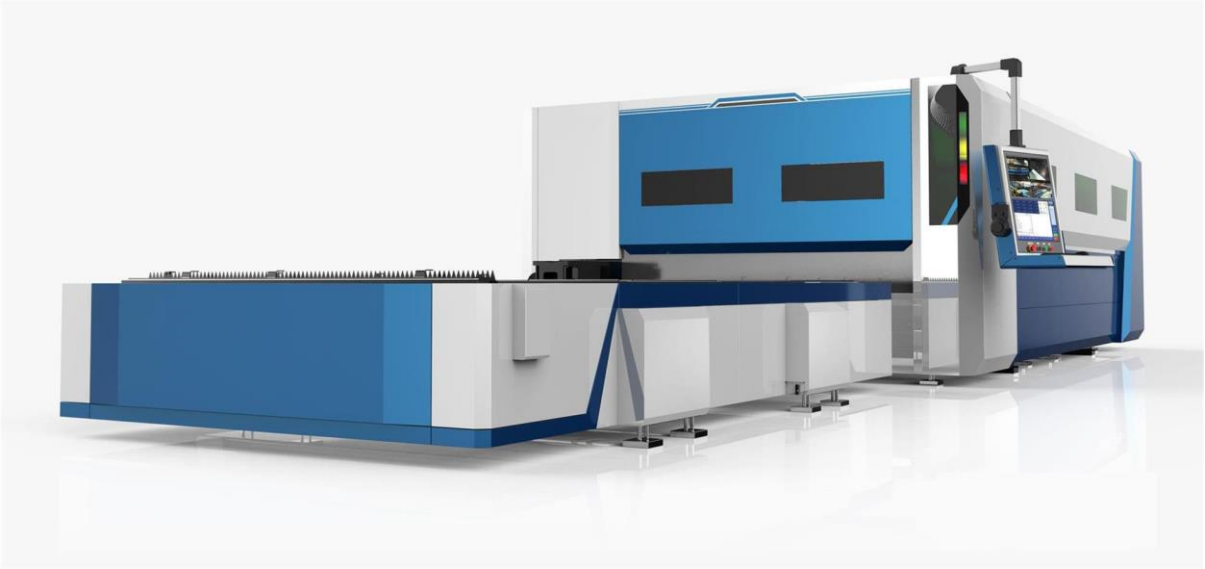
TECHNICAL OFFER

PRC LEAD LASER Excalibur 4020
(also available as 3015)

With 3 , 4 , 6 , 8 , 10, 12 kW Fiber Laser



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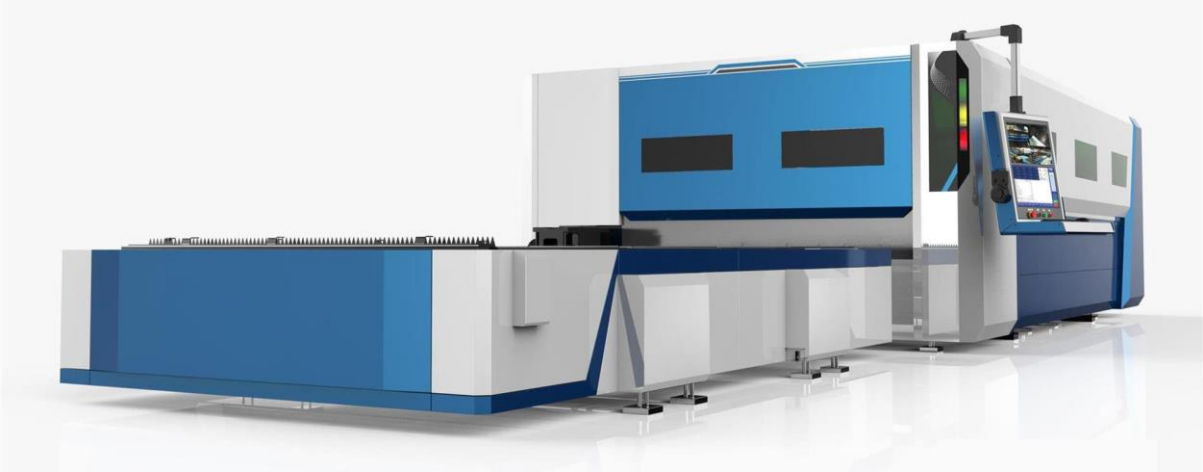
GENERAL INFORMATION

MODEL



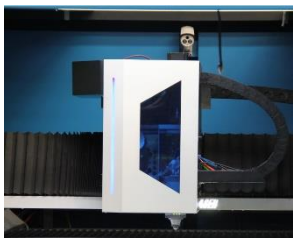
PRC Lead Laser Excalibur 4020 for fiber-delivered high power laser cutting of sheet metal.

