

SELMACH[™]
MACHINERY

Making Metal Work

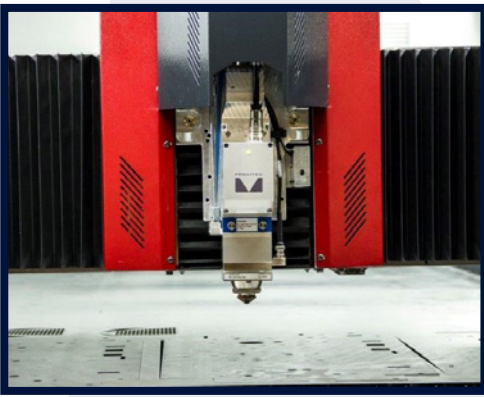


XS Fibre Laser Cutting Machine

The Morgan Rushworth XS range of fibre lasers are available in a range of bed sizes and are equipped with an automatic shuttle table with dual pallet changer enabling parts to be safely loaded and unloaded whilst the machine is still cutting. Class leading components ensure superior cut quality, high reliability and reduced down time.

The range covers from 6kw up to 20kw which with the high performance rack and pinion system for X & Y axis and a rigid gantry and frame structure, resulting in fast acceleration, fast positioning speeds and fast cutting times. Optionally machines can be fitted with linear motors and guides for even greater acceleration. A user friendly touch screen CNC control allows parts to be programmed on the screen or imported from an office PC, providing flexible modes of operation.





**PRECITEC PROCUTTER
CUTTING HEAD**



SHUTTLE TABLE

Machine Features

- Class leading nLIGHT or IPG fibre laser source available from 6Kw – 20Kw
- Precitec ProCutter cutting head with auto focus and anti-collision functionality
- Beckhoff servo motors and drives
- Wittenstein rack and pinion system with automatic lubrication
- SMC automatic gas selection system
- Beckhoff touch screen controller with part graphic view and extensive cutting parameter data base
- Automatic sheet edge detection with skew allowance
- Automatic nozzle cleaning and calibration
- Class leading Lantek Expert software
- Fast shuttle table change time
- Large window viewing area with laser protective material
- Light guard protection for shuttle table

Optional Equipment

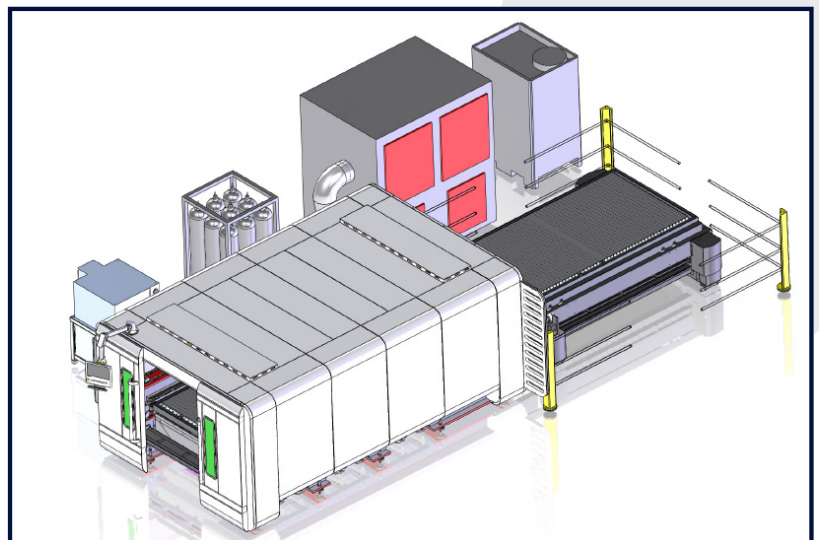
- Auto nozzle changer
- CNC bevel cutting up to 45°
- Linear motors and drives instead of servo motors and drives
- CNC parts conveyor
- Metalix software instead of standard Lantek
- CCTV view of cutting action
- Fume extractor with filters
- Air compressor and dryer
- Loading and unloading systems

Modular, Large Format and High Speed

The Morgan Rushworth XS range of large format high power fibre laser cutting systems takes plate cutting to a new dimension. Large format material can now be processed at feed rates only seen in smaller systems. Traditional large format systems have used slow inaccurate rack and pinion drive systems, and recently companies have taken to plate repositioning as a means of cutting larger material sizes. Both these practices fall short in cutting speed and accuracy and also in production performance.

