKING OVERVIEW

Datalogic Laser Marking is able to provide the best laser technology solution for your application, from fiber laser to solid state and CO2, powered by the l

With the increasing popularity of Fiber lasers in recent years, Datalogic invested aggressively in this technology, and now we can offer a complete range that meets the requirements for speed, quality and budget.

Datalogic's product portfolio provides users the ability to select the perfect technology to provide the best results through a single software platform with

No other manufacturer is so vertically integrated on Fiber technology (Pulsed and MOPA), Solid State technology (IR, GREEN & UV) software and hardware

TECHNOLOGIES

FIBER LASER

High reliability fiber laser technology

solid

TECHNOLOGY **TIMELINE**

1993	1994	1995	1996	1997	2000	2002	2003	2003
Laservall SPA was founded	Laservall is the leader of jewelry laser welding	VIOLINO First industrial grade DPSS laser marker	Medical, Aesthetical, Dental laser sources were introduced	KUBO is the new family of stand alone spot welders	New Production plant in Sesto Calende. Large class 1000 clean rooms	Laservall Asia was founded	Laservall Korea was founded	Eurmarker low cost laser marker

...atest software platform and hardware controller.

...of proprietary fiber laser sources. Moreover, when selecting a laser marker it is important to choose the best technology for the application and material

...flexible controller and integration I/O options.

...e controllers, scanning heads and marking system design!

D.P.S.S.
DIODE PUMPED
High peak power,
multi-wavelength
state technology

CO^2
Consolidated technology
for painted, coated or
organic material

2004	**2006**	**2007**	**2008**	**2011**	**2012**	**2013**	**2013**	**2014**	**2015**
Datalogic acquires Laservall SPA	XELL was introduced	Datalogic provides 550 laser systems for Spanish DNI (Documento National de Identitad)	ULYXE first ultra compact all-in-one laser marker introduced	EOX, CO2 laser marker introduced	AREX fiber laser based marking system introduced	Datalogic introduces FILOS fiber laser source based on proprietary technology	Datalogic acquires high power pulsed fiber laser assets and technology of Multiwave Photonics S.A.	Datalogic offers the most complete range of laser marking products and sources	UniQ™ fiber laser marker introduced

WHAT IS LASER MARKING? HOW DOES IT WORK?

Laser marking is a way to permanently mark a physical item for branding, tracking, coding, personalizing, either for security or quality control reasons.

During the process, an intense, collimated laser light beam is focused on the surface of a target. By scanning this concentrated spot with moving mirrors on the target's surface the laser beam can create image.

Depending on laser source characteristics, an instantaneous peak power density of several hundred kilowatts are delivered on the target causing instantaneous modification to the surface.

Laser Marking does not involve the use of inks, masks, solvents, acids, nor does it require tools which contact the engraving surface and wear over time. These properties distinguish laser engraving from alternative engraving or marking technologies where inks or bit heads have to be replaced regularly.

While most forms of engraving result in a loss of some of the marked material when it is etched away, laser marking results in essentially no loss of material. Instead, the laser is used to create a shift in the color of the material, creating a visible, virtually indestructible mark with minimal impact to the item.

Laser marking's environmental impact is low, since the technology does not utilize inks, solvents, or other consumables. Environmentally-conscious companies realize both the cost savings and environmental friendliness to laser marking solutions.

X-GALVANOMETER

BEAM EXPANDER

X-MIRROR

Y-MIRROR

Y-GALVANOMETER

F-THETA LENS
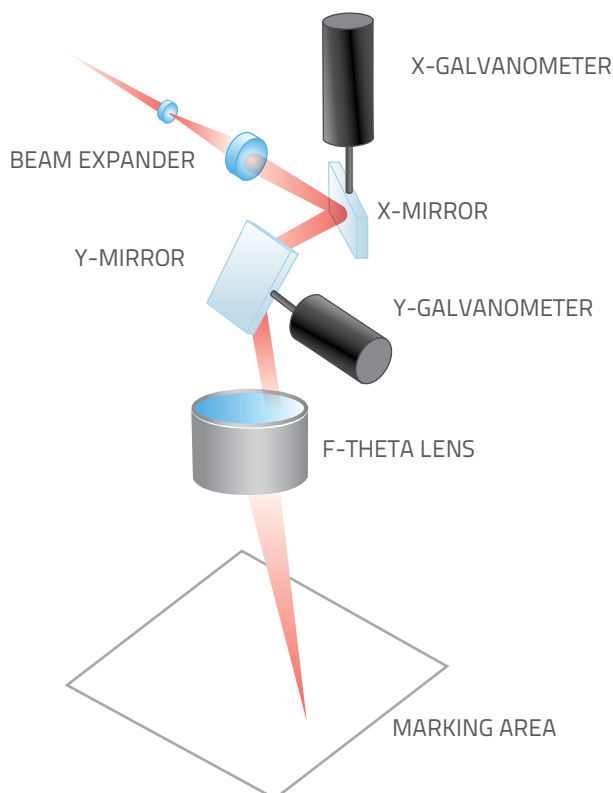
MARKING AREA

Laser marking is obtained by delivering and focusing a laser beam on a target surface with motorized mirrors controlled by dedicated hardware and software. Synchronizing the XY movement with the power modulation of the laser beam a non-contact and permanent mark is applied to the target surface.

Laser marking technology is the preferred choice in manufacturing due to its intrinsic advantages:

- **PERMANENT & DURABLE**
  Abrasion proof, water, solvent, oil, temperature, UV resistant marking

- **COUNTERFIT PROOF**
  Strong interaction with substrate: Tamper proof, impossible to alter or remove

- **LONG TERM CONTRAST & READABILITY**
  Human and machine readable over long periods of time

- **NON CONTACT, CLEAN & DRY**
  Solvent and ink free with no mechanical interactions with materials, complex clamping or special handling systems, with no drying time

- **FAST - HIGH PRODUCTIVITY**
  On-the-fly and static marking with up to 1000 characters per second

- **HIGH RESOLUTION, HIGH QUALITY**
  High resolution for graphics, logos or fonts, up to 600 DPI

- **FLEXIBLE**
  Fixed, variable, or dynamic text, full vectorial and bitmap graphics, 1D & 2D bar codes

- **RELIABLE & ENVIRONMENTALLY FRIENDLY**
  No paint, ink, acid, solvents or chemicals with no waste or downtime. Excellent energy efficiency.

LASER MARKING PROCESSES

1 - ANNEALING

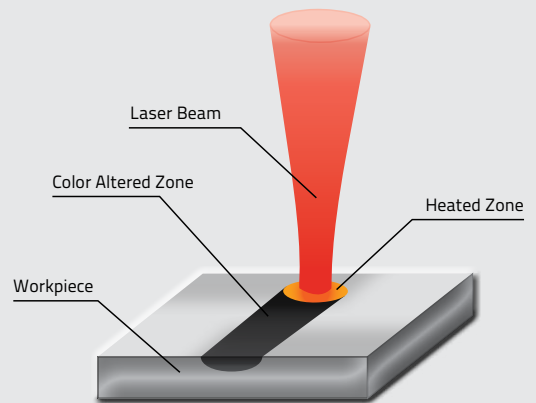### Materials:
Ferrous metals (iron, steel)
Titanium

Laser marking product:
AREX Series- Fiber Laser Marker
VLASE Series – DPSS Laser Marker
UNIQ™ - Fiber Laser Marker

Laser annealing is a marking technique that uses laser irradiation to thermally induce local oxidation without noticeable material ablation, this process creates an indelible, permanent black mark without any cracks, depressions or burrs suitable for already finished surfaces like high surface precision on surgical instruments and tools.

Typical annealing processes usually penetrate 20 to 30 µm deep in the metal surface, resulting in a stable marking that is corrosion-proof ensuring the mark cannot be removed by acid, solvents, or abrasive techniques.

This dark, permanent mark is perfect for medical device applications where marks withstand passivation, salt spray testing, and autoclaving and where material removal is prohibited to ensure part integrity and surface quality.

Laser Beam
Color Altered Zone
Heated Zone
Workpiece

2 - ENGRAVING
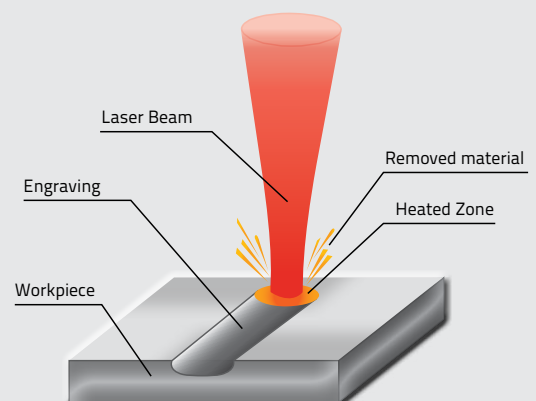
Materials:
Metals
Thermoplastic
Paper, wood, organics

Laser marking products:
AREX Series- Fiber Laser Marker
VLASE Series – DPSS Laser Marker
EOX Series – CO2 Laser Marker
UNIQ™ - Fiber Laser Marker

In laser engraving, the laser beam locally overheats the workpiece material to the vaporization point. In some cases, thermal effects are very evident with large Heat Affected Zones (HAZ), colored oxides can be produced at the bottom or the engraving further accentuating the marking.