Description

The PRC Lead Laser Excalibur 4020 Laser Cutting is an all-purpose gantry type flying optics laser cutting machine. It is designed to offer high dynamics during high-speed cutting of thin materials while having all the technology and know-how on board to produce stable and consistent parts in thicker material, where the maximum thickness is only limited by the output power of the laser.

With the shuttle table in the front of the machine close to the operator access to the cutting head, the operator of the machine has always a full overview of all the steps in the production. Additional cameras inside the working area and their display on the wide 21.5” TV helps further in having full control of what happens at all times, both inside the machine and on the loading and unloading station. The user interface is completely graphical, very intuitive and can be operated on the 21.5” multi-touch screen. Advanced laser cutting features are easily accessible and the built-in intelligence allows simple manipulations of the cutting programs where traditionally a deep knowledge of the G-code was necessary. Years of experience of our application engineers have been built into the software and make even tough laser cutting jobs a simple task for every Excalibur operator.

Bridge structure



Central in the design of the machine is the light-weight aluminum bridge which has been optimized to have an extreme high stiffness and allows the machine to reach very high dynamics without compromising the accuracy of the parts over the entire 2m span of the width of the working range. The compact design of the Z-axis offers an optimum weight distribution while keeping the access for the operator to the cutting head easy and straightforward. All critical parts are covered and well protected against dusts and smokes from the laser cutting process. The work-pieces are always visible thanks to the integrated LED lighting in the bridge structure.

Transmission system

The powerful low-inertia servo motors with integrated gear-box provide the necessary torque to the high-precision rack and pinion drive system. This robust system offers the highest accelerations at maximum accuracy, no matter the length of the stroke of the axis in question. There is virtually no back-lash and the integrity and long life-time of the rack and pinion is guaranteed by an automatic central lubrication system providing a continuous lubricant to both the pinions of the X- and Y-axis transmission system and the carriages of the linear guides of the machine.

PRECITEC Procutter Cutting head

Auto-focus Cutting Head

For higher power lasers (>3kW) the fully automatic Procutter focus cutting head is recommended. This cutting head has all the features of the manual adjusted focus head, but additionally is equipped with a very fast auto-focus axis that will adjust the focus point dynamically during piercing and cutting according to the parameters stored in the on-line cutting database. Moreover this head has internal sensors that will detect possible problems before they result in bad processing: the internal optics temperatures are monitored, the actual cutting gas pressure inside the head and the occurrence of unwanted stray radiation of laser light inside the head. So, not only will this head provide superior cutting piercing and cutting results over manual adjusted focus heads because the optimum focus for both the piercing and cutting processes are automatically applied, it offers also further flexibility in the production: no extra manual operations are needed between the cutting of different materials and thanks to the integrated sensors, possible problems are detected before they cause break-downs or loss of production quality.

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Control system

A powerful German CNC lies at the heart of the PRC Lead Laser Excalibur's laser cutting performance. Proprietary algorithms to control the laser process from the piercing of the holes to the cutting of the most demanding contours are directly integrated in the NC kernel. This allows extreme fast processing of all tasks and introduces virtually no dead-times in the production. All important laser components (servo drives, laser cutting head, capacitive distance sensor, laser source, laser pulse generator, cutting gas servo valve, etc.) are integrated in one single closed-loop control system mastering every single aspect of the laser cutting process at a microsecond-level cycle-time.

Cutting gas system

Up to three types of assist gasses can be connected to the Excalibur's laser cutting machine. An automatic gas selection valve will supply the right gas for each application. A digital servo valve will keep the cutting gas pressure constant, as long as the input pressure is 1 bar higher than the demanded process gas pressure. This means the gas container can be used until they are empty and without losing stability of the piercing or cutting process in question. The fast reaction times of the digital servo valve and the short supply lines from the valve to the cutting head allow fast changes in gas pressure between piercing and cutting process without a need for any dwell times. This way, the extreme fast cutting gas supply system goes hand in hand with the high dynamics of the cutting head and machine movements and guarantees stable laser processing.