The XS uses new generation high performance linear systems with gear head, high performance rack and high performance class pinion and its modular format allows for systems to be offered in sizes from 3000mm x 1500mm up to 12000mm x 3200mm.

With the usage of fibre laser technology there is no need to move the laser source or plate, thus allowing high speed, high accuracy cutting and coupled with dual full size pallets maximum production throughput.



Uniqueness

- Ease of processing both large and small size formats
- High performance Gears, pinions, and the genuine case-hardened rack from a single source
- No repositioning of plate ensure accuracy.
- Fibre optic laser delivery system.
- Simple and User-friendly operator interface and cutting database.
- Dual pallets.
- Superior cutting speed approach up to 45 m/min.

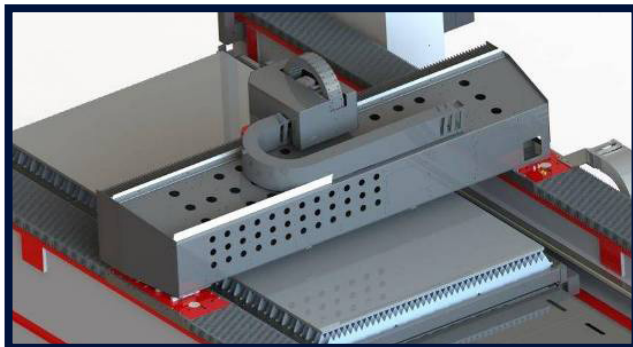
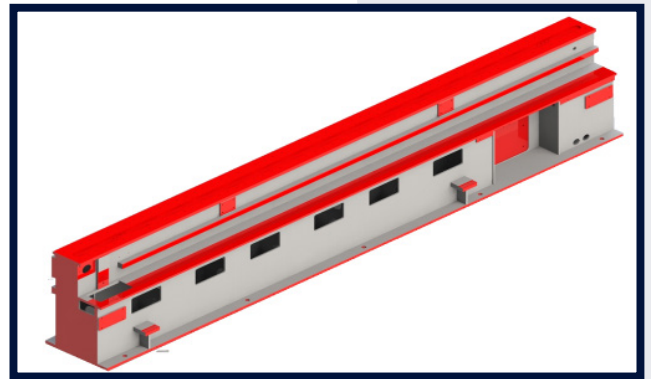
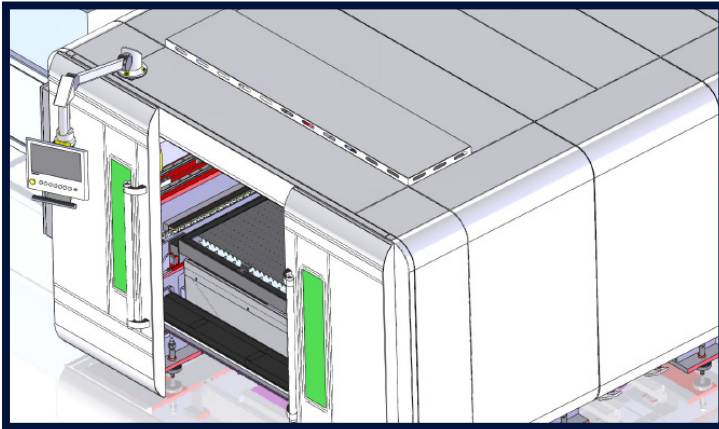
Applications

The XS offers processing capabilities for large and specialised material sizes, and can be used in wide variety of manufacturing industries, whilst still offering comparative performance in all areas of laser cutting.

- Automotive Industry (Heavy transport trucks and trailers)
- Farm and construction equipment
- Railway carriage industry
- Shipbuilding industry
- Steel suppliers (cutting of customers jobs)
- Steel construction industry
- Machinery manufacturers (conveyors etc)

The XS Laser profiling system produces two-dimensional contoured shapes from flat material by moving a focused beam of infra-red light along a programmed path.

