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**Best choice.**

## Technical Specifications

### **BySprint Fiber 4020; Fiber 6000**

Cuts faster, saves energy and relies on fiber technology



### **Unique advantages**

- Unmatched throughput rates in the light-gauge to medium-gauge thickness range thanks to innovative fiber laser technology
- Undemanding high-tech fiber laser combined with sophisticated machine technology
- Economical and ecological due to incomparable energy efficiency, peerless throughput and worry-free operation

### **Machine design**

- Clear, compact and simple layout
- Optimum access to the working area
- Simple and quick positioning of leftover sheets, access without risk of collision • Ideal for fitting in express jobs
- Optional remote diagnosis
- Low operator intervention means higher productivity

### **Drive system**

- Direct motors provide a precision drive for the axes and deliver high levels of acceleration
- Long service life thanks to low bearing stress
- Enclosed and protected drives

### **Cutting head**

- Focal length is optimally adapted to your range of parts and your production
- Integral capacitive detection
- ByPos Fiber automatically sets the correct focal position

### **Operation**

- Hand-held controller for time-saving setup and adjustment tasks
- Straightforward restart of interrupted cutting plans.

### **ByVision**

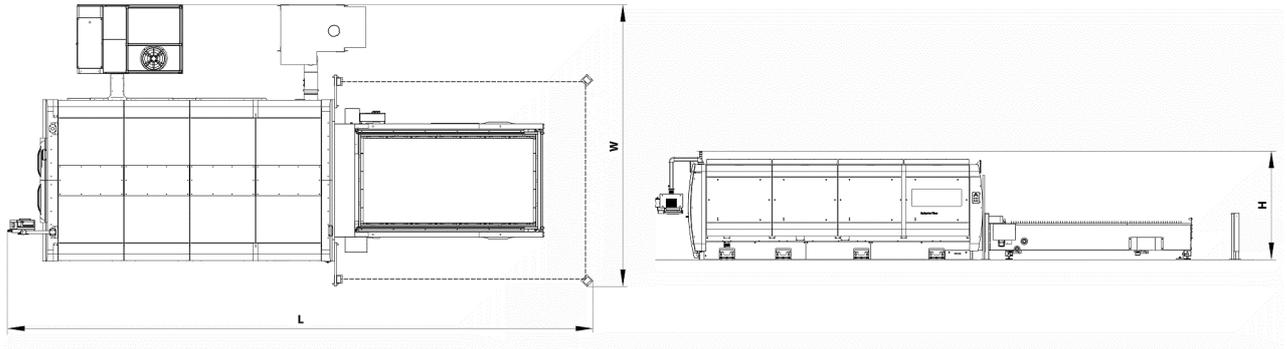
Like no other controller, ByVision ensures that the specifications of the laser cutting machine are used to best advantage.

- The ergonomically designed user interface ensures efficient and quick-to-learn operation of the laser cutting machine
- Thanks to the various restart options, you can easily resume an interrupted cutting plan
- Activate, deactivate and set microjoints automatically without starting the programming software
- Nesting of individual parts from existing nesting plans
- Microweld points for retaining small or long, thin parts

### **Laser**

- The highest energy efficiency due to minimal electrical energy consumption
- Very low operating costs due to high-tech fiber laser technology (for example, no laser gas required, minimal wear costs)
- Expanded spectrum of materials (non-ferrous metals)

## Technical data - Standard machine



Length, approx.	13743	mm
Width, approx.	6670	mm
Height, approx.	2565	mm
Nominal sheet size (X)	4000	mm
Nominal sheet size (Y)	2000	mm
Cutting area (X)	4064	mm
Cutting area (Y)	2024	mm
Cutting area (Z)	70	mm
Max. positioning speed simultaneous	140	m/min
Max. positioning speed parallel axis X/Y	100	m/min
Repeatability (positioning spread) Ps (VDI/DGQ 3441)	± 0.05	mm
Positioning accuracy Pa (VDI/DGQ 3441)	± 0.1	mm
Edge detection accuracy	± 0.5	mm
Max. workpiece weight	1580	kg
Machine weight (without exhaust, chiller)	15000	kg
Table change time	35	s
Laser source	Fiber 6000	
Power	6000	W
Range of adjustment	600-6000	W
Wavelength	Fiber	
Steel (max. cutting sheet thickness)	25	mm
Stainless steel (max. cutting sheet thickness)	30	mm
Aluminum (max. cutting sheet thickness)	30	mm
Brass (max. cuttable sheet thickness)	15	mm
Copper (max. cuttable sheet thickness)	12	mm
Total electric consumption of system (with exhaust, chiller)	31.4	kW