Operator panel

The operator panel of PRC Lead Laser Excalibur 4020 is built around two high definition 21.5" screens. One for the display of the images captured and recorded by the 4 cameras inside the working area of the machine, and the other one is a full multi-touch screen where the PRC Lead Laser Suite© comprehensive graphical user interface is displayed. Most of the functions of the Excalibur are activated by a simple button on the screen, no complex interactions, sequences or program manipulations are necessary. Ease of operation and an intelligent machine control have been a central criterion in the concept design of the Lead Laser Suite© platform for our laser cutting machines. The operator panel includes a mouse and keyboard and a hand-held box for operating the machine in both manual and automatic mode.

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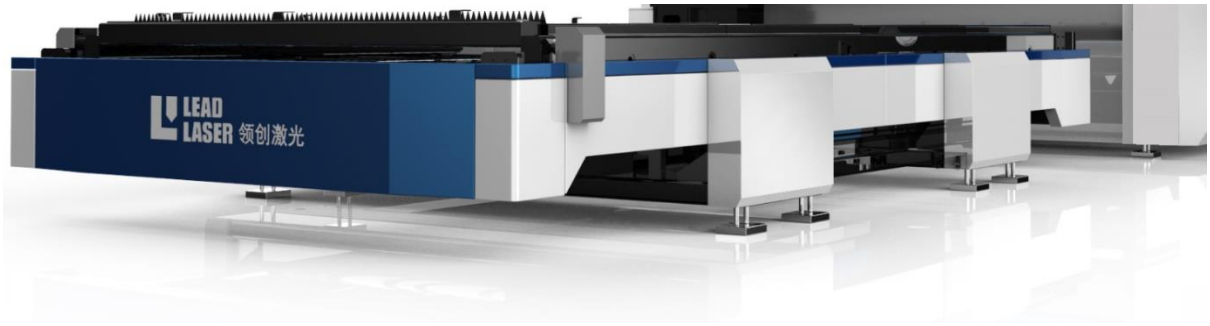
Shuttle table

The shuttle table of the Lead Laser Excalibur has a robust design that guarantees the perfect level and lifting of 2 cutting tables with 1800kg of material each. All cutting table movements are controlled by maintenance-free electric motors.



The operation of the shuttle table is intelligent and full-automatic and completely integrated with the safety light curtain system around it to protect the operator.

Suction unit

The working area under the cutting table of the PRC Lead Laser Excalibur is divided into separate sections from where dust and smoke can be extracted efficiently. The air from the dust collector is guided through two channels inside the machine frame where a pneumatic system will make sure that only that area where the cutting head is processing will be extracted by the air flow from the external air filter unit. Scrap pieces and heavy dust will fall through the cutting tables into separate boxes that can easily be taken away from the side of the machine.

Electrical cabin

The electrical cabin is mounted on the back of the machine frame of the PRC Lead Laser Excalibur 4020, allowing a quick installation of the machine and a very compact factory lay-out. The electrical cabinet is kept cool and dry with an air conditioner. All air, water and gas connections are easily accessible in a separate cabinet..

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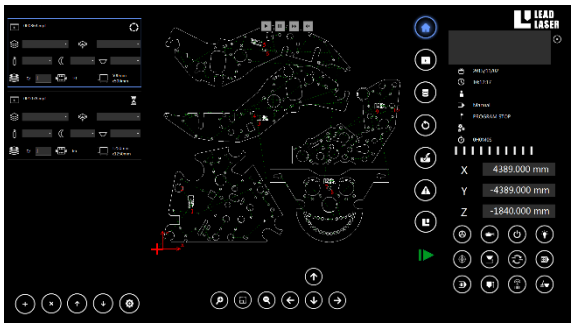
PRC Lead Laser Suite©