The system is a fibre cable delivery design moving the laser beam from a fixed laser resonator to a focusing lens, which moves over a stationary work-piece. Material is removed where the lens concentrates the laser power into a small spot on the material to be cut. Different gases are also emitted with the focused beam from the cutting nozzle; these are used to control the cutting process.



The XS laser machine is a Gantry type machine which has rugged design and construction. With its rigid, stress relieved and precisely machined base it ensures precision of the machine.

With its high strength, low weight gantry ensures stiffness and acceleration up to 3.2G.

High acceleration produces more accurate parts when processing small radius arcs and sharp corners at high speeds.

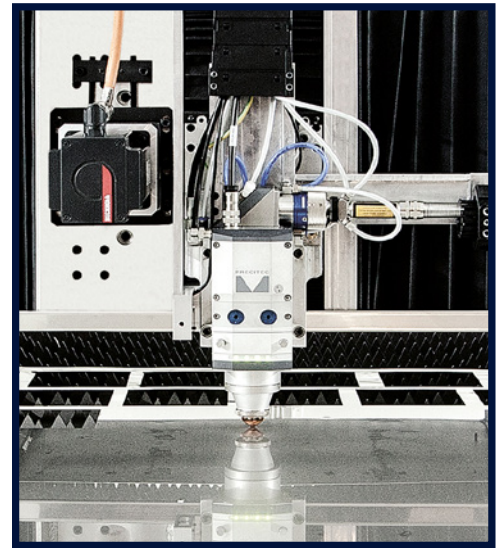
Precitec Laser Head

The Morgan Rushworth XS uses a Precitec laser head, which permits achieving best result and constant top performance on final material surface. The ProCutter offers a fully-integrated sensor system that monitors the cutting process and provides the user with relevant information.

Distance to the work piece remains consistent via capacitive sensor. Fast, exact, drift-free distance measurement at any operating temperatures, even at high accelerations.

LED status bar for immediate display of the current system state (pressure, temperature, drive, contamination). Cutting head includes lens protective glass. This feature saves cutting lens and ensure long life usage. Easy interchangeable and low cost protective glass allow you free work without troubles for lens. The cutting head is equipped with a crash protection system. In case of collision with the work pieces the head easily separates to avoid any damages.

CNC controlled feature allows cleaning and quick calibration of nozzle at predefined numbers of piercing. Applying auto nozzle cleaning avoids problems caused by stacked spatters and ensure height following accuracy.



CNC Controller

The 360 degree rotating CNC control console is ergonomically designed for observing cutting area with the best view.

- One touch menu to reach all machine HMI pages
- Multi-touch part program graphic view
- Animated safety warnings and graphical diagnostic



Dual Pallet Transfer Table

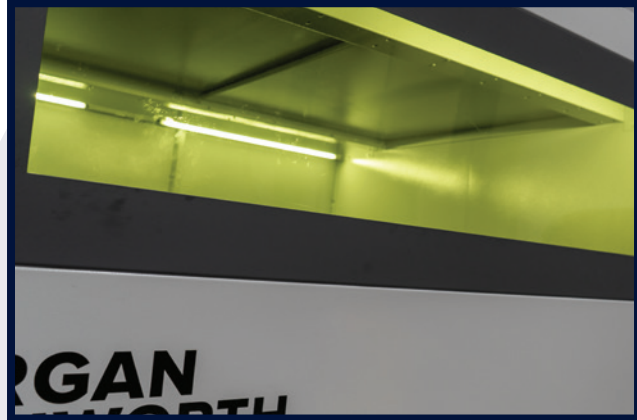
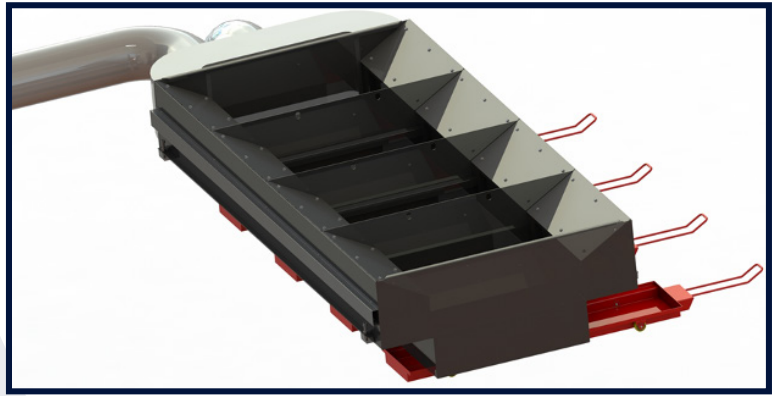
The XS is equipped with a dual pallet hydraulic lift transfer table. This allows to continue cutting during loading and unloading.

