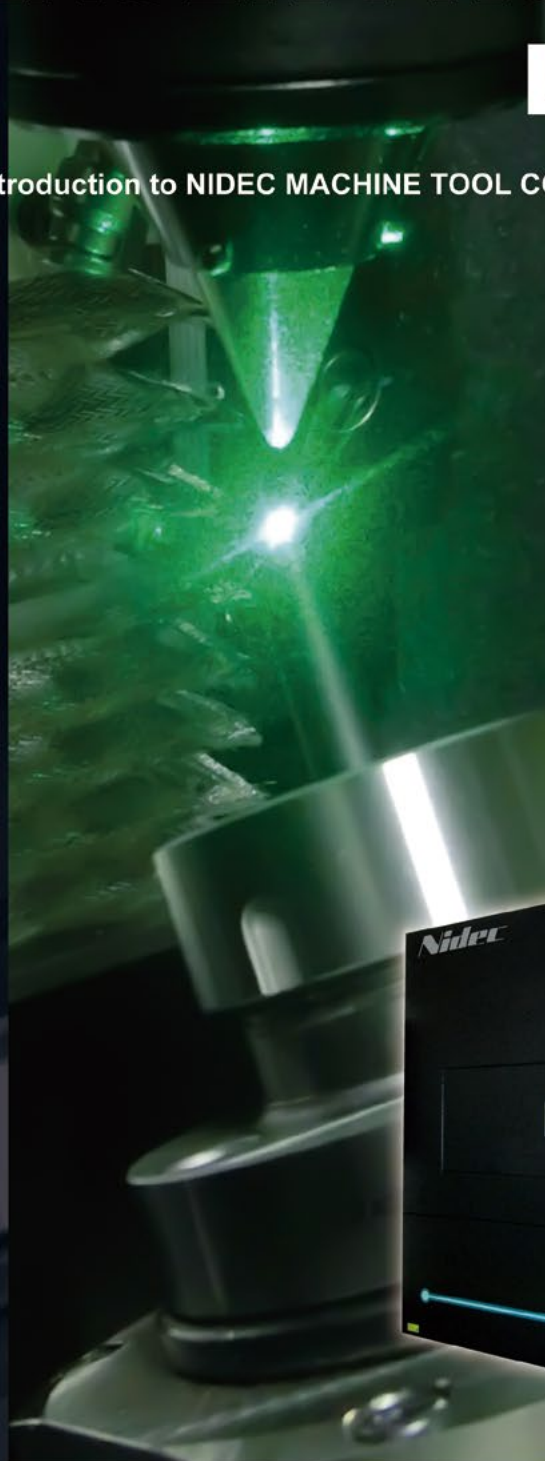


LASER PRODUCTS LINE UP

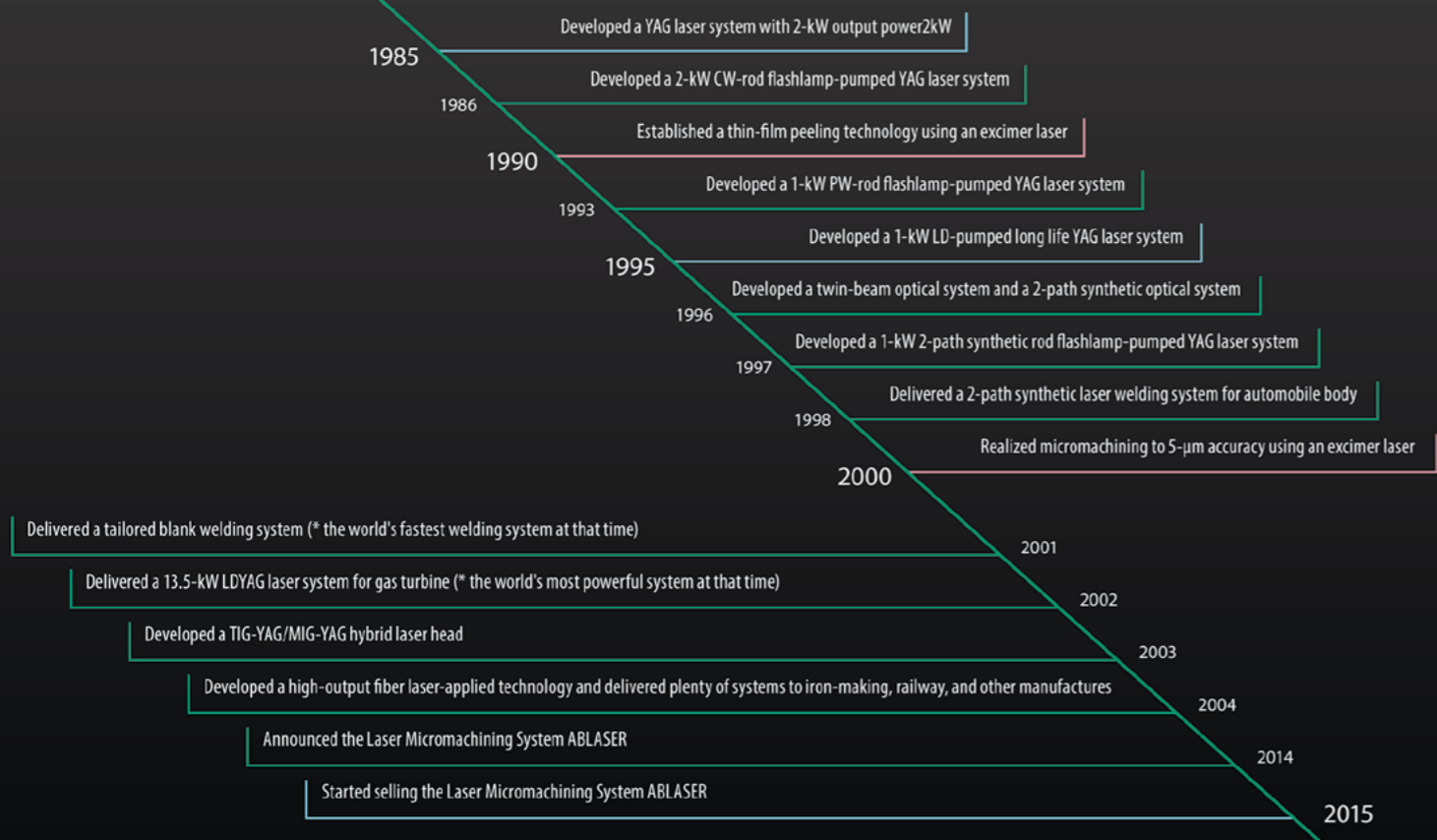
Introduction to NIDEC MACHINE TOOL CORPORATION Laser Products