A depression is created in the workpiece through melting displacement and/or vaporization of material. Typical engraving depths vary between 0,001mm to 0,1mm and almost any material can be engraved with a suitable laser source (Fiber, YAG, CO2). Deep engraving is a method to create durable, direct and forgery-proof product marking which is resistance to wear and corrosion, even after painting or coating processes as used in automotive applications.

Deep engraving also includes 3D marking, which is the progressive removal of several layers of material at different depths to create a three-dimensional carving into the workpiece. 3D marking relies on external devices to reposition the focus field to affect different layers along the Z axis. Typical deep engraving depths vary between 0,1mm to 5mm.

Laser Beam
Removed material
Engraving
Heated Zone
Workpiece

3 - SURFACE ETCHING

Material marked:
Metals

Laser marking product:
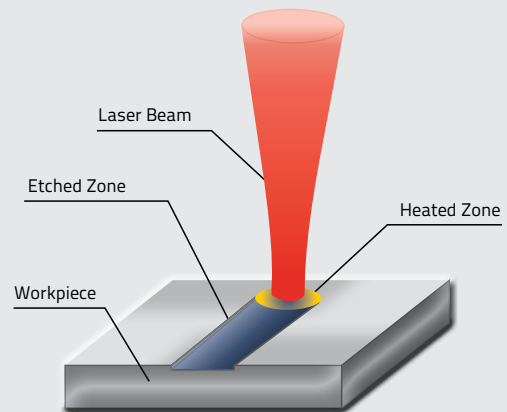AREX series - Fiber Laser Marker
VLASE series – DPSS Laser Marker
ULYXE – Compact DPSS Laser Marker
UNIQ™ - Fiber Laser Marker

The laser etching process consists of using laser irradiation to alter the superficial finish of a metal and create contrast by enhancing the way it reflects ambient light.
Depth of penetration usually does not exceed 0.01mm. Laser etching is probably the most widely used high speed laser marking process.

Laser Beam
Etched Zone
Heated Zone
Workpiece

4 - COATING ABLATION /PAINT STRIPPING

Materials:
ANY, depending on coating

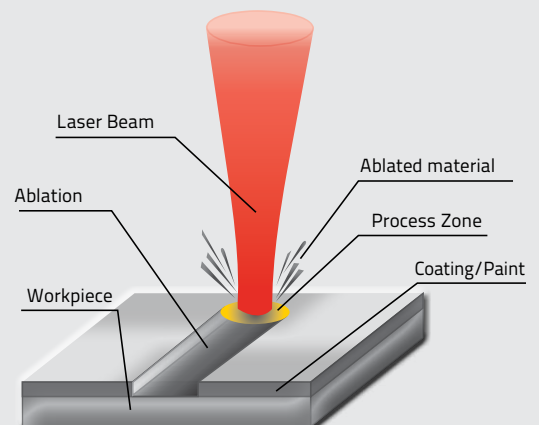**Laser marking product:**
AREX Series- Fiber Laser Marker
VLASE Series – DPSS Laser Marker
EOX Series – CO2 Laser Marker
UNIQ™ - Fiber Laser Marker

Ablation marking process consists of the partial/complete removal of one or more coating layers which exposes the contrasting color of the substrate material.
This process is popular for backlight marking and 'night & day' buttons and keys in the automotive, computer and mobile electronics industries, where a dark spray coating is applied on a transparent substrate, and then selectively ablated by laser irradiation. Short pulses with high peak reduces the thermal impact on the material resulting in high resolution marking. Laser ablation can also be used to prepare substrates for other steps in the production process. For example welding of oily, dirty or oxidized surface or when an electrical contact is needed on metal frames. In these applications, cleaning and chemical agents can be eliminated and replaced with laser ablation.

Laser Beam
Ablation
Ablated material
Process Zone
Coating/Paint
Workpiece

LASER MARKING PROCESSES
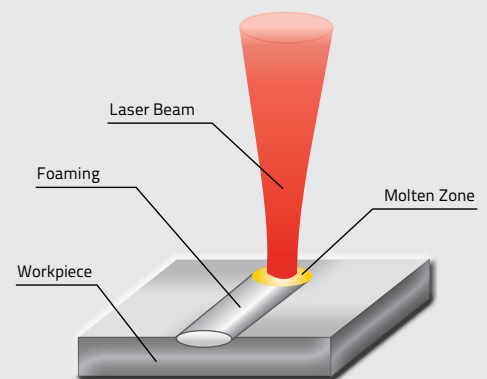
5 - FOAMING

Materials:
Thermoplastic Materials

Laser marking product:
AREX Series- Fiber Laser Marker
VLASE Series – DPSS Laser Marker
UNIQ™ - Fiber Laser Marker

Due to laser absorption and low thermal conductivity the local workpiece temperature rises to its melting point. Small gas bubbles appear in the molten material, which increases its volume creating a type of plastic foam. The processed area appears much brighter then the surrounding material. This process is typically enhanced using laser marking additives that increase contrast and the reliability of the marking process. The foaming marking process is usually tactile and with poor scratch resistance.

6 - COLOR CHANGE / BLACKENING / BLEACHING
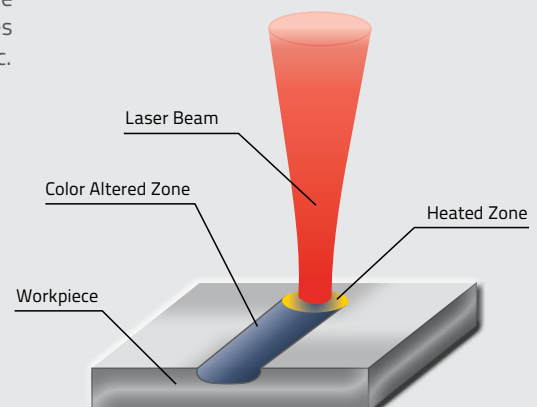
Materials:
Thermoplastic Materials

Laser marking product:
AREX Series- Fiber Laser Marker
VLASE Series – DPSS Laser Marker
UNIQ™ - Fiber Laser Marker

To color change plastics, the laser beam heats the surface locally which causes the workpiece material to change color. The darkening or lightening of the workpiece depends on the composition of the plastic. In blackening, soot particles are generated which show the marking in dark letters on lighter-colored plastic.

7 - CARBONIZATION/ENGRAVING WITH CARBONIZATION

Materials:
Thermoplastic Materials
Paper, Wood, Organics

Laser marking product:
AREX Series- Fiber Laser Marker
VLASE Series – DPSS Laser Marker
EOX – Series – CO2 Laser

Carbonization of one or more specific pigments, flame retardants or other additives will provide consistent marking with sharp contrast in most light colored thermoplastic materials. Engraving may be present depending on the vaporization of the material and its absorption level.

Laser Beam
Carbonized Zone
Heated Zone
Workpiece
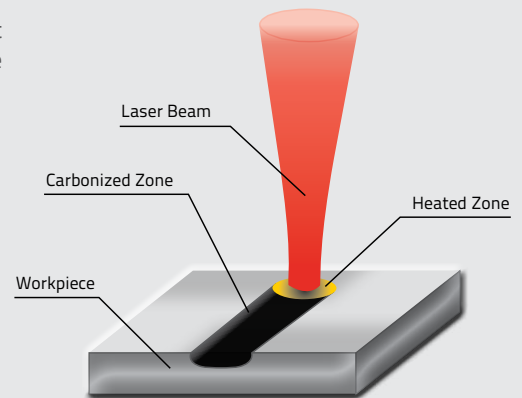
8 - SUBSURFACE LASER ENGRAVING (SSLE)

Materials:
Glass, transparent materials

Laser marking product:
VLASE Series – DPSS Laser Marker

Focusing intense laser radiation below the surface of a glass object creates a mark made of micro-cracks induced by localized absorption of the laser light. As a result, microscopic cracks cause multiple internal light reflections which makes the spot look white. Without affecting the polished surfaces, two and three dimensional images can be created inside of the glass. The images are created dot by dot and the workpiece is moved in two or three dimensions. This technique is popular for decoration as well as tamper-proof traceability.

ABCDEF123456789

Laser Beam
Internal micro-cracks zone
Heated Zone
Transparent Workpiece

DATALOGIC
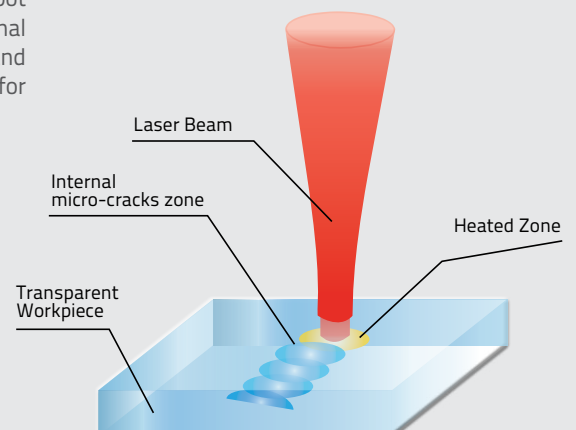
LASER MARKING TECHNOLOGIES

LASER MARKING TECHNOLOGIES

FIBER LASER

Fiber lasers are not new in Industrial Laser Marking, CW fiber sources have been used for high speed marking of integrated circuits (IC) since 1998. In recent years, fiber lasers have tremendously progressed in terms of flexibility and overall performance enabling the 'Fiber Revolution' in the laser market.