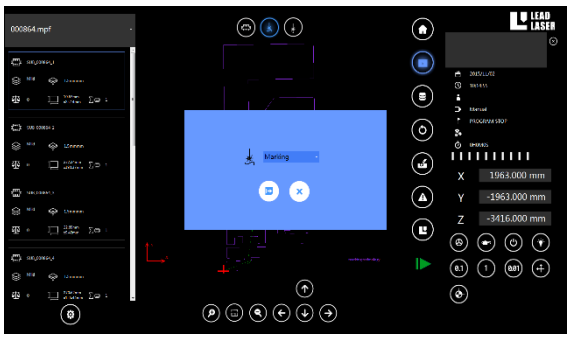
PRC Lead Laser Suite© is the Windows based software platform for laser cutting machines offering a modern graphical user interface for all the laser machine's functions and features. The most important screens are explained below:

Task manager



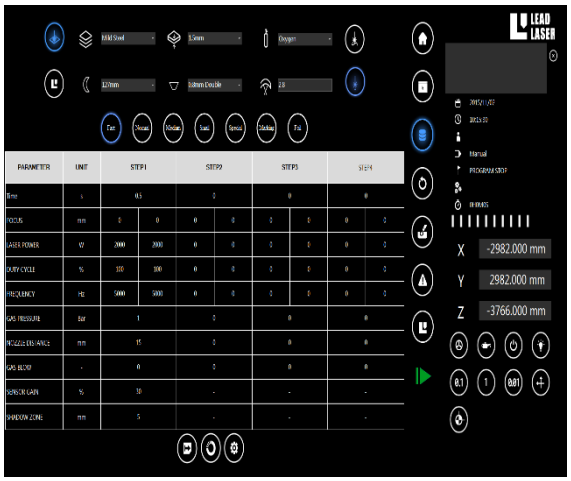
All tasks for the machine can be managed, organized and visualized in the task manager. PRC Lead Laser Suite© will provide the operator with all necessary information about the correct set-up of the machine. When used with automatic loading and unloading equipment, the task manager will make the work queues for full automatic operation of the laser cutting manufacturing cell.

Program information



In the program information, the operator can graphically manipulate the cutting program without the need of the program software. Cutting or piercing technologies can be changed, and the cutting head movement between contours can be adjusted to the real situation on the machine if necessary for example to avoid any flipped parts. With one single button a program for a single part from any nesting can be generated and executed.

Database manager



In PRC Lead Laser Suite© the parameters of all cutting and piercing technologies for every material and thickness are present on-board and can be managed in this dedicated page. Default values for all common applications are stored for reference in the Lead Laser database, the customer can create and add his own materials and parameters in the fully flexible and intelligent database manager. During cutting a graphical interface for the most common parameters can be used to fine-tune the process. For expert users, an advanced view gives a full overview of all parameters and their values.

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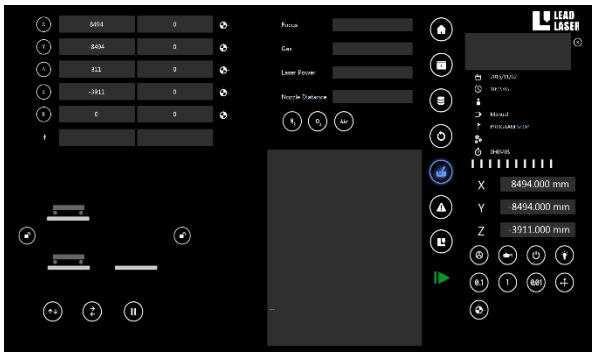
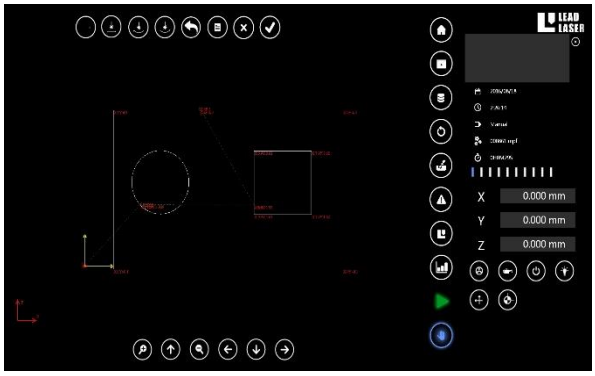
Machine interface



