

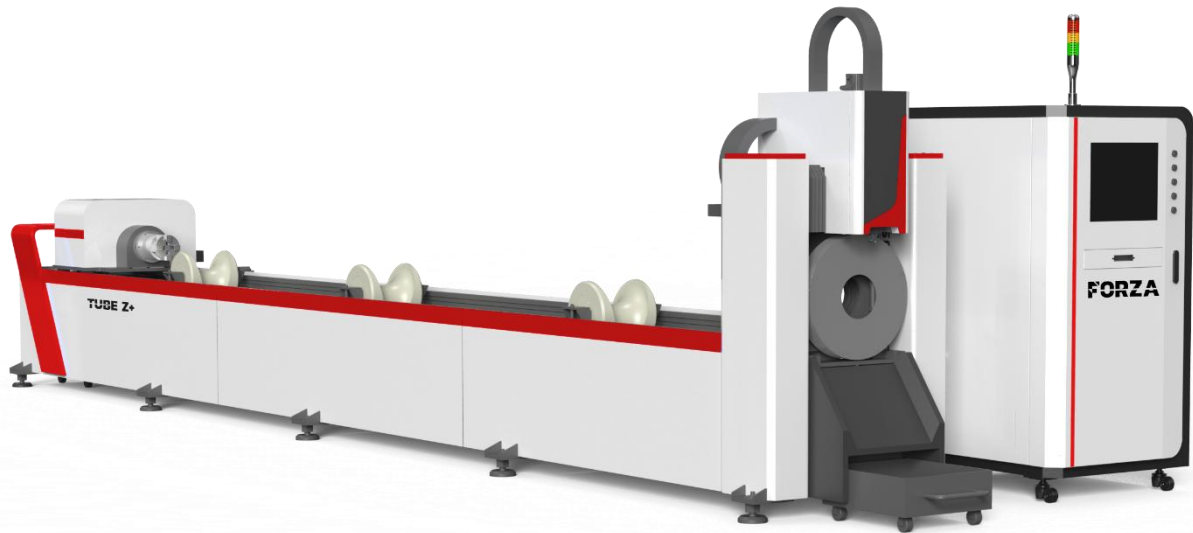


FORZA

Tube Z

V250818

Datasheet
Model Z6016P30



FORZA Tube Z

Laser cutting machine for tubes and profiles up to 19.7ft

CUTTING / MARKING / PERFORATION

The FORZA Tube Z machine is ideal for tube and profile applications up to 6.3in in diameter, capable of cutting aluminum, stainless steel, black steel, brass and copper.

It incorporates a dual-chuck system and an optional loading and unloading system, ensuring precise, stable, and uniform work even on long tubes, eliminating any risk of deflection or vibration during cutting.

Main Features

FEATURE	DETAIL
Application	Cutting tubes and profiles
Maximum tube length & diameter	L:20ft x D:6.3in L:6000mm x D:160mm
Laser power rating	3000W
Nominal cutting thickness (ASTM A36) ⁽¹⁾	$\frac{9}{16}$ in 14mm
Maximum cutting thickness (ASTM A36) ⁽²⁾	$\frac{3}{4}$ in 19mm
Maximum acceleration ⁽³⁾	32.2ft/s ² 1.0G
Maximum XY travel speed ⁽³⁾	5.5ft/s 100m/min
Maximum rotation speed ⁽³⁾	120rev/min
Cutting precision ⁽⁴⁾	± 0.1mm

1. This is the maximum limit at which a burr-free and clean cut can be obtained. Up to this thickness, cutting can be performed continuously.
2. The maximum thickness is the greatest thickness that can be cut under certain parameter settings. It is not recommended to size the machine based on the maximum thickness. Working with thicknesses closer to the limit significantly restricts the cutting geometries that can be achieved, due to the high temperatures reached by the material.
3. As the tube weight increases, motion parameters may decrease.
4. Cutting precision is measured on a 0.027in stainless steel sheet, considering the machine's repeatability and accuracy. A precision of 0.0039in means that when cutting a 3.937in plate, the actual measurement may be 3.941in or 3.937in. If the material thickness increases, the error may become greater due to material properties and cut width.



Special Features

Automatic Lubrication System



Automatic lubrication of the guide rails on the motion axes significantly reduces maintenance costs and saves time

Marking Technology



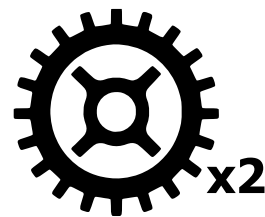
Not only cuts but also performs a marking function, ideal for engraving bending lines for post-bending processes or for marking numbers and letters.