- More parts per hour every single day of operation.
- Loading and unloading during operation.
- Pallet changing controlled by either CNC or manual control panel.
- Tables driven by one single motor and connected by chain.
- Hydraulic lift up system equipped with six independent and CNC synchronized cylinders.

Fume Extraction System

Cutting table divided into sections with pneumatically moved and CNC controlled doors.

An optional parts debris conveyor carries dropped small parts, scraps and slag from cutting table into a wheeled scrap box.



Protection Cabin

To obtain compliance with CE, the machine is surrounded by ergonomic cabin construction. Because of the wavelength of fibre laser, there is the need of a strongly protected cabin construction.

Using special protective glasses on the outer cabin also allows observation of the cutting process.

High Performance Rack and Pinion Motion System

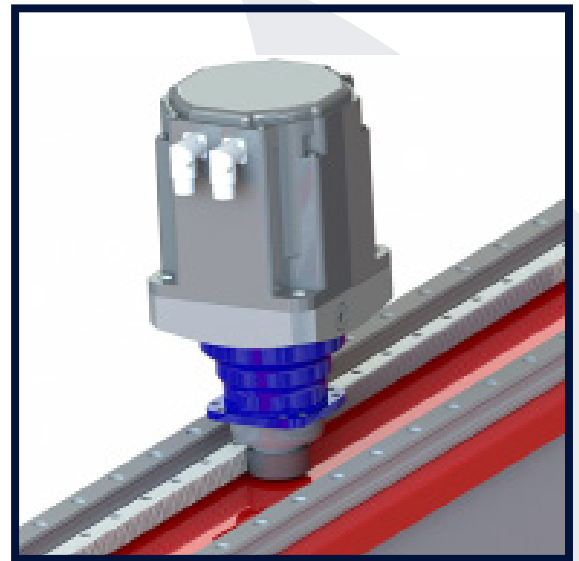
The gantry uses new generation high performance linear systems with gear head, high performance rack and high performance class pinion. The innovative High Performance assemblies are ideally suited and gantry sorted for high speed cutting systems which require performance and accuracy at the same time.

The new Wittenstein alpha rack and pinion drive systems are fast, smooth, accurate and trouble free, setting the pace in laser drive system design.

Gas Control and Delivery

The machine is equipped with an automatic gas selection system. Depending on the cutting process the machine will automatically select and adjust the pressures of cutting and assist gases. Low and High pressure Nitrogen, Oxygen and Air cutting and assist gas supply lines are all installed.

The innovative Hoerbiger gas pressure control system combines the benefits of piezo actuators with precision engineering, electronics, and sensors. Because of the high gas pressure stability, the Hoerbiger gas pressure control valve allows precise cutting edges in consistent quality to be achieved. At output pressures of up to 28 bar, even thick metal sheets can be cut efficiently and in best quality. The beam delivery system consists fibre optic cable and focusing lens. System is fully enclosed that gives ability of working free of dust achieving long life of usage.



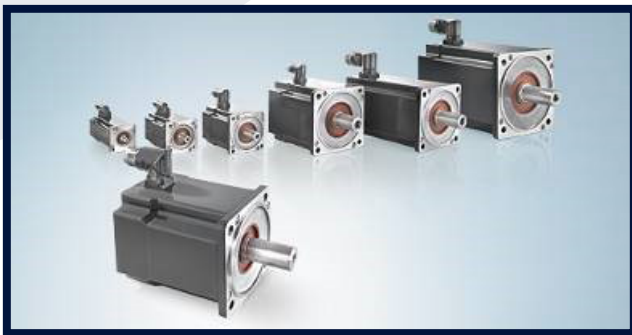
Beckhoff TwinCAT CNC

TwinCAT CNC offers complete CNC functionality as a pure PC-based software solution. TwinCAT CNC covers the complete range of classic CNC path control, including high-end systems for complex motion and kinematics requirements. The powerful, continuously evolving PC platform and the hard real-time base of the TwinCAT realtime kernel provide the foundation for the CNC Software.



