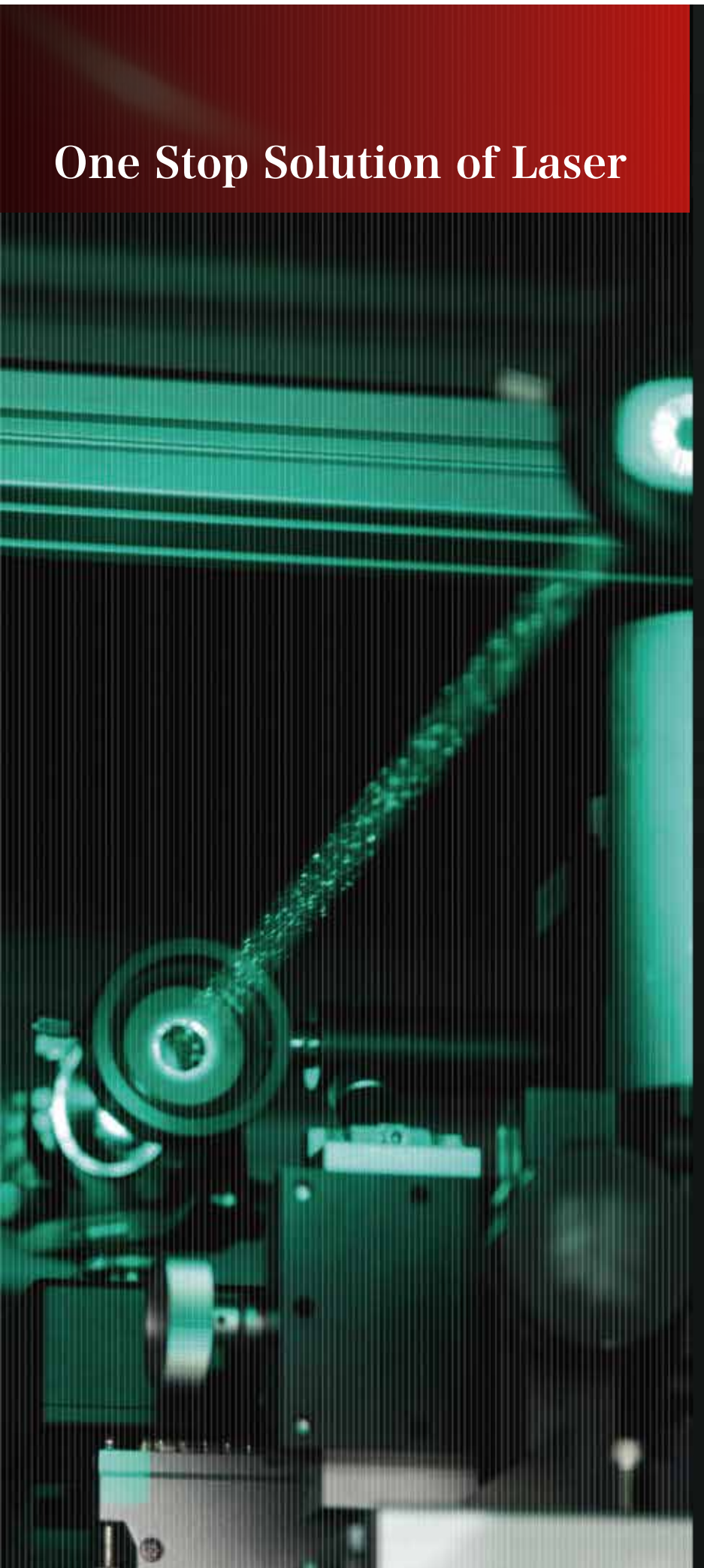
One Stop Solution of Laser



L.P.S.Works

Laser Process Solution

Company Brochure

Rev.1.5

Staying one-step ahead of customers' needs

As a second laboratory and factory for customers

One Stop Solution of Laser

The objective of our cutting-edge
" Laser Process Solution' is to truly please our customers "

We deliver customers technology that highly reflects their wishes and ideas as well as continuous safety, reliability and great satisfaction through meticulous quality control, delivery date management, and excellent cost performance.

When making products that reflect the ideas of L.P.S. Works Co., Ltd., we create added value as a laboratory/factory for customers, where we develop products side-by-side with customers. Our machining technology has been fostered as system engineering knowledge, so we can provide more customized laser beam machines than our competitors.

Utilizing our wealth of human resources and experience, L.P.S. Works Co., Ltd. is confident that it can meet customer needs.