FORZA Play T Software



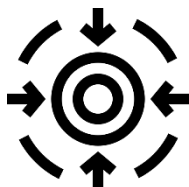
User-friendly Spanish/English cutting tubes and profiles specialized software with an integrated alarm system and maintenance notice.

Double Chuck Clamping



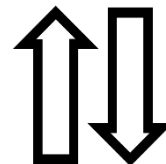
The system works synchronously to ensure tube precision and clamping. Both chucks operate via pneumatic control.

Self centering chuck



Incorporates two clamping chucks with pneumatic actuators that enable automatic tube centering, ensuring optimal performance across various profile types.

Auto Loading-Unloading (Optional)



Optionally, an automatic tube loading and unloading system can be implemented, enabling continuous, and efficient production.

General Specifications

SPECIFICATION	DETAIL
Model	FORZA Tube Z – Z6016P30
Laser Type/Technology	Fiber Laser 1064nm $\pm$ 10nm
Fiber laser diameter	150 μ m
Nominal fiber laser power	3000W
Fiber laser power range	5 a 100% ($\pm$ 0.5%)
Output power stability	$\pm$ 1.5W
Laser working frequency	4 a 5000Hz
Laser source protection level	IP54
Laser source model	MFSC-3000W MAX PHOTONICS
Working modes	CUTTING / MARKING / PERFORATION
Focusing system	SMARTFOCUS TECHNOLOGY ⁽¹⁾
Auxiliar gas type for cutting	O ₂ , N ₂ or Air
Proportional oxygen control	Analog control 145 psi (10 bar) AIRTAC
Laser head model	OSPRI – LC40
Focal range	-10mm ~ +10mm
Maximum focusing speed	3.9in/s 100mm/s
Head protection system	Collision prevention and detection
Pre-loaded cutting profiles	Yes ⁽²⁾
Laser cutting width	0.004in ~ 0.06in 0.1mm ~ 1.5mm ⁽³⁾
Cutting precision	Thickness - dependent ⁽⁴⁾

1. The focusing system incorporates an internal servo motor that moves the lens, along with a capacitive sensor that maintains the distance between the laser head and the plate during cutting.
2. Cutting parameters are available on the library.forzalaser.com platform, where customers can download them for free. A local backup is also stored on the machine for quick access.
3. The cutting width is directly proportional to the material thickness; as thickness increases, so does the cutting width. The type of assist gas also plays a role, with oxygen producing a wider cut line.
4. Cutting precision is 0.0039mm for thicknesses up to 0.027mm. As material thickness increases, precision may be affected due to the widening of the cut line, reaching up to 0.019mm on ½in plates.

Cutting angle	<2° ⁽⁵⁾
XY movement repeatability	±0.02mm
XY movement accuracy	±0.05mm
Tube working length	1.7ft to 19.7ft 500mm a 6000mm
Tube working diameter	0.4in to 6.3in 10mm a 160mm
Minimum tube thickness	³ / ₆₄ in 1mm ⁽⁶⁾
Maximum cutting speed	1.64ft/s 30m/min
Maximum travel speed	5.5ft/s 100m/min
Maximum tube rotation speed	120rev/min
Maximum XY acceleration	32.2ft/s ² 1.0G
XY motion system	Rack and pinion
Z motion system	Ball screw
Servo motors brand	INOVANCE
Lubrication system	Automatic by working path
Wireless control	Wi-Fi enabled remote control
Fume extraction system	Extraction by external motor
Maximum plate load capacity	264.5lb 120kg ⁽⁷⁾
Laser source power	10.5kW
Chiller power	3.8kW
Fume extractor power	1.5kW
Motion & control system power	17kW
Peak machine power	32.8kW

5. The cut angle depends on the material thickness and the type of assist gas used. Thicker materials can result in greater cut angles, and oxygen may increase the cut angle.
6. Thin-walled tubes are susceptible to deformation or crushing during chuck clamping. Do not work with tubes thinner than this value to ensure a safe and precise process.
7. Although the structure can support thick-walled tubes, the cutting thickness specified for this laser power must not be exceeded.

