

# SOLUTION

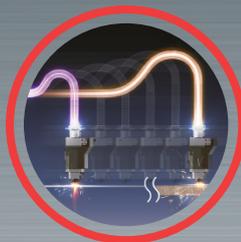
LASER CUTTING



## ENSIS AJ SERIES



UNIQUE BEAM CONTROL FOR HIGHER PRODUCTIVITY



**AMADA**

# ENSIS AJ SERIES

UNIQUE BEAM CONTROL FOR HIGHER PRODUCTIVITY

## FULLY FEATURED FIBRE LASERS PROCESSING THIN TO THICK MATERIALS WITH A SINGLE LENS

### AMADA'S ORIGINAL VARIABLE BEAM CONTROL TECHNOLOGY IS NOW COMBINED WITH HIGHER POWER FIBRE LASER ENGINES

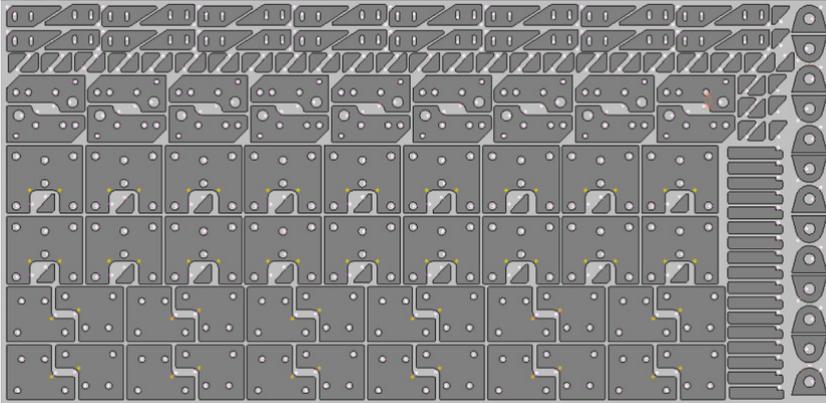
Now utilising 3kW, 6kW and 9kW fibre laser engines, the ENSIS-AJ series machines significantly increase processing capabilities. 6kW and 9kW variants introduce AMADA's Auto Collimation system, to provide unrivalled beam spot control. Linked with AMADA's Variable Beam Control technology, this allows very high speed piercing, fast cutting rates and vastly improved bevel angles on thicker materials.

Utilising a single lens for the entire range of materials and thicknesses reduces machine setup and avoids potential mistakes, providing higher productivity and therefore higher profitability. A high capacity automatic nozzle changer and the simple, intuitive AMNC 3i numerical control are further features ensuring machine setup is reduced to a minimum.



Photograph includes optional equipment

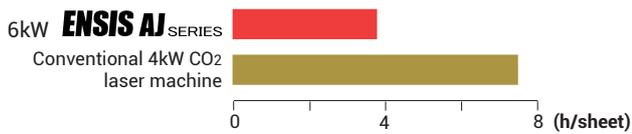
## TYPICAL PROCESSING SAMPLES



Material: Mild steel  
 Thickness: 22 mm  
 Dimension: 3000.0 x 1500.0 mm  
 Assist Gas: Oxygen

