

SIENNA™

Compact laser wire stripping systems offering unequalled damage-free, high quality and selective removal of wire insulation

Laser Wire Strippers



stripping

SIENNA

Laser Wire Strippers

Spectrum Technologies' SIENNA laser wire strippers offer cost effective, high quality, damage free stripping of hi-tech wire and cable constructions used in the most demanding manufacturing applications; including medical electronics, aerospace, consumer electronics and automotive.

Spectrum offers a range of SIENNA systems designed to deal with different wire types and manufacturing requirements. Process capabilities and rates vary according to each system, offering flexibility for differing production requirements.

We will be pleased to discuss your particular requirements and advise on the most appropriate model.



Laser Wire Stripping

Laser wire stripping has been developed by Spectrum Technologies to replace conventional wire stripping methods such as mechanical, chemical or thermal processes, particularly where:

- damage of any sort to the conductor or shield is unacceptable
- the shape and geometry of the cable makes it incompatible with mechanical stripping processes
- specialised insulations are used that are incompatible with other stripping methods
- process limitations in conventional wire stripping methods result in the use of manual stripping with knives, e.g. large diameter (>10 mm (0.39")) wire and cables

Why Laser stripping...

The laser stripping process offers the following performance benefits;

- Non-contact process – guarantees quality: no nicks, no cuts, no damage
- High precision, consistent and reliable stripping, from the first strip to the last, day-in, day-out
- Fully programmable equipment capable of stripping most insulation types and profiles without the need for tooling changes
- Reduced inspection, as the laser beam is reflected by the conductor resulting in zero risk of damage to the conductor
- Low maintenance, low consumable costs with minimal wear and tear on components
- Unaffected by variance between batches, fast set up for new wire types and quick switch over time.
- Capable of processing discrete wires and cables, component assemblies and can be integrated with other systems for in-line processing

Typical Applications

Typical uses of SIENNA systems are as follows (non-exhaustive):

Electronics

Notebooks, mobile phones, digital cameras, PDA's, MP3 players, PC interconnect cables

Medical

Ultrasound probes, earpieces, implants, intra-vascular devices

Communications

Infiniband™ cables, fibre optic cable

Automotive

Airbag wiring, battery cables, handbrake cables

Aerospace

Multi-core wires, extruded and tape wrapped wires, large gauge power cables, avionics installations and space systems

Locomotive and Rolling Stock

Locomotive, rolling stock, trackside and signalling

Military & Defence

RF systems, telecoms devices, military vehicles

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SIENNA 200 & 300 Laser Wire Strippers

The Laser Wire Stripping Process

During the laser wire stripping process the laser beam is absorbed strongly by the insulating material. As the laser penetrates the insulation it vaporises the material through to the conductor. The conductor strongly reflects the radiation at the laser wavelength and is therefore unaffected. No nicks, no cuts, no damage.

The absorption and thermal properties of the insulating material have a significant influence on the laser power used, which often affects the quality of the end result. Typically the laser power and processing speed are selected to provide precision and overall cleanliness of the stripped region.

The melting point of the material may be used as a guide to determine the laser power level required for stripping. In general, lower melting point materials require the least amount of laser power.



Above: 12 AWG, single core Polyimide and PTFE tape wrapped MIL spec aerospace wire (22759/87) with window strip and slit, with insulation left on.

Single Axis systems

A single axis system moves the laser beam in one plane only and would be used primarily for the end stripping of wires. First, the beam moves across the top of the wires, then across the underside to cleanly cut through the insulation. Using this method, wires up to a diameter of 6mm (0.24") may be processed. The direction of movement can be fixed in the X or Y direction dependent upon the required orientation of the equipment on the workbench. The laser beam can move up to 100mm (4") thus allowing multiple wires or ribbon cables to be processed in a single operation. High volumes of wires can be processed and stripped by utilising simple tooling plates to hold the wires in position. The system operation is simple and is initiated by a single key press or footswitch. The laser power, scan speed, scan distance and number of cycles are all set via the front panel keypad. Single axis systems are available with 10W, 25W and 50W lasers. 10W lasers are suitable for most applications but for thicker or harder insulations or where faster process speeds are required, 25W and 50W are preferred.