Minimum power for electrical system design ⁽⁸⁾	23.55kW		
Average energy consumption ⁽⁹⁾	19.68kWh		
Operating voltage	220V/250V/380V/440V/480V 3ph 50Hz-60Hz		
Minimum line current	68.7A @220VAC 3ph		
	60.4A @250VAC 3ph		
	39.8A @380VAC 3ph		
	34.3A @440VAC 3ph		
	31.5A @480VAC 3ph		
Conductor wire gauge to the thermal-magnetic circuit breaker (MCCB) ⁽¹⁰⁾	Up to 140°F 60°C (TW, UF)	Up to 194°F 90°C (THHW, THHN)	Voltage
	3 x 4AWG	3 x 6AWG	220VAC 3ph
	3 x 4AWG	3 x 6AWG	250VAC 3ph
	3 x 8AWG	3 x 10AWG	380VAC 3ph
	3 x 8AWG	3 x 10AWG	440VAC 3ph
	3 x 10AWG	3 x 12AWG	480VAC 3ph
Recommended MCCB and grounding conductor	MCCB	PE Conductor (Copper)	Voltage
	70A	8AWG	220VAC 3ph
	70A	8AWG	250VAC 3ph
	40A	10AWG	380VAC 3ph
	35A	10AWG	440VAC 3ph
	35A	10AWG	480VAC 3ph

8. The minimum power sizing for electrical design is calculated based on typical power consumption of the laser source and chiller, along with half the power of the fume extractor and machine actuators.
9. Average power consumption is estimated at 60% of the measure peak power. Not all components operate simultaneously; the intermittent activation of systems such as the chiller, motors, and laser source results in lower actual consumption. To estimate hourly power consumption, use the average consumption.
10. The cable gauge sizing was done based on NEC 310-16 for maximum conductor temperatures of 140°F and 194°F, considering conduit installation. If installing cables in open air, a smaller gauge may be used upon consultation with FORZA Laser's technical department.

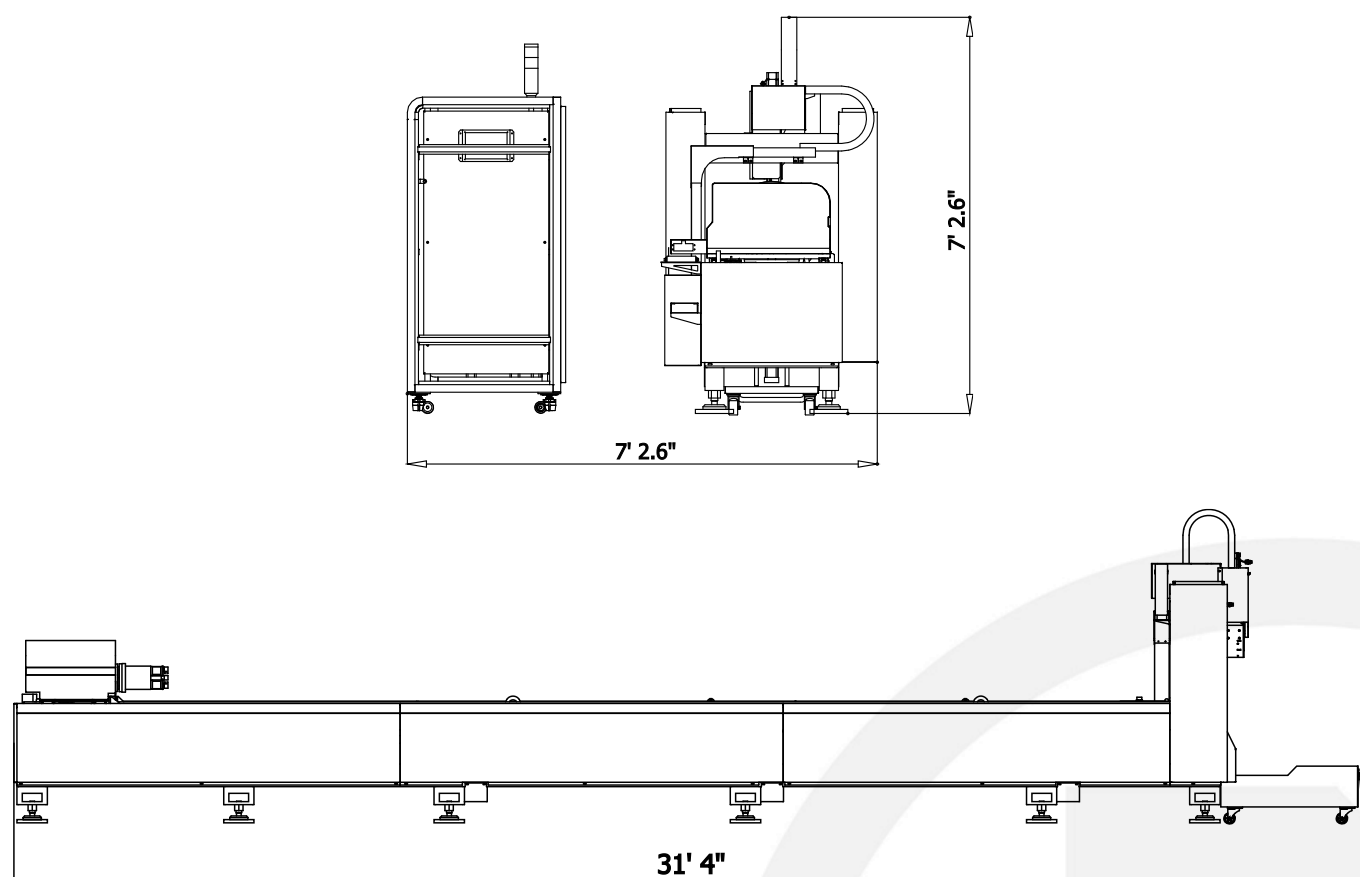
Power cable length ⁽¹¹⁾	32.8ft 10m		
Pneumatic supply for actuators	87psi 6bar		
Communication Interface	RJ45, WIFI, USB 3.0		
Compatible design formats	IGS, IGES, STP, STEP		
Software	FORZA Play T		
Software language	Spanish and English		
PC control interface	By screen and by manual control		
Cooling method	Water-cooled		
Chiller tank capacity ⁽¹²⁾	TFLW	CWFL	HL
	7.9gal 30L	5.8gal 22L	5.5gal 21L
Gas connection diameter	O ₂ and N ₂ 8mm (⁵ / ₁₆ in) hose (Nylon)		
Maximum gas pressure at laser head	362.59psi 25bar		
Maximum Air/N ₂ input pressure	290psi 20bar		
Maximum O ₂ input pressure	145psi 10bar		
Recommended N ₂ input pressure	≤232psi ≤16bar		
Recommended O ₂ input pressure	87psi 6bar ⁽¹³⁾		
Machine weight	~3.3ton ~3000kg		
Machine shipping weight	~3.5ton ~3200kg		
Machine dimensions	31.3 x 7.2 x 7.2 ft 9550 x 2200 x 2200 mm		
Required floor resistance	92.45psi 6.5Kgf/cm ²		
Relative humidity	< 85%		
Operating temperature	35.6 – 95 °F 2 - 35 °C		
Storage temperature	46.4 – 86 °F 8 - 30 °C		
Certifications	CE, RoHS		

