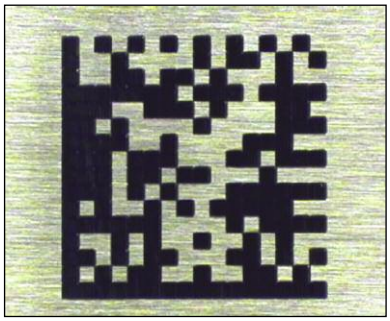
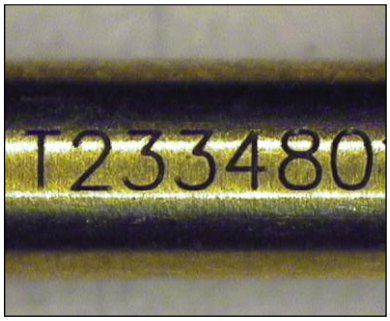
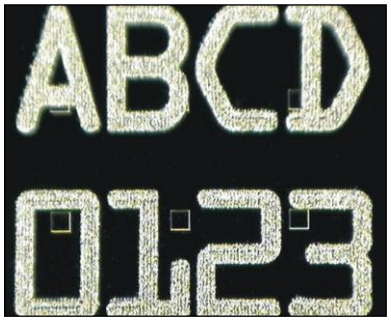
Laser Marking

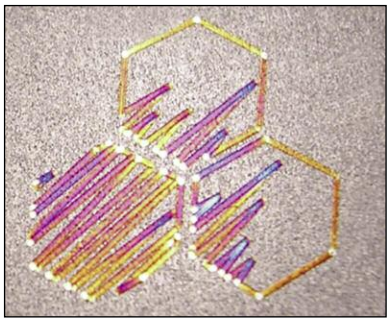
Fiber, Nd:YVO_4, Green, UV and CO_2 Laser Markers

TYPICAL APPLICATIONS

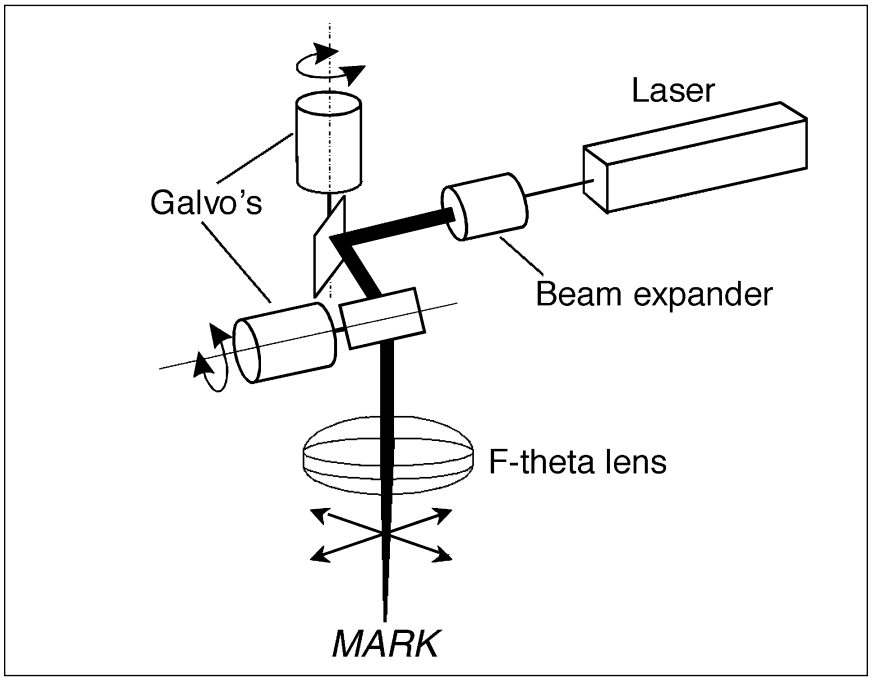








HOW A LASER MARKER WORKS



How it works: The laser is steered by mirrors mounted onto galvo motors to produce the mark. Each mirror moves along a single axis. These galvos move extremely quickly with very little inertia, and, therefore, can write marks at high speeds. The beam is focused using an f-theta lens.