## 1 Basic machine

### 1.1 BySprint Fiber 4020; Fiber 6000



### 1.2 Hand-held controller



The hand-held controller is a USP of all Bystronic laser cutting machines. It allows simple and fast positioning of the cutting head at any position in the cutting area. Also, you can use the hand-held controller to perform a manual cut without the need for any programming. The hand-held controller is used for manually cutting trials and separating cuts as well as for performing servicing tasks.

How the customer benefits from the hand-held controller

- Unique Bystronic feature
- Fast positioning of the cutting head at any position in the cutting area
- No programming required to perform a simple separating cut
- Just a few steps required to perform trial cuts

### 1.3 Shuttle table system with 2 shuttle tables



The shuttle-table system with 2 shuttle tables contains removable serrated steel grates.

(Note: The picture is showing an example and does not correspond automatically to the described machine)

### 1.4 Closed cutting area/roof

How the customer benefits from closed encapsulation

- Reduction of noise emissions by at least 10dB
- Reduction of odour/dust emissions

(Note: The picture is showing an example and does not correspond automatically to the described machine)

## 1 Basic machine

### 1.5 Scrap bins on rollers



Cleaning and the removal of small parts that fall through the grate in the cutting area is simplified considerably by placing collecting bins.

(Note: The picture is showing an example and does not correspond automatically to the described machine)

### 1.6 CNC controller and cabinet

The air-conditioned control cabinet contains:

- Mains supply and power distribution
- Bystronic CNC controller ByVision
- Drive modules for the main axes
- Uninterruptible power supply (UPS) for the control of proper shutdown of the ByVision CNC controller and the industrial computer in the event of a power outage

Network capability of the CNC controller

The CNC-controlled machine can be connected to the company's intranet by means of a router (included in the scope of delivery).

Network transmission rate: 100 Mbit/s

### 1.7 Touchscreen with user interface for ByVision



The user interface complies with ISO standard 9241-10 for ergonomic design of workplace visual display terminals, and helps the user to master operation of the laser cutting machine quickly and easily.

- Large 22" touchscreen panel with full HD, 16:9
- Switch between numerous languages
- USB 2.0 interface
- Standard PC keyboard (US version) and mouse

# 1 Basic machine

## 1.8 Operation and convenience

The laser controller developed by Bystronic provides:



- display of status information
- direct operation of the laser module from the operating terminal

## 1.9 Maintenance Messenger

The Maintenance Messenger notifies the operator when the machine and the laser module must be serviced.



In this case, a corresponding and unmistakable icon appears on the graphic user interface of the ByVision.

How the customer benefits from Maintenance Messenger

- The machine automatically gives notification of what maintenance tasks are due when. This makes it possible to plan for standstills and keep them short.
- No special schedule must be maintained in which the operator makes entries and looks up dates.
- A simple, convenient tool for keeping the machine in good form.

## 1.10 Restart Manager

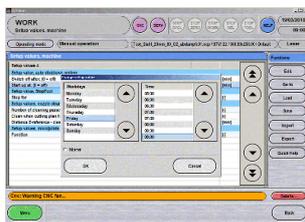
Thanks to the various restart options, you can easily resume an interrupted cutting plan. This can be the case if a power outage stops the machine during cutting or if the operator finishes cutting a very complex cutting plan at the end of the shift in manned operation and the machine switches off. After starting the laser cutting machine, the restart function allows you to finish machining the cutting plan without any problems.