11. The maximum length of the power cable is 32.8ft (10m) to prevent voltage drops and ensure optimal system performance.

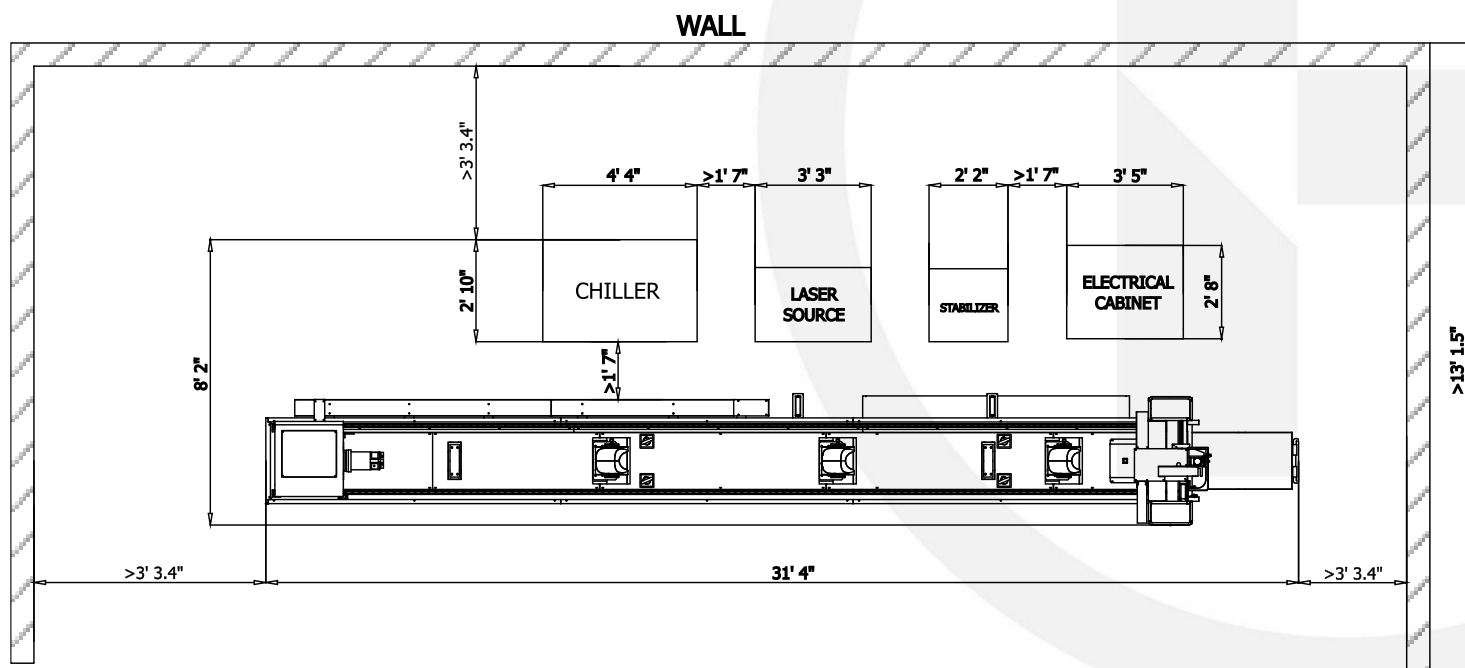
12. The tank size depends on the cooler model equipped in the laser machine. At the time of installation, at least 1.1 gallons (4 liters) of additional distilled water beyond the tank capacity must be available to fill the water circuits between the chiller, the power supply, and the laser head.