The EtherCAT Servo Drives

The AX5000 Servo Drive product line from Beckhoff sets new standards in drive performance. Featuring integrated, high-speed control technology with a current control cycle of down to 62.5 Qs, the AX5000 drives support fast and highly dynamic positioning tasks.



The drives utilize EtherCAT as a high-performance communication system, providing an ideal interface with PC-based control technology while supporting coupling with other fieldbus systems.

AM8000 Servomotors with OCT One cable technology

The AM8000 motors feature a low rotor moment of inertia and a very high overload capacity. Based on these technical data, the most dynamic applications can be realized. The windings of the AM8000 motors are implemented using salient pole-wound technology. This gives rise to a high copper space factor. Due to the high slot space factor, high continuous torques can be attained.

The fully potted stator provides for a thermally ideal transition of the winding to the housing. A further positive consequence of them is the mechanical protection of the winding wires against vibrations.

With the servomotors of the AM8000 series the feedback signals are sent directly along the conductor to the power supply so that the power and feedback systems are combined in a single motor connection cable. With the use of the One Cable technology, the information is sent reliably and without interference through a digital interface. Since a cable and plug are omitted at both the motor and controller end, the component and commissioning costs are significantly reduced.

The I/O signals are wired in a decentralized way to fieldbus devices or centrally to the controller. The Beckhoff Bus Terminal ensures that control cabinets and terminal boxes are constructed more economically. The Bus Terminal can be connected to the controller by connecting a Bus Coupler via the fieldbus as required.

Control PC

Beckhoff supplies the right Industrial PC for every application. High-quality components based on open standards and the rugged construction of the device housings mean that the Industrial PCs are ideally equipped for all control requirements.



Multi-touch control panel

The multi-touch panel series from Beckhoff offers the greatest possible flexibility: various display sizes, horizontal or vertical orientation, 4:3 or widescreen, built-in or IP 65 mounting arm panel.

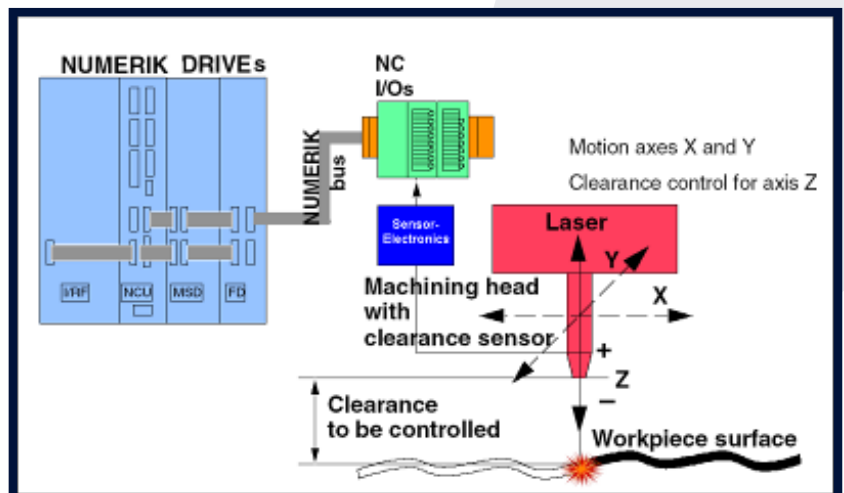
In addition, the panels are robust and industrially compatible thanks to the use of aluminium or stainless steel. A narrow, circumferential metal impact protector reliably protects the touch screen surface or the display against mechanical destruction. In addition, all-glass surface offers maximum resistance to environmental influences.

The Beckhoff multi-touch panels with projective capacitive touch screen (PCT) technology feature a high touch-point density, which enables accurate, safe and jerk-free operation even in minute steps. The front of the display is a glass pane with an anti-reflection coating; operation with thin work gloves (e.g. latex gloves) is also possible.

