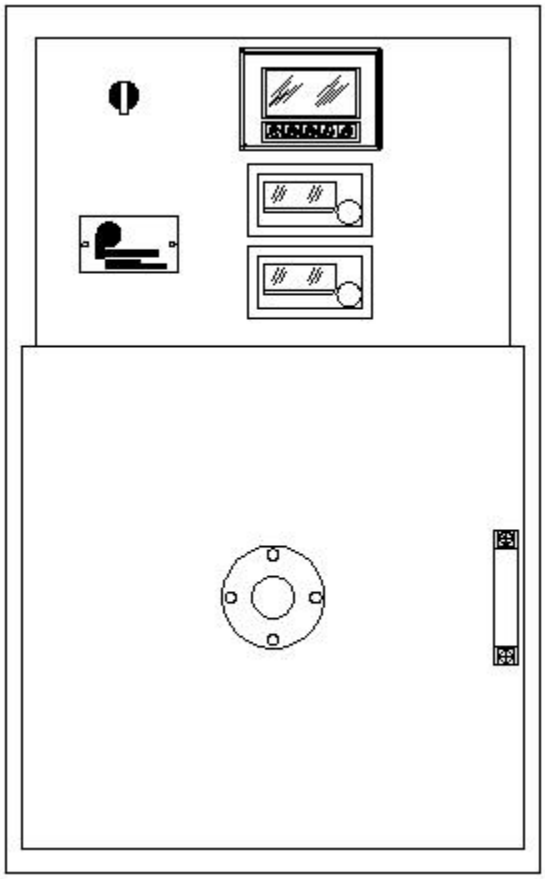
Plasma Etch, Inc.
3522 Arrowhead Dr.
Carson City, NV 89706
P: 775 883-1336 F: 775 883-2559
www.plasmaetch.com



PE-100 SERIES PLASMA SYSTEM

TABLE OF CONTENTS

TABLE OF CONTENTS

1. Manual Organization

The system manual is separated in various sections. Review the table of contents for information.

Please familiarize yourself with the system manual before operating the system. Please observe all warnings or important notes throughout the manual. The following are examples of how important information will be displayed:

NOTE:	This box indicates important information supporting the subject.
WARNING:	This box indicates a possible hazard to personnel or machinery.
DANGER:	This box indicates a hazard to personnel.

2. SAFETY

Observe all warning labels on the system. Labels throughout the system indicate a High Voltage danger.

3. Contact information

Plasma Etch, Inc.
3522 Arrowhead Drive
Carson City, NV 89706
Phone: (775) 883-1336
Fax: (775) 883-2559