How the customer benefits from Restart Manager

- ByVision offers the most and the most effective restart functions compared with the competition
- Even after an unforeseen machine standstill, for example, after a power outage, you can finish cutting the cutting plan easily and without rejects
- You can also prioritize a particular part quickly and easily in the current cutting plan

## 1 Basic machine

### 1.11 System Manager



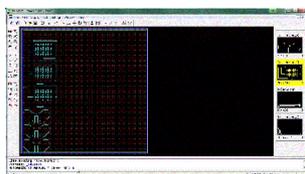
The operator can enable automatic shutdown in ByVision and the machine will be shut down automatically after machining of the last job is completed.

To avoid losing time the next time work is begun, the machine can also be restarted automatically.

How the customer benefits from System Manager

- The machine saves energy
- Best possible availability of the laser cutting machine because it's already been started when the shift begins

### 1.12 ByHand



This function within ByVision allows the user to:

- Use parts from existing cutting plans and simply and quickly nest them on a residual sheet.
- Modify existing cutting plans.
- Copy, delete, rotate, and add individual parts and separation cuts.

### 1.13 Parameter Wizard

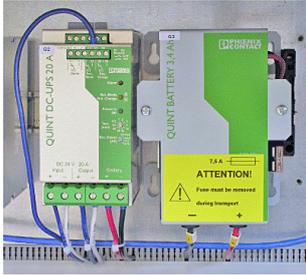
This function provides a fast and easy way to create additional cutting parameters for material thicknesses not included in the standard cutting parameters. This ensures maximum productivity as you can also cut special thicknesses with the optimal cutting parameter. The cutting parameters are calculated with the aid of the parameter editor.

How the customer benefits from Parameter Wizard

- Unique, flexible and unrivalled Bystronic process
- Maximum productivity and reliability while cutting all material thicknesses
- Just four mouse-clicks required to calculate a new parameter

## 1 Basic machine

### 1.14 Uninterruptible power supply UPS



Uninterruptible power supply (UPS) for the control of proper shutdown of the ByVision CNC controller and the industrial computer in the event of a power outage

(Note: The picture is showing an example and does not correspond automatically to the described machine)

### 1.15 Cutting bridge



The robust cutting bridge runs on profiled rollers along precision-ground flat and Vee-shaped guides. The cutting carriage runs on precision linear guides.

The main axes are driven directly (i.e. Without intermediate gearing) by high torque AC motors and via rack-and-pinions adjusted for zero play.

### 1.16 Cutting head



low-maintenance and robust cutting head

- The design of the cutting head and nozzle optimizes cutting-gas consumption
- Capacitive sensing is used to maintain a constant distance between nozzle and material.
- Before cutting, the position of the sheet (X/Y) can be detected by the cutting head without contacting the sheet. The cutting plan is then adjusted automatically to this position.

## 1 Basic machine

### 1.17 Cut Control Fiber

Cut Control Fiber increases process reliability and monitors the process of fusion cutting [N<sub>2</sub>] of stainless steel and steel. It detects the amount of light emitted by the workpiece, and, if the cut is poor, stops the feed, retraces the cutting position and repeats the cut. In addition, Cut Control Fiber enables precise edge detection by accurately detecting the position of the metal sheet on the table. The reproducible accuracy of edge detection with Cut Control Fiber averages +/- 0.15 mm. However, this accuracy can only be achieved if the edges of the metal sheet are in good condition and the detected sheet edges are at right angles to each other.

How the customer benefits from Cut Control Fiber

- Cut Control Fiber monitors the cutting process automatically
- This keeps the amount of rejects low and cutting quality at a constantly high level
- Exact edge detection (+/- 0.15 mm)
- The piercing detection allows immediate start of the cutting process once the sheet is pierced. For sheets from 10mm thickness, this saves minimum 20% time and increases the productivity (on Cut Control for fiber lasers)

### 1.18 Piercing Jet



The Piercing Jet cools the piercing site and prevents undesirable overheating of the melt at the site. The Piercing Jet requires a nitrogen [N<sub>2</sub>] supply.

### 1.19 ByPos Fiber

ByPos Fiber automatically sets focal position depending on the different materials and thicknesses.