Five-finger touch and automation solutions with 2-hand operation are equally possible. Familiar functions from the world of smartphones and touchpads, such as zooming, scrolling, object turning, flicks etc. are now also usable for industrial applications with the multi-touch devices. Single-touch mode can be set via the Windows operating system for applications where multi-touch is not required.

Height Following Control System

- High quality capacitive height following electronics with excellent noise suppression capabilities.
- Good linearised stand-off signal (tol 0.1mm)
- Highly dynamical adjustable following gain for different process situations.



nLIGHT ALTA High Power Fibre Lasers

nLIGHT alta™ is the first in a line of next generation high power fibre lasers to address the rapidly evolving needs of industrial materials processing. Designed to meet the performance and reliability requirements for industrial applications, nLIGHT alta™ incorporates several improvements over other commercially available fibre lasers:



- **Improved Cutting and Welding Performance:** By increasing the modulation rate to 50 kHz and decreasing the rise and fall times to less than 10 Qs, nLIGHT provides the most advanced fibre laser for rapid pierces during cutting and for processing of fine features with minimal heat affected zone.
- **Back Reflection Isolation:** nLIGHT's novel back reflection isolation technology allows uninterrupted full power processing of highly reflective materials.
- **Design-for-Service:** nLIGHT alta™ incorporates a unique, proprietary fibre laser architecture that enables tool integrators or end users to manage common field service events, resulting in higher machine uptime, lower cost of ownership and an improved customer experience.

The nLIGHT alta™ fibre laser platform is designed and manufactured in the U.S., leveraging nLIGHT's vertically integrated high brightness laser diode and fibre technologies, and is supported through a global sales and service network. nLIGHT alta™ — the next generation of fibre lasers.

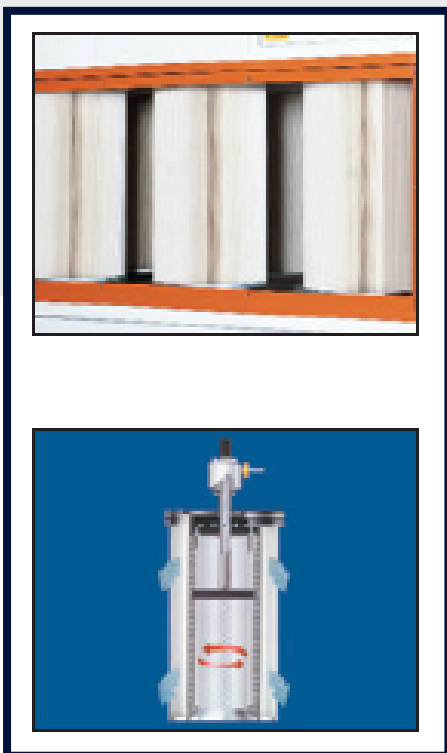
- Easy process set-up
- Failsafe processing of highly reflective materials
- Unique service model
- Designed for harsh environmental conditions
- Optional fibre-to-fibre coupler or beam switch

OPTICAL	UNITS	
Mode of operation		CW/QCW
Polarization		Random
Maximum average power (CW)	W	4000
Maximum peak power (modulated)	W	4000
Power tunability	%	5 - 100
Power variation (8 hr)	%	≤ 1
Modulation frequency	kHz	≤ 50
Rise/fall time	µs	≤ 10
Tailored BPP options	mm-mrad	Tailored to customer need: ≤ 2.5 with 50 µm fibre, ≤ 5.0 with 100 µm fibre ≤ 10 with 200 µm fibre, ≤ 15 with 300 µm fibre
Wavelength	nm	1080 ± 10
ELECTRICAL		
Operating voltage	VAC	3-phase 380-420
Operating voltage frequency	Hz	50/60
Control interface		External hardware control/RS-232/Ethernet
MECHANICAL		
Dimensions (mm)		815 w x 1000 h x 1275 d
Optical fibre		10 m, 20 m, 30 m, QBH connector standard, other options available
Fibre-to-fibre coupler/beam switch module		Optional
Cooling method		Water
GENERAL CONDITION		
Operating temperature*	°C	+10 to +40
Storage temperature	°C	-20 to +70
Relative humidity*	%	10 to 90

Fume Filtration System

The interior fumes and dust suction system is a self-cleaning type by mean of compressed air pulse. The dusty air enters the filter chamber, in which the heaviest particles fall to the floor and the lighter ones are retained by the external surfaces of the filter cartridge. The air is cleaned as it passes into the cartridge, and is sent to the plenum chamber at the top of the filter, through the extraction unit and out to the atmosphere.