With a monolithic, solid state, fiber-to-fiber design which eliminates mirrors and optics to align or adjust, fiber lasers have technological advantages that dramatically improve reliability and repeatability of laser processes.

Fiber lasers also offer integration and operational advantages:

- Fiber lasers are compact and deliver their energy through an flexible optical fiber
- Fiber lasers are scalable and more efficient than any other laser technology, with wall-plug efficiencies greater than 30%
- Fiber lasers offer higher and stable beam quality and excellent pulse-to-pulse stability ensuring the best repeatability over time, especially for critical marking processes
- Q-Switched Fiber lasers offer a long pulse-width (typ 100 nsec) that make these sources the first choice for marking metal in the automotive industry

APPLICATIONS & MATERIALS

High contrast marking on metal

Metals: engraving & deep engraving on metal

Color change on thermoplastic polymer with additive

SOLID STATE LASER

Diode Pumped Solid State Lasers (DPSSL) represent the most consolidated technology for laser marking applications and are still the most flexible solution to generate green and UV laser radiation.
The capability to provide extremely high peak power (up to 10 times higher than standard Fiber Lasers) and short pulse duration, make these laser sources very aggressive for difficult-to-mark materials such as highly reflective metals (copper, brass, silver, gold,...) or very stable polymer plastic.

Solid state lasers emission @ 1064 nm can be efficiently converted into GREEN emission @532 nm (SHG Second Harmonic Generation) and UV emission @355nm (THG Third Harmonic Generation) enabling the capability to engrave virtually any kind of material with extremely high resolution and reduced Heat Affected Zones (HAZ). DPSSL are ideal for even thermally sensitive materials like silicon wafers, WLCSP, thin memory cards, ICs or highly reflective materials (copper, gold, silver).

DPSS lasers are suitable to process, damage free marking process high tech, multilayers, sensitive materials and components in Aerospace, and high technology Industry.

- DPSS lasers offer highest Peak Power and Short pulse width, providing cold process, extremely aggressive marking spot, even on stable and hard to engrave materials.
- DPSS lasers are easy to repair.
- DPSS lasers are available even with GREEN and UV emission, for low thermal footprint marking process.
- DPSS lasers are the first choice for Thermoplastic Polymer Marking in electronics / electromechanical Industry.

APPLICATIONS & MATERIALS

INFRARED

Color change on high stability plastic polymer

Paint stripping, coating removal

Night & day

Paint stripping

Surface modification

High contrast marking on highly reflective metal

UV glass marking

LASER MARKING TECHNOLOGIES

CO2 LASER

Developed over 50 years ago, the CO2 laser has captured the largest portion of the laser materials processing market. Current day CO2 lasers are the best solutions for high thermal impact marking with wavelengths 10x longer than DPSS and Fiber lasers. The long wavelength (10600 nm) is extremely efficient on typical packaging materials, such as:

- Paper, Corrugated Cardboard
- Glass, Ceramic
- Plastic polymer , Rubber
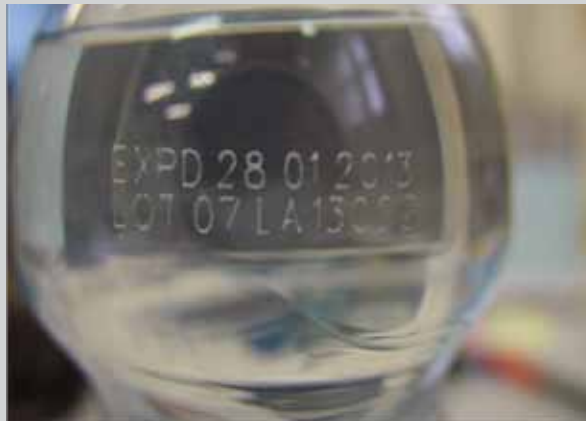- Painted, coated material (metals, plastic PCB)

APPLICATIONS & MATERIALS

PCB marking

Packaging materials - heat sensitive coatings and cardboard

High speed PET coding

Direct marking on cardboard

LASER
APPLICATIONS

AUTOMOTIVE

PARTS TRACEABILITY & DPM

Direct Part Marking (DPM) of parts and components during assembly process
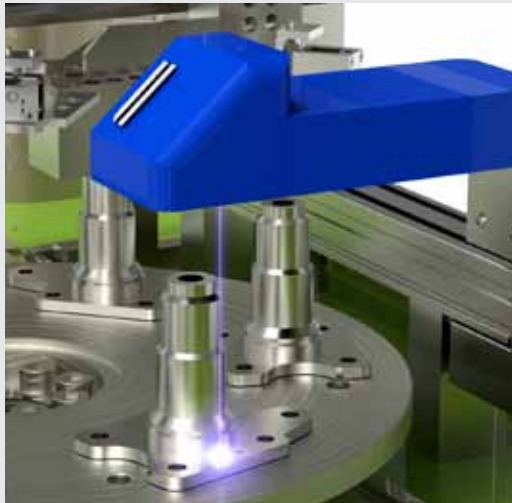
BENEFITS
- Direct part marking: no ink, no label
- Highly configurable serial numbering features including time/date, shift coding etc.
- Comprehensive 1D and 2D bar code library with advanced cell filling functions
- Built-in scripting capability for custom data formatting and integration with external database
- Deep engraving for end-of-life traceability
- Contactless operation : no mechanical stress or deformation on target
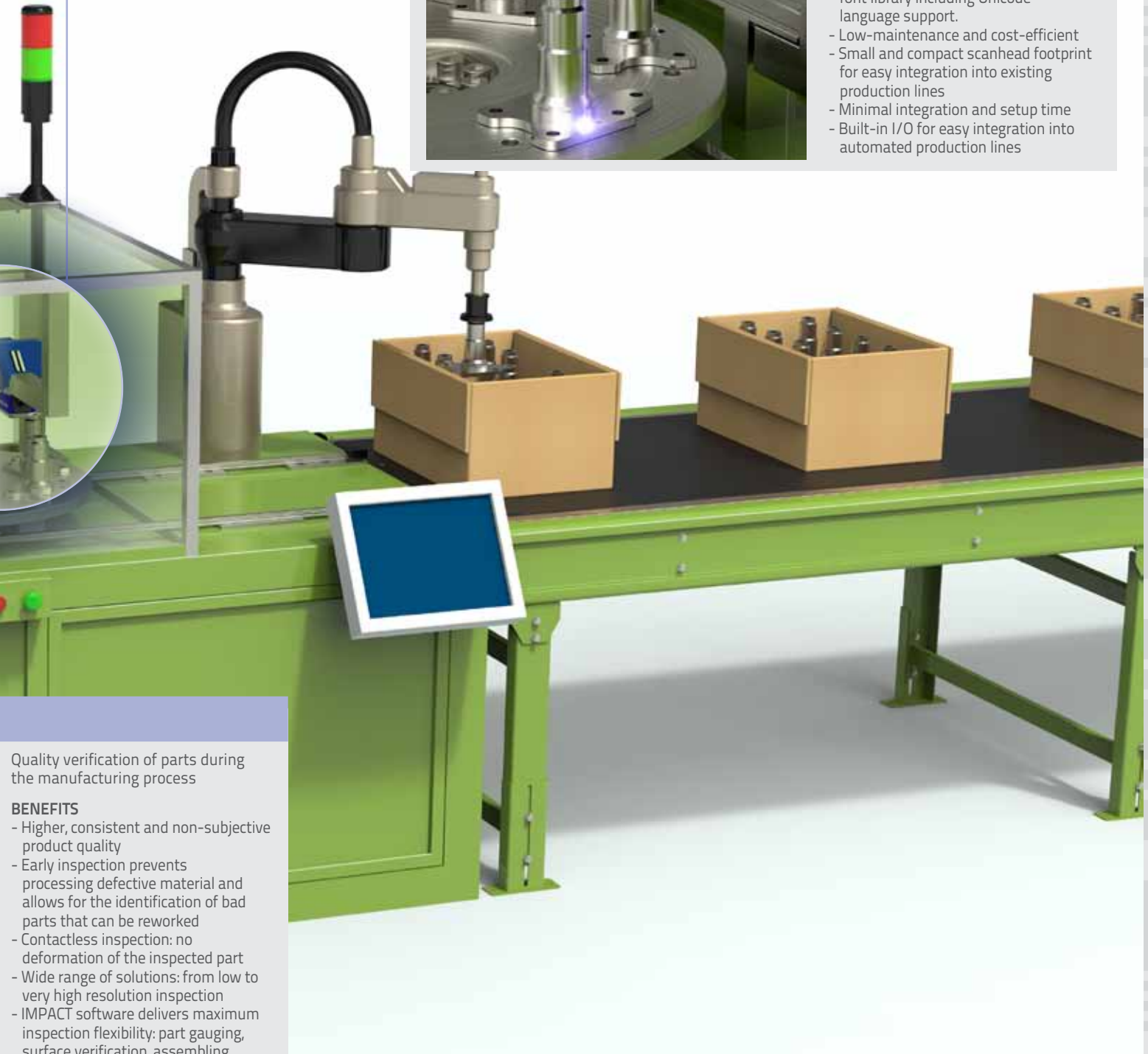
INSPECTION

COMPONENTS MARKING

Parts are branded and personalized with manufacturer logos, graphics or quality marks.