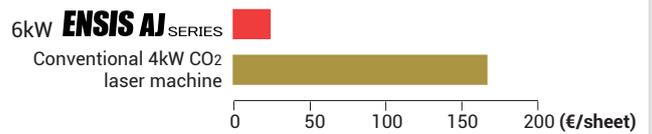
### PRODUCTIVITY COMPARISON

**55.3%** REDUCTION IN PROCESSING TIME



### RUNNING COST COMPARISON

**77.4%** COST REDUCTION PER SHEET



Material: Mild steel 9 mm  
 Dimension: 116.2 x 138.4 mm

### RUNNING COST COMPARISON

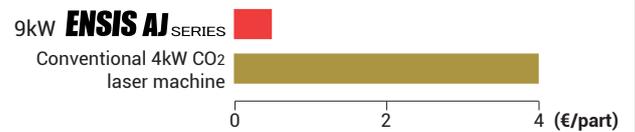
**64.7%** COST REDUCTION PER PART



Material: Stainless steel 12 mm  
 Dimension: 223.0 x 195.0 mm

### RUNNING COST COMPARISON

**83.8%** COST REDUCTION PER PART

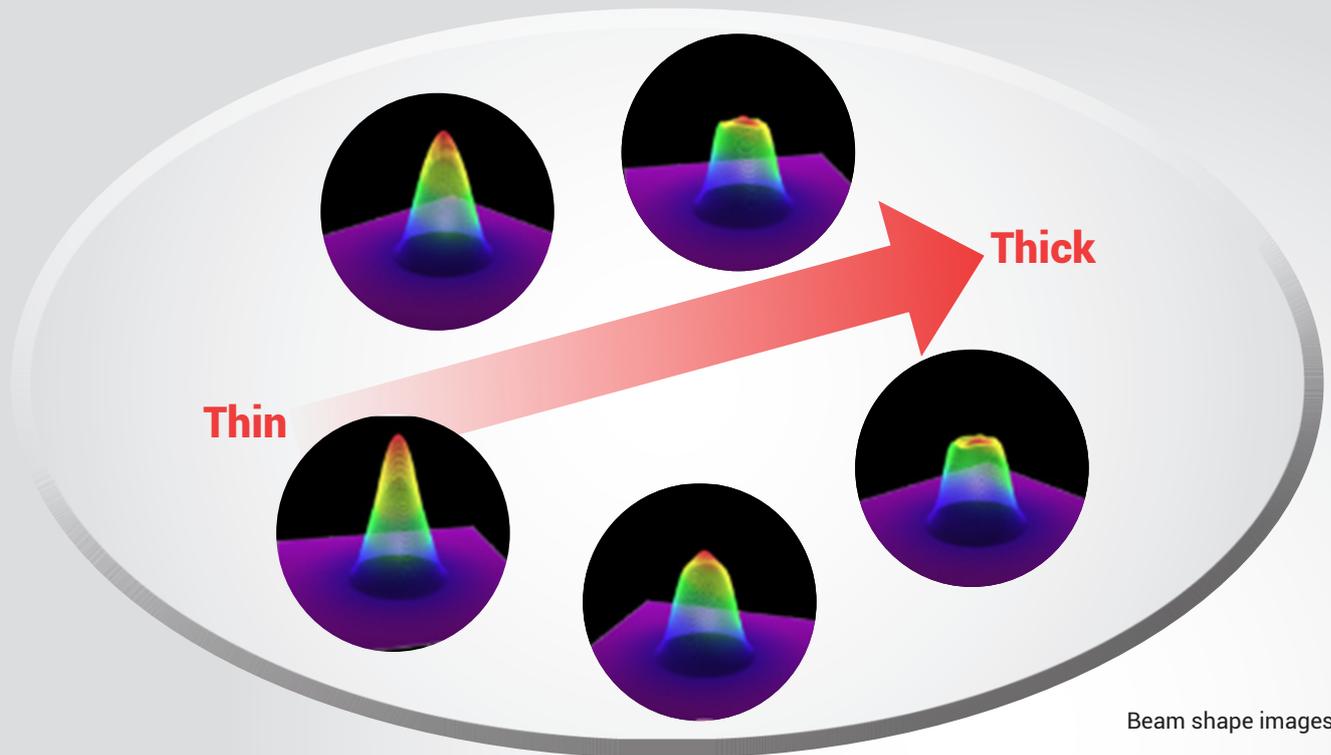


Running costs include assist gases, electricity and consumables.

## VARIABLE BEAM CONTROL TECHNOLOGY

### COMPLETE BEAM MODE CONTROL

Adapting the beam to suit every material combination.

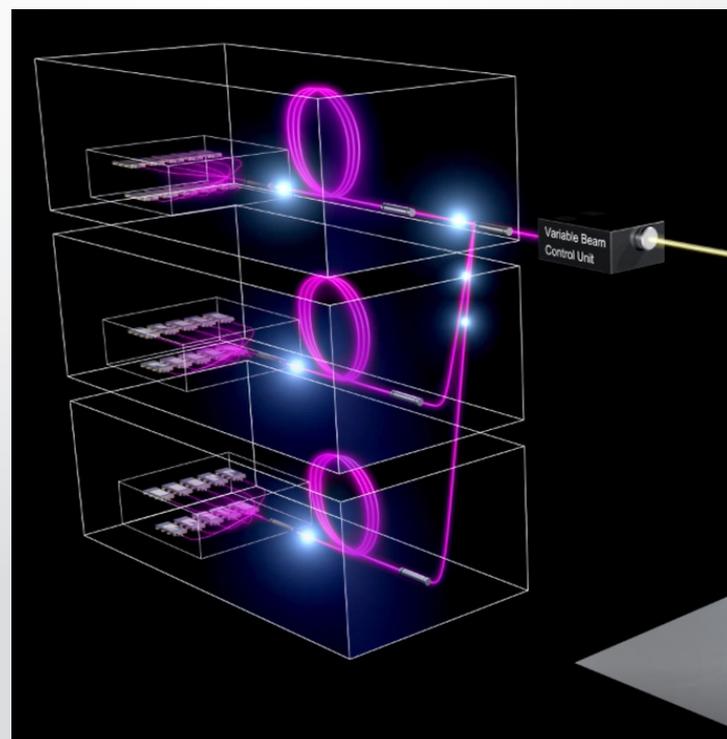


Beam shape images

AMADA's original Variable Beam Control technology has been in use since 2014, providing highly stable cutting of thin to thick materials by automatically adapting the laser beam mode exactly to the type and thickness of material being processed. The system does not simply switch from a 'thin' mode to a 'thick' mode. It incrementally changes the beam mode to provide complete control over the entire material range. The beam mode can also be instantly changed between piercing and cutting to bring the benefit of high speed piercing and increased productivity.

Another advantage of this system is that a single lens can be used to cut the entire specification range. This reduces the amount of setup required and ensures costly mistakes do not happen.