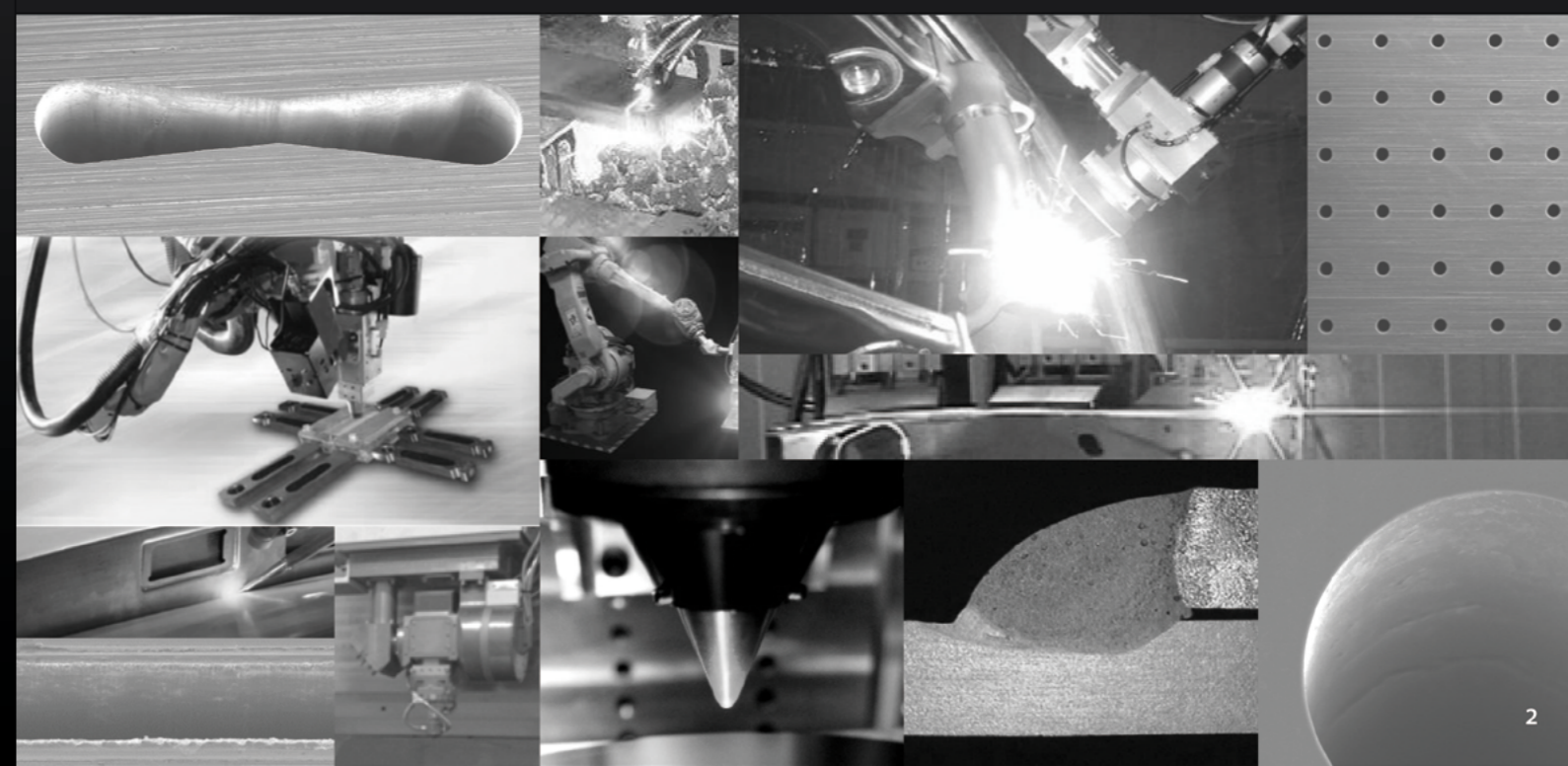
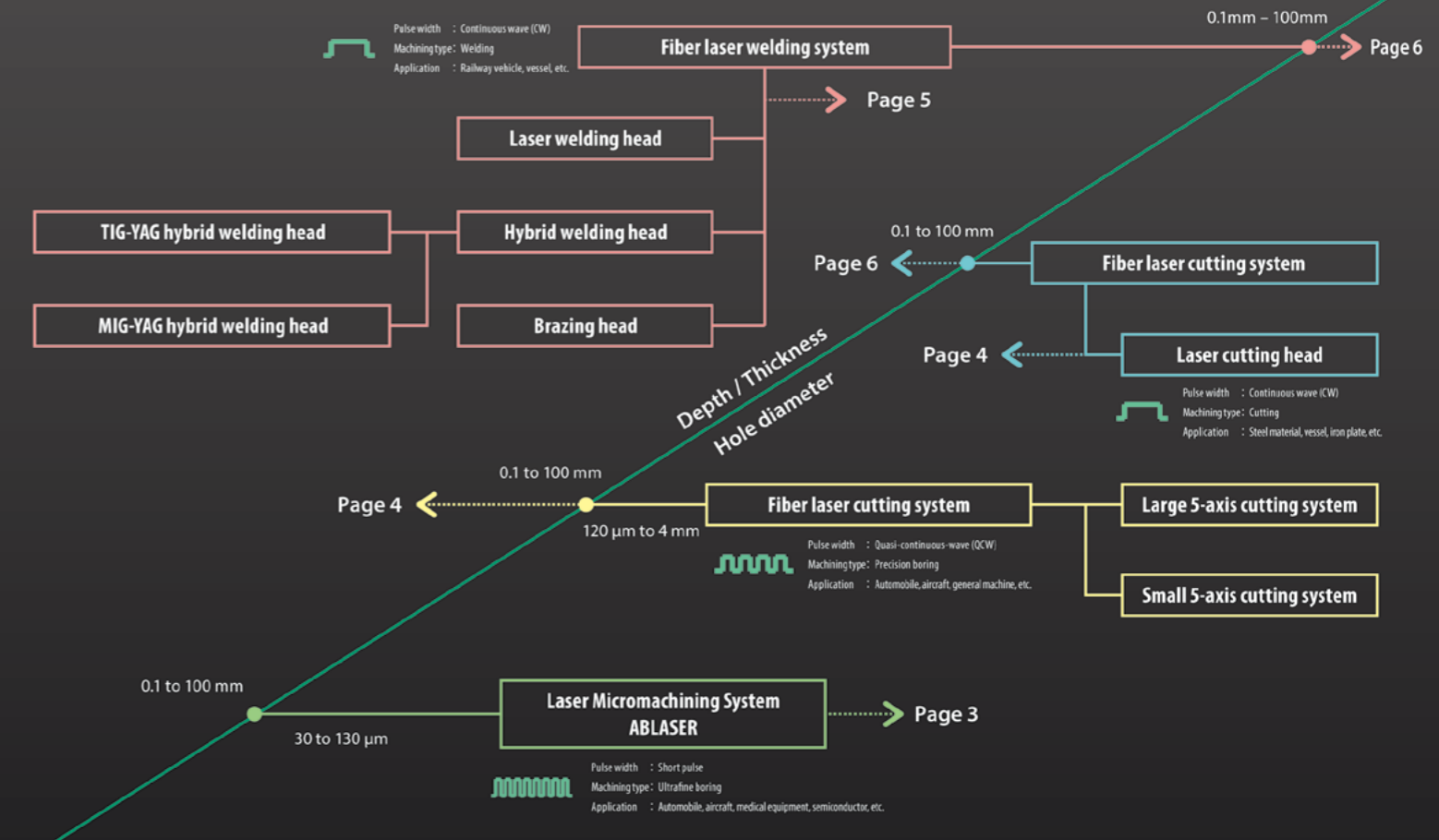
Our Most Advanced and Sophisticated Technologies
Provide Optimal Solutions for Laser Machining.