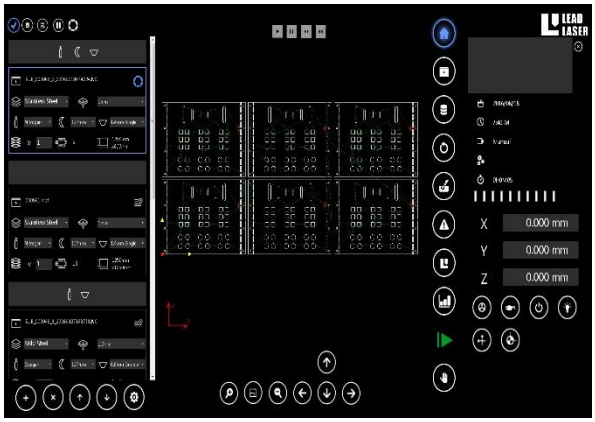
A more traditional machine interface screen shows all operation conditions of the machine together with the feed-back values from the integrated process sensors. An easy interface allows both manual and automatic operation of the shuttle table. At all times, the main features of the machine can be activated by the software control panel buttons on the right of the screen (and for left-handed operators: on the left of the screen).

Manual programming



Simple programs can be made on the machine itself. An intuitive interface allows you to select graphical elements (lines and arcs) to draw simple parts. While programming the part in this graphical way, the part is drawn simultaneously indicating all relevant points and movements, so it is easy to detect mistakes and correct them immediately. Once the parts is drawn, the relevant laser cutting and piercing technologies are selected and the machine code is generated, of course all automatically.

Single part nesting



Any part in the part database can be selected and then nested automatically with no more necessary information than the available sheet size and the amount of parts needed. Both the distance between the parts and the order in which to cut the parts can also be modified if necessary: first cut all parts along the X-direction or first along the Y-direction. This feature gives full flexibility for the operator to produce additional parts if necessary on any sheet remnant without the need of having a new program made.

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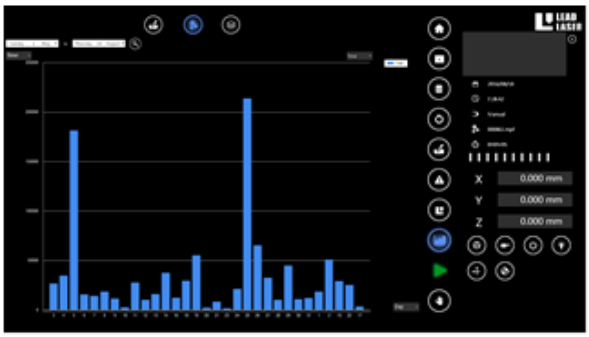
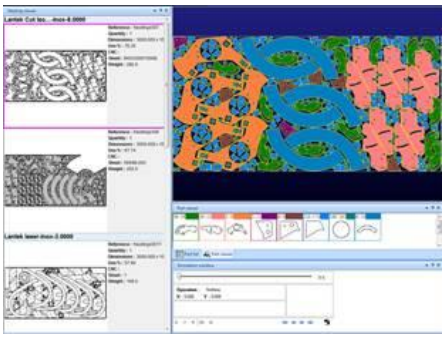
Reporting feature



PRC Lead Laser Suite© can automatically generate reports about the use of the machine. Ready available reports are daily reports of how much time or how much percent of time the machine was running programs, how much time or percentage of time it was in stand-by and how much time or how much percentage of time it was in alarm status. Reports on the actual production time can be generated by day, by week, by month and even by year. PRC Lead Laser Suite© also keeps track how much kg has been cut in which material and what thickness, again on daily, weekly, monthly or yearly basis. Even the amount of parts and programs that have been finished are kept in the database. Upon demand these reports can be exported in different file formats or even be sent on regular basis over the network to an external ERP or MES system. If other specific reports are required, the development team at Lead Laser can provide these upon request.
PRC Lead Laser Suite© is the ultimate tool to help you optimize the use of the machine, the production planning and even the material flow in the factory.

Off-Line Programming software (Not included)



- The Lead Laser machine can be delivered with Off-line software for nesting and programming. Libellula and PRC Lead Laser Suite© share a common database with all materials and thicknesses and their corresponding cutting and piercing technology parameters, allowing a simple one-button starting of each task on the machine. The configuration of all cutting and piercing technologies in Libellula is fully automatic and pre-defined for every PRC Lead Laser machine.