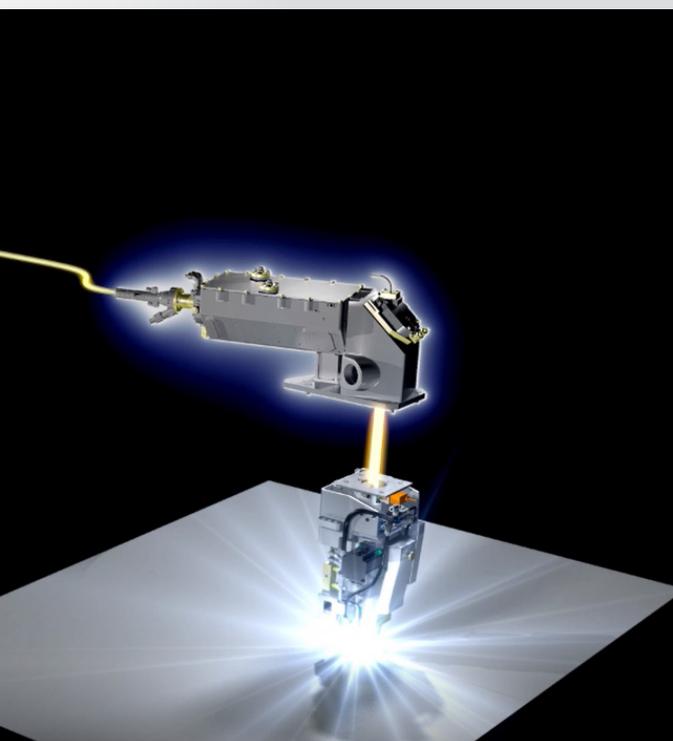
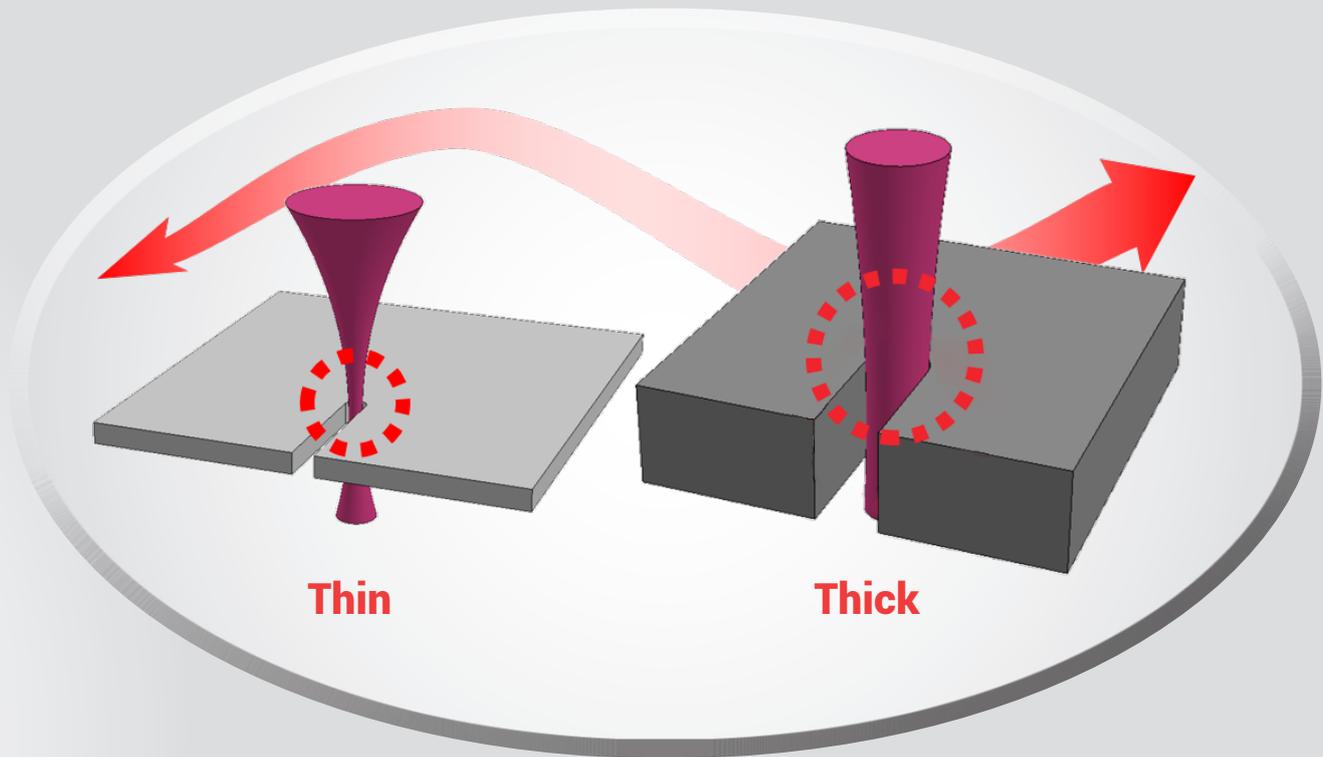
Now being offered with the increased power of AMADA's 6kW and 9kW fibre laser engines, as well as the well proven 3kW engine, Variable Beam Control technology covers every requirement for metal processing, ensuring lower cost-per-part and higher profitability.



# AUTO COLLIMATION TECHNOLOGY

## COMPLETE SPOT SIZE CONTROL

Optimum beam diameter and focus point.



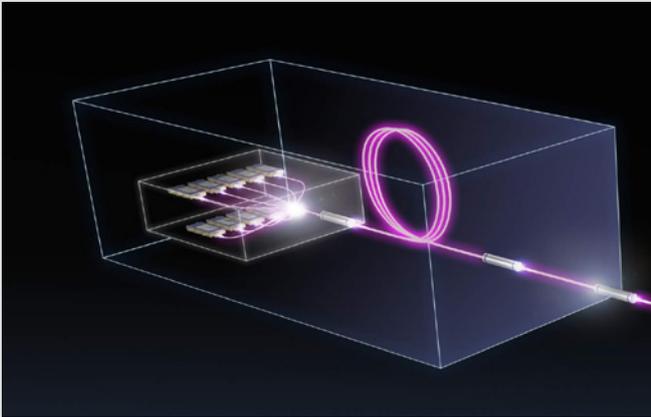
The new, original Auto Collimation technology from AMADA offers the ability to precisely control the laser beam spot size and focus position, allowing the seamless removal of molten metal from within the kerf of the cut. This has solved the issue that standard fibre lasers can have when processing thicker mild steel: If molten material is not removed from the cut quickly enough, the cutting speed needs to be reduced. AMADA's Auto Collimation technology ensures the highest cutting speeds with a high quality cut surface.