Extensive Develop Experience and Advanced Machining Know-how

HISTORY



Products
LINEUP



Laser Micromachining System

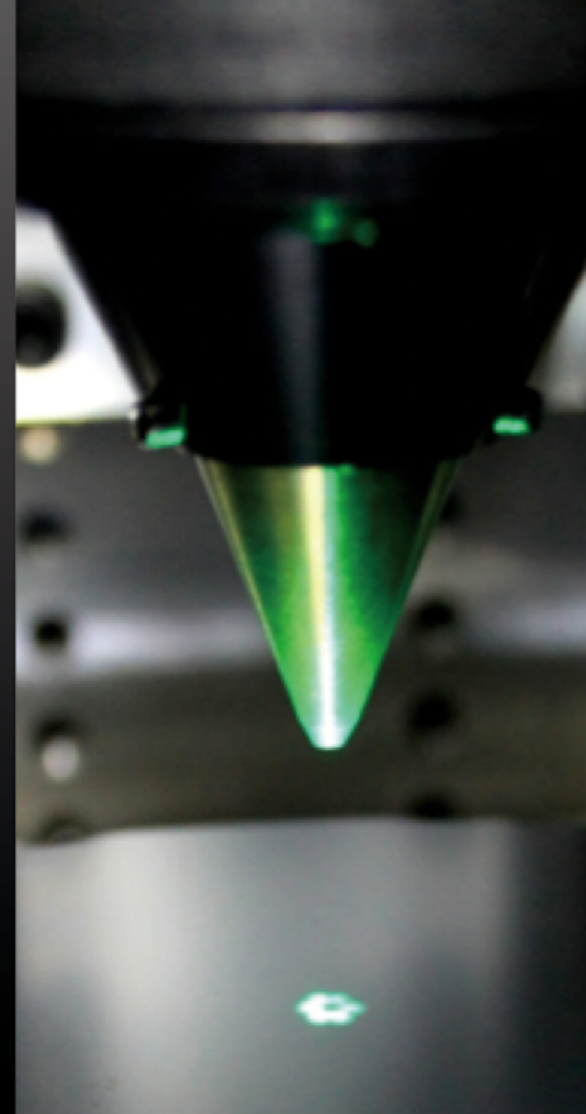
ABLASER

The Solution to Realize Ultimate Micromachining without Thermal Effects

With the combination of a short pulse duration green laser enabling machining with minimal thermal effects and the advanced precision positioning technology that we have developed as a leading machine tool builder, ABLASER realizes innovative micron-order precision machining. Particularly in boring applications, ABLASER achieves dimensional accuracy exceeding that of electric discharge machines and, even more, supports the machining needs for forward/reverse tapered holes and 3-dimensional pockets, as well as for irregular shapes and curved surfaces with a 5-axis control technique.



* Detailed specifications are listed on the "Specifications - 1" page.



Fiber Laser Cutting System

Utilizing extensive knowledge of machine tool engineering, we offer optimal laser cutting systems to our customers.

The advanced precision positioning technology that we have developed as a machine tool builder and the use of our unique optical system for the machining head enable high-quality boring and cutting with minimal thermal effects.

Optimal Solution for Laser Cutting through Extensive Machining Know-how as a Machine Tool Builder

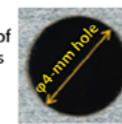
- With the combination of engineering know-how and laser control technologies that we have developed as a leading machine tool builder in Japan, we offer optimal forms of systems in terms of the machining method, productivity, accuracy, etc. to meet customer demand.
- With the support of 5-axis control, these laser cutting systems enable high-quality cutting and boring of propeller shapes and 3-dimensional curved surfaces with minimal thermal effects.

Large Fiber Laser Cutting System



- The use of a portal structure prevents the inclination of the ram for excellent positioning accuracy.
- This system enables high-quality cutting and boring of workpieces such as a large sheet material with minimal thermal effects.
- Workpiece diameter**
φ0.6 to 4.0 mm
- Stroke**
 - X-axis: 2,150 mm
 - Y-axis: 1,000 mm
 - Z-axis: 750 mm

High-speed and high-accuracy boring of φ4-mm diameter holes
Machining time: 1.3 s/hole
Material: Heat-resisting alloy
Sheet thickness: 1.2 mm



* The above data is presented as only an example of specifications.
* The detailed specifications of this system are listed on the "Specifications - 1" page.