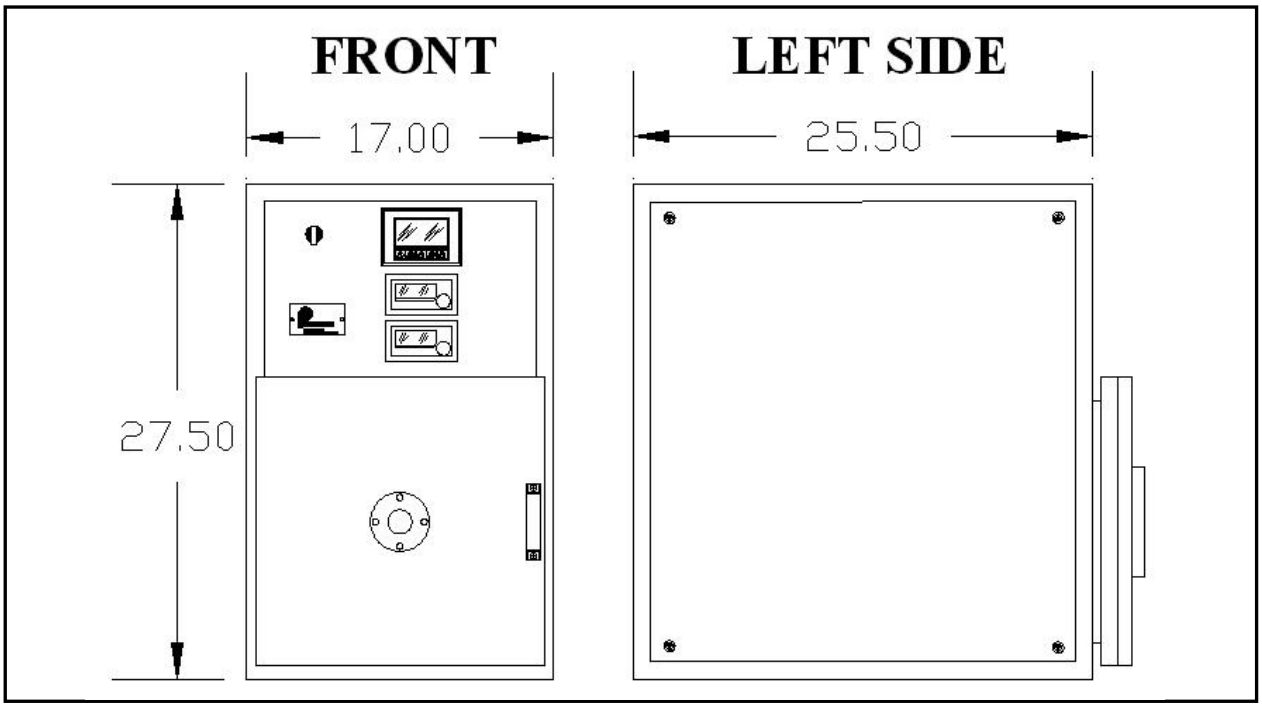
Email: service@plasmaetch.com

1. SPECIFICATIONS

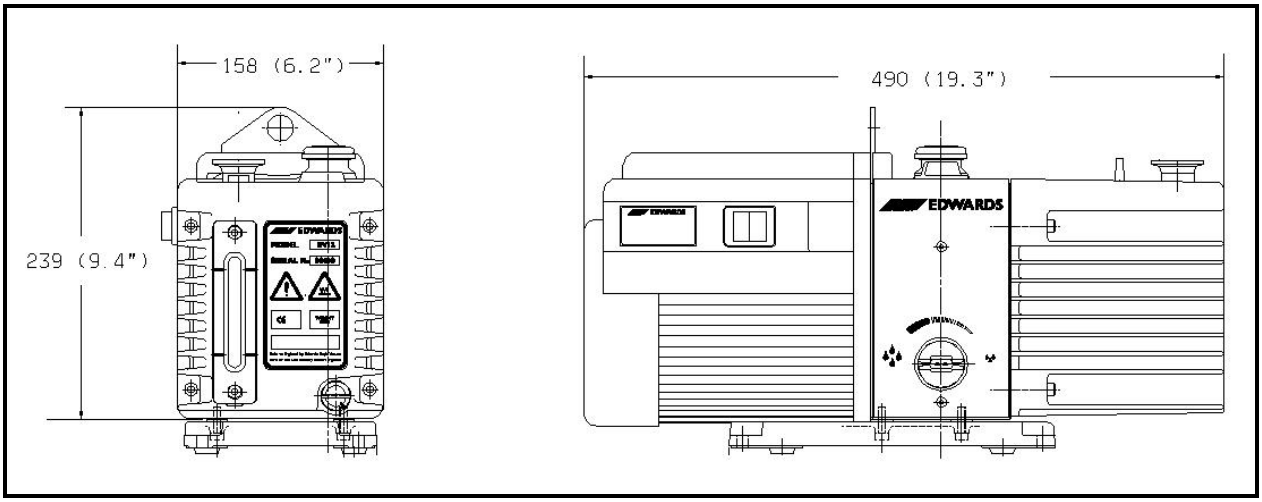
VACUUM CHAMBER	
CHAMBER DIMENSION:	12" H X 12"W X 12"D
ELECTRODE CONFIGURATION:	9”W X 9”D X 3” Spacing, 3 Levels
VACUUM SYSTEM	
MAIN PUMP	7 CFM
VACUUM GAUGE	0-1 TORR
PROCESS COMPONENTS	
RF POWER	0-300 WATTS @ 13.56MHZ
GAS FLOW	0-500CCM O2, AR
TEMPERATURE CONTROL (Optional)	0°F to 150°C ± 0.5°C
FACILITIES	
AC SERVICE	120 VAC, 50/60HZ, 1 PHASE, 15A
PROCESS GAS	15 to 30PSIG
SYSTEM ENVIRONMENT	85°F

2. FOOTPRINT

SYSTEM FOOTPRINT



VACUUM PUMP



MISCELLANEOUS COMPONENTS

Refer to the vendor supplied manual for specifications on chiller, scrubbers, dryers etc.

FACILITIES REQUIREMENTS **(Refer to Section II for Specifications)**