Further benefits of the Auto Collimation technology are improved cut edge quality and greatly reduced bevel angles. Also, a wider cut kerf on thicker materials ensures easy part removal to provide increased productivity when parts are removed manually by the operator. This is also the ideal solution when automated part removal is considered, providing highly reliable manufacturing.

Auto Collimation is being utilised for 6kW and 9kW ENSIS fibre lasers.

## AMADA'S LATEST FIBRE LASER OSCILLATORS

### ADVANCED DEVELOPMENT OF OUR IN-HOUSE FIBRE LASER SYSTEM



#### High power diode modules

All AMADA fibre lasers utilise the in-house developed high power diode modules. Each individual module provides 3kW of power, the industries highest, allowing 3, 6 and 9kW cutting capabilities.

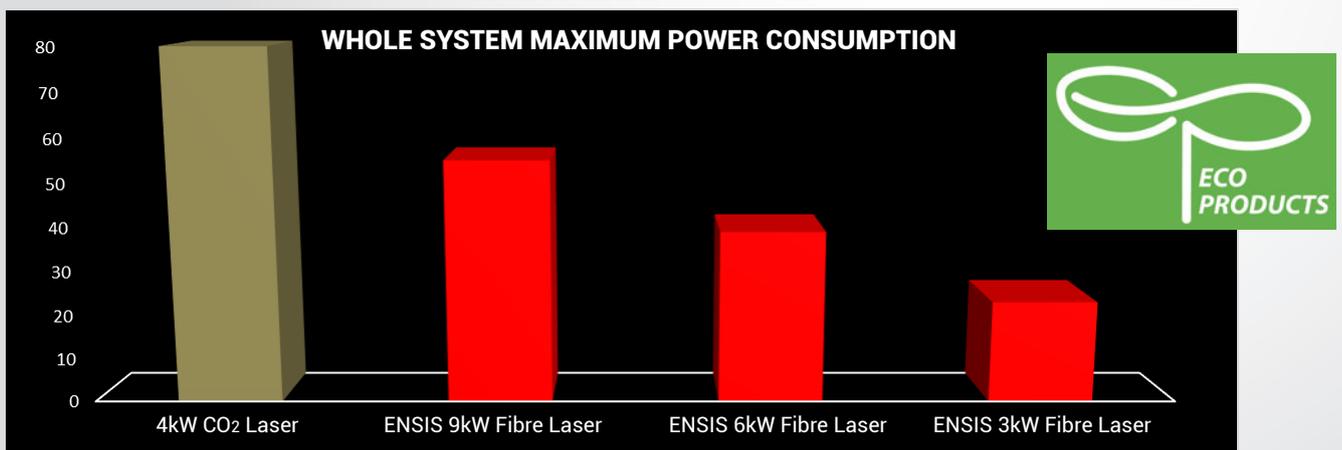


#### In-house manufacturing

In order to enhance the production of fibre laser oscillators at AMADA's Fujinomiya facility and to meet ever increasing demand, clean rooms have been created specifically for production and assembly operations.

## EFFICIENCY THROUGH ENERGY SAVING

### CHOOSE THE CORRECT POWER FOR YOUR APPLICATION

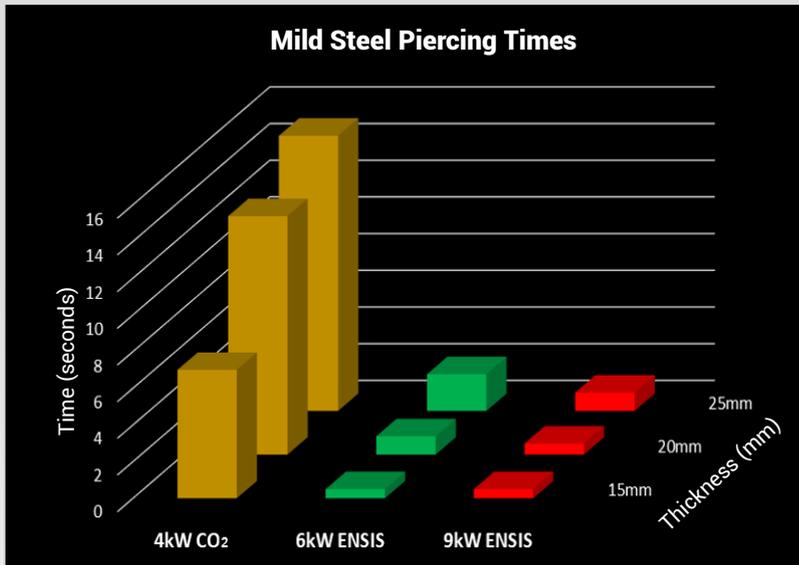


#### Less consumption, more profit

AMADA want its products to be as environmentally friendly as possible, while still providing the highest levels of productivity. ENSIS-AJ fibre laser technology significantly reduces the power consumption for laser material processing. Maximum power consumption of the entire system (including chiller and dust extractor) is significantly lower than a 4kW CO<sub>2</sub> laser, providing further profit for our customers. Utilising 3, 6 or 9kW fibre laser engines, AMADA can help our customers to select the appropriate power level for their individual situation and requirements.