Small Fiber Laser Cutting System



- Being designed based on our precision machining system, this system is ideal for small-diameter boring.
- With the support of 5-axis control, this system enables high-quality precision cutting of 3-dimensional free-form curved surfaces.
- Workpiece diameter**
φ0.6 to 4.0 mm
- Stroke**
 - X-axis: 350 mm
 - Y-axis: 350 mm
 - Z-axis: 350 mm

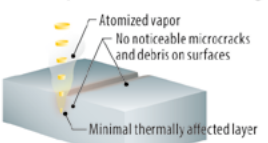
φ1.5-mm deep boring
Machining time: 3.5 s/hole
Material: Heat-resisting alloy
Sheet thickness: 4 mm



* The above data is presented as only an example of specifications.
* Detailed specifications are listed on the "Specifications - 1" page.

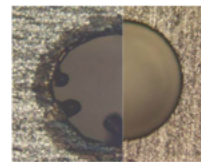
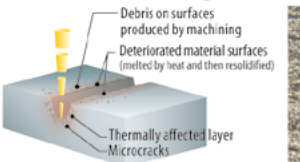
Innovative Non-thermal Machining with a Short Pulse Duration Laser

Laser ablation



- Ablating the machining area with short pulse duration laser realizes machining with minimal thermal effects, compared with machining using a conventional nanosecond laser.
- This prevents the deterioration/deformation of the target workpiece and the occurrence of spattering, enabling sharp edges and excellent interior finish that have never been achieved with conventional techniques.

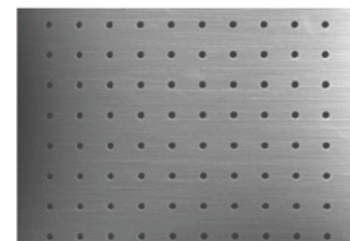
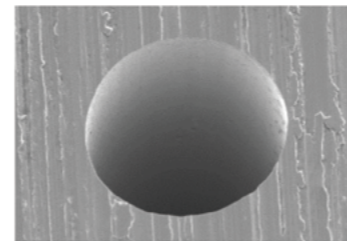
Interaction between laser light and heat



Test results for drilling a φ200 μm through-hole in a SUS material
Left: Nanosecond pulse laser
Right: Picosecond pulse laser

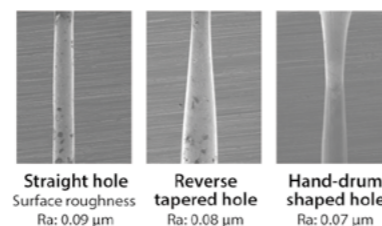
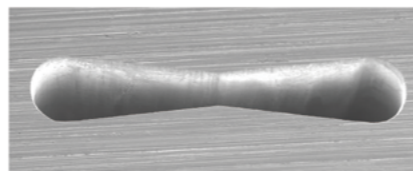
Application Examples

Drilling a hole in a SUS420 material
Hole diameter: 120 μm
Sheet thickness: 0.3 mm



Drilling a hole in a SKD11 material
Hole diameter: 0.07 mm
Sheet thickness: 0.5 mm
Pitch accuracy: ±0.5 μm

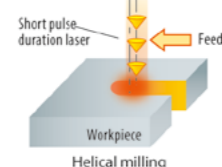
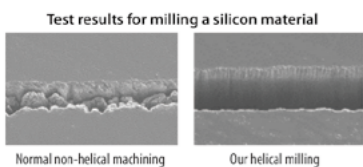
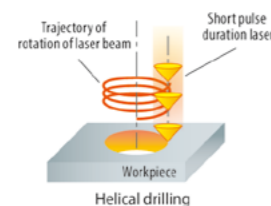
Machining a quenched SCM420 material (Hrc65 or higher) into an irregular shape
Sheet thickness: 0.8 mm



Quenching a SCM420 material
Sheet thickness: 0.8 mm
Minimum hole diameter: φ0.1 mm
* Any taper shape can be machined to a surface roughness of Ra 0.1 μm or less.

Proprietary Optical Control Technology to Realize Unrivaled High-accuracy Machining

- ABLASER features our proprietary technology in its optical system, enabling the laser head to rotate at high speeds while adjusting the laser beam to any hole diameter.
- This helical machining feature realizes machining with higher accuracy and efficiency.

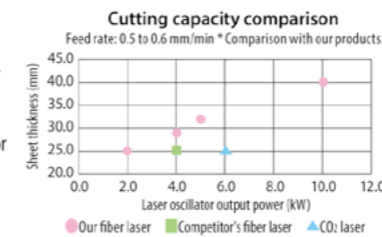


Fiber Laser Cutting Head

Our unique optical system creates an optimal beam profile for cutting to ensure high efficiency and clean manufacturing.

Exceptional Beam Intensity to Realize a High-quality Cut Surface

- Our proprietary beam profiling technology is optimized for cutting and dramatically improves the cutting capacity per oscillator output.
- This contributes to downsizing the oscillator that tends to be expensive.