BENEFITS
- Extreme flexibility: automatically change data on every mark, including logo, date, lot, order codes etc.
- Full range of options for drawing, importing and editing logos and graphics
- Comprehensive Windows® True Type font library including Unicode language support.
- Low-maintenance and cost-efficient
- Small and compact scanhead footprint for easy integration into existing production lines
- Minimal integration and setup time
- Built-in I/O for easy integration into automated production lines

Quality verification of parts during the manufacturing process

BENEFITS
- Higher, consistent and non-subjective product quality
- Early inspection prevents processing defective material and allows for the identification of bad parts that can be reworked
- Contactless inspection: no deformation of the inspected part
- Wide range of solutions: from low to very high resolution inspection
- IMPACT software delivers maximum inspection flexibility: part gauging, surface verification, assembling control, component positioning

LASER CUTTING
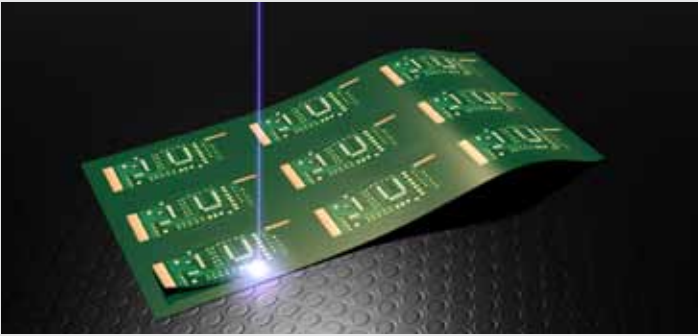
Stress free PCB cutting, drilling and depaneling for flex-rigid circuitry. Suitable for ITO/TCO processing and for cutting ceramic based materials

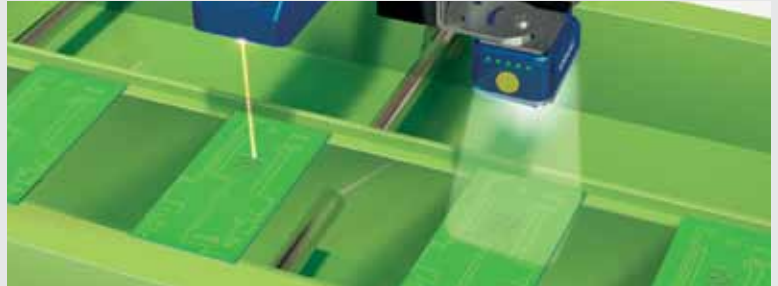**BENEFITS**
- Low thermal footprint, no mechanical stress
- Rated for 24/7 operation
- Cost effective solution
- Broad range of materials

DPM READING AND
CODE QUALITY VERIFICATION

Tracking of a PCB is made easy through Direct Part Marking (DPM). 2D code validation after a laser marking station assures the correct information and 2D code readability.

BENEFITS
- YAG laser marking protection for mark-and-read solutions
- High density code reading on very small codes
- Code quality analysis for statistical process trending

LASER TRIMMING
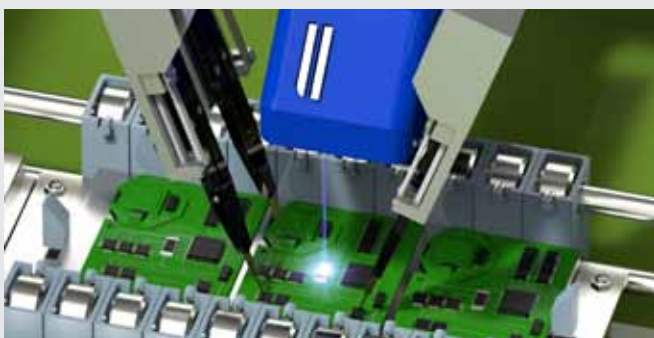
Active laser trimming of electronic circuits and SMD components and other SMD components

BENEFITS
- Low thermal footprint, reduced kerf width
- Accurate and precise beam positioning
- High speed ablation
- Easy integration and reduced setup time

WAFER MARKING
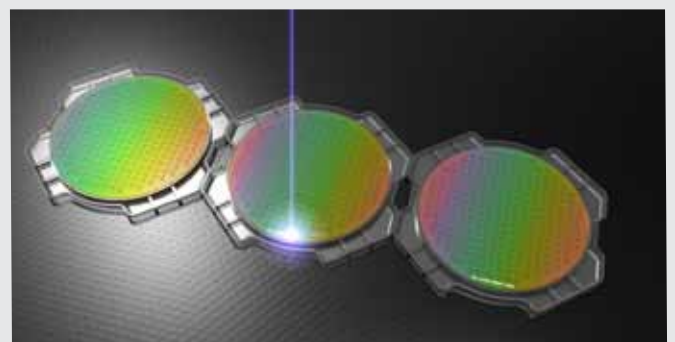
Stress & debris-free marking, by melting the silicon

BENEFITS
- Low thermal footprint, no mechanical stress
- Rated for 24/7 operation
- Cost effective solution
- Machine-readable marks

FOOD
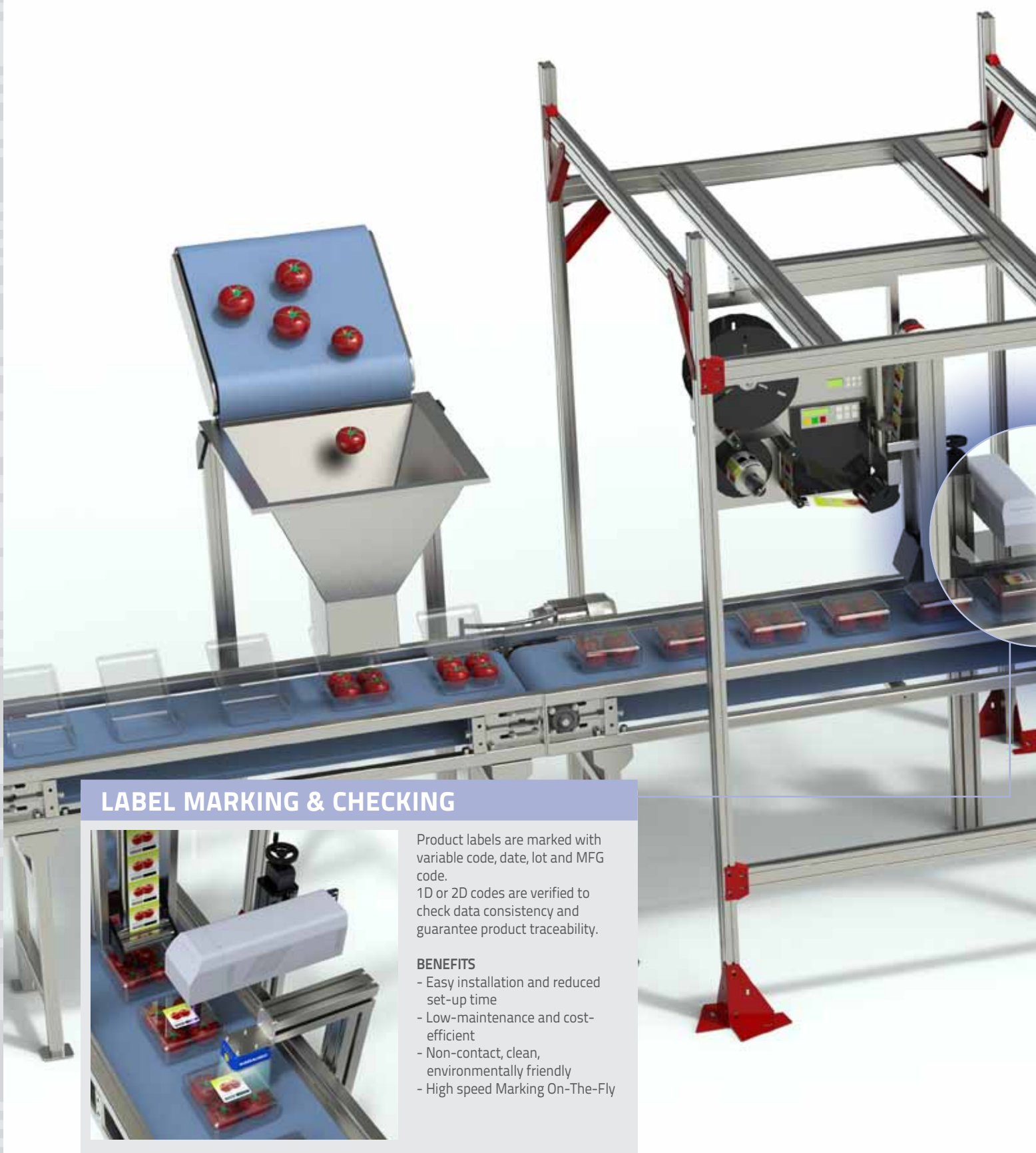
LABEL MARKING & CHECKING
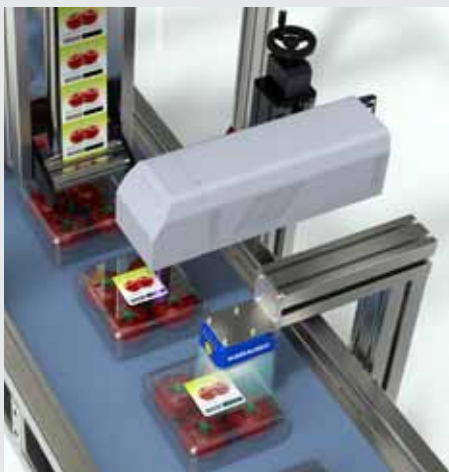
Product labels are marked with variable code, date, lot and MFG code.
1D or 2D codes are verified to check data consistency and guarantee product traceability.