# HIGHER PRODUCTIVITY

## HIGH SPEED PIERCING REDUCES PROCESSING TIMES



### ENSIS-AJ Technology

Thanks to the combination of the Variable Beam Control and Auto Collimation technologies, the 6kW and 9kW ENSIS-AJ can pierce thicker mild steel very quickly. The 9kW variant can pierce 25mm in as little as 1 second, depending on material quality.

The machine can instantly change between a high power density beam for piercing and the ideal beam mode for high quality, high speed cutting which provides faster processing times.

This high speed piercing can save up to 57% of the processing time for a full sheet of parts.

The 3kW ENSIS-AJ has the same Variable Beam Control technology, which is capable of high speed piercing up to 20mm mild steel, making it a very energy efficient but highly productive proposal.

# LOWER COST

## AMADA'S ORIGINAL "ECO CUT" TECHNOLOGY



### Thick mild steel productivity

AMADA's original ECO Cut technology is a system that gives high productivity when processing thick mild steel, while reducing the cost-per-part. This has several benefits:

- Reduced running costs
- Faster cutting speeds
- High quality cut edge
- Improved bevel

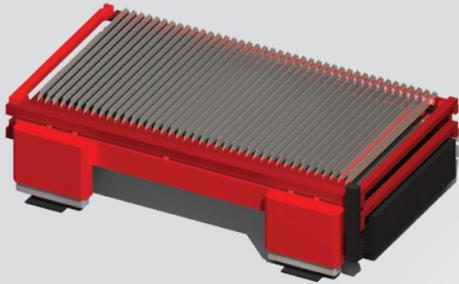
On previous fibre lasers, ECO Cut was available up to 12mm mild steel. For the ENSIS-AJ series fibre lasers, the ECO Cut specification is:

- 25mm (9kW)
- 22mm (6kW)
- 20mm (3kW)

Utilising smaller diameter nozzles and AMADA's extensive knowledge of gas flow dynamics, ECO Cut is the perfect way to increase thick mild steel throughput while getting the added benefit of higher profit.

## AUTOMATION SYSTEMS

### FROM AUTOMATIC PALLET CHANGERS TO FULL STOCKYARD SYSTEMS



#### Automatic pallet changer (LST-E)

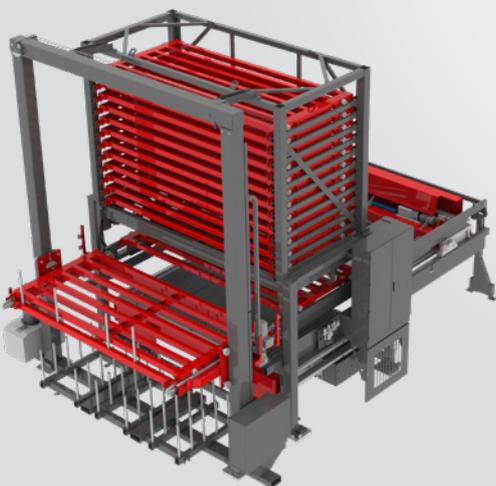
AMADA's standard automation module for 3m and 4m sheet formats is a fully electric system that consists of 2 cutting pallets capable of supporting a full size sheet of 25mm thick material. This is the ideal setup for customers with space restrictions and lower volume production. Continuous operation can be achieved as the next job can be setup while the machine is cutting and parts can be easily sorted from the skeleton.

A free bearing table (FBT) option is extremely useful for customers processing thicker materials, increasing operator safety as it supports the loading and positioning of the heavy sheet. It also allows fast loading of large, thin sheets with a single operator.



#### MP Flexit – Automatic sheet load/unload

The MP Flexit automation module provides continuous, automatic loading and unloading operations to increase machine utilisation. A 3000kg pack of raw material can be loaded into the system, and finished sheets are unloaded via a chain drive fork system onto a pallet at the front of the cell. The chain drive system ensures high quality parts compared to other automation systems as the finished parts are not dragged over the unload forks. Cut parts can be quickly removed by a fork lift truck while the laser is working and moved to the next stage of the manufacturing process. MP Flexit is the perfect solution for mid level volume production for 3m sheet lengths in a factory with height restrictions.



#### ASF-EU – Single tower or double tower

The ASF-EU was designed to compliment the advance in laser technology and the increased speed of manufacture that higher power fibre lasers achieve. With a sheet changeover time of less than 90 seconds, the ASF-EU ensures the highest levels of machine utilisation and flexibility for high volume manufacturing of 3m sheet formats.

The standard configuration consists of 7 raw material shelves and 3 unload shelves, but this can be adapted if required to satisfy each customers requirements.

Alternative versions of the ASF-EU can provide 7 shelves in total (for factories with limited height) and 14 shelves (for even greater automated manufacturing).