Product Lineup

- Laser cutting head**
 - Specifications**
 - Head dimensions: 580 mm x 90 mm square
 - Mass: 14 kg
 - Focal distance: BK-S 250 mm
 - BK-M 300 mm
 - BK-L 350 mm
 - Applied output power: 10 kW max.
 - Light-collecting magnification: x1.5

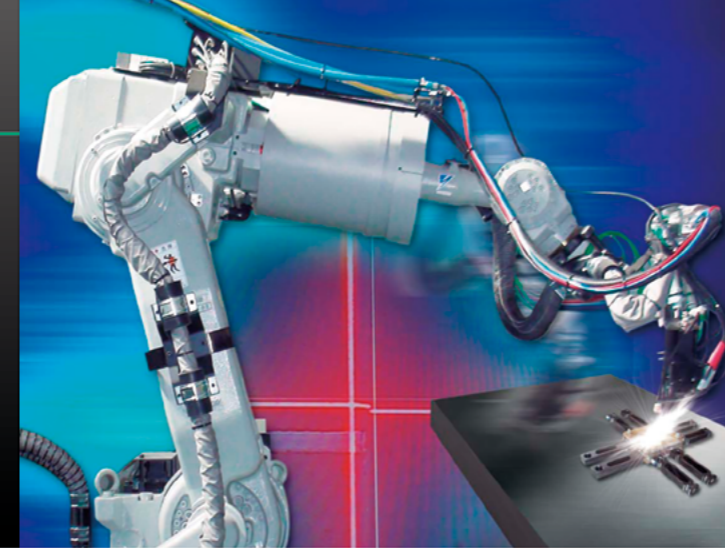




Fiber Laser Welding Head

Our unique arc and laser hybrid welding technology realizes an unprecedented level of welding quality.

Our proprietary arc and laser hybrid welding head provides the benefits of the two welding processes, "arc welding" that allows for padding and "laser welding" that features high speed with less strain. Our fiber laser welding heads allow for welding in arbitrary directions that has been difficult with conventional welding technologies, realizing high-speed and stable padding with a sufficient penetration of weld metal.



Fiber Laser Machining System

The combination of the arc and laser hybrid welding head and the control technology that we have developed through its experience in machine tool engineering enables complex machining.

Our fiber laser machining systems provide the path memory function that uses a teaching system to automate a complex machining process, in addition to the automatic machining of round and long workpieces in combination with a robot system or 5-axis machine. Please feel free to consult with us. We can propose an optimal system solution to your machining needs.

Benefits of Arc Welding and Laser Welding Integrated into a Single System

MIG	YAG Laser	MIG-YAG
Large gap tolerance, padding allowed	High speed, deep penetration, low strain	Stable padding and welding with a sufficient penetration of weld metal at high speed
Slow speed, high strain	Small gap tolerance, padding not allowed	



- Our unique coaxial arc and laser technology enable the benefits of both arc and laser welding processes to be incorporated into a single system for the improvement of machining efficiency.
- This technology can ease the required accuracy for the welding groove because the arc melts the laser-irradiated portion to provide a sufficient weld bead even if there is a slight gap.
- The technology enables welding with a deeper penetration of weld metal than laser-only welding because the arc is concentrated in the key hole formed by the laser to produce a large heat input.

Product Lineup

* These products are sold in a package with the oscillator specified on the "Specifications - 2" page.

TIG-YAG hybrid welding head

- Specifications**
 - Head dimensions: 560 mm x 90 mm square
 - Mass: 6 kg
 - Focal distance: 165 mm
 - * Applied output power: 6 kW max.
 - Light-collecting magnification: x1.0



Main applications:
Welding of galvanized steel sheets
Welding of non-ferrous materials (Al, Cu, Ti)



MIG-YAG hybrid welding head

- Specifications**
 - Head dimensions: 465 mm x 100 mm diameter
 - Mass: 5 kg
 - Focal distance: 190 mm
 - * Applied output power: 6 kW max.
 - Light-collecting magnification: x1.7

Main application:
Thick structural materials
High-speed welding of aluminum parts

- Features**
 - Improved gap tolerance, welding speed can be increased
 - Welding with low strain (Comparison with conventional MIG welding)

Laser welding head

- Specifications**
 - Head dimensions: 580 mm x 90 mm square
 - Mass: 14 kg
 - Focal distance: 250/300/350 mm
 - * Applied output power: 20 kW max.
 - Light-collecting magnification: x1.5



Main application:
High output power (20 kW max.)
Welding of stainless steel with low strain

- Features**
 - Head structure design for high power output
 - Stable welding quality by suppressing the change in the focal distance.
 - Ability to weld thick plates due to the long depth of focus

Coaxial Arc and Laser Technology for Welding in Arbitrary Directions

- General welding systems that perform horizontal arc welding only allow for padding in a fixed direction.
- On the other hand, our welding heads are designed to supply the arc from the central axis in the same way as the laser beam, allowing for padding in a free 3-dimensional trajectory independent of the direction in which the arc is supplied.

Use of a Fiber Laser as the Light Source for All Operations

The system uses a fiber laser to solve the problems inherent to conventional welding technologies such as the quality, speed, and cost of welding.

