

LC3 2kW – 6kW Specifications



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MACHINE SPECIFICATIONS

LC 3	UNIT	2000	3000	4000	6000
Length	mm	10561	10561	10561	10561
Width	mm	5903	5903	5903	5903
Height	mm	2744	2744	2744	2744
Nominal sheet size	mm	3000 x 1500	3000 x 1500	3000 x 1500	3000 x 1500
Cutting area X, Y, Z	mm	3106, 1582, 100	3106, 1582, 100	3106, 1582, 100	3106, 1582, 100
Max. positioning speed parallel axis X/Y	m/min	100	100	100	100
Max. simultaneous positioning speed	m/min	140	140	140	140
Bilateral repeatability of positioning of one axis R (following ISO 230-2:2014(E))	mm	0.05	0.05	0.05	0.05
Averaged, bilateral position deviation of one axis M (following ISO 230-2:2014(E))	mm	0.1	0.1	0.1	0.1
Edge detection accuracy	mm	±0.5	±0.5	±0.5	±0.5
Max. weight of workpiece	Kg	900	900	900	900
Machine weight	Kg	11800	11800	11800	11800
Table changeover time	Sec	24	24	24	24
Power	W	2000	3000	4000	6000
Wavelength	µm	1	1	1	1
Maximum sheet thickness: Steel	mm	10	15**	15**	20
Maximum sheet thickness: Stainless steel	mm	5	12	15	20
Maximum sheet thickness: Aluminium	mm	6	12	15	20
Maximum sheet thickness: Brass	mm	3	6	8	10
Maximum sheet thickness: Copper	mm	2	6	8	10
Total electrical consumption of system (with exhaust, chiller)*	kW	16	19	25	29

* Electrical consumption data shows an average value based on 4 reference cutting plans of mild steel between 1-10mm thickness.

** For thicker steel test cuts with customer material are necessary.

All specifications are subject to change without prior notice.

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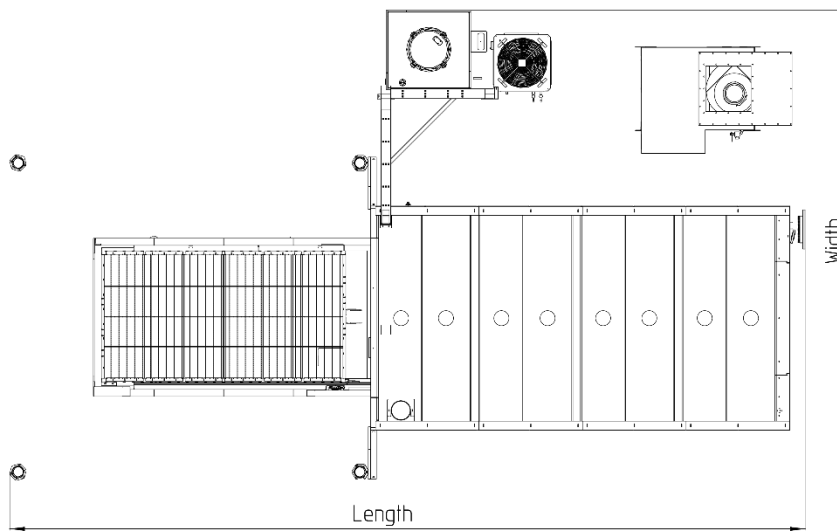
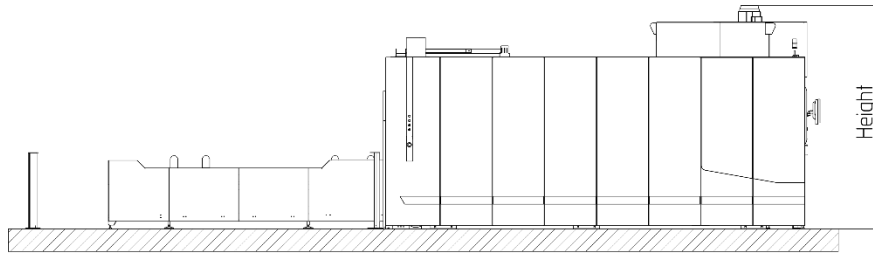


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STANDARD MACHINE:

Layout

(See table on previous page for dimensions)



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STANDARD MACHINE FEATURES:

Cutting head



- // The high-performance cutting head for fibre laser technology.
- // With up to 6000 watts, the cutting head cuts with precision and speed.
- // This enables you to cut materials from thin to thick with the highest level of quality.
- // The slim cutting head is low-maintenance, robust, and reduces collisions with tilted parts.
- // Integrated changing system enables fast maintenance of the protective glass.
- // Capacitive sensing ensures that a constant distance is maintained between the nozzle and the material that is to be cut.
- // Prior to cutting, sensors in the cutting head determine the precise position of the metal sheet (X/Y). Subsequently, the cutting plan is automatically adapted to the position determine.