BENEFITS
- Easy installation and reduced set-up time
- Low-maintenance and cost-efficient
- Non-contact, clean, environmentally friendly
- High speed Marking On-The-Fly
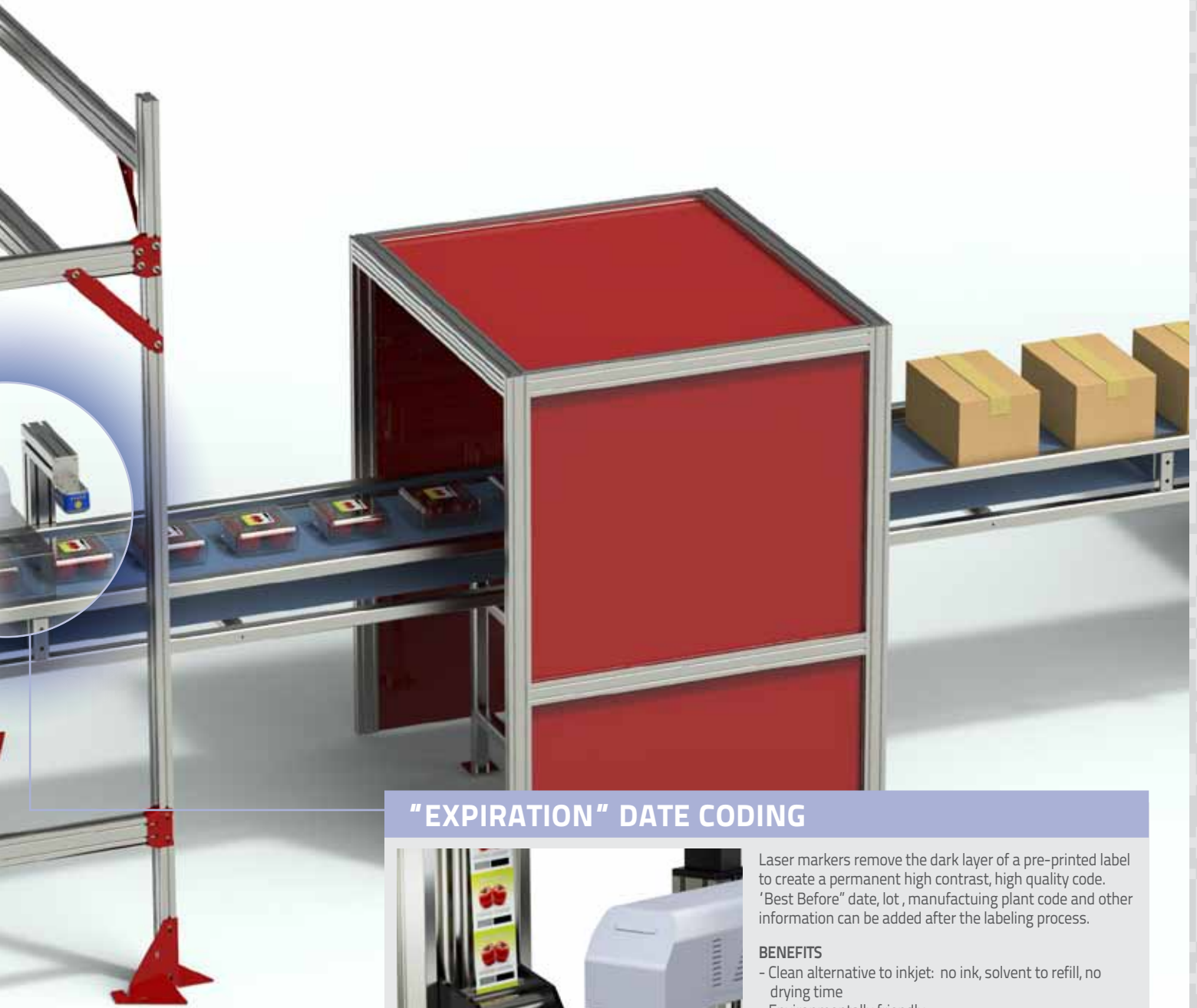
"EXPIRATION" DATE CODING

Laser markers remove the dark layer of a pre-printed label to create a permanent high contrast, high quality code. 'Best Before" date, lot , manufactuing plant code and other information can be added after the labeling process.

BENEFITS
- Clean alternative to inkjet: no ink, solvent to refill, no drying time
- Environmentally friendly
- Very high quality, contrast and resolution
- Highly configurable serial numbering features including time/date, shift coding etc.
- Comprehensive 1D and 2D bar code library with advanced cell filling functions
- Built-in scripting capability for custom data formatting and integration with external database
- High speed, marking-on-the-fly
- Low total cost of ownership, reduced maintenance

PHARMACEUTICAL

CAP INSPECTION
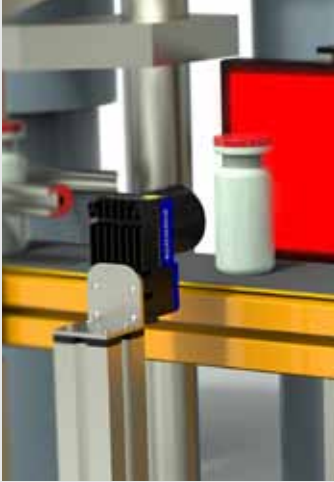
The pharmaceutical industry requires high performance solutions for product inspection, coding and tracking.

This inspection ensures the product quality by verifying the bottle cap is present and applied correctly. Normally, this inspection is performed at high rates of speed prior to the sealing and final packaging process where visual inspection is not possible without reopening the sealed package.

BENEFITS
- High speed, high accuracy quality control
- Full product traceability
- Certified product integrity
- Image and data archiving for quality
  reporting

MARK, READ & INSPECT
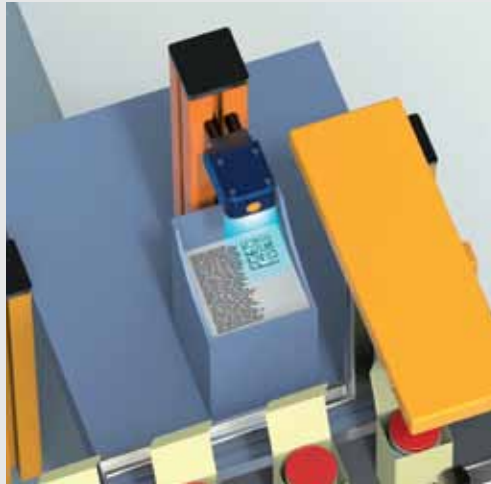
Complete integrated track, trace and control solutions with laser marking, inspection and bar code reading to guarantee accurate and efficient processes.

BENEFITS
- Correct match of drug, package and drug facts leaflet
- Full track&trace system
- Total traceability of every product component

LASER CODING AND VERIFICATION

LASER CODING
Critical variable product information is permanently marked directly or on laser activated labels.
The combination of human readable data and 2D codes identifies the product, the manufacturer, the batch number and the expiration date.

CODE VERIFICATION
Checking for critical variable product information on labels to verify data consistency and maintain quality standards.

BENEFITS
- Complete label inspection: 1D/2D code and OCR reading
- Total control of product serialization
- Information readability verification

LIGHTER
SOFTWARE

LIGHTER SOFTWARE

LIGHTER SOFTWARE is the laser marking software suite for all DLA laser marking products. With innovative software functions and concepts, the LIGHTER Suite delivers an important step ahead for simple integration and ease of use. **LIGHTER** combines advanced editing features with laser setup, laser controls and diagnostics for a complete, flexible and easy to use laser marking system platform.