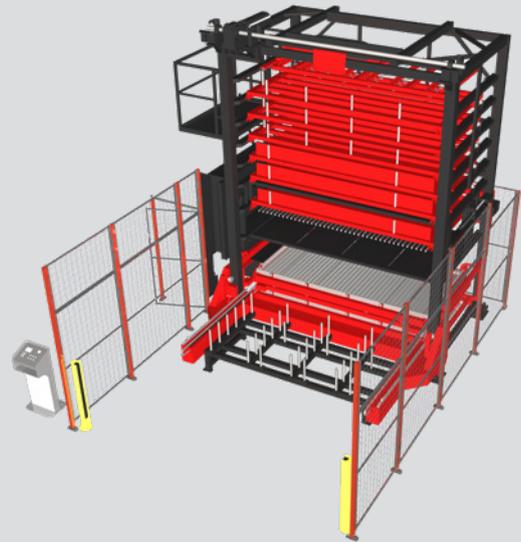
Raw material is loaded onto one of the two cutting pallets via suction cups, while the cut sheets are simultaneously unloaded by the chain drive fork system. Cut parts can be removed and new raw material loaded while the laser is still in operation.

Double tower versions of the ASF-EU are also available which significantly increases the manufacturing capacity for very high volume applications.

## ASL-UL – Single tower or double tower

To satisfy customers with mid to high volume production requirements, the ASL-UL tower was introduced with great success in Europe. It has a compact footprint for minimal impact on factory space, while providing fully automatic, continuous part flow. One feature that is particularly useful for sub contractors is the ability to bring the cutting pallet to the front of the tower and manually load a sheet of material as well as unloading finished parts. This allows the interruption of a long running schedule for an urgent job to be processed. The schedule can then be resumed afterwards.

Available as single or double towers, the ASL-UL is also available in 3m or 4m sheet length configurations.



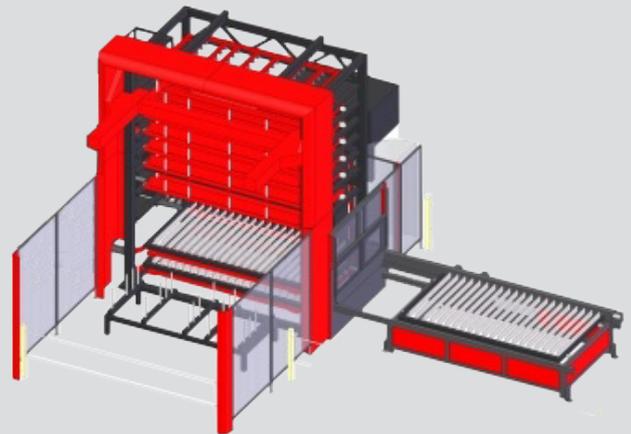
## Second output station

Sometimes, there is a requirement to immediately unload cut parts from the manufacturing cell, while allowing other cut sheets to be stored within it. This is where the second output station proves to be a big benefit.

Once the sheet of parts has been processed, it can be automatically moved through the cell to its home position and manually unloaded from 3 sides. After the parts have been removed, the skeleton can either be removed manually, or sent back into the storage tower to be removed later.

When combined with an ASF-EU automatic tower system, it provides the possibility to interrupt a long running schedule with an urgent job, process the sheet and remove the parts simply and quickly, before restarting the schedule.

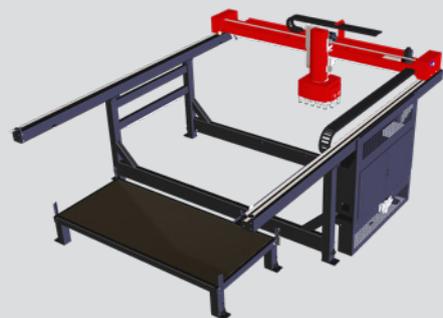
The second output station is available for 3m sheet formats.



## TK-EU – part remover

Modern manufacturing requirements demand high machine efficiency and quick part turnaround. AMADA's TK-EU part removal system satisfies both these requirements. Parts can be removed from the cut sheet in-cycle and stacked on pallets at the front of the cell, with the skeleton returned to the storage system. Individual suction cup activation, extendable arm configurations, 180 degree head rotation and simple offline programming ensure a wide range of part sizes and shapes can be removed automatically. The TK-EU is available for 3m sheet formats.

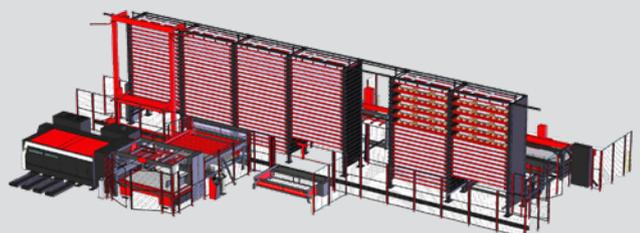
With the ENSIS-AJ technology, a very wide cut kerf is produced when processing thick mild steel. This makes it much easier to remove parts when compared to standard solid state lasers that produce a much narrower kerf.



## CS II – Full warehouse storage

The very highest volume requirements can be fulfilled by AMADA's CS II warehouse automation system. Up to 999 shelves are possible, with both single row or double row configurations available. Lasers, punching and combination machines can all be connected, with input/output (I/O) stations positioned according to the customer requirements.

The stacker crane delivers raw materials to the individual machine cells and removes finished parts either back to the storage or to an I/O station for removal to the next manufacturing stage. CS II warehouse systems are available for 3m sheet formats.



## FUNCTIONS AND OPTIONAL EQUIPMENT



### Automatic Nozzle Changer

To ensure fully automatic operation, the ENSIS-AJ is equipped with a multiple station nozzle change system which includes a nozzle cleaning and head calibration unit.