Piercing jet



- // The Piercing Jet cools the piercing area and prevents the molten material from boiling when cutting with short piercing times.
- // The Piercing Jet requires a nitrogen supply [N2].

Nozzle cleaning



- // A brass brush mounted on the machine frame cleans the nozzles.
- // The frequency of cleaning can be set by the machine operator using the operating terminal.

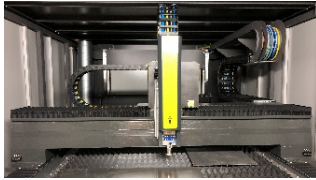
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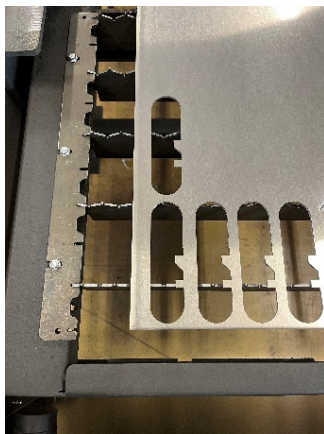
STANDARD MACHINE FEATURES:

Cutting bridge



- // The robust cutting bridge and the cutting carriage rest on precision-ground guides.
- // The main axes (X/Y) are driven by servo motors.

Shuttle table



- // The DNE LC3 is equipped with a shuttle table system (consisting of two shuttle tables).
- // The shuttle tables are moved in and out of the machine on two different level.
- // The shuttle tables are equipped with exchangeable, pluggable, toothed steel grates.
- // Distance between the grate slats increased to improve manual loading.
- // If necessary, additional grate slats can be inserted. This is useful when cutting small parts.
- // The grate slats 10166767 can be ordered or cut by yourself. The drawing is on the control of the machine.

Laser source



- // With fibre laser technology, the laser beam is generated in the core of an optical fibre and is also guided to the machine's cutting head via fibre optics.
- // A laser cutting system with a fibre laser is characterized by lower electricity consumption compared to other types of solid-state lasers.
- // The compact design means that the fibre laser requires little floor space.

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STANDARD MACHINE FEATURES:

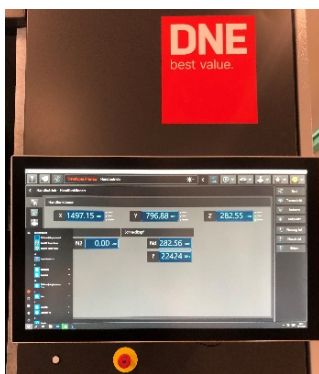
Cooling unit



// The cooling unit ensures efficient cooling of the laser source, the optical elements and the cutting head.

Coolant	R407C
Quantity of coolant	4.2 kg
Electrical supply cooling unit: 3 phase & PE	
Supply system	TN
Mains frequency	50/60 Hz
Supply voltage	3 x 400/480 V
Max. permitted voltage fluctuation 50 Hz	+10/-10 %
Max. permitted voltage fluctuation 60 Hz	+5/-10 %
Fuse	20 AT
cos (φ)	0,81/0,70
Connection power from supplier's data sheet	9 kW

Machine control and user interface



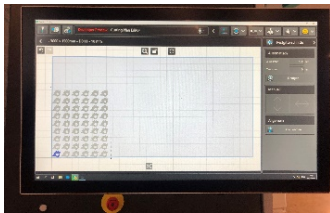
- // The machine is equipped with the DNE Motion Cutting high-performance CNC control. DNE Motion Cutting is optimally tailored to DNE's machine systems and supports the entire range of applications.
- // The DNE Vision Cutting user interface enables intuitive operator guidance via a touch screen and offers a choice of 19 languages.
- // In addition, DNE Vision Cutting is equipped with: 21.5-inch touch screen, solid state disk (SSD), USB interface, Windows 10 operating system.
- // DNE Motion Cutting is network compatible.

STANDARD MACHINE FEATURES:

Uninterruptible electricity supply

- // A power fail safe function ensures a controlled shut down of the DNE Motion Cutting CNC control and industrial PC in the event of power failure.