How the customer benefits from ByPos Fiber

- Reliable process with constant cutting results
- No interruption of the cutting process to set focal position during cutting
- No loss of time due to setting focal position when changing material or material thickness
- Fast piercing as focal position is ideally geared to this process

## 1 Basic machine

### 1.20 Power Cut Fiber

Power Cut Fiber opens up new fields of application.



In order ensure a high degree of process reliability during piercing, Power Cut Fiber automatically sprays a fine layer of oil onto the piercing point. We therefore recommend:

- Not to use the nozzle changer in combination with Power Cut Fiber.
- To clean the nozzle body before switching to standard operation mode.

Comments:

- The maximum workpiece weight of the shuttle tables must not be exceeded.
- The cutting grates will wear faster than in the standard operation mode.

### 1.21 Detection Eye

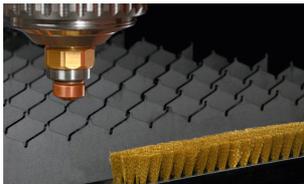


Detection Eye detects the precise position of the loaded metal sheet. To achieve this, the edges of the metal sheet are measured precisely in just a few seconds. This function enables users to save time and optimize material usage.

Customer benefits:

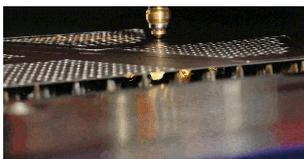
- Shortest non-productive periods possible
- Precise position detection of the loaded metal sheet
- Optimal sheet utilization

### 1.22 Nozzle cleaning



The nozzles are automatically cleaned by a brass brush mounted on the machine frame. The frequency of the cleaning cycle is programmed on the operating terminal.

### 1.23 Scanning



Scanning allows linear processing of rectangular and square holes. Time saved per part is up to 50% compared with cutting without scanning.

How the customer benefits from scanning

- Significant reduction of part processing time of up to 50%

## 1 Basic machine

### 1.24 Fiber laser modules

Fiber lasers are the latest development in laser cutting. The laser beam is generated in the core of an optical fiber and sent to the machine's cutting head through another optical fiber. Fiber lasers are much smaller than CO<sub>2</sub> lasers and derive twice the performance from the same power supply.

Fiber lasers achieve incredible cutting speeds in thin sheet.

How the customer benefits from fiber laser modules

- Lowest power consumption of entire laser cutting machine in comparison with other types of solid-state lasers
- The highest output of parts extending into the upper sheet thickness range
- Cutting non-ferrous metals is no problem
- Little space required thanks to compact design

### 1.25 Tank heater

The tank heater prevents the cooling water from freezing. It needs to be installed when the ambient temperature at the place of installation is less than 5°C.

The minimum ambient temperature must not drop below -5 °C when the laser cutting machine (with tank heater) is switched off.

The cooling unit must not be switched off.

### 1.26 Tropicalisation

This kit prevents fogging of the optical elements and the cutting head where the dew point is too high.

In the following table you see when the tropical region kit is required.

Relative humidity	> 60 %
Max. ambient temperature at the installation location	30 °C
Relative humidity	> 45 %
Max. ambient temperature at the installation location	35 °C
Relative humidity	> 30 %
Max. ambient temperature at the installation location	40 °C
Relative humidity	> 25 %
Max. ambient temperature at the installation location	≤ 43 °C

## 1 Basic machine

### 1.27 Dust extraction system: 4000



The dust extraction system is designed to take 50 liter dust bags (10 dust bags supplied; excludes dust extraction system with drum adapter). These bags can be conveniently removed from the collecting bin for disposal of the cutting dust.

- The owner is responsible for the disposal of cutting dust.
- The sound absorption, which is included as standard on all dust extraction system, reduces noise exposure during continuous use to 70 dB(A).
- This equipment is a filter for dry dust removal from industrial used air and gases in accordance with VDI 3677, paragraph 4.

It can be used for the following applications:

- If the state of the pollutant is solid, dry (=dust) the standard dust extraction system will be suitable for use.
- If the state of the pollutant solid and moist or hygroscopic, liquid (= mist) or even gaseous the standard dust extraction system will NOT be suitable for use.
- Materials that produce toxic gases on vaporization (e.g. plastics) require additional filters. The customer must obtain relevant information from the manufacturer of the material concerned. A change in the intended use (including the cutting of non-metallic materials) without written permission from Bystronic Laser AG is at the customer's own risk.