Advanced Editing Function
- Graphical layout with a user friendly interface for labels, logos, text, data matrix codes, and bar codes
- Property browser concept for fast adjustment of all parameters
- Creates and edits text strings, shapes, and logos.
- Powerful coding library for 1D and 2D bar codes (100+ code styles available)
- Bitmap and vector import and export formats (BMP, PNG, GIF, JPG TIF, PLT, DXF)
- Filling and hatching of objects and pattern structures with various styles
- Grid array capabilities for IC marking
- Gray tone marking

Automation Capability
- 4 independent mechanical axes: X, Y, Z and Rotary/indexer
- User controlled general purpose inputs and outputs
- Built-in marking-on-the-fly (MOF) wizard for easy, fast set-up
- Sequential programming through Sequence editor: with a few clicks create control objects and design automation jobs
- Stand alone and master-slave modes
- **LIGHTER** allows OEMs and machine builders to develop a complete, cost effective laser marking station based on embedded hardware and software (STAND ALONE mode), or to design an advanced laser marking solutions that are able to control an entire machine via a simply Ethernet connection with a supervisor computer (MASTER-SLAVE mode).
- Full control in both local and remote modes via the Laser Editor GUI:
  - Local/Remote laser configuration with MOF Wizard
  - Local/Remote laser diagnostics
  - Local/Remote I/O & axis control
  - Local/Remote Automation Project control
  - Local/Remote Active X controls

Programmable Interface and Protocols
Lighter is scriptable, meaning it can be easily integrated into legacy systems through a wide range of transmission media, protocols and architectures.
- Scripting programmability
  LIGHTER Suite integrates the Integrated Development Environment (IDE) providing the users with a full set of tools for extremely flexible customization. The programming language for Lighter Suite is ECMAScript std, also known as JavaScript.
  With Project Editor it is possible to:
  - Control the marking process
  - Fully customize your layout
  - Interact with users with a dedicated custom GUI
  - Built-in scripting capability for custom data formatting and automatic layout code update

- **IP ActiveX** allows OEM integrators and end-users to create customized Applications and User Interfaces via Ethernet
- **RS232 and the new Ethernet protocols** for synchronized and reliable communication

Example preview of horizontal fill for Datamatrix   Example preview of pocketing fill for text
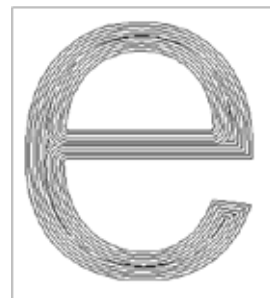
TECHNICAL FEATURES		
User Interface	Languages	English, Italian, German, Spanish, French, Polish, Japanese, Traditional Chinese, Simplified Chinese, Korean. Qt-Languist™ Tool Kit to a new language add
	OS supported	Windows 8, Windows 7,Vista, XP
	Access	password protected user levels
Character type	Font	Original single line, True Type, Open Type, Type1, Type42
	Languages	Unicode language support European, Asian and all "non-latin" languages Arabic, Cyrillic and Hindi
	Text	Fixed text, linear and radial text, customizable date/time objects, serial number, batch code, fully customizable code
Code type	Barcode	I 2of5, Code39, Code128, UPC, EAN (GS1 ready)
	Stacked	PDF417, Code16K, RSS Family
	Matrixcode	Datamatrix, QRcode, microQR, MaxiCode, Dot Code, Aztec Code, Han Xin Code, MicroPDF417 and many more
Drawing capabilities	Logo image types	HPGL, PLT, DXF, DWG, BMP, JPG, TIF, GIF, PNG
	Draws	Vector optimization and graphical adjustments
	Filling	Single, cross, triple lines filling, advanced spiral and pocketing with Filling Marking preview editor
	Array	Grid array capabilities for IC marking
Automation	Mode	Stand-Alone, Master-Slave Ethernet
	Script	step and repeat with different control objects (Wait, Timer, ...)
	Mechanical Axis	motion control for driving 4 external axis: x, y, z and Rotary/indexer axis
	Programmable Interface	ActiveX, Scrip, Sequence
	Communication protocols	Ethernet, RS232

DATALOGIC
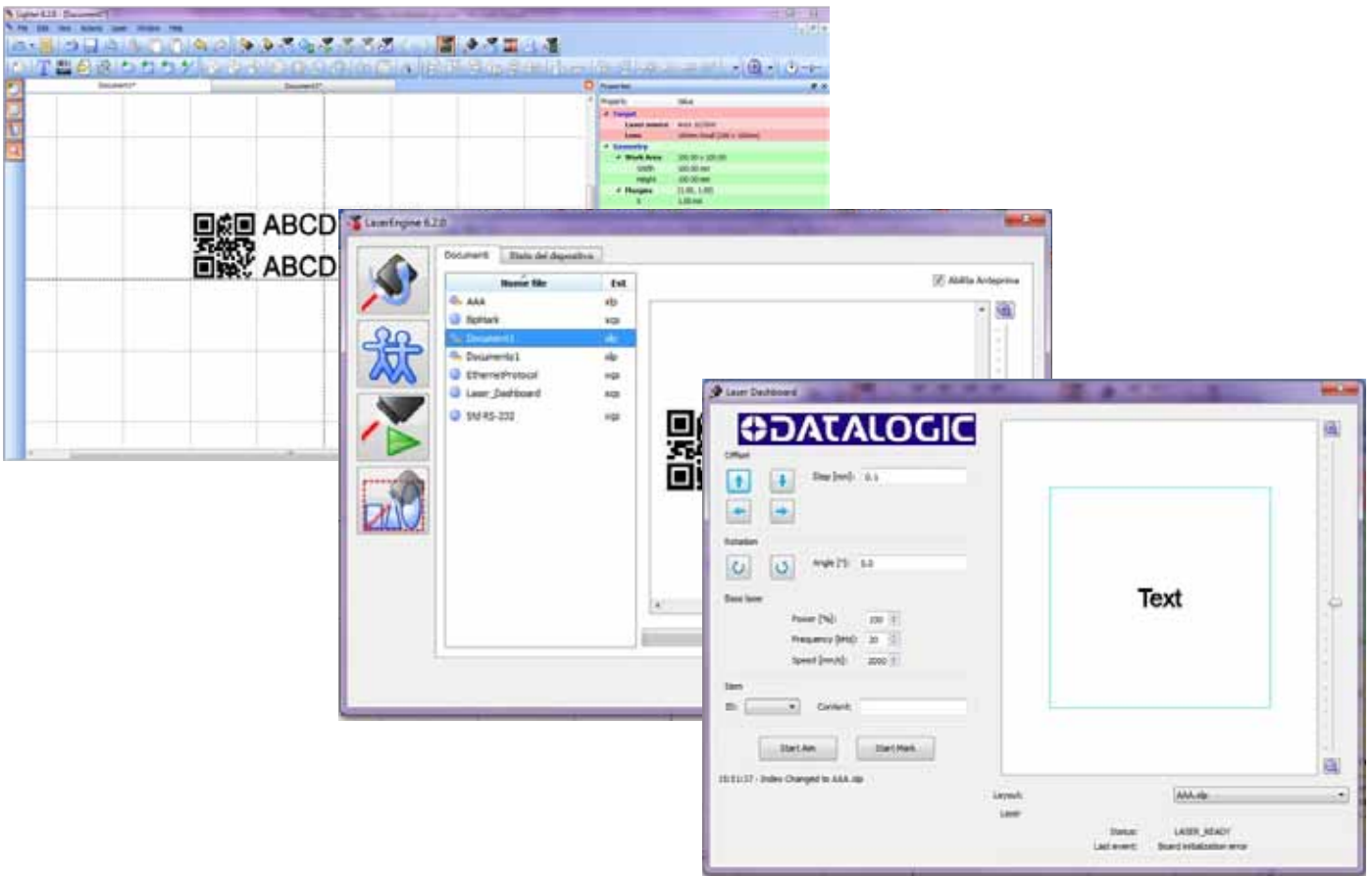
LASER MARKING PRODUCTS

AREX SERIES

Arex is a complete family of high performance laser marking products based on fiber laser technology designd for high performance in high speed Direct Part Marking (DPM) applications.
AREX combines a fan-less, IP54, environment resistant compact scanning head with 19 inch controller unit.

A high performance embedded controller allows for easy operation in stand-alone configuration as well as sophisticated integration in master-slave configuration.

FEATURES & BENEFITS

- Compact, high performance scanning head
- Built-in embedded controller
- Ethernet, RS232, 4x USB ports
- Dedicated I/O for photocells and encoders
- IP54 scanning head
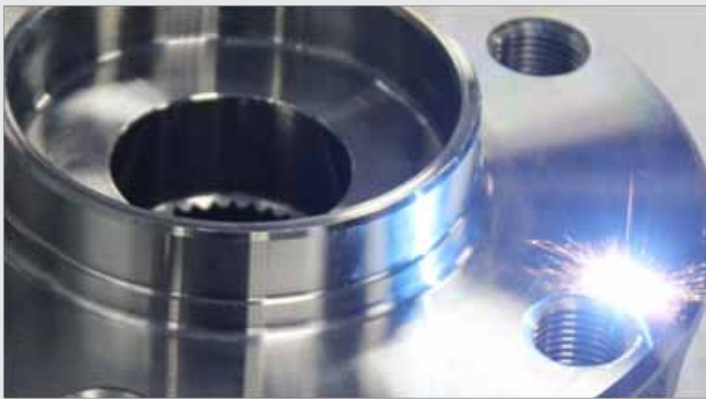- Precise dual laser aiming beams system
- 4 axis embedded controller

MAIN APPLICATIONS

FACTORY AUTOMATION

- **Automotive**
  High Contrast DPM for traceability, quality control, testing & sorting
  Deep engraving for traceability after painting, coating or other surface treatments
- **Electronics**
  DPM for traceability, quality control, testing & sorting, WIP track and control, quality selection
  Label replacements, dynamic coding
  Branding and high resolution product identification

Other

- **Healthcare**
  Branding and high resolution product identification
  DPM for traceability, quality control, testing & sorting, quality selection
  Ink replacement, dynamic coding
- **High Precision Machining**
  Branding and high resolution product identification
  DPM for traceability, quality control, testing & sorting, wip track and control, quality selection

PARAMETER		AREX 10	AREX 20	AREX 30	AREX 50
Nominal average power	W	>10	>20	30	50
Wavelength	nm	1060 - 1080	1060 - 1080	1060 - 1080	1060 - 1080
Pulse Energy (Max)	mJ	0,5	1,0	1,0	1,0
Pulsewidth (Typ)	ns	100	100	100	100
Peak Power (Max)	kW	5	10	10	10
Repetition Rate	kHz	20 -100	20 -100	30 -200	50 -200
Beam delivery cable length	m	3			
Working Area	mm^2	100x100 with F-Theta 160S 140x140 with F-Theta 254S			
Working Distance	mm	184 mm with F-Theta 160S 294 mm with F-Theta 254S			
Marking capabilities		Static, Rotary axis, On the fly (marking in motion)			
Integration		Up to 4 mechanical axis driving capabilities (stepper motor) Up to 10 digital inputs and 10 digital output fully programmable 1 dedicated connector for Dual line high resolution encoder 1 dedicated connector for photocell			
Aiming laser beam		Semiconductor laser @ 635nm			
Focus laser beam		Semiconductor laser @ 635nm			
Cooling		Air cooled			
Power Supply		100/240 VAC – 50/60 Hz			
Resonator Dimension & Weight		87x112x298 mm 2 kg			
Rack Dimension & Weight		111x430x370 mm 16 kg			

UNIQ™

UniQ™ marker is a revolutionary and innovative approach to Fiber Laser Marking.

