310 Bagot St., Kingston, ON, K7K 3B5, Canada

www.coldplasmagroup.ca

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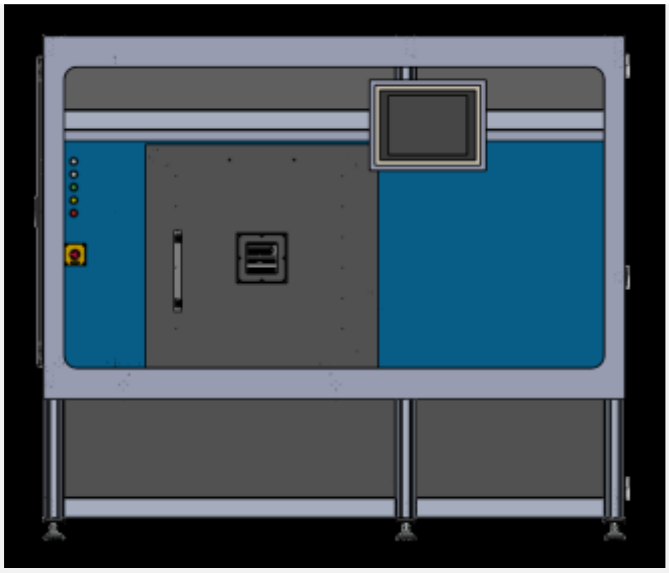
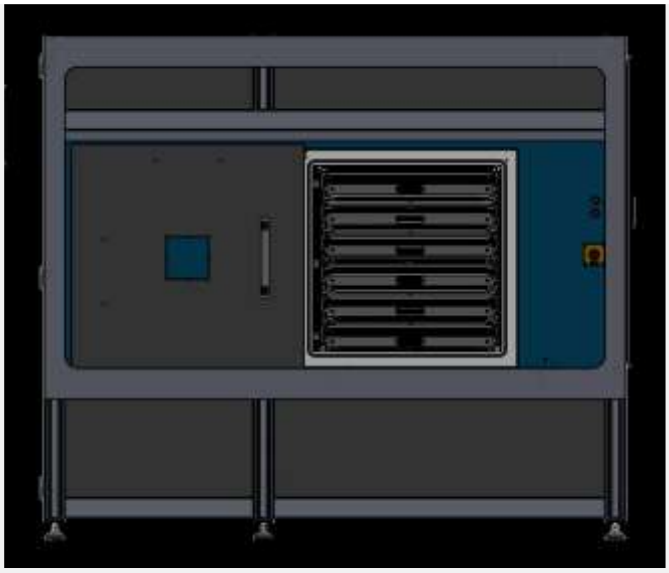
Version 002 24/05/21

CP390-6-TD





TWO door plasma system

- **Separate entrance and exit of the material to be treated (two doors)**
- **Power Generator: AC, 5 KW**
- **1 mass flow controller**
- **Industrial PC with Windows 10+ for user control with commercial software**
- **Sample holder assembly with 6 racks and electrodes**
- **Water chiller unit**
- **12 product trays**
- **Oxygen concentrator**

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1. Machine Overview

Description		
External dimensions	W x H x D (mm)	2 300 x 2 000 x 1 000
Internal dimensions of the vacuum chamber	W x H x D (mm)	720 x 720 x 760
Chamber volume	(l)	390
Total weight	(Kg)	1 200
Materials used	Vacuum chamber	Stainless steel
	Door	Stainless steel
	Inspection window	Borosilicate glass
	Cladding	Painted aluminium
	Frame	Stainless steel
	Electrodes	Aluminium, Cu 6.5 mm connection
Material carrier	Levels	6
	Material	Stainless steel
Plasma generator	AC	
	Max. power (W)	5 000
	Nominal power (W)	< 5 000
Vacuum Pump	Type	Dual Stage
	Dry	
Plasma working pressure	Range (mbar)	0.1 – 1.0
Process gas	Number of gas inlets	2
	Upstream pressure (bar)	< 2
	Connection	6 mm compression fitting
Control unit	PLC	CPU VIPA 014
	Software	PlasmaBee_II
	Version	3.2.97
Electrical supply	Voltage (V)	400
	Preliminary fuse (A)	32
	Control voltage (V)	24

2. Space for the Operation of the Plasma Machine

The assembled machine has the following dimensions:

Dimensions	(mm)
Height	2 000
Depth	1 000
Width	2 300

The plasma machine comes complete with:

- a source of process gasses, i.e., an oxygen concentrator which concentrates ambient air to 96% oxygen.
- an external water-cooling unit to provide a consistent supply of chilled water for the vacuum pump and the power generator.