13. The specified pressure is measured at the tank pressure indicator output; from this pressure, the valves are calibrated.

Machine Dimensions

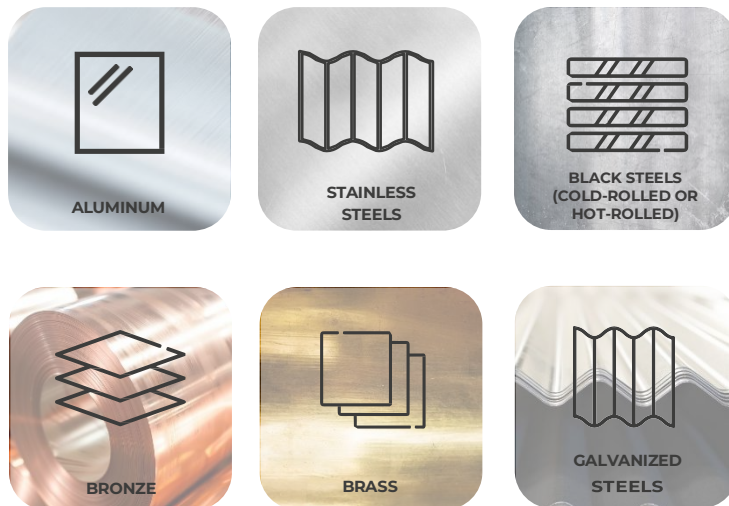


Required Space

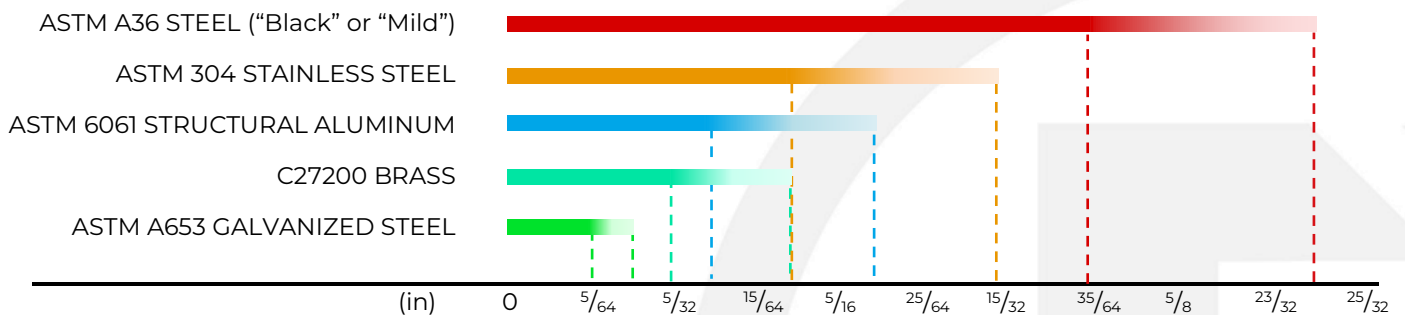


* Peripheral dimensions may vary depending on the machine model.