UniQ™ fiber laser marker represent the perfect combination of a high performance fiber laser into a innovative, ultra-compact housing designed to provide an effective solution to the recent request of shorter, smaller production lines, in order to reduce footprint and floor area consumption.

Thanks to its advanced internal design, UniQ™ laser marker does not need any low-ip grade external cabinet, controller or power supply, and is totally free from delivery fiber constraints such as fiber length and fiber bending limitations.

The IP54 rated innovative housing guarantees maximum protection even in harsh factory environments and industrial applications.

UniQ™ laser marker works seamless with Datalogic's Lighter Suite, a powerful, quick and intuitive marking software, and is fully compatible with the latest Datalogic I/O interfaces.

FEATURES & BENEFITS

- Powerful 15W fiber laser source

- All-in-one, Fully integrated ultra-compact device

- Rugged IP54 rated housing

- All included: No external controller, no external power supply needed

- No fiber delivery constraints

- Built-in second generation EMC (Embedded Marking Controller)

- Great Money Vs Watt ratio

- Powered by Lighter software Suite

MAIN APPLICATIONS

FACTORY AUTOMATION

- **Automotive**
  - High Contrast DPM for traceability, quality control, testing & sorting.
  - Label replacement, inkjet replacement.
  - High engraving depth for END –OF-LIFE traceability

- **Industrial Electronics**
  - High contrast marking on additivated plastic materials
  - High speed coding and branding on industrial electronic devices

Other
- **Medical & surgical tools**
  - Contactless and Clean Direct Marking Process for Branding & Personalization
  - Instant permanent marking: no drying time, no post processing, no solvent or additive

- **Precision Mechanics**
  - high precision marking with no mechanical stresses
  - Clear and precise annealing even on very small surface

PARAMETER		UNIQ
Wavelenght	nm	1060 – 1080 nm
Nominal Power	W	15 W
Repetition Rate Range	kHz	15 - 100 kHz
Pulsewidth	Typ	120 nsec
Pulse Energy	mJ	0.75 mJ
Peak power	kW	10 kw
Marking capabilities		Standing, Rotary axis, On the fly (marking in motion)
Working area	mm^2	100x100 with F-Theta 160S 140x140 with F-Theta 254S
Working distance	mm	184 mm with F-Theta 160S 294 mm with F-Theta 254S
integration		Up to 4 mechanical axis driving capabilities (stepper motor) Up to 10 digital inputs and 10 digital output fully programmable dedicated connectors for Datalogic's Encoder and Photocell
Interface		Ethernet, RS 232, 4x USB
Aiming & Focus Beam		Class II Semiconductor laser @ 635 nm
Power Supply		100/240 VAC – 50/60 Hz
Cooling System		integrated air
Temperature Range	°C	5 to 40

LASER MARKING PRODUCTS

VLASE SERIES: IR, GREEN, UV

VLASE SERIES now combines state-of-the-art YVO4 Solid State laser sources with the high flexibility and easy setup of the 'ONE.RACK" embedded controller, providing machine builders, system integrators and end users a unified I/O interface for all three main laser marking technologies as well as only one control unit footprint and design. The high performance embedded controller provides easy operation in stand-alone configuration as well as sophisticated integration in master-slave configuration.

FEATURES & BENEFITS
- Compact, high performance laser resonator
- Detachable resonator & optical fiber
- High Peak power up to 60 kW
- Infrared, Green and UV on same platform
- Build-in embedded controller
- Ethernet, RS232, 4x USB ports
- Dedicated I/O for photocells and encoders
- 4 axis embedded controller

MAIN APPLICATIONS

FACTORY AUTOMATION

- **Automotive**
  Coating removal and paint stripping for NIGHT & DAY application
  High Contrast DPM for traceability, quality control, testing & sorting on high reflectivity materials.
- **Electronics**
  DPM for traceability to thermal sensitive, like silicon wafers, WLCSP, memory cards, ICs or high reflectivity materials like copper, gold and silver
  Branding and high resolution product identification

Other
- **Healthcare**
  Branding and high resolution product identification
  DPM for traceability, quality control, testing & sorting, quality selection.
  High quality marking on highly stable material for medical implants
- **High Precision Machining**
  Branding and high resolution product identification
  DPM for traceability, quality control, testing & sorting, wip track and control, quality selection

PARAMETER		VL-IR 10	VL-IR 15	VL-IR 20	VL-GR 4	VL-GR 10	VL-UV 3
Wavelenght	nm	1064	1064	1064	532	532	355
Nominal Power	W	10	15	20	4	10	3
Repetition Rate Range	kHz	10 ÷ 200	15 ÷ 200	20 ÷ 200	20 ÷ 100	20 ÷ 100	20 ÷80
Pulse Width	ns	15@10KHz	12@15KHz	8@20KHz	14@50KHz	10@50KHz	8@25KHz
Max Pulse Energy	mJ	0.48@10kHz	0.65@15KHz	0.55@20KHz	0.18@20KHz	0.31@20KHz	0.12@30KHz
Peak power	kW	32@10KHz	55@15KHz	65@20KHz	13@25KHz	28@20KHz	14@25KHz
Marking capabilities		Standing, Rotary axis, On the fly (marking in motion)					
Working area	mm^2	100x100 with F-Theta 160S 140x140 with F-Theta 254S					
Working distance	mm	184 mm with F-Theta 160S 294 mm with F-Theta 254S					
integration		Up to 4 mechanical axis driving capabilities (stepper motor) Up to 10 digital inputs and 10 digital output fully programmable dedicated connectors Encoder and Photocell					
Interface		Ethernet, RS 232, USB					
Optical Fiber		Detachable – 3 meters standard- 5 meters OPZ					
Aiming Beam		Semiconductor Laser - 630 – 670 nm					
Power Supply		100- 240 VAC 50/60Hz – 600 W max					
Cooling System		Air cooled					
Temperature Range	°C	5°C to 40°C (41°F to 104°F)					

ULYXE

The Ulyxe product line provides ideal laser marking solutions for both stand-alone applications and industrial production lines.

The Ulyxe integrates a 6.5W DPSS laser marking system providing a cost effective and innovative design. With the best price/performance for plastics and metals, Ulyxe is the first choice in laser marking systems.

FEATURES & BENEFITS

- Air-cooled, reduced footprint ultra-compact design
- All-in-one design: scanning head, power driver & control electronics, marking controller, diagnostic and software suite
- Embedded, visible aiming beam and focus beam for fast and easy focus finding and simplified marking operations setup
- User-friendly touch screen LCD display for monitoring and controlling laser status and functions
- Patented, high efficiency, laser resonator design
- Best price to performance ratio on the market

MAIN APPLICATIONS

MANUAL OR LOW THROUGHPUT APPLICATIONS

- **Automotive**
  Label marking, paint stripping & coating removal
- **Electronics**
  Branding and coding of thermoplastic polymers for electronics industry
- **Healthcare**
  Branding and high resolution for medical devices and traceability for implants
- **Tool industry**
  Branding, personalization of high quality tools.

PARAMETER		ULYXE	ULYXE PL	ULYXE IMARK
Nominal average power	W	6	6	6
Wavelength	nm	1064	1064	1064
Repetition Rate	KHz	10 – 100	10 – 100	10 – 100
Working area	mm^2	100x100 with F-Theta 160S 140x140 with F-Theta 254S		
Fixing distance	mm	184 mm with F-Theta 160S 294 mm with F-Theta 254S		
Marking capabilities		Static		Static, Rotary axis, On the fly (marking in motion)
Integration		Up to 4 mechanical axis driving capabilities (stepper motor)		Up to 4 digital inputs and 4 digital outputs fully programmable Up to 10 digital inputs and 10 digital output fully programmable dedicated connectors Encoder and Photocell
Aiming Beam		Semiconductor laser @ 635nm		
Focus Beam		Semiconductor laser @ 635nm		
Cooling system		Air cooled		
Display		YES, touch screen	NO, OPTIONAL	NO, OPTIONAL
Power Supply		24 VDC – 300 W MAX		
Operating Temperature Range	C°	10 to 35		

LASER MARKING PRODUCTS

EOX SERIES

EOX is a family of CO2 Laser Markers for laser coding and marking applications.

EOX offers high quality permanent marking on a wide range of materials like paper, carton, wood, plastics, painted or coated metals, and many other organic materials.