Category	Specifications	Values (mm)
Space requirements during operation	W x H x D	3 200 x 2 000 x 2 000
Distance from other machines, equipment, systems, paths, walls	On each side	Min. 800 Ideally: 1 000

Please note that a water-cooling system (chiller) comes with the machine. It is not integrated in the machine cabinet, and it needs to be placed outside, near the machine.

3. Ambient Conditions during Operation and Storage

Recommended ambient conditions during operation and storage of the plasma machine:

Category	Specifications	Values
Ambient temperature	During operation (°C)	15 - 30
	During storage (°C)	12 - 40
Relative humidity		10 – 95 % @ 40 °C, no condensate

4. Machine Installation

The Schematic Diagram for the machine installation is shown below.

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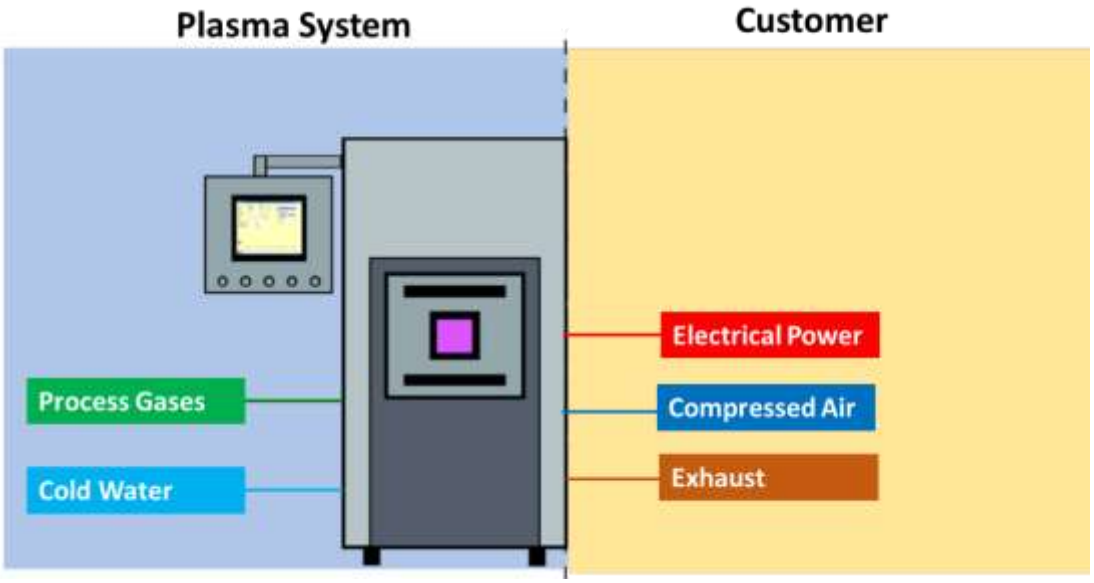

The customer is responsible for facilitating the basic installation of the machine, to the electrical mains, compressed air, and the exhaust for the plasma system.

Category	Specifications	Values
Electrical	Voltage (V)	400 or 480
	Preliminary fuse (A)	32
	Control voltage (V)	24
Compressed air supply	Pressure	6 – 10 bar (87 – 145 psi)
	Oil	< 0.1 ppm
	Dust	< 1 µm
	Pressure dew point	< -22 °C
	Flow rate	≥ 10 l/min (≥ 0.35 cfm)
Cooling water	Distilled or deionized	
	pH value	6.5 - 8
	Turbidity	< 20 mg/l
	Alkalinity ($CaCO_3$)	< 75 mg/ml
	Hardness ($CaCO_3$)	< 1.2 mmol/l (“soft” approx. 7.3 ° dH)
	Evaporation residue (TSD)	< 250 mg/l

	Cl-	
	Fe^{3+}	< 80 mg/l
	Mn^{2+}	< 0.3 mg/l
	Spec. resistance	< 0.2 mg/l
	TDS is estimated as follows	> 2 500 Ω/cm at 25 °C TDS = 640 000 / spec. resistance
	The use of distilled or deionized water is recommended; alternatively, fresh water can be used if it fits criteria above. The freshwater quality indicators can sometimes be found on the website of the local water supply company.	