Applicable Materials



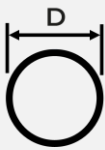
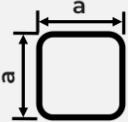
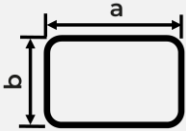
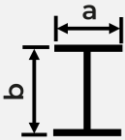
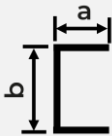
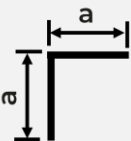
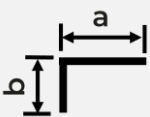
Cutting Thicknesses by Material



MATERIAL	IDEAL THICKNESS ⁽¹⁾			MAXIMUM THICKNESS ⁽²⁾		
	mm	in	gauge	mm	in	gauge
ASTM A36 STEEL ("Black" or "Mild")	14	9/16	-	19	3/4	-
ASTM 304 STAINLESS STEEL	7	9/32	2	10	3/8	-
ASTM 6061 STRUCTURAL ALUMINUM	5	3/16	6	9	11/32	-
C27200 BRASS	4	5/32	9	7	9/32	2
ASTM A653 GALVANIZED STEEL	2	5/64	14	3	1/8	11

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Supported dimensions per profile

PROFILE TYPE	SHAPE	DIMENSIONS (in)
ROUND		$2 < D < 9$
SQUARE		$2 < a < 9$
RECTANGULAR		$2 < a \text{ y } b < 9$
H/ BEAM		$a < 2$ $b > 7.8$
CHANNEL		$a < 2$ $b > 7.8$
SYMMETRIC ANGLE		$2 < a < 4.3$
ASYMMETRIC ANGLE		$2 < a < 5.5$ $2 < b < 3.5$

Packing List:

- ❑ 1 x FORZA Tube 3000W Machine 
- ❑ 1 x OSPRI-LC40 Head 
- ❑ 1 x Wireless remote control 
- ❑ 1 x Wireless keyboard and mouse 
- ❑ 1 x Laser safety glasses with case 
- ❑ 2 x Waste collection carts 
- ❑ 12 x Machine leveling feet 
- ❑ 1 x Cable tray and drag chain assembly kit 
- ❑ 1 x Monitor screen 
- ❑ 1 x Industrial CPU 

- TOOLBOX -

- ❑ 1 x Plastic toolbox 
- ❑ 1 x Scotch tape 
- ❑ 1 x Masking tape 
- ❑ 1 x Metric Allen key set 
- ❑ 1 x screwdriver set (4 pieces) 
- ❑ 1 x Door and switch key set 
- ❑ 1 x Adjustable wrench 
- ❑ 1 x Cotton swabs and cleaners 
- ❑ 1 x 6 mm (15/64in) bolts and anchors bag 
- ❑ 1 x Wi-Fi module 
- ❑ 1 x Electrical terminal set 
- ❑ 1 x Service terminal block set 
- ❑ 1 x QBH protector 
- ❑ 2 x 10" extraction duct clamps 

- LICENSES -

- ❑ 1 x FORZA Play T Software License
- ❑ 1 x **FORZA Vectors** license – 1 year
- ❑ 1 x **FORZA Academy** full license – 1 year
- ❑ 1 x **Super 7 SUPPORT** license – 4 years

- PERIPHERALS -

- ❑ 1 x Electrical cabinet
- ❑ 1 x 380V / 45 KVA Voltage Stabilizer 
- ❑ 1 x Automatic 3kW Chiller 
- ❑ 1 x MFSC Power Supply – 3000W Max Photonics 
- ❑ 1 x 1.5 kW Industrial fume extractor 
- ❑ 1 x 45 KVA Transformer [220V - 380V] @220v3ph 
- ❑ 1 x 45 KVA Transformer [250V - 380V] @250v3ph 
- ❑ 1 x 45 KVA Transformer [440V - 380V] @440v3ph 
- ❑ 1 x 45 KVA Transformer [250V - 380V] @480v3ph 

- CONSUMABLES -

- ❑ 1 x Top protective lens 
- ❑ 9 x Bottom protective lenses 
- ❑ 16 x Cutting nozzles, multiple sizes 
- ❑ 1 x Ceramic base for capacitive sensor 
- ❑ 1 x 1 liter (0.26gal) ISO 68 oil 