- Smooth and fine weld bead due to continuous radiation with a continuous-wave laser
- Strong resistance to leakage due to a low probability of blowhole generation even in butt welding
- Less welding strain due to a small spot diameter and light-collecting density of the laser
- Process monitoring, seamless tracking, and other options to enable accurate welding depending on the welding conditions



Main application:
Seal joining
(Automobile trunk lid etc.)

Coaxial laser brazing head

- Specifications**
 - Head dimensions: 470 mm x 110 mm diameter
 - Mass: 5 kg
 - Focal distance: 140 mm
 - * Applied output power: 6 kW max.
 - Light-collecting magnification: x1.3

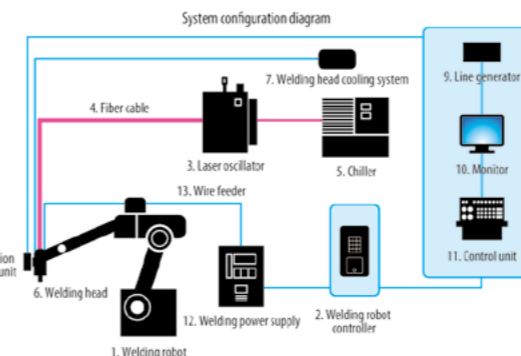
- Features**
 - 3-dimensional welding through coaxial laser and wire technology
 - Brazing with excellent penetration up to narrow portions

Standard System

* This system is available in combination with the fiber laser head and oscillator specified on the "Specifications - 2" page.

System configuration

The standard system consists of our fiber laser head and oscillator, an articulated robot, and a teaching system controller.



Detailed specifications are listed on the "Specifications - 1" page.

Features

- Usability**
 - Easy visual positioning of machining points with the observation camera and laser marker
 - Easy-to-operate joystick for control of the front end of the head
 - Improved safety through remote teaching on the monitor
 - Improved usability through the addition/change of teaching points from the dedicated control unit
 - Improved welding quality through the support of real-time (manual) trajectory correction
- High quality and high productivity**
 - Deep penetration with low strain in welding or hybrid welding
 - Improved welding quality by controlling the welding conditions in conjunction with teaching points
 - Improved quality by controlling the slow up/down of laser power output and the output of the arc current
 - High-quality welding through automatic groove tracking (optional)
- Space saving**
 - Space saver through the use of a fiber laser (approx. 60% in volume ratio in comparison with CO2 laser systems)
 - No dedicated system control panel needed
- High-speed welding**
 - Improved welding speed through hybrid (laser and arc) welding (approx. 300% or more in comparison with arc welding systems)
 - Reduced set-up time through the use of automatic groove tracking (optional) that eliminates the need for fine-tuning teaching points

Teaching system

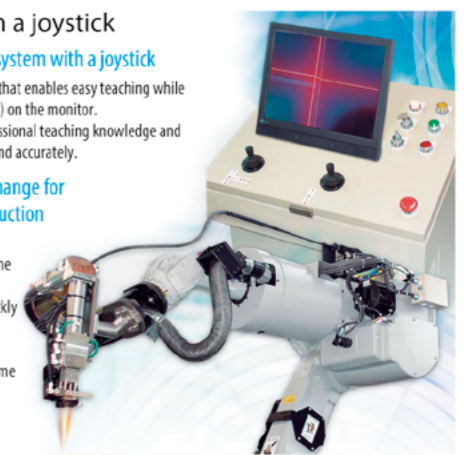
Easy teaching with a joystick

Easy and reliable teaching system with a joystick

The teaching system has a joystick that enables easy teaching while looking at the groove (welding line) on the monitor. Therefore, operators without professional teaching knowledge and skills can perform teaching easily and accurately.

Flexible and quick set-up change for high-mix low-volume production

Creating a single teaching program for the master workpiece enables the operator to correct strain, displacement, or other failures quickly in real time while looking at the monitor without the need for recreating it for high-mix low-volume production.



Significant Reduction in Teaching Time



On the monitor, check the groove line and central points generated by the line generator and correct strain and displacement.



In real-time correction using the joystick, move the groove line to the descent point and correct strain and displacement.



Use the joystick to correct strain and displacement in an intuitive manner to complete teaching.



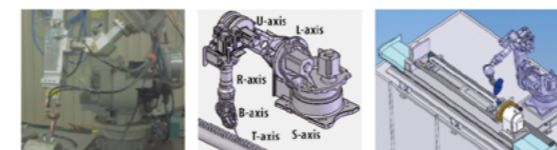
Start your operation. The system can perform highly accurate teaching in a short time, which is needed for laser welding.