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Features

The most important PRC Lead Laser Suite© additional features are:

- Skeleton cutting function: if a nesting has been cut on a sheet which can still be used for another job, the remains of the sheet can be cut out nicely in any possible shape by a simple teach-in of the machine.
- Graphical restart: the machine can be restarted on any point by a simple mouse-click on the exact point of the part geometry where a restart is required.
- Automatic micro-joints: if micro-joints were not included in a certain program, but show to be important, the operator can add a simple micro-joint on the end of every contour inside the PRC Lead Laser Suite© with one single button.
- Automatic sheet probing: the zero-point and the orientation of any rectangular sheet can be automatically found.
- Automatic pallet change: an automatic pallet change can be commanded from the PRC Lead Laser Suite©
- Automatic machine calibration: the calibration of basic machine functions as the capacitive distance control or the servo gas valve can be performed at any time.
- Obviously, all the advanced laser cutting technology on-board is managed by PRC Lead Laser Suite© software:
    - ✓ Adaptive corner pulse and laser power modulation: optimum cutting results in corners of parts are obtained by the adjusting the pulse characteristics and the laser power according the momentary cutting speed at all times.
    - ✓ Lead-in transition function: in order to establish a stable cutting after the piercing procedure, the machine will make a smooth transition of cutting parameters according the application demands on the lead-in towards the cutting contour.
    - ✓ Fly cutting: in materials where no piercing is necessary, the laser beam will be switched on and off “on the fly” during the dynamic axis movements which guarantees the fastest possible cycle times in high speed cutting of thin materials.
    - ✓ Multi-step piercing procedure: the piercing process can be performed in several steps in which every parameter can be controlled individually, allowing a complete control of the process.

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PRC Fiber laser source

6kW

PRC Fiber laser sources feature high electrical efficiency, superior optical beam quality, high stability and extremely long lifetime. The lasers are available for a wide variety of industry application, and different power levels from 1 to 12 kW.

12kW

Water Chiller

The delivery of the machine includes a chiller that matches the cooling requirements of both the laser source and the external optical systems of the machine. All systems come with a dual circuit chiller that is specially designed to have the laser source cooled at lower temperature, while a higher temperature cooling water output is maintained for cooling of the external optics to avoid condensation. The temperature stability of the low temperature cooling water circuit is±1℃, which guarantees the stability of the laser output power.

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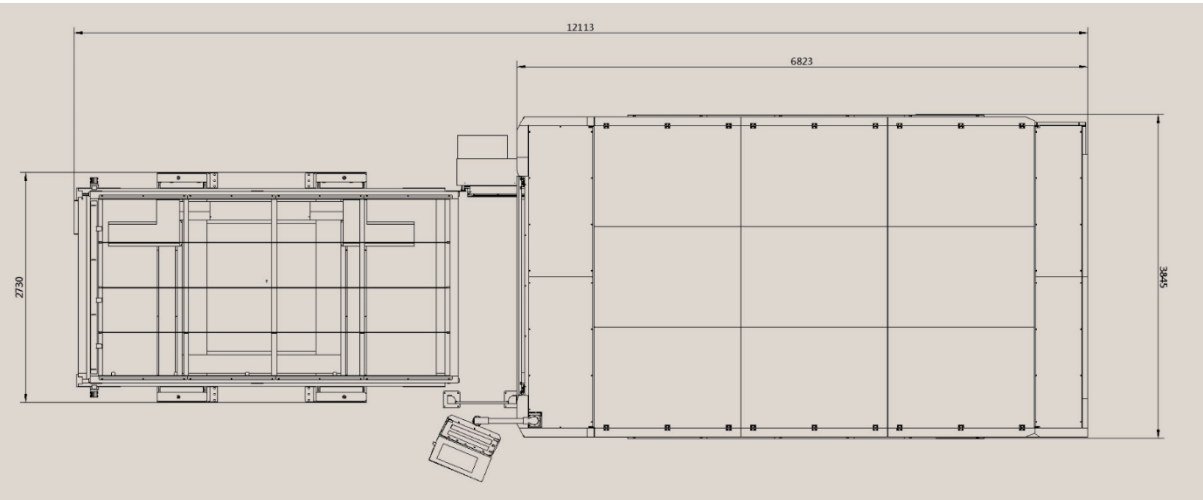
Dust collector (OPTION)

The dust collector delivered with the Laser machine is a dust and fume collection system specifically engineered for various laser applications including laser cutting and welding. The dust collector uses unique oval-shaped cartridge filters making dust and fume filtration more efficient, compact and cost-effective. The dust collector can be installed in a corner and even outdoor installation is possible, providing additional flexibility in adapting the machine installation to the existing factory lay-out.