- POWER CABLES AND TRAYS -

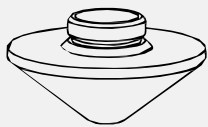
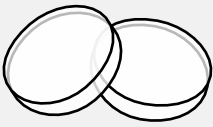
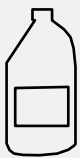
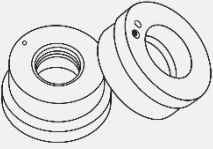
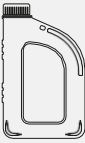
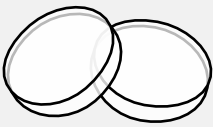
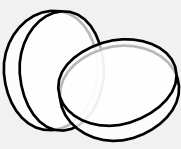
- ❑ 1 x Gas extraction tube/hose, 4.8m (15.75ft) x 10" 
- ❑ 1 x Monitor power cable 
- ❑ 10m (32.81ft) x Metal tray 
- ❑ 2 x PU hoses for C-H cooling, 10mx8mm (32.81ftx5/16in) 
- ❑ 2 x PU hoses for C-F cooling, 10mx19mm (32.81ftx3/4in) 
- ❑ 1 x Voltage stabilizer for monitor 
- ❑ 5m (16.4ft) x Cable 3x4AWG + 1x8AWG, B-T (T: Ring-Spade) @220v3ph 
- ❑ 5m (16.4ft) x Cable 3x4AWG + 1x8AWG, B-T (T: Ring-Spade) @250v3ph 
- ❑ 5m (16.4ft) x Cable 3x8AWG + 1x10AWG, B-E (T: Ring-Spade) @380v3ph 
- ❑ 5m (16.4ft) x Cable 3x8AWG + 1x10AWG, B-T (T: Ring-Spade) @440v3ph 
- ❑ 5m (16.4ft) x Cable 3x10AWG + 1x10AWG, B-T (T: Ring-Spade) @480v3ph 
- ❑ 2m (6.56ft) x Cable 4x8AWG + 1x10AWG, T-E (T: Ring-Ring) @220/250/440/480v3ph 
- ❑ 10m (32.81ft) x Cable 4x8AWG + 1x10AWG, E-M (T: Ring-Spade) 
- ❑ 15m (49.2ft) x Cable 4x12AWG, M-X (T: Ring-Spade) 

T: Transformer, B: MCCB, E: Stabilizer, M: Machine, F: Laser source, C: Chiller, H: Head, X: Extractor, G: Ground.

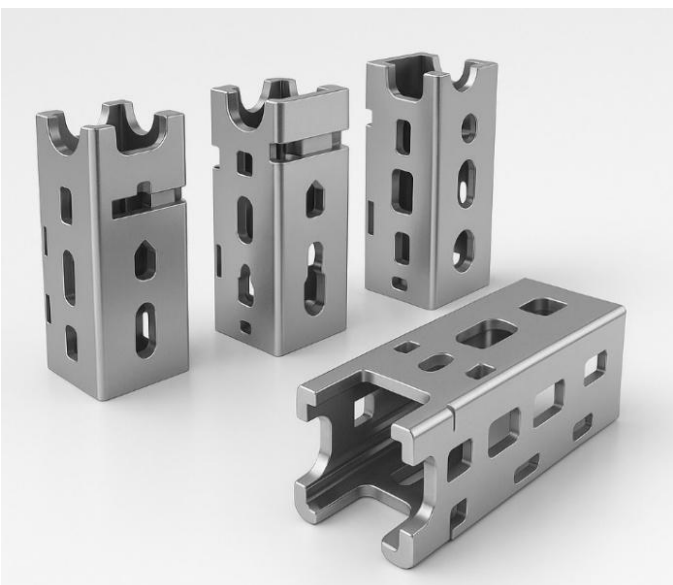
* Reference cables are coated with TW-type insulation