An air pulse extraction system is fitted to provide fast, efficient cleaning of the cells. The system generates a pressure front which runs through the interior of the cell, thus detaching the dust which falls to the floor of the chamber. The machine is equipped with the ducts for connection between the extraction chambers and the fumes and dust extraction circuit.



Gas Requirements

The Laser Centre uses three different gas supplies to keep clean, cool laser head and assist the cutting process. The gas requirements are listed in this chart:

OPTICAL	USE	GRADE	MINIMUM PURITY	MAXIMUM MOISTURE	MAXIMUM OXYGEN	INLET PRESSURE	MAXIMUM HYDROCARBON CONTENT
Air	PURGE ASSIST	Clean, dry and oil free, filtered to 1 micron	Oil free	Dew point: Not above 4.5°C (40°F)	Not Applicable	400 to 690 kPa (60 to 100 psi)	Not specified
Nitrogen (N2)	ASSIST and CUTTING	Industrial Laser process purity	99.95% (quality 3.5)	-	-	550 to 690 kPa (83 to 100 psi)	-
Oxygen (O2)	ASSIST and CUTTING	Industrial Laser process purity	99.95% (quality 3.5)	-	-	550 to 690 kPa (83 to 100 psi)	-
High Pressure Nitrogen (N2)	ASSIST and CUTTING	Industrial Laser process purity	99.95% (quality 3.5)	-	-	2700 to 3000 kPa (405 to 450)	-

Specifications for material to be cut:

Mild Steel: Should be of high quality, rust free, with low silicon content (Si < 0.020%) and possibly pickled. *The reference material is Fe 360 (I), St 37 (D), E24 (F), 4360-40 (UK), ASTM A284 Gr. C (USA).*

Stainless Steel: The reference material is AISI 304 (International-US), better known as stainless steel 18.10 or 1.4301.

Aluminium: The reference material is AlMg3 (International).

Key Machine Processes

Here are just some of the key technological cycles making a significant difference in the laser cutting process. All of these contribute to the speed and efficiency of the Morgan Rushworth XS Fibre Laser System.

- CLC calibration
- Nozzle cleaning
- Sheet Edge Detection
- Param. Set Selection
- Beam On - Off
- Piercing cycles
- Following On / Off
- Gas Selection
- Gas Pressure Selection
- Dataset call
- Zero Offset
- Laser Functions
- Retract / Set to cut
- Program Events



The Morgan Rushworth XS range of fibre lasers are typically offered in 3 different bed sizes, however the modular system allows for a variety of sizes if required.

The tables below show the different specifications available firstly of the laser source, followed by the popular bed sizes available. Talk to us about your requirements today.

TECHNICAL SPECIFICATIONS

FIBRE LASER SOURCE			6 kW	8 kW	10 kW	12 kW	15 kW	20 kW
Maximum Cutting Capacity	Mild Steel	mm	25	25	30	35	35	40
	Stainless Steel	mm	20	25	30	35	35	40
	Aluminium	mm	20	25	30	35	35	35

BED SIZE			3 metre x 1.5 metre	4 metre x 2 metre	6 metre x 2 metre
X Axis Travel	mm		3000	4000	6000
Y Axis Travel	mm		1500	2000	2000
Z Axis Travel	mm		100	100	100
Maximum Sheet Size	mm		3010	4020	6020
			x 1510	x 2020	x 2020
Positioning Speed	Standard	m/min	115	115	115
	Linear	m/min	150	150	150
Axis acceleration	Standard	G	2.2	2.2	2.2
	Linear	G	3.0	3.0	3.0
Shuttle table exchange time	sec		38	38	38
Maximum table capacity	kg		1500	2500	3500
Positioning accuracy	mm		0.05	0.05	0.05
Length	mm		9600	11750	15250
Width	mm		3350	3950	3950
Height	mm		2300	2300	2300
Weight	kg		12000	14000	16500