Installation requirements for dust extraction system

- The distances shown in the installation diagram must be observed.
- The distance between the highest point of the dust extraction system and the ceiling must not be less than 500mm.

Piping for the dust extraction system

- A ventilation engineer or the manufacturer of the dust extraction system must always be consulted when designing the piping layout. The piping must comply with technical specifications and local regulations. Installation of a manual flap for the outgoing or circulating air is advisable.
- The maximum resistance presented by the entire piping system of the dust extraction system must not exceed 150dPa.

(Note: The picture is showing an example and does not correspond automatically to the described machine)

Extraction performance	4.000 m <sup>3</sup> /h
Fire-retardant cartridge filters (quantity)	6
Residual pressure	300 daPa
Filter surface area	106 m <sup>2</sup>
Dust content of filtered air	< 0,5 mg/m <sup>3</sup>
Dimensions [L]	1.410 mm
Dimensions [W]	2.000 mm
Dimensions [H]	3.000 mm
Weight	1.400 kg
Fuse	35 AT
Mains frequency	50 Hz

## 1 Basic machine

Supply voltage	3 x 400 V
Max. permitted voltage fluctuation 50 Hz	+10/-10 %
Power supply	7,5 kVA
Rated power	5,5 kW
cos (φ)	0,9

Mains frequency	60 Hz
Supply voltage	3 x 480 V
Max. permitted voltage fluctuation 60 Hz	+6/-13 %
Power supply	6,4 kVA
Rated power	5,1 kW
cos (φ)	0.91

Compressed-air quality (ISO 8573-1)	
Min. input pressure, air	6 bar
Connector dimension	1/2 Zoll
Max. air consumption (short-term)	16,2 Nm <sup>3</sup> /h
Average air consumption	3 Nm <sup>3</sup> /h
Max. particle size (class as in ISO)	4
Max. particle density (class as in ISO)	4
Pressure dew point (class as in ISO)	4
Max. residual oil content (class as in ISO)	3

### 1.28 Interface for handling/automation

If the laser cutting machine operated with Bystronic automation / handling systems on the mechanical and electrical interface, the machine utilization, flexibility and autonomy increased.

## 1 Basic machine

### 1.29 Cooling unit for Fiber 6000



Efficient cooling of the laser resonator, the optical components and the cutting head enables reliable continuous operation.

(Note: The picture is showing an example and does not correspond automatically to the described machine)

Coolant	R407C
Quantity of coolant	1,7 kg
Electrical supply cooling unit: 3 phasen & PE	
Supply system	TN
Mains frequency	50/60 Hz
Supply voltage	3x400/480 V
Max. permitted voltage fluctuation 50 Hz	+10/-10 %
Max. permitted voltage fluctuation 60 Hz	+6/-13 %
Fuse	20 AT
cos (φ)	0,75
Power consumption, factory*	9.6 kW
* Values are measured at full laser power and at an ambient temperature of 20°C.	

### 1.30 Operator safety in the cutting area



With a sliding protection door on the operator side and additional fixed screens on the side and rear of the machine, the safety regulations specified in the EC Machinery Directive are met in full.

(Note: The picture is showing an example and does not correspond automatically to the described machine)

### 1.31 Operator safety in the loading and unloading area



Operation of the shuttle table and loader is inhibited when the operator trips the light barriers. After leaving the protected area, the operator must press a button to re-enable operation. The light-barrier protection system consists of a transmitter, a receiver and the necessary number of deflecting mirrors to enclose the loading-/unloading area. The way these are arranged depends on the installation diagram.

(Note: The picture is showing an example and does not correspond automatically to the described machine)

## 1 Basic machine

### 1.32 Voltage 400V / 50Hz

The voltage supplied by the mains supply company must satisfy the requirements given in EN 50160: 2010 or ANSI C84.1 as well as IEC 60364-1.

A constant voltage is required to provide a stable power output. The power supply must not be subjected to any voltage fluctuations that exceed the voltage tolerance range.

If this condition cannot be met at the installation site, the installation must be fitted with a transformer and/or a voltage stabilizer.