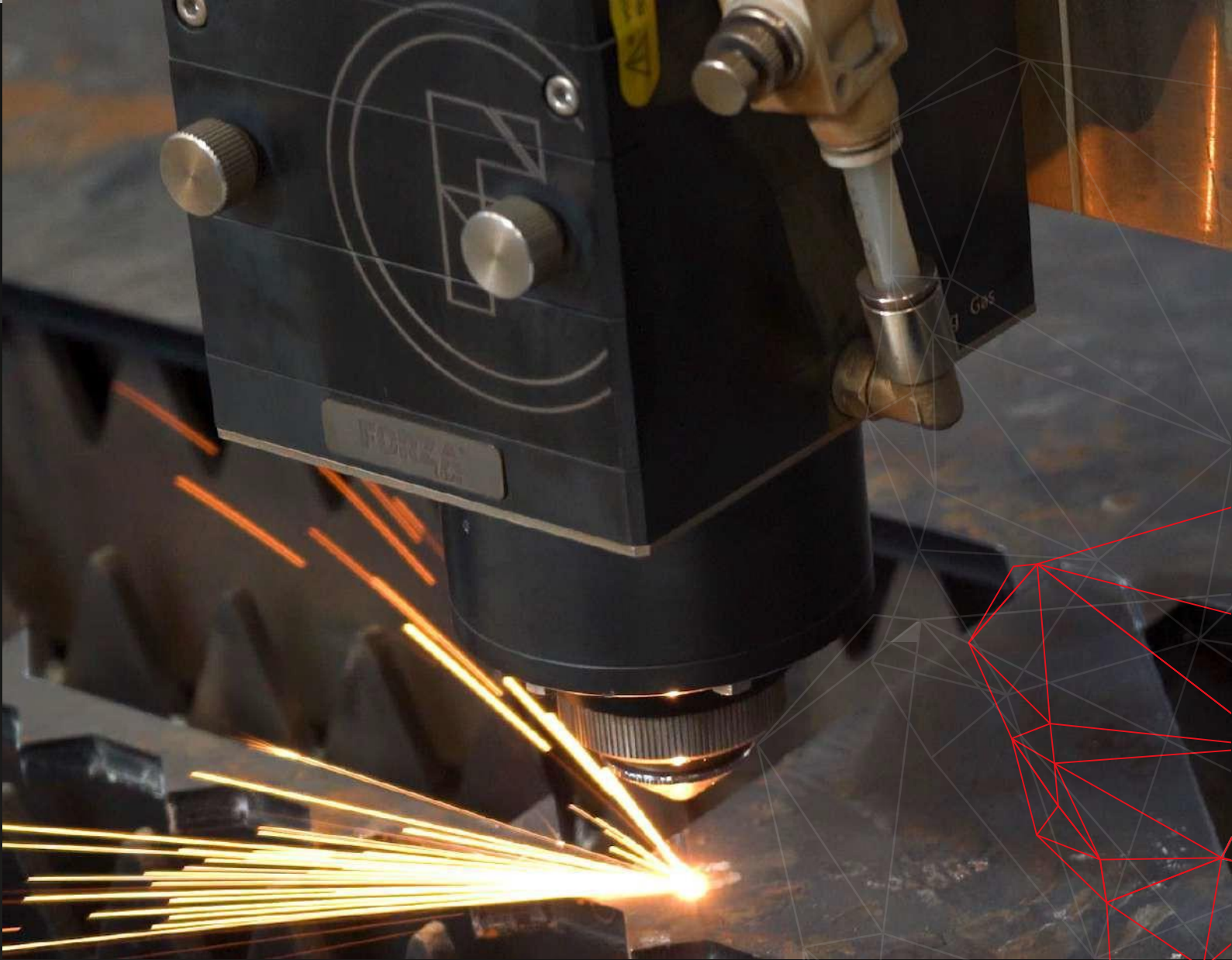
Transportation symbols:  (package),  (inside the package),  (installed on the machine).

Consumables:

IMAGE	ITEM	MODEL	DIMENSIONS	LIFETIME
	Cutting nozzle: single/double	xxxx	D:28mm M11x0.75 H:15mm	200 hours
	Bottom protective lens	CF-L30.0x5.0-4K	D:30mm T:5mm	200 hours
	Distilled water	xxxx	7.9gal 5.8gal 5.5gal 30L 22L 21L	2 months
	Ceramic base for capacitive sensor	CF-BDC28M11L12	D:28mm	1000 hours
			D:24.5mm	
			M11	
			H:12mm	
	ISOVG68 lubricating oil	xxxx	0.26gal 1L	31.09 miles 50 000 meters
	Blue grease for pinions	xxxx	Lithium grease	6.21 miles 10 000 meters
	Secondary Bottom Protective Lens	CF-L30.0x5.0-4K	D:30mm T:5mm	Not specified
	Top protective lens	CF-L21.5x2.0-4K	D:21.5mm T:2mm	Not specified

Manufactured Parts:





At FORZA Laser, laser specialists, our team has everything you need to take your business to the next level.

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