Combining excellent laser beam quality and an advanced control unit, EOX is suitable for accurate industrial traceability, branding and coding applications.

Based on the Embedded Marking Controller Platform (EMC), flexible 'Stand Alone" or 'Master – Slave" control modes and provides axis control as well as dedicated photocell / encoder ports for marking-on-the-fly (MOF).

Thanks to its low operating cost, long lifetime and minimal maintenance, EOX provides a reliable and clean technology for industrial marking and coding applications.

FEATURES & BENEFITS

- Air-cooled, reduced footprint
- All-in-one design:
  scanning head, power & control electronics, marking controller, diagnostics and software suite
- Embedded visible aiming beam and focus beam for fast and easy focus setup and marking operation
- High resolution marking

MAIN APPLICATIONS

- **General Marking:**
  Label marking, paint stripping & coating removal, kiss-marking and perforating labels
- **Electronics**
  PCB marking and coding, ceramic component marking, alumina marking
- **Healthcare**
  Branding and coding containers
- **Food**
  Direct, high contrast marking on food (cheese, bread, eggs, fruits, vegetables …)
- **Packaging**
 Marking coated paper, inked paperboards, film cutting and perforating

PARAMETER		EOX 10	EOX 30
Nominal average power	W	10	30
Wavelength	nm	10600	
Working area	mm^2	70x70 with F-Theta 100 140x140with F-Theta 200	
Working distance	mm	100 with F-Theta 100 200 with F-Theta 200	
Marking capabilities		Static, Rotary axis, On the fly (marking in motion)	
Integration		Up to 4 mechanical axis driving capabilities (stepper motor) Up to 10 digital inputs and 10 digital output fully programmable dedicated connectors Encoder and Photocell to 75mt/min and 12.000 pcs/hour	
Aiming beam		Semiconductor laser @ 635nm	
Focus beam		Semiconductor laser @ 635nm	
Cooling system		Air cooled	
Resonator dimensions & weight		180x185x634 mm kg 17	
Controller dimensions &weight		–	437x94x333 mm kg 9
Power Supply		100 – 240 VAC 50/ 60 Hz	
Operating Temperature Range	C°	10 to 35	

ACCESSORIES
AND MARKING KIT

ACCESSORIES AND MARKING KIT

F-THETA LENS & ACCESSORIES
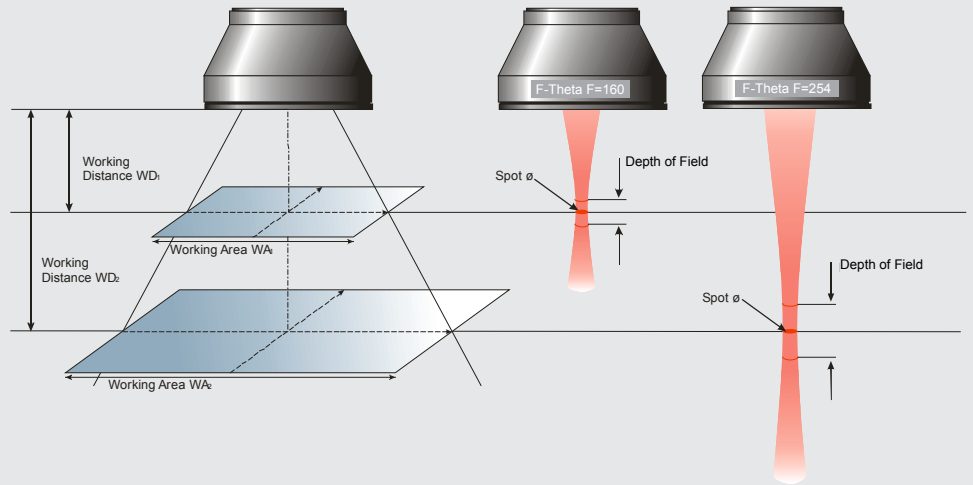
STANDARD 1064 NM F-THETA LENS							
CODE	F-THETA	WORKING AREA [WA]	WORKING DISTANCE [WD]	SPOT DIAM (TYP)	LENS THREAD	ADAPTER	LASER PRODUCT
985300029	F100S	50 x 50 mm^2	118 mm	40 µm	M39x1.0	985300021	AREX Series VLASE IR Series ULYXE, UniQ™
985300011	F 160S	100 x 100 mm^2	184 mm	60 µm	M39x1.0	985300021	
985300028	F 254S	140 x 140 mm^2	294 mm	90 µm	M39x1.0	985300021	

OTHER 1064 NM F-THETA LENS (AVAILABLE ON REQUEST)							
CODE	F-THETA	WORKING AREA [WA]	WORKING DISTANCE [WD]	TYPICAL SPOT DIAM *	LENS THREAD	ADAPTER	LASER PRODUCT
985300014	F 100L	60 x 60 mm^2	97 mm	40 µm	M85x1,0	985300022	AREX Series VLASE IR Series ULYXE, UniQ™
985300012	F 160L	110 x 110 mm^2	176 mm	60 µm	M85x1,0	985300022	
985300018	F 254L	180 x 180 mm^2	300 mm	90 µm	M85x1.0	985300022	
985300019	F 330L	220 x 220 mm^2	393 mm	120 µm	M85x1.0	985300022	
985300020	F 420L	285 x 285 mm^2	507 mm	160 µm	M85x1.0	985300022	

*On AREX /new VLASE

STANDARD 532 NM F-THETA LENS							
CODE	F-THETA	WORKING AREA [WA]	WORKING DISTANCE [WD]	TYPICAL SPOT DIAM *	LENS THREAD	ADAPTER	LASER PRODUCT
985300001	F 160S	100 x 100 mm^2	184 mm	40 µm	M39x1.0	985300021	VLASE GREEN

*New VLASE

OTHER 532 NM F-THETA LENS (AVAILABLE ON REQUEST)							
CODE	F-THETA	WORKING AREA [WA]	WORKING DISTANCE [WD]	TYPICAL SPOT DIAM *	LENS THREAD	ADAPTER	LASER PRODUCT
985300005	F 100S	60 x 60 mm^2	97 mm	30 µm	M39x1,0	985300021	VLASE GREEN
985300003	F 160L	110 x 110 mm^2	176 mm	40 µm	M85x1.0	985300022	
985300006	F 254L	180 x 180 mm^2	300 mm	60 µm	M85x1.0	985300022	

STANDARD 355 NM F-THETA LENS							
CODE	F-THETA	WORKING AREA [WA]	WORKING DISTANCE [WD]	TYPICAL SPOT DIAM *	LENS THREAD	ADAPTER	LASER PRODUCT
985300010	F 103T	60 x 60 mm^2	136 mm	25 µm	M85x1,00	985300022	VLASE UV

OTHER 355 NM F-THETA LENS (AVAILABLE ON REQUEST)							
CODE	F-THETA	WORKING AREA [WA]	WORKING DISTANCE [WD]	TYPICAL SPOT DIAM *	LENS THREAD	ADAPTER	LASER PRODUCT
985300008	F 160L	60 x 60 mm^2	197 mm	35 µm	M85x1,0	985300022	VLASE UV

ZINC SELENIDE CO2 F-THETA LENS					
CODE	F-THETA	WORKING AREA [WA]	WORKING DISTANCE [WD]	TYPICAL SPOT DIAM.	LASER PRODUCT
985300024	F 100	70 X 70 mm^2	96 mm	250 µm	EOX Series
985300023	F 200	140 X 140 mm^2	196 mm	370 µm	

MARKING KIT

The marking kit allows system integrators to easily interact with the laser marking system.

The laser marking software, LIGHTER, provides the functionality for many fully automated industrial applications as well as for job shops or small production lines.

Two different Marking KIT configurations are available, with or without the scanning head.

Based on the iMARK control board (PCI & PCI-Express) the marking kit is a user friendly PC-based desktop solution for controlling laser marking systems.

Lighter is scriptable, meaning it can easily integrate with legacy systems through a wide range of combinations of transmission media (RS232, ETH), protocols (FTP, SMB, XML) and architectures (master/slave, client/server, …).

No specific tool or software development environment is necessary for integration since everything is provided in LIGHTER through a powerful Integrated Development Environment (IDE).

Lighter is extensible; its scripting features can be extended through custom-developed plug-ins to deal with specific integration-related issues (custom components or protocols, patent protected algorithms etc.).

FEATURES & BENEFITS

- Marking-on-the-fly
- Array marking
- Grey tones marking
- Mechanical axis control (X, Y, Z)
- Rotating Axis control
- 16 programmable I/Os
- User friendly interface
- Scriptable SW for easy integration and personalization
- High speed scanning head 8 mm aperture available @ 1064, 532, 355 nm
- Full digital, single cable connection to scanhead

iMARK marking KIT	iMARK marking kit without scanning head - iMARK PCIe control board - I/O expansion board - SW Lighter - Digital to analog converter for scanhead - Cable set (3 m)
iMARK marking KIT iMARK marking KIT + Miniscanner 8 DGT	iMARK marking kit without scanning head - iMARK PCIe control board - I/O expansion board - Miniscanner 8 scanhead - SW Lighter - Cable set (3 m)
Miniscanner 8 analog input	High speed scanhead with 8 mm aperture mirrors Available @1 064 nm, 532nm 355 nm

NOTES

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THE VISION IS YOURS

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