Cutting plan editor



The touch capable Cutting Plan Editor within DNE Vision Cutting 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.

Restart manager



- // DNE Vision Cutting has various restart options that enable the smooth continuation of work when a cutting plan is interrupted. This can occur if the machine is stopped due to a power failure, or if the operator manually interrupts a cutting plan at the end of a working shift.
- // The Restart Manager enables the simple and quick prioritization of a specific part within the current cutting plan.

System Manager



- // DNE Vision Cutting incorporates an automatic machine shut-down function. If the operator activates this function, the machine automatically shuts down at the end of the last job processed.
- // On the next working day, the machine can be restarted automatically, in order to eliminate unproductive operator time.

OPC Interface cutting



- // OPC Interface interlinks with the customer's OEE systems or specific monitoring devices and messenger applications.
- // These applications are third-party solutions that are provided by the customer.
- // Thus, the OPC interface enables a structured presentation of machine and operating data.

STANDARD MACHINE FEATURES:

Hand-held control



// The wireless hand-held control unit enables fast positioning of the cutting head to any position within the cutting range.

// In addition, the hand-held control unit allows a separation cut to be carried out without requiring programming.

Voltage 400v/50Hz



The voltage supplied by the main 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 stabiliser.

Voltage 480v/60Hz



The voltage supplied by the main 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 stabiliser.

STANDARD MACHINE FEATURES:

Electrical connection (machine incl. laser source and chiller)



- // The voltage supplied by the grid operator must fulfil the requirements specified by EN 50160 and IEC 60364-1
- // A stable voltage is a prerequisite for constant performance. The electricity supply must not have any voltage fluctuations throughout the entire grid tolerance, such as those which, for example, can be generated by spot welding systems.
- // If such a voltage supply cannot be guaranteed at the location where the machine is installed, the system must be equipped with a transformer and/or voltage stabiliser.

Machine power supply, including laser mod: 3 phases & PE

Supply system	TN
Mains frequency	50/60 Hz
Supply voltage	3 x 400/480 V
Max. permitted voltage fluctuation 50 Hz	+10/-10 %
Max. permitted voltage fluctuation 60 Hz	+6/-13 %
Fuse	80 AT
Power consumption, factory*	29 kW
cos (φ)	0.83
Power supply**	35 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 stabiliser

STANDARD MACHINE FEATURES:

Compressed air (machine, laser source, cooling unit, dust extraction system)



- // The quality of the compressed air must conform to ISO 8573-1:2001
- // In order to prevent risk of contamination by the compressor, an oil-free screw compressor with a downstream compressed air treatment system (air dryer) is required.

Min. dynamic pressure on supply unit	6 bar
Max. consumption	4.5 Nm ³ /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

STANDARD MACHINE FEATURES:

Cutting gas



- // The cutting gas supply lines [O₂/N₂] to the machine's connectors must be provided and installed by the customer.
- // They must consist of non-oxidized and cleaned copper or stainless steel pipes.
- // The gas fitter responsible must ensure that the dimensions of the cutting gas supply pipes conform to the given specifications.
- // The following table displays the cutting gas consumption and the cutting gas quality as recommended by Bystronic. If lower quality gas is used, Bystronic cannot guarantee the machine's maximum cutting performance.
- // Cutting systems that do not use nitrogen as the cutting gas still require a nitrogen supply for the Piercing Jet function.

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

STANDARD MACHINE FEATURES:

Material specification



- // The steel that is cut using the machine must either be cold-rolled or pickled and oiled.
- // Rust and mill scale have a strong adverse effect on the cutting quality.
- // The standard cutting parameters are based on laser-quality steel.
- // If lower quality materials are used, DNE cannot guarantee the machine's maximum cutting performance.

Recommended material quality	
Steel	
0.8 - 3 mm	DC01
4 - 12.7 mm	DD11
15 mm - max. thickness	Rukki 250 C / S235JR
Stainless steel	
0.8 mm - max. thickness	X5CrNi18-10 / 1.4301
Aluminum	
0.8 mm - max. thickness	AW5754 / AlMg3
Copper	
0.8 mm - max. thickness	OF-CU
Brass	
0.8 mm - max. thickness	CuZn37

Ambient conditions



- // The laser cutting system is designed for an industrial environment. It is intended only for indoor operation.
- // Permissible ambient temperature for machine operation: 5°C to 43°C.
- // Condensation on the laser cutting system, including all the peripheral equipment is not recommended and may cause malfunctions of the control components.
- // Direct sunlight on any parts of the system should be avoided.
- // Operation of the laser cutting system is permissible exclusively in conjunction with a dust extraction system.