Dual Axis systems

A dual axis system moves the laser beam in two planes within a stripping area of 100mm x 100mm (4" x 4"). This additional direction of movement enables both end stripping and window stripping to be performed. As with the single axis machine, single wires, multiple wires and ribbon cables can be processed. Windows and end strips can be performed by means of a cross cut and slit or raster scan (ablation) operation. Programming the operations can be performed via the front panel keypad or more usually with our Windows™ based SIENNA control software. This simple interface allows quick and easy programming and programme storage and gives the system a high degree of flexibility. Our dual axis systems are available with 10W, 25W and 50W lasers.



SIENNA 200 series

For single core wires, multi-core cables, twin leads and flat ribbon cables up to 6 mm OD (0.24") or 100 mm wide (4")

SIENNA 300 series

For wire, cables, twin leads and ribbon cables up to 6mm OD (0.24") or 100mm wide (4"), with high temperature insulations

	SIENNA 200 series	SIENNA 300 series
Laser	10 Watt, air cooled	25 or 50 Watt, air cooled
System	Class 1 laser product for use on open shop floor	
Control	Single axis	Microprocessor with easy to use operator control panel
	Dual axis	PC with proprietary control software
Wire types	Single core wire Twin leads Twisted pairs Multi-conductor & ribbon cables	
Wire sizes	up to 6mm (0.24") O/D	
Strip range	Either singly or laid in parallel up to a total maximum width of 100 mm (4"). Or 100 x 100 mm (4 x 4") for dual axis system	
Insulation types (non-exhaustive)	PTFE / Teflon® Tefzel® PVC Polyurethane Silicon Kapton® Polyimide Polyesterimide	PTFE / Teflon Tefzel PVC Polyurethane Silicon Kapton Polyimide Polyesterimide
		Polyester Fibreglass Polyethylene Nylon
Dimensions	305 x 510 x 965 mm (12 x 20 x 38")	510 x 510 x 940 mm (20 x 20 x 37")
Weight	45 Kg (99 lbs)	60 Kg (132 lbs)
Options	ACS4	Automatic wire handling (AWH) ACS4



Flat ribbon cable, 18 mm (0.71") wide processed by a dual axis SIENNA system in a programmed pattern



Black twin-ax InfiniBand™ cable, used for high speed data connections. Outer sheath stripped mechanically, inside wires end-stripped using a single axis SIENNA system



Flat Laminated Cable (FLC), 16 mm wide (0.63") window stripped using a dual axis SIENNA system

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SIENNA 500 Laser Wire Strippers

Rotary Stripping Process

Our rotary laser stripping process uses the same technology as the SIENNA 200 and 300 systems; whereby the laser beam is absorbed by the insulating material, vaporises it, and then is reflected by the conductor, leaving it un-damaged. However in the case of the 500 series, the beam can move 360 degrees around the wire as well as along the wire.

This patented beam delivery method makes the SIENNA 500 series particularly well suited for stripping larger gauge wires and cables up to 25 mm (1") in diameter. With two axes of movement, radially and longitudinally, cross-cuts and slits along the wire lengths are possible. End strips up to 200 mm (7.87") in length are possible as well as window strips for back shell termination purposes.

Two versions are available, a 10W system, ideal for stripping multicore cables up to 7 mm (0.28") diameter, and a 30W system which is perfect for stripping larger diameter wire and multi-core cables as well as tougher insulation types.



SIENNA 500 series

For large diameter individual wires and cables up to 25mm OD (1").



SIENNA 500 series		
Laser	10 or 30 Watt, air cooled	
System	Class 1 laser product for use on open shop floor	
Control	Microprocessor with easy to use operator control panel	
Wire types	Single wires Multi-conductor cables	
Wire sizes	1 to 25 mm (0.04 – 1")	
Strip range	Up to 200 mm long (7.87")	
Insulation types (non-exhaustive)	PTFE / Teflon Tefzel PVC Polyurethane Silicon Polyester Kapton Polyesterimide Fibreglass Polyethylene Nylon Polyimide	
Dimensions	305 x 510 x 760 mm (12 x 20 x 30")	
Weight	510	45 Kg (99 lbs)
	530	50 Kg (110 lbs)
Options	PC and software ACS4	



Fiberglass aerospace power cable, approx. 12mm OD (0.47") with a simple end strip performed on a SIENNA 530



High temperature, shielded, twisted, 3-core cable, approx. 5 mm OD (0.2") used in aero engine harnesses with an end-strip and window strip performed on a SIENNA 530



Extruded coaxial cable, approx. 4.5 mm OD (0.18") with end and window strip performed on a SIENNA 510

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Automation

For stripping, measuring and cutting-to-length single wires, multi-core cables and ribbon cables on a reel.