### Single Lens Processing

Due to the ENSIS-AJ technology, a single lens is used to process the entire range of materials, which saves setup time and increases productivity.



### Front and Side Access

To allow the most flexible access to the cutting area, the ENSIS fibre laser is equipped with front and side opening doors.



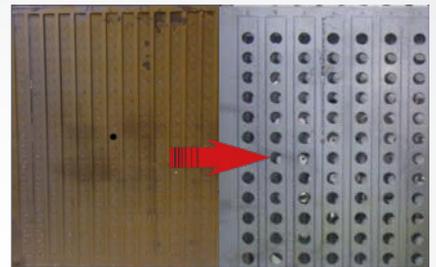
### WACS II

While cutting thick material, water is sprayed on the material to reduce the thermal effect of cutting, prevent cutting defects, and improve the material yield.



### X-Direction Conveyor

Scrap and small parts are unloaded in the X direction by the conveyor installed in the frame of the laser machine.



### Dust Air Blow

In order to improve the quality of mild steel parts, the ENSIS-AJ is equipped with the dust air blow system. This continuously feeds a blade of air across the underside of the metal sheet to inhibit any dust created by the cutting process from adhering to it.

### AMNC 3i NUMERICAL CONTROL

The AMNC 3i numerical control used on the ENSIS-AJ series fibre lasers is a 21.5" HD touch screen system that provides simple, intuitive operation for higher productivity. It fits perfectly into the VPSS 3i digital suite concept.



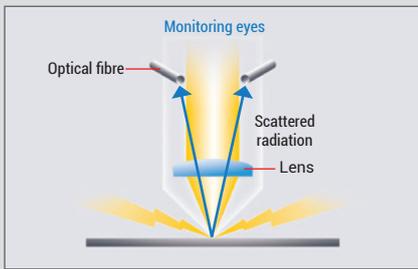
**AMNC 3i**

Features include:

- Smart phone type operation for zooming.
- On-screen nesting automatic NC generation.
- One touch operation for quick machine setup.
- Machine productivity and history record.

### STANDARD MACHINE FEATURES

	3kW standard	3kW fully featured	6kW/9kW
ENSIS Technology	●	●	●
Auto Collimation Technology			●
Single lens cutting	●	●	●
Nozzle changer (no. of stations)	8	16	16
Compress air cutting system	●	●	●
Clean Fast Cut (CFC) compatibility	●	●	●
Oil shot functionality	●	●	●
Front & side access	●	●	●
Deep etch capability	●	●	●
Dust air blow	●	●	●
Water assisted cutting (WACS II)		●	●
Pierce monitoring		●	●
X axis conveyor		●	●



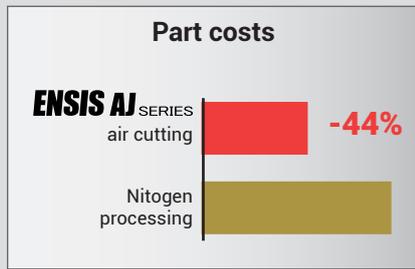
### Pierce Monitoring

Pierce Monitoring checks that the pierce is completed before beginning the cutting process. The pierce cycle is automatically altered depending on the material quality.



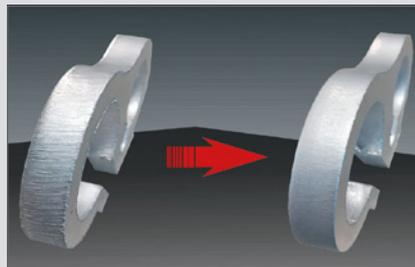
### Silky Cut

For stainless steel processing, AMADA developed Silky Cut for fibre lasers, giving CO<sub>2</sub> type quality and maintaining the fibre laser savings for electrical consumption (typically 70% less than an equivalent CO<sub>2</sub> laser).



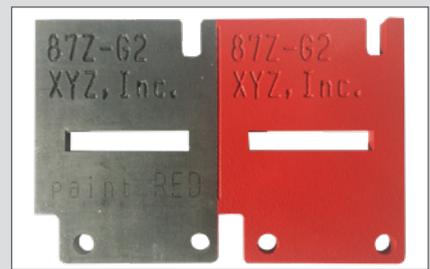
### Compressed Air Cutting

To keep part cost to a minimum, AMADA fibre lasers allow you to process many materials with the standard compressed air cutting system, giving high quality results. Assist gas costs are, therefore, zero.



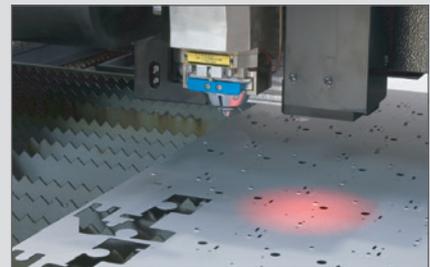
### Gas Mixer

When processing aluminium, a mix of nitrogen and oxygen allows the perfect combination of improving the cut quality compared to nitrogen, while keeping the weldability of the material, which is a problem when processing with oxygen.



### Deep Etch

The Deep Etch function, completed in a single pass of the laser beam, allows part identification to be readable even after coating. This provides part traceability through the manufacturing process.