### 1.33 Electrical supply (machine, including laser module)

The power supply must not contain frequent voltage fluctuations, spikes and/or dips lying outside the overall mains tolerance range, such as those generated by spot welding machines etc.

Machine power supply, including laser mod: 3 phases & PE	
Supply system	TN
Mains frequency	50/60 Hz
Supply voltage	3x400/480 V
Max. permitted voltage fluctuation 50 Hz	+10/-10 %
Max. permitted voltage fluctuation 60 Hz	+6/-13 %
Fuse	80 AT
cos (φ)	0.95
Power consumption, factory*	15,6 kW
Power supply**	38 kVA

\* Values are measured at full laser power and at an ambient temperature of 20°C.

\*\* These maximum values must be used when designing a possible transformer and stabilizer

## 1 Basic machine

### 1.34 Compressed air (machine, including laser module and cooling unit)

The quality of compressed air is as in ISO 8573-1:2001.

Important! Air taken in by the compressor must not contain any solvent vapors or aerosols.

The air distribution network must be free from contamination and must not contain any oils.

Min. dynamic pressure on supply unit	6 bar
Max. consumption	4.5 Nm <sup>3</sup> /h
Max. temperature of compressed air at inlet to maintenance unit	43 °C
Max. particle size (class as in ISO)	4
Max. particle density (class as in ISO)	4
Pressure dew point (class as in ISO)	4
Max. residual oil content (class as in ISO)	3

### 1.35 Material specification

Steels must be either cold rolled or descaled and oiled.  
Rust and rolling scale seriously affect the cutting quality.  
We recommend the use of a special laser steel. The standard Bystronic cutting parameters are based on the quality of laser steels.

Recommended material quality	
Steel	
0.5 - 3 mm	DC01
4 - 8 mm	DD11
10 mm - max. thickness	Rukki 250 C / S235JR
Stainless steel	
0.5 mm - max. thickness	X5CrNi18-10 / 1.4301
Aluminum	
0.5 mm - max. thickness	AW5754 / AlMg3
Copper	
0.5 mm - max. thickness	OF-CU
Brass	
0.5 mm - max. thickness	CuZn37

### 1.36 Part tolerances and cut face quality

Part tolerances and cut face quality are specified in the EN ISO 9013 and Bystronic standards.

## 1 Basic machine

### 1.37 Cutting gas supply and quality of the cutting gas

Cutting gas supply pipes [O<sub>2</sub>/N<sub>2</sub>] between gas fittings and the machine input are supplied and installed by the customer.

Stainless steel piping or fully cleaned copper piping with no signs of oxidation must be used.

The dimensions of the cutting gas pipes must be chosen by the responsible gas supplier according to the above listed specifications.

In the following table the cutting gas supply (O<sub>2</sub> or N<sub>2</sub>) is shown respectively at the machine connections depending on material and application. Furthermore the quality of the cutting gas that is recommended by Bystronic is shown in the table.

If lower quality gases are used we can no longer guarantee our cutting performance data.

Please note! Nitrogen still needs to be supplied to cutting machines that do not use nitrogen as the cutting gas, because it is required for the Piercing Jet function.

N <sub>2</sub> primary pressure, dynamic at machine input	25 bar
N <sub>2</sub> dynamic flow rate at machine input	2.200 l/min
N <sub>2</sub> primary pressure, static at machine input	30 bar
O <sub>2</sub> primary pressure, dynamic at machine input	12 bar
O <sub>2</sub> dynamic flow rate at machine input	700 l/min
O <sub>2</sub> primary pressure, static at machine input	15 bar
Type of gas	O <sub>2</sub>
Gas quality	3.5
Purity	≥ 99,95 Vol.-%
Content of Nitrogen plus argon (N <sub>2</sub> +Ar)	≤ 500 ppm
Water content (H <sub>2</sub> O)	≤ 5 ppm
Type of gas	N <sub>2</sub>
Gas quality	3.5
Purity	≥ 99,95 Vol.-%
Content of Nitrogen plus argon (N <sub>2</sub> +Ar)	≤ 3 ppm
Water content (H <sub>2</sub> O)	≤ 5 ppm

## **1 Basic machine**

### **1.38 Ambient conditions**

The laser cutting machine is designed for an industrial environment. It is only designed for operations in enclosed spaces. Thawing the laser cutting system is not recommended - can result in the malfunctioning of the controller components. No parts of the system should be exposed to direct sunlight.