SIENNA AWH Automated Wire Stripper

SIENNA wire strippers can be automated to perform a strip, measure and cut operation by pairing the fast, non-damaging accuracy of laser stripping with the convenience and efficiency of a mechanical measure and cut system.

Automated systems may be configured from any dual axis SIENNA 300 series laser wire stripper in combination with a suitable commercial wire handling system (with a hot-stamp mark control output), a powered wire dereeler and some simple modifications to both systems.

This resulting integrated bench-top system can feed wire automatically through the laser stripper from a reel and then measure and cut it to length. Using this method jobs can be automatically processed as batches via the SIENNA system controller.

For higher levels of automation, our products are also available to systems integrators who may need to incorporate them into more complex automation systems.

This type of system is designed according to customers' requirements - please contact us to discuss your particular needs.



Left: This is computer-generated illustration of a typical automated laser wire stripping setup using a SIENNA 300 series system

Extraction

For air and fume extraction if not available on site

ACS-4 Air Cleaning System

Air exhaust, if not available on site, can be provided by the separate self-contained ACS-4 air cleaning system. Fume exhaust is mandatory for the use of a laser wire stripper and a minimum of 2.8 CMM (100 CFM) is recommended for all systems.

The ACS-4 will remove smoke and debris from the laser stripping area, filter it and return clean air to the room. It is a small compact unit that can be located anywhere near the SIENNA system and contains a replaceable multistage filter which removes:

- Particulates
- Smoke
- Odours
- Halogens and toxic gases



Laser shield cutting process

Laser scribing has been developed primarily for the processing of micro- or pico- coax cable assemblies. This process uses a laser to cut the metal shield to a pre-determined depth. There are two common methods of operation:

For larger cable types, AWG40 and bigger, the outer insulation is first stripped and removed using a SIENNA 200 or 300 system. The shield is dipped in solder and once an even layer of solder has been applied to the cable, the shield, impregnated with the solder, is scribed by the laser. The scribing process produces a very thin cut of around 20µm across the cable, allowing the shield to be mechanically snapped at this point and removed to expose the underlying dielectric.

For cables AWG42 and smaller, direct cutting of the shield without soldering is preferred. Careful selection of the laser parameters is required to cut completely through the shield without damaging the dielectric or inner conductor.



Left: Close-up of a laser scribed 42 AWG micro-coax ribbon cable used in mobile phone applications

SIENNA 220SR Shield Scriber

For cutting the metallic shield on coaxial cables

The SIENNA 220SR is a single axis laser shield scriber and cutter. The system utilises the latest air cooled solid state laser technology to provide excellent beam quality and small focal spot size. When used with our SIENNA 200 or 300 series machines, customers will have the full capability to strip micro coaxial cables of the type used in the manufacture of notebook computers, mobile phones, digital cameras, ultrasound transducer cables, etc.

SIENNA 220SR Shield Scriber	
Laser	20 Watt, air cooled
System	Class 1 laser product for use on open shop floor
Control	Microprocessor with easy to use operator control panel
Wire types	Shielded wire Shielded Ribbon cables
Wire sizes	Up to 1.5 mm OD (0.0625") and 100 mm wide (4")
Strip range	Up to 100 mm (4") in "x" direction
Dimensions	305 x 510 x 760 mm (12 x 20 x 30")
Weight	50 Kg (110 lbs)
Options	PC and software ACS4

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Before and After Sales Support

Spectrum Technologies' end-to-end expertise enables us to offer unrivalled customer support. Our experienced team will be pleased to guide you from start to finish, from discussing your original requirements, to processing your sample wires, recommending the best system for you, and providing the best possible after-sales care through our experienced team of customer service engineers.

Wire Samples

If you would like to see the results of laser wire stripping on your own materials we will be pleased to process samples and return them to you for inspection.