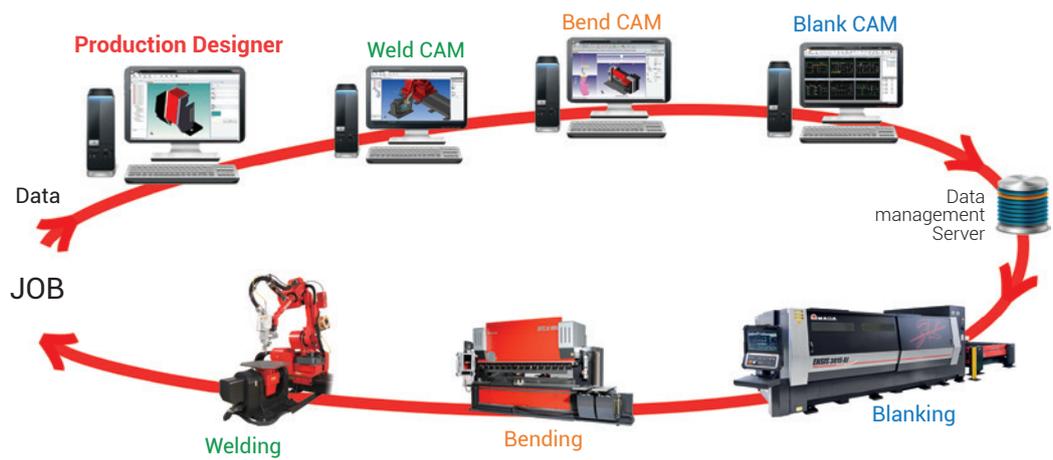
### OVS IV

The OVS IV system measures the pitch of two reference holes and automatically compensates for any origin deviation when transferring a sheet of parts from the punch machine. The pitch and circularity of the cut holes are also measured. When the measured values fall outside the specified limits, an alarm is activated.

## THE SHEET METAL DIGITAL FACTORY

AMADA proposes digital manufacturing using VPSS (Virtual Prototype Simulation System).

All data is created in the office and utilised in the workshop via a network.



Unit: mm

**DIMENSIONS**

**ENSIS-3015AJ 3/6 kW + shuttle table (LST-E)**  
(L) 10136 x (W) 2840 x (H) 2432

**ENSIS-3015AJ 9 kW + shuttle table (LST-E)**  
(L) 10136 x (W) 2840 x (H) 2730

**ENSIS-4020AJ 3/6 kW + shuttle table (LST-E)**  
(L) 12080 x (W) 3360 x (H) 2432

**ENSIS-4020AJ 9 kW + shuttle table (LST-E)**  
(L) 12080 x (W) 3360 x (H) 2730

**MACHINE SPECIFICATIONS**

			ENSIS-3015AJ	ENSIS-4020AJ
Numerical Control			AMNC 3i	
Controlled axes			X, Y, Z axes (three axes controlled simultaneously) + B axis	
Axis travel distance	X x Y x Z	mm	3070 x 1550 x 100	4070 x 2050 x 100
Maximum processing dimensions	X x Y	mm	3070 x 1550	4070 x 2050
Maximum simultaneous feed rate	X/Y	m/min	170	
Repeatable positioning accuracy			± 0.01	
Maximum material mass			920	1570
Processing surface height			940	
Machine mass			9100 (3kW) / 9500 (6kW) / 9600 (9kW)	12200 (3kW) / 12800 (6kW) / 12900 (9kW)

**OSCILLATOR SPECIFICATIONS**

		ENSIS-3000	ENSIS-6000	ENSIS-9000
Beam generation		Laser diode-pumped fibre laser		
Maximum power	W	3000	6000	9000
Wavelength	µm	1.08		
Maximum processing thickness*	Mild steel	25**	25	25
	Stainless steel	15	25	25
	Aluminium	12	25	25
	Brass	8	15	18
	Copper	6	12	12
	Titanium	5	10	15

\* Maximum value depends on material quality and environmental conditions

\*\* With WACS. Without WACS = 20mm

**SHUTTLE TABLE SPECIFICATIONS**

		LST-3015E	LST-4020E
Max. material dimensions X x Y	mm	3070 x 1550	4070 x 2050
Number of pallets		2	

Specifications, appearance, and equipment are subject to change without notice by reason of improvement.



For your safe use

Be sure to read the user manual carefully before use.

When using this product, appropriate personal protection equipment must be used.



Laser class 1 when operated in accordance to EN 60825-1

The official model name of the machines and units described in this catalogue are non-hyphenated like ENSIS3015AJ. Use this registered model names when you contact the authorities for applying for installation, exporting, or financing.

The hyphenated spellings like ENSIS-3015AJ are used in some portions of the catalogue for sake of readability. This also applies to other machines.

Hazard prevention measures are removed in the photos used in this catalogue.

**AMADA UK LTD.**

Spennells Valley Road,  
Kidderminster,  
Worcestershire DY10 1XS  
United Kingdom  
Tel: +44 (0)1562 749500  
Fax: +44 (0)1562 749510  
www.amada.co.uk

**AMADA SA**

Paris Nord II  
96, avenue de la Pyramide  
93290 Tremblay en France  
France  
Tél : +33 (0)149903000  
Fax : +33 (0)149903199  
www.amada.fr

**AMADA GmbH**

AMADA Allee 1  
42781 Haan  
Germany  
Tel: +49 (0)2104 2126-0  
Fax: +49 (0)2104 2126-999  
www.amada.de

**AMADA ITALIA S.r.l.**

Via AMADA I., 1/3  
29010 Pontenure  
(Piacenza)  
Italia  
Tel: +39 (0)523-872111  
Fax: +39 (0)523-872101  
www.amada.it