Special System

Robot based welding system

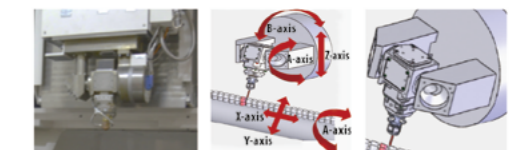
Featuring a high degree of freedom and high-speed machining, a robot based system is very easy to use.

It consists of an articulated robot with up to six axes and a tilt table that work together to machine round, long, or complex workpiece shapes while avoiding interference.



Machine-tool based welding system

Featuring excellent machine rigidity, a machine-tool based welding system is applicable to welding/cutting applications that require higher speed and higher accuracy. As a leading machine tool builder in Japan, we utilize our high-speed and high-precision positioning technology to get the most out of our laser products.



Main application:
Automobile body,
Vessel parts



Inquiry

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www.nidec.com/en/nidec-machinetool/



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Southeast Broach Company - South Carolina LLC
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<https://www.sebroach.com/index-2.html>

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Machine specifications such as dimensions etc., are fixed using SI units including the metric system.
In case data are shown in other units in blue, such as inches, pounds and gallons etc. they are for reference only and the formal data in black supersedes any equivalent data given in blue when fractions caused by conversion become an issue.
Specifications are subject to change without prior notice.
The export of this product is subject to Japanese Governmental approval.

Specifications

Laser Micromachining System ABLASER

Item	Specification		Remarks
	ABLASER	ABLASER-DUV	
X-axis (mm)	300		Precision scale equipped as standard
Y-axis (mm)	200		Precision scale equipped as standard
Z-axis (mm)	100		Precision scale equipped as standard
Positioning accuracy (mm)	0.002		
Maximum feed rate (m/min)	10		
NC system	FANUC 31iB		
Maximum output power	30W	2W	
Pulse width (ps)	Less than 10		Oscillator built into the machine
Wavelength (nm)	515	266	
Laser head	In-house product		
Workpiece diameter (mm)	φ0.05 to 0.3	φ0.01 to 0.3	The size sometimes changes depends on type of material.
Taper hole control	Forward taper/reverse taper/hand-drum shaped		
Assist gas	Selectable for each workpiece		
Width x Depth x Height (mm)	2,040 x 2,590 x 2,220		The weight of the machine only, excluding the control enclosure and attachments
Weight	5.0 t		The weight of the machine only, excluding the control enclosure and attachments
Fume collector and built-in air conditioner	Attached		
Bellows covers for the X/Y/Z-axis	Heat-resistant		
Work centering system	Attached		

Fiber Laser Cutting System

* Manufactured as a custom-made system, so below is only an example of specifications.

Item	Specification	Large	Small
Stroke	X-axis (mm)	2,150	350
	Y-axis (mm)	1,000	350
	Z-axis (mm)	750	350
Rotation axes	C-axis (°)	360	360
	B-axis (°)	180	-10 to 120
Workpiece diameter	(mm)	φ0.6 to 4.0	φ0.6 to 4.0
Positioning accuracy	(mm)	0.005	0.005
Oscillator	Pulse width (ms)	0.2 to 10	0.2 to 10
	Wavelength (nm)	1,070	1,070
	Average output power (W)	Less than 600	Less than 600

Standard System for Fiber Laser Cutting

Item	Specification	Remarks
Articulated robot	Payload capacity 80 kg	
Robot controller	Autonomous 6-axis control	
Laser oscillator	1.0 to 10.0 kW	Select a suitable oscillator from the table below.
Fiber cable	10 m (ϕ 0.1 to 0.2 mm)	50 m max.
Chiller	Water-cooled	
Fiber laser head <small>* Types of heads listed on the right can be mounted.</small>	Laser welding head	Available with 20.0 kW max.
	TIG-YAG head	Available with 6.0 kW max.
	MIG-YAG head	Available with 6.0 kW max.
	Brazing head	Available with 6.0 kW max.
	Laser cutting head	Available with 6.0 kW max.
Welding head cooling system	Tap water circulation	
Imaging camera	CCD camera	
Line generator	Reference line (Cross line / Circle)	
Monitor	17-inch LCD	
Control unit	Control unit with joystick	
Welding power supply	30 to 350 A	TIG-YAG / MIG-YAG / Brazing
Wire feeder	Wire diameter ϕ 0.8 to 1.4 mm	MIG-YAG / Brazing

Oscillator for Fiber Laser Welding / Cutting Head

Output power (kW)	Model (Manufactured by IPG Photonics)	QBH connector (HLC-8)	Fiber coupler (Built-in)
1.0	YLS-1000-CT	Standard equipment	Standard equipment
1.5	YLS-1500-CT		
2.0	YLS-2000-CT		
3.0	YLS-3000-CT		
4.0	YLS-4000-CT		
5.0	YLS-5000-CT		
6.0	YLS-6000-CT		
7.0	YLS-7000-CT		
8.0	YLS-8000-CT		
10.0	YLS-10000-CT		

* On-site adjustment and commissioning included.