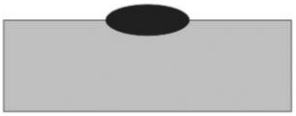
FEATURES

- Marks text, barcodes and datamatrix codes, logos and graphics
- Imports .jpg, .bmp, .dxf and other formats
- Variable text, data and batch codes can be linked to external database
- Windows® based control software
- Marking fields up to 12 in x 12 in
- Character size down to 0.004 in
- RS232 and external I/O for ease of integration
- Rotary motion for circumferential welding

HOW A LASER MARKS

The laser marks (ablates, melts, vaporizes, or removes) materials using a fine spot diameter which ranges from 0.002 in–0.01 in. It marks with short pulses (30 nano-seconds), providing precise mark control and negligible heat input. Subsequently, mark penetration into the material of less than 0.001 in unless otherwise required.

High speed mark in plastics, annealing mark in some metals.



Most common type of mark, the material melts and creates surface relief.

Material is vaporized, contrast is optical effect with ambient light.

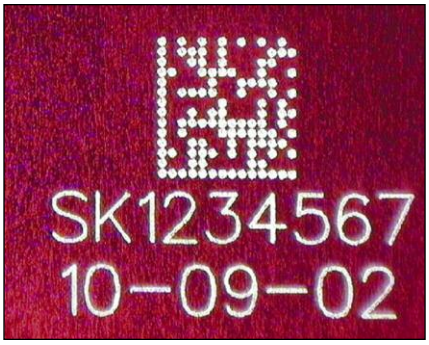
Material removal and surface melt, common in marks requiring lifetime readability in a demanding environment.

BENEFITS

- Non-contact, direct mark process
- No post processing
- High speed
- High quality
- Permanent marks
- Dynamic mark sizing
- Datamatrix code friendly
- Wide range of markable materials

LASER MARKING EXAMPLES

Steel component



Anodized aluminum

Day / night switches

Plastic molded part

Medical implantable device

Fine mark next to penny

MARKING PLASTICS

Lasers are the best solution for marking plastics, as many inks either have difficulty adhering to them or quickly wear away, and many labels simply will not stick. Other processes produce unclear marks or require post-process operations. Laser marks generally require no post-process finishing operations and so can be shipped immediately.

Lasers produce contrasting, high quality marks on a wide range of plastics. With the development of additive pigments and resins that enhance contrast, virtually any plastic can now be laser marked.

MARKING METALS

By using fine spot sizes to increase power density, many metals can be marked extremely well. High contrast marks can be produced on stainless steels and titanium. These highly permanent marks, which have no crevices or features to attract debris, care ideal for medical, food and pharmaceutical applications.

Other key metals such as aluminum are engraved to minimal depths such that the mark has good permanency but does not affect the material's bulk properties.

However, an engraved mark that penetrates into the material can also be produced in applications that require an increased level of wear resistance.

PART TRACKING AND TRACEABILITY

With the flexibility of marking characters, barcodes or datamatrix codes on plastics and metals, laser marking is well geared to direct part marking for identification purposes. Laser marking systems linked to part information databases are able to automatically increment serial numbers or data codes that can be verified by in-system readers.

FREE EVALUATION SERVICE

Amada Miyachi America offers a free service to evaluate your application. Simply send a few samples to our laser applications lab in Monrovia, along with a brief mark description, and we'll mark and return them to you with a written evaluation and product recommendation.

Alternatively, contact our staff directly to discuss your application.

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MARKING SUITABILITY OF MATERIALS

Material	Contrast
Ceramic	Good
Glass	Good
Metals	
Aluminum	
Anodized	Excellent
Bare	Good
Painted	Excellent
Copper	
Brass (bare)	Good
Copper (bare)	Good
Copper (nickel coated)	Good
Cobalt	Good
Germanium	Good
Gold	Good
Invar	Excellent
Inconel	Excellent
Kovar (gold plated)	Good
Silver	Good
Steel	
Carbon steel	Excellent
Chrome plated	Good
Hardened	Good
Nickel plated	Excellent
MIM Parts	Excellent
Stainless (300 & 400)	Excellent
Surgical steel	Excellent

Material	Contrast
Titanium	Excellent
PC Board	
Bare	Good
Coated fiber	Good
Fiber substrate (FR4)	Good
Plastics	
ABS	Excellent
Acrylic	Good
Epoxy	Good
Mylar (silver nickel coating)	Good
Nylon (natural)	Good
Nylon (pigment, glass filled)	Good
PES/PET/PBT	Good
Phenolic	Good
Polyacetal (POM)	Good
Polycarbonate (Lexan®)	Excellent
Polyethylene	OK
PVC	Excellent
Styrene	Excellent
Rubber	Poor
Silicon	Good

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