Moving into 2018, SPI Lasers new products & developments.

March 2018
• SPI is a UK based leader in fiber laser technology.

• We offer innovative laser solutions for industrial material processing, marking, and micro applications.

Our strengths:
• R&D in lasers, fiber technology and applications

• Lean production and vertical integration:
  • Optical fiber & key components, high volume production of lasers

• Global ‘Sales & Service’ presence

• Customer focus: We enable the success of our customers and build lasting business relationships.
redENERGY® G4

Flexibility & speed for marking & pulsed micro-machining.
20W - 200W
Pulsed Fiber Laser

3 to 2000 ns pulse duration
1 kHz to 4 MHz repetition rate
Selection of mode profiles from $M^2 = 1.1$ to 3.5
Pulse energy >1mJ, peak power >20kW
Pulse-to-pulse tunable temporal shapes and cw-mode

- Easily integrated, compact and robust
- Common interfaces for all lasers
- Enhanced connectivity
- Improved controllability
- Air-cooled, maintenance-free
- 3 years standard warranty

Applications range from marking & engraving to advanced micro-machining tasks, serving industries from automotive, battery, jewellery, solar, to consumer electronics.
The new air-cooled 100W EP-Z

- **Wavelength**
  - 1060 nm as standard

- **Beam Quality**
  - $M^2 < 1.6$

- **Pulse Energy**
  - Up to 1.25 mJ

- **Pulse Duration**
  - 4 ns – 2000 ns

- **Peak Power**
  - In excess of 10 kW

- **Pulse Repetition Frequency**
  - From single shot to 4 MHz

- **Divergent output of 100 mrad**
  - Optional collimators to provide 3, 5, 7.5 and 10 mm beam diameters

- **Visible pilot laser**
The new air-cooled 200W EP-Z

- **Wavelength**
  - 1060 nm as standard
- **Beam Quality**
  - $M^2 < 1.6$
- **Pulse Energy**
  - Up to 1.50 mJ
- **Pulse Duration**
  - 10 ns – 2000 ns
- **Peak Power**
  - In excess of 10 kW
- **Pulse Repetition Frequency**
  - From single shot to 4 MHz
- **Collimated output**
  - With nominally 10 mm diameter
- **Visible pilot laser**
Micro-joining

- **Faster processing**
  - Can produce lap, butt and filet welds
  - Pulse energy >1.5mJ allows high speed joining
  - Speed of up to 0.3-1.5 seconds per spot join

- **Able to join thicker materials**
  - Joins broad range of materials
  - Able to join a top layers of <800μm,

- **High quality micro-welding**
  - Strong welds with peel strength
  - Extremely low levels of thermal distortion

- **Dissimilar metal joining**
  - Can make joins which cannot readily be achieved by other lasers
  - Able to join even the most ‘difficult’ combinations

- **SPI Innovation**
  - SPI patented process (WO2016128704, WO2016128705)
  - China patents: (CN205764438U CN105855706)
Foil Cutting

- High levels of accuracy and repeatability
  - Even on reflective metals!

- Faster than traditional techniques
  - Foil cutting at >1m/s
  - No need for costly tooling changes

- Able to cut varying thicknesses
  - 10 um thick foils with high edge quality...
  ...to in excess of 1 mm with low heat affected zone

- Energy efficient
  - Reducing waste and environmental impact

- Ideal for cutting battery foil material
  - With associated coatings
**redPOWER® qube**

Power & control for cutting, welding & micro-machining.

**300W – 2kW**

CW Fiber Laser

Single mode and multi-mode output beam options

Modulation speed up to 100 kHz, < 5µs rise/fall

**redPOWER® prism**

Efficiency & flexibility for macro materials processing.

**300W – 2kW**

CW kW Fiber Laser

Single mode and multi-mode output beam options

Core functionality for optimum value added

- CW or modulated operation
- High reliability and power stability
- Pulse Shape Equalisation (PSE)
- Dynamic pulse shape control
- Air and water cooling available
- 2 years standard warranty

- Compact design for OEM integration
- Single and multi-mode delivery fiber
- High back reflection protection
- Integrated power & temperature monitoring
redPOWER® qube
Multi-kW
Providing exceptional levels of power & control.
3kW – 8kW
CW kW Fiber Laser
Stand-alone systems with full safety and control functionality

redPOWER® prism
Multi-kW OEM
Building blocks for high power Fiber Lasers.
3kW – 6kW
CW kW Fiber Laser
Optical engines with core functionality for optimum value added
High power fiber combiner with integrated control and monitoring features

- Pierce Detection
- Easily automated
- Patented back reflection protection
- Multiple fiber delivery options
- Integral pulse shaping capability
- Multi-way beam time share options

- Pierce Detection
- Differentiated products
- Optimised value add
- Rack mount (19”) format
- Integral pulse shaping capability
- Optional module for system safety control.
• **Ideal for:**
  - Oscillation welding
  - Remote welding applications
  - High speed foil slitting

• **Class-leading 10m Single Mode delivery fiber (25µm, M2=1.2±0.1):**
  - Also 50um and 100um MM delivery fibres up to 20m long.

• **High speed modulation capability:**
  - up to 50kHz

• **Back Reflection Protection**
  - inherent to PIPA-Q Fiber Termination design.

• **FiberView comprehensive control software:**
  - With integrated pulse shaping
redPOWER QUBE Cabinet Laser

- **New Product at 8kW**
  - Enhances current range from 3kW to 6kW

- **Patented PIPA-Q delivery fibers with back reflection protection**
  - Optimised beam quality options for 100µm fibers to match material thickness
  - 50µm fibers for lower power levels

- **Features integrated Pierce Detection**
  - an SPI breakthrough invention for increased productivity
  - See separate presentation

- **High speed modulation for precise cutting control.**
In Summary

- The new air-cooled 100 & 200W EP-Z
  - Battery foil cutting
  - New ns Pulsed Laser Applications incl IP protection for our customers
- QUBE 2kW Cased Laser
  - Oscillation welding
  - Remote welding applications
  - High speed foil slitting
- New Flagship Prism and Qube Product at 8kW