



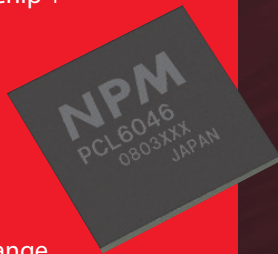
# MARKET: SUBTRACTIVE MACHINING

Nippon Pulse is a custom motor manufacturer that offers a variety of motion control products that are perfect for the subtractive machining and machine tool markets. We offer customizable and fully custom versions of our patented Linear Shaft Motor, linear stages and stepper motors, as well as electronics to drive them.

## LASER PROCESSING

**Welding/Heat Treating**  
(PCL6000 Controller Chip + Linear Shaft Motor)

Small structures can be easily fused in the machining process with the Linear Shaft Motor. With its nanometer-range precision and accuracy, the Linear Shaft Motor makes easy work of three-axis maneuverability, small-dimension resolution and extremely small motor speed variation. This also allows for better heat treating due to the control maintained over the heat input, thereby reducing the Heat Affected Zone and producing harder surfaces that will withstand chipping and other wear and tear.



**Cutting**  
(PCL6000 Controller Chip + Linear Shaft Motor)

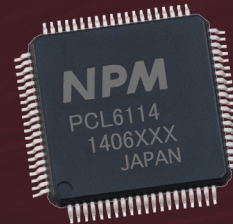
Burn cut lines or create etched patterns in very small regions of the workpiece with the high precision of the Linear Shaft Motor and the circular interpolation capabilities of the PCL6000 controller series.



## SHAPING

**EDM (Electrical Discharge Machining)**  
(Linear Shaft Motor + PCL6000 or PCL61x4 Controller Chip)

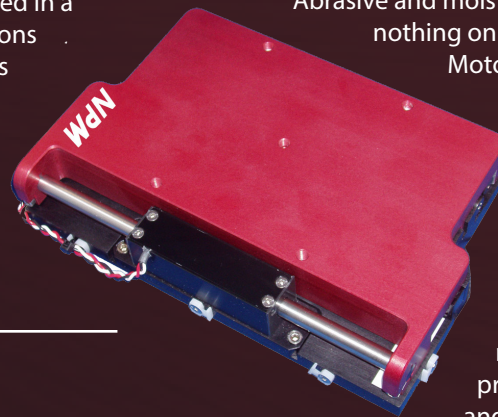
The Linear Shaft Motor is ideal for spark machining applications that require high motor stiffness, low speed ripple, and fast settling time. Both the PCL6000 and PCL61x4 chip series offer incredible precision and the ability to coordinate control when multi-axis movement is required through linear or circular interpolation. The Linear Shaft Motor also has the benefit of being able to be operated in a variety of conditions and temperatures without force or movement being affected, even when tooling hard or harsh materials.



motion control, up to 36 axes of movement for Large Scale Integration. The Linear Shaft Motor integrated into the SCR stage provides excellent control of machining tools relative to the workpiece, with impressive repeatability, resolution and precision.

**Grinding**  
(Linear Shaft Motor + PCL6000 Controller Chip)

Abrasive and moist environments have nothing on the Linear Shaft Motor's capabilities. The motor is non-contact, and its magnets are protected by its stainless steel casing, so the Linear Shaft Motor's mechanisms are protected from grime and damaging particles that would typically



**Milling**  
(SCR Nanopositioning Stage + PCL61x4 Controller Chip)

Our advanced PCL61x4 series controller chips allow for precise coordinated motion for multi-axis

affect motion speed or smoothness. The PCL6000 controller allows for linear and circular interpolation for incredible precision in final dimensioning and surface finishing.

Visit Nippon Pulse at IMTS!  
September 12-17, 2016  
Chicago, IL  
Booth #E-4723

**NPM** Nippon Pulse  
*Your Partner in Motion Control*

## MACHINING CENTER

### Automated Machines

(Variety of Nippon Pulse Linear Motor/ Linear Stage Products and Controllers)

Automated Machining Centers usually incorporate a number of the functions previously mentioned, providing you with a compact and useful tool. Below are some of the hundreds of automated systems that can benefit from Nippon Pulse products.

- Multi-axis CNC Grinding Centers
- Rotary Table Grinders
- Production Measuring Stations
- Bore Sizing Machine
- CNC Milling Centers
- Multi-axis CNC Milling Centers
- Grippers
- Pick and Place Robotics
- Measuring Stations
- Loading and Unloading Stations
- Material Processing
- CNC Tool Grinders
- Precision Tooling
- Laser Centers
- Slotting Machines
- CNC Control Systems
- Lathes
- CNC Lathes
- Laser Milling
- Boring Machines
- Multi-axis CNC Machining Centers
- Drilling Machines
- Surface Grinding
- Bending Machines
- Laser Engraving
- CNC Cylindrical Grinders
- Water Cutting
- Laser Cutting
- Shearing
- Training Machines
- Radial Drilling
- CNC Electrical Discharge Machines

## ABOUT NIPPON PULSE

Since 1952, Nippon Pulse has built state-of-the-art motion control products. We provide solutions for lab automation original equipment manufacturers that include products that accomplish sample and liquid handling, microscope automation, medical robotics, drug delivery, surgical tools, pharmaceutical dispensing and other healthcare technologies.

Over the past 60 years, Nippon Pulse has been established as a leader in stepper motor, driver and controller technology. We want to impress you with our products and service, not just satisfy your requirements. We do this through complete system engineering expertise, individual attention and support, superior prototyping, and cutting-edge technology.

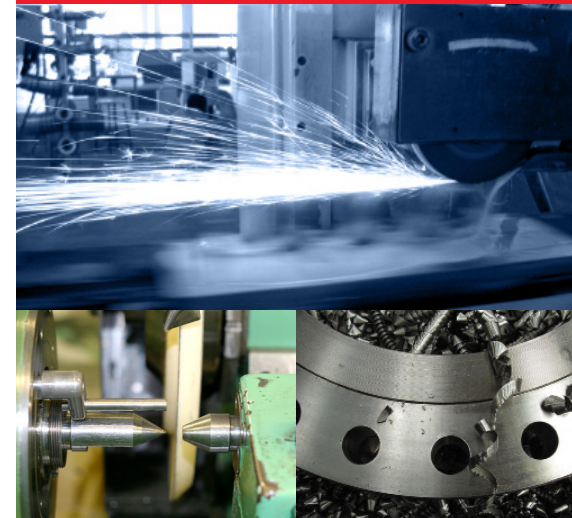
Nippon Pulse America, Inc. is a wholly owned subsidiary of Tokyo-based Nippon Pulse Motor Co. Ltd., and serves customers in North, Central and South America, and Europe.

## LINEAR SHAFT MOTORS IN SUBTRACTIVE MACHINING

### Benefits

The Linear Shaft Motor servomotor can be integrated into a variety of systems, including Nippon Pulse's SCR and SLP linear stages, and has quite a few benefits when used in subtractive machining environments.

- High Speed and High Precision
- No lubrication or adjustments required
- Simple setup
- Reduced noise
- No cogging
- Uses available servo drives
- Non-contact motor eliminates wear
- Eliminated backlash and pitch-error compensation
- Reduced downtime
- Reduced motor replacement



For more information about possible subtractive machine tooling applications, or to discuss how Nippon Pulse products can be integrated into your machinery, contact an applications engineer at 1-540-633-1677.