The temperature range for operation of the laser cutting machine lies between 5 and 43°C.

The minimum ambient temperature must not drop below 5°C when the laser cutting machine is switched off.

Permissible ambient temperatures for operation of the laser cutting machine:

- Min. ambient temperature: 5°C
- Max. ambient temperature: 43°C

Minimum ambient temperature when laser cutting machine is switched off:

- No tank heater: 5°C
- With tank heater: -5°C

# 1 Basic machine

## 1.39 Structural requirements

All utility supplies (electric mains, compressed air, gases) and preparatory work must be provided by the customer in accordance with the installation diagram and the "Installation" chapter. Please refer to the "Machine installation" checklist (CL030201) sent to you prior to delivery of the machine

If the subsoil is poor, we recommend you employ the services of a structural analyst onsite

The basic machine and laser module must be assembled on a continuous floor plate or intermediate floor

Tool machines (such as punching machines, bending presses, etc.) can couple vibrations into the foundations of the laser cutting machine which lie outside of values defined by Bystronic. This must be prevented by taking appropriate structural- or installation measures (structural analyst)

Prevent deformations (e.g. shrinkage, creep) of the floor plates and intermediate floors which exceed known limits

Heavy loads in the immediate vicinity of the machine can lead to sinkages which impact upon the machine

Problem vibrations may arise when using suspended intermediate floors (joist free ceilings) and require examination by a structural analyst

Important: The following data are recommended values and can only be assessed conclusively by a structural analyst on site

Recommended foundation thickness (depending on subsoil)	200 mm
Concrete quality	C 25/30
Required working load	10 kN/m <sup>2</sup>
Nominal reinforcement in both directions above and below	3,5 cm <sup>2</sup> /m
Compressive strength of the cylinder	>20 N/mm <sup>2</sup>
Differential settlement	≤ 0,3 mm/m
Evenness of floor (over 5m)	± 5 mm
Max. permitted amplitude of acceleration (measured at support points of the laser or basic machine, in time period s)	1 m/s <sup>2</sup>

## **1 Basic machine**

### **1.40 Machine documentation**

The following documentation is included with the machine:

- Operating instructions
- Cutting technology
- Diagrams
- Supplier documentation
- Spare parts catalog (CD)
- Machine logbook
- Machine documentation
  - Declaration of Conformity
  - Handover report
  - Attached report(s)
  - nstallation diagram

### **2.2 Netbox**

The Netbox is available as an optional upgrade. It allows one or several machines to be connected to the Internet or with other machines.

## 2 Machine accessories

### 2.3 Cut Control Fiber

Cut Control Fiber increases process reliability and monitors the process of fusion cutting [N2] of stainless steel and steel. It detects the amount of light emitted by the workpiece, and, if the cut is poor, stops the feed, retraces the cutting position and repeats the cut. In addition, Cut Control Fiber enables precise edge detection by accurately detecting the position of the metal sheet on the table. The reproducible accuracy of edge detection with Cut Control Fiber averages +/- 0.15 mm. However, this accuracy can only be achieved if the edges of the metal sheet are in good condition and the detected sheet edges are at right angles to each other.

How the customer benefits from Cut Control Fiber

- Cut Control Fiber monitors the cutting process automatically
- This keeps the amount of rejects low and cutting quality at a constantly high level
- Exact edge detection (+/- 0.15 mm)
- The piercing detection allows immediate start of the cutting process once the sheet is pierced. For sheets from 10mm thickness, this saves minimum 20% time and increases the productivity (on Cut Control for fiber lasers)

### 2.4 Automatic nozzle changer with 40 positions



The optional Nozzle Changer enables fast, automatic changing of the cutting nozzle and thus increases machine autonomy substantially. Preventively replacing the cutting nozzle ensures constant quality of parts and process reliability. The Nozzle Changer has an automatic nozzle counter and checks nozzle availability and correct docking. It consists of five magazine wheels with eight identical nozzles per magazine wheel – i.e. a total of forty nozzles. In addition, the Nozzle Changer option allows user-friendly, manual nozzle changing at any time.