Machine Lay-out for reference

The main dimensions and lay-out plan of the PRC Lead Laser Excalibur 4020 machine can be seen in the drawing below. (Note: auxiliary equipment as chiller, laser source and dust collector are not indicated, their dimensions and placement depend on the exact final configuration).



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TECHNICAL SPECIFICATION

The technical specifications of PRC Lead Laser Excalibur 4020 are summarized below:

Item	Specification	Unit
X axis stroke	4010	mm
Y axis stroke	2025	mm
Z axis stroke	100	mm
Cutting area	2000 × 4000	mm x mm
X- and Y-axis positioning accuracy	±0.03	mm/m
Repositioning accuracy	0.05	mm
Maximum positioning speed X- and Y-axis	120	m/min
Maximum simultaneous X- and Y-axis positioning speed	180	m/min
Maximum acceleration X- and Y-axis	20	m/s2
Maximum simultaneous X- and Y-axis acceleration	28	m/s2
Maximum Z-axis acceleration	30	m/s2
Maximum sheet weight	1800	kg
Machine weight (including shuttle table)	14500	kg
Basic machine main dimensions	3805x12115x2090	mm x mm x mm

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STANDARD EQUIPMENT

A PRC Lead Laser Excalibur 4020 delivery includes the following standard equipment:

- An automatic shuttle table for nearly continuous cutting operation
- Two cutting tables with supporting grids
- Scrap boxes for scrap and dust removal from under the working area of the machine
- LTi-Motion Andronic 3060S CNC control (German) with virtually unlimited program memory
- Built-in laser pulse generator
- 21.5" touch screen operator panel with PRC Lead Laser Suite© graphical user interface (HMI)
- Mouse and keyboard
- Precitec Cutting head for fiber-delivered laser source (German)
- Collimator for QBH fiber
- 21.5" monitor with 4 cameras inside the working area
- Automatic gas selection valve for three different assist gases (German)
- Servo gas valve for precise cutting gas pressure at the cutting head (German)
- LTi Motion digital servo drives and motors for X-axis gantry, Y- and Z-axis (German)
- CE certified safety light curtain around the shuttle table
- Automatic operator access door for easy access to the working area
- Automatic table door for fast table changes
- Automatic cabin lighting
- Air conditioner for the electrical cabinet
- Automatic cutting head height sensor system with capacitive distance sensor
- Central lubrication system
- Spare parts included in the delivery:
  - ✓ Single nozzle, 1.5 mm diameter: 5 pieces
  - ✓ Single nozzle, 2.0 mm diameter: 5 pieces
  - ✓ Single nozzle, 2.5 mm diameter: 5 pieces
  - ✓ Double nozzle, 2.0 mm diameter: 5 pieces
  - ✓ Double nozzle, 2.5 mm diameter: 5 pieces
  - ✓ Ceramic part for capacitive distance sensor: 2 pieces
  - ✓ Protective mirror: 2 pieces
  - ✓ Filter element: 2 pieces
  - ✓ Tool attachment : 1 set

OPTIONS

- Off-line nesting and programming software (Libellula)
- Airco Container Box for Fiber laser (for very humid and hot countries)
- SVI function (Cutting material by precision camera)

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INSTALLTION REQUIREMENTS

The basic installation requirements for PRC Lead Laser Excalibur 4020 are:

Item	Requirement
Power supply	3 x 380 V at 50 Hz
Power supply voltage fluctuations	< 5%
Power supply (Depending on laser power)	> 60 kVA
Ground resistance	< 10 Ω
Compressed air: maximum size of solid particles	5 µm (ISO 8573-1 Class 3)
Compressed air: maximum concentration of solid particles	5 mg/m^3 (ISO 8573-1 Class 3)
Compressed air: maximum dew point temperature	3 °C (ISO 8573-1 Class 4)
Compressed air: maximum oil content	1 mg/m^3 (ISO 8573-1 Class 3)
Maximum ambient temperature for operation of machine	30 °C
Minimum ambient temperature for operation of machine	5 °C
Maximum ambient relative humidity for operation of machine	70 %RH
Minimum purity of oxygen assist gas	> 99.95%
Minimum purity of nitrogen assist gas	> 99.95%

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