Trade name	L.P.S. Works Co., Ltd.
Established	20th may,2009
Capital	25,000,000yen
Business	・Consignment of Laser Micromachining by Ultrashort Pulse Laser ・Design, manufacture and sale of laser systems
Representative	Koji Fujita, Representative Director and CEO
Location	Room 409, OTA Techno Core, 6-4-17 Higashi-kojiya, Ota-ku, Tokyo
T E L	+81-3-3745-0330
F A X	+81-3-3745-0331
E-mail	sales@lps-works.com
U R L	https://www.lps-works.com

Two pillars of business

Machining technology development consignment of machining business

As a second factory and laboratory for customers

System engineering business

Selection of oscillators, optimization of mechanisms, optical systems and control

Customized machining method proposals laser selection
From experiments and trial machining to mass-production machining

We develop applications by using ultra-short pulse laser and receive conduction of experimental tests, trial manufacture, and mass production. Our service's feature is unmatched technology of microfabrication in some microns unit.

Oscillator proposals
Proposing customized machining methods through verification tests
Design and manufacture of machining equipment

We offer laser beam machining equipment that utilizes our laser machining technology. From the selection of oscillators and development of machining conditions, our system engineering strength is offering devices that can achieve quality satisfactory to customers.

History

2009.5.20.	Established
2009.7.	Completion of No.1 picosecond laser beam machine
2011.8.	Completion of No.2 and No.3 picosecond laser beam machines
2011.8.	Acquired ISO 14001 and ISO 9001 certification
2012.5.	Office relocated (OTA Techno Core)
2013.6.	Completion of a femtosecond laser beam machine
2016.12.	Completion of a laser processing machine for large area and roller's surface
2016.12.	Completion of a laser horning machine

Acquired ISO 14001 and ISO 9001 certification

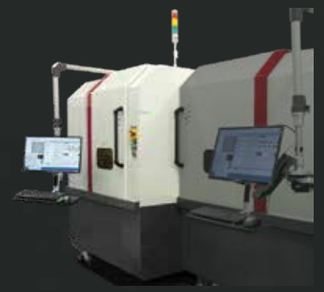
Machining technology development
Consignment of machining business

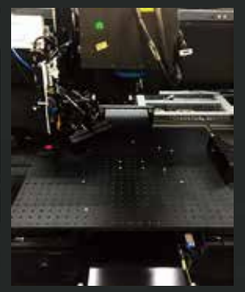
Most Advanced Laser Micromachining Technology in the world As a 2nd Factory and Laboratory for You

With our laser consignment business, L.P.S. Works Co., Ltd. is making rapid progress as a second laboratory or factory for customers. As an industrial tool, lasers are superior to other machining methods when it comes to recognition levels. But because it is a noncontact tool, “never-ending improvement of machining technology” and “fusion with other machining methods” are required to fully exploit its features. We have a diverse lineup of lasers that can meet customers’ needs and we devoted ourselves to the study of “people, lasers, optical systems and controlling” in order to maximize the capabilities of these lasers.

Machines for Commissioned Manufacturing

Laser Processing Machine for Large Area

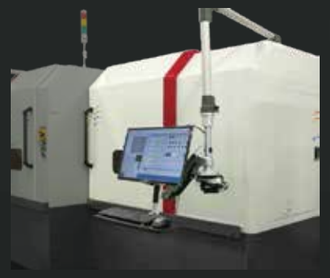




This machine is :
- ◆ Self-manufactured to accommodate a variety of customers’demands.
- ◆ Equipped with world’s top level high-frequency laser oscillator.
- ◆ Specialized for speedy processing micro-texture to large

Center Wavelength	515nm 1030nm
Pulse Duration	800fs~10ps
Maximum Average Power	200W(1030nm)/100W(515nm)@2MHz
Maximum Repetition Rate	40MHz
Stage Size	700×600mm
Y Axis Drive by Stage	Distance of Constant Speed : 400mm Maximum Speed : 2000mm/sec
X Axis Drive by Optical Device	Movable Distance : 2350mm Maximum Speed : 3000mm/sec
Optical Device	Ultra-High-Speed 2D Scanner Aberration-Free Lens with NC Motion on X Axis Galvano Scanner (200×200mm)
Minimum Beam Diameter	Galvano scanner : $\phi 35\mu$m Aberration-free lens : $\phi 8\mu$m

Laser Processing Machine for Roller’s Surface



This machine is :
- ◆ Able to set and fabricate a big roller; maximum ϕ300mm, 600mm length.
- ◆ Equipped with world’s top level high-frequency laser oscillator.