How the customer benefits from Nozzle Changer

- Fastest nozzle change on the market – extremely short “cut to cut” time
- No downtime due to manual nozzle changing when the material and/or material thickness is changed
- Best process reliability and quality of parts thanks to preventive nozzle change after a freely definable number of pierces
- High level of autonomy in low-manned operation as cutting nozzles are changed automatically based on the cutting pla

## 2 Machine accessories

### 2.5 Parts conveyor under cutting area and cross conveyor



The combined parts and transverse conveyor carries small parts and waste directly into a dumpster (not included) placed beside the laser cutting machine - installation position laser machine right side.

How the customer benefits from the small-parts conveyor and transverse conveyor

- Waste is automatically and continuously discharged into the waste cart
- Parts that can fall through the shuttle table can be easily removed from the waste cart
- No need for handling of multiple waste carts

(Note: The picture is showing an example and does not correspond automatically to the described machine)

### 2.6 Outdoor installation dust extraction system, incl. special painting, raincap & low temp. (< 0°C) equipment

This option contains the following elements for weather-proofing your dust extraction system:

- Special coating
- Rain hood

The system can now be installed outdoors.

### 2.7 Special Position above

## 4 ByTrans Extended

### 4.1 ByTrans 4020 Extended with 2 cassettes incl. copper grates



ByTrans 4020 Extended with two cassettes and individually controlled suction cups provides the user with the following extra functions:

- Double the loading capacity thanks to the second cassette
- Big-part removal
- Plastic sheets can be placed automatically between machined sheets as spacers

ByTrans 4020 Extended with two cassettes has following characteristics:

**Fast:** ByTrans delivers automatic and rapid loading and unloading in less than 75 seconds thanks to the unique material-flow design. This means that ByTrans is always quicker than the shortest cutting plan.

**Good design:** ByTrans provides full access and optimum operating conditions in minimum space, and can handle all machine loading and unloading operations over the full sheet thickness range up to 20 millimeters.

**Value for money:** ByTrans enables far higher machine utilization for a small extra investment and significantly reduces the operating costs and payback period for the entire machine.

**Autonomy:** The second cassette doubles the ByTrans storage and loading capacity. Doubling the length of time in which the entire machine system can work autonomously.

**Flexible:** The second cassette also enables removal of big parts. Cut parts are removed and stored temporarily in the second cassette. The skeleton sheet is also removed and deposited automatically. Alternatively, the second cassette can also be used for storing plastic sheets. These are automatically placed between machined sheets to protect the parts.

**Loading the ByTrans with a stack of uncut sheets:**

The loading unit with the integral suction-cup frame moves into the loading area above the shuttle table. This makes its quick and easy to load the ByTrans Extended with a stack of uncut sheets using a factory crane or fork-lift truck.

Nominal sheet size (X)	4.000 mm
Nominal sheet size (Y)	2.000 mm
Number of changeover cassettes	2
Sheet thickness (loading and unloading)	0,8 - 20 mm
Max. sheet weight	1.300 kg
Recommended material thicknesses for big part removal	1,5 - 6 mm
Suction-cup diameter (per piece)	150 mm
Quantity	54
Max. height of uncut sheet stack (including pallet)	240 mm
Max. weight of uncut sheet stack	3.000 kg
Weight uncut-sheet cassette	600 kg

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Max. stack height of cut sheets (including pallet)	350 mm
Cycle time for loading and unloading	75 s
Cycle time for big part removal	190 s
Cycle time for inserting a spacer sheet	210 s
Module weight incl. cassettes (net)	7.200 kg
Max. electrical power consumption	6,0 kW
Max. compressed air consumption	10 m <sup>3</sup> /h

Foundation requirements: See the documents «Layout Plan Technical Data» and «Installation Guide»

### 4.2 Additional suction cup for sheet separation for ByTrans Extended



The additional suction cup improves the separation of thin and oiled sheets.