STANDARD MACHINE FEATURES:

Structural requirements



Please observe the following supporting documents, which you will receive before the laser cutting system is delivered:

- // Checklist «Machine Installation» (CL030201).
- // Installation guide & layout plan.
- // All energy supply lines (electricity, compressed air, gas) and preparations must be provided by the customer in accordance with the layout plan
- // In the case of poor subsoil, DNE advises consulting a local structural engineer.
- // Machine tools (for example punching machines, press brakes) may cause the foundations of the laser cutting system to vibrate in excess of the values defined by DNE. This must be prevented by construction measures or by installation measures (structural engineer).
- // With new floor slabs and intermediate ceilings, deformation (e.g. shrinkage, creeping) that exceeds the defined limit values must be prevented.
- // Heavy loads in close proximity to the machine can result in subsidence that affects the machine
- // With free-span intermediate ceilings (flat slabs) vibration-related problems are possible and must be examined by a structural engineer.
- // The details in the table below are guideline values and can only be conclusively evaluated by a structural engineer on-site.

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

OPTIONAL ACCESSORIES FOR THE MACHINE:

Dust extraction system indoor installation



- // Small metallic particles, soot, and floating particles that result during the laser cutting process are extracted and filtered by the dust extraction system.
- // Using the machine for non-specified applications (including cutting non-metallic materials) takes place at the user's own risk.
- // A continuous cleaning cycle ensures the optimal performance of the filters.
- // The exhaust air system for the dust extraction system must be constructed according to local regulations.
- // The maximum resistance of the entire pipeline system of the dust extraction system must not exceed 1000dPa.

Extraction performance	4.000 m ³ /h
Fuse	35 AT
Main frequency	50 Hz
Supply voltage	3 x 400 V
Max. permitted voltage fluctuation 50 Hz	+10/-10 %
Power supply	8,5 kVA
Rated power	7,5 kW
cos (φ)	0,88
Fuse	25 AT
Main frequency	60 Hz
Supply voltage	3 x 480 V
Max. permitted voltage fluctuation 60 Hz	+6/-13 %
Power supply	7,3 kVA
Rated power	6,4 kW
cos (φ)	0,88
Max. ambient temperature at the installation location	-10 - ≤ + 40 °C
Relative humidity	≤ 95 %

OPTIONAL ACCESSORIES FOR THE MACHINE:

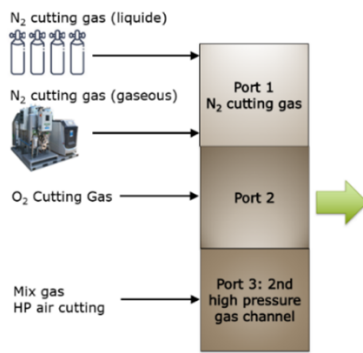
Dust extraction system outdoor installation



Technical Requirements:

- // Temperature: -10 to +40°C / 14 to ≤ 104°F.
- // Humidity: ≤ 95%.
- // Installation condition: Rain-protected installation due to weather protection roofing provided by the customer.
- // Compressed air quality required for operation: 3.3.3 n. ISO 8573 for compressed air supply.

2nd high pressure cutting gas channel



- // Additional process gas channel with high pressure capability for compressed air, argon, and mixed gas cutting (nitrogen with up to 21% oxygen).
- // Flow rate and pressure at the machine input must match the cutting parameter requirements.
- // Option does not include compressor/mixed gas generator and supply lines between compressor/mixed gas generator and the machine.
- // The connector at the machine inlets is similar to the nitrogen channel (Ø18mm copper pipe).
- // This option will be installed during installation at customer site.

Max. partied size (class as in ISO)	1
Max. partied density (class as in ISO)	1
Pressure dew point (class as in ISO)	2
Max. residual oil content (class as in ISO)	1

Acceptable volume flow rate at machine input	40 – 132 m ³ /h
Max. dynamic flow rate at machine input	670 – 2200l/min
Acceptable primary pressure, dynamic at the machine input	9 – 25 bar
Acceptable primary pressure, static at the machine input	10 – 30 bar
Max. achievable pressure in cutting parameters (dynamic pressure)	22 bar

OPTIONAL ACCESSORIES FOR THE MACHINE:

Software for the machine



Power CAM:

- // Programming process from part design to cutting plan is separated from the machine.
- // Ultimate operating simplicity.
- // High-level material utilisation (e.g. compressed nesting of parts).
- // Effortless data import.