Center Wavelength	515nm 1030nm
Pulse Duration	800fs~10ps
Maximum Average Power	200W(1030nm)/100W(515nm)@2MHz
Maximum Repetition Rate	40MHz
Maximum Size of Work Pieces	Diameter : 300mm Length : 600mm
Maximum Rotating Speed	2rps
X Axis Drive by Optical Device Optical Device	3000mm/sec Aberration-Free Lens with NC Motion on X Axis

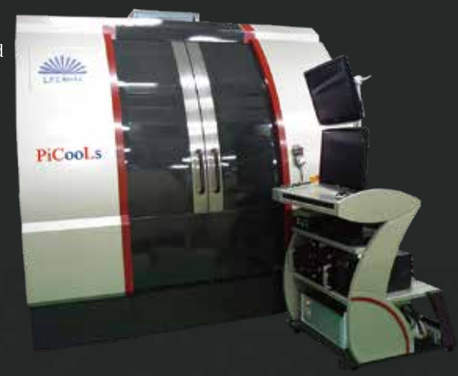
Laser Honing Machine

This machine is :
- ◆ Self-made and for processing cylinder’s inner surface by optical device’s vertical motion on Z axis and rotational motion.
- ◆ Able to apply to processing of piston liner, engine block, and many kind of another cylinders.
- ◆ Able to change length and distance of pits by turning laser gate on and off during helical motion.

Center Wavelength	532nm
Pulse Duration	9.6ps
Maximum Average Power	25W
Maximum Repetition Rate	8.2MHz
Maximum Inner Diameter of Work Pieces	ϕ75~105mm
Maximum Length of Work Pieces	250mm
Angle in Helical motion	0° < Indicated Angle < 90°
Available groove width	15μm~40μm
Available groove depth	1/2 of the Groove Width Value *It varies with material.

Picosecond Laser Processing Machine

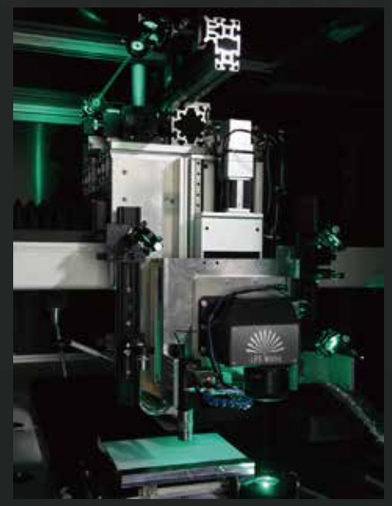
This machine is :
- ◆ Is self-manufactured to accommodate a variety of customers’ demands.
- ◆ Is able to change its optical device for each aims of processing. It can be equipped galvano scanner, beam rotator or fixed lenses.
- ◆ Has linear X-Y stage and its optical system has Z axis.
- ◆ Can be mount rotating machinery and U axis is available as



Center Wavelength	515nm
Pulse Duration	<10ps
Maximum Average Power	30W
Maximum Repetition Rate	200kHz
Minimum Beam Diameter	Galvano Scanner : $\phi 10\mu$m Aberration-Free Lens : $\phi 1\mu$m
Stage Size	400×400mm

Femtosecond Laser Processing Machine

This machine is:
- ◆ Is self-manufactured to accommodate a variety of customers’ demands.
- ◆ Is able to change its optical system for each aims of processing. It can be equipped galvano scanner or fixed lenses.
- ◆ Has linear X stage and its optical system has X-Z axis.
- ◆ Can be mount rotating machinery and U axis is available as an option.



Center Wavelength	515nm
Pulse Duration	180~190fs
Maximum Average Power	8.2W
Maximum Repetition Rate	600kHz
Minimum Beam Diameter	Galvano Scanner : $\phi 14\mu$m Aberration-Free Lens : $\phi 1\mu$m
Stage Size	300×300mm
Maximum Scan Speed	3000/sec
Maximum Scan Area	30×30mm

Measuring Instruments

Measuring Microscope
OLYMPUS STM 7-LF

Magnification : ×50, ×100, ×200, ×500, ×1000
Stroke : 300×300×90mm

CNC image measuring system
Nikon Confocal NEXIV

Magnification : ×3.0 (Max ×675),×7.5 (Max ×1687.5)
Observation Method : Bright Field(2D measurement)
Stroke : 300×400×150mm

Scanning electron microscope
NeoScope II JCM-6000

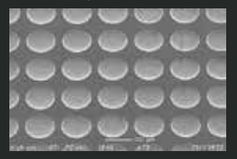
Magnification : ×10~×60,000
Observation Mode : High/Low Vacuum
ModeStage Drive : 35×35mmMax
Work Piece Size : φ70mm, height 50mm

Laser Micromachining

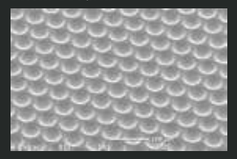
Micro Texture

◇ It can apply to any materials, for instance, to metal, resin, brittle materials such as glass and ceramics.
◇ It enables to give added-value features, for example, reduction of friction and abrasion, controlling hydrophilicity or water repellency and releasability or adhesion strength by processing periodic structure.
◇ It can be made periodically in some micron units and not random pattern.

Aluminum (Al)
Diameter: 200μm
Depth: 20μm
Pitch: 250μm

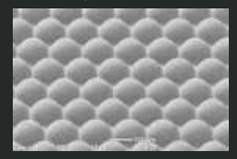


SUS430
Diameter: 95μm
Depth: 28μm
Pitch: 110μm



Nickel(Ni)
Diameter: 200μm
Height: 30μm
Pitch: 250μm

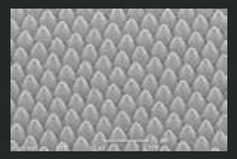
Borosilicate Glass
Diameter: 250μm
Height: 125μm
Pitch: 280μm



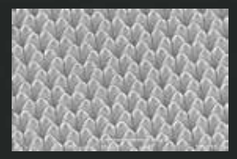
SUS430
Diameter: 100μm
Height: 12μm
Pitch: 200μm

SUS304
Length of a Side: 50μm
Groove Depth: 10μm

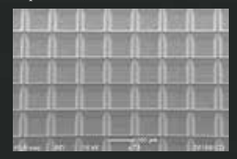
SUS430
Height: 20μm
Pitch: 20μm



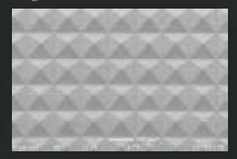
SUS430
Height: 17μm
Pitch: 15μm



SUS304
Length of a Side: 200μm
Depth: 50μm



SUS304
Length of a Side: 190μm
Height of Vertex: 50μm



Micro Straight Through Hole Machining

◇ It can apply to any materials, for instance, to metal, resin, brittle materials such as glass and ceramics.
◇ Precise micro machining without burrs, dross, chipping and cracks is available.
◇ It can control hole's taper angle; taper, non-taper and reverse taper.

Cupper(Cu)
Diameter:100μm
Thickness: 100μm

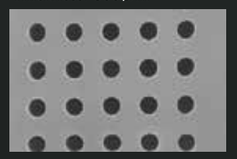
SUS304
Diameter: 50μm
Thickness:50μm

Aluminum (Al)
Diameter:100μm
Thickness:100μm

Molybdenum (Mo)
Diameter:50μm
Thickness:600μm

Silicon Nitride
Diameter:100μm
Thickness:200μm

Single-Crystal Silicon
Diameter: 100μm
Thickness: 300μm



Synthetic Silica
Diameter: 90μm
Thickness: 500μm

Zirconia
Diameter: 110μm
Thickness: 330 μm

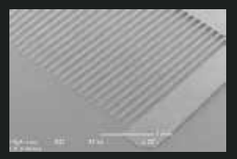
Alumina Ceramics
Diameter: 100μm
Thickness: 300μm

Polyimide Resin
Diameter: 100μm
Thickness: 125μm

Cutting, Grooving and Patterning

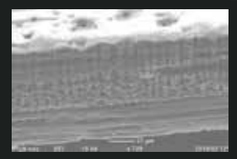
◇ It can apply to any materials, for instance, to metal, resin, brittle materials such as glass and ceramics.
◇ Precise micro machining without burrs, dross, chipping and cracks is available.

Cutting SUS304 Foil
Slit Width: 100μm
Thickness:10μm

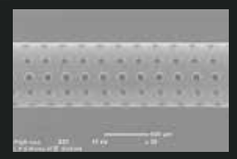


Patterning by Removal of Al film
Line-Space: 40μm

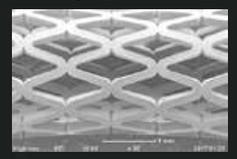
Cutting CFRP
Thickness: 100μm



Drilling Many Holes on Extra-Fine pipe
Outer Diameter: 700μm
Inner Diameter: 580μm
Hole's Diameter:100μm



Cutting Out Stent from Resin Tube
Outer Diameter: 2.55mm
Inner Diameter: 2.20mm
Tube Length:25mm



System engineering business

We make proposals that best suit customers

With system engineering at L.P.S. Works Co., Ltd., we can locate lasers from across the world matching customers' requirements (materials, drilling, cutting, welding, ablation, surface reforming, etc.) quicker than our competitors due to our laser machining technology knowledge (machining, technology, optical systems, controlling).
Our optimized lasers, optical systems, machining jigs and software satisfy customers' needs.

Examples of delivered devices

Loadable optical systems

Scanner optical system

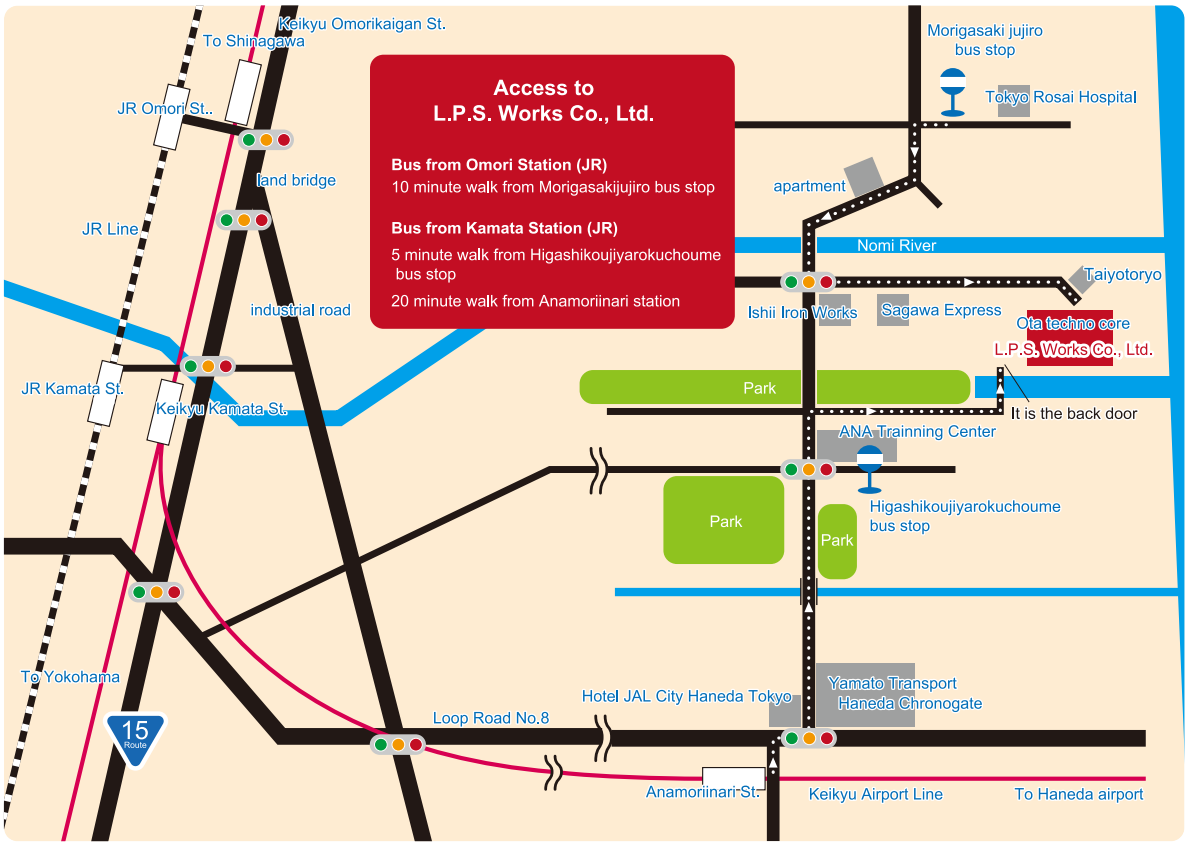
・Supports scanners made by various manufacturers
・Scanner can be either analog or digital.
・Creating a system that combines X and Y stages enables on-the-fly machining.

Image processing equipment

Incorporating image processing equipment enables advanced alignment.

Condensing and transfer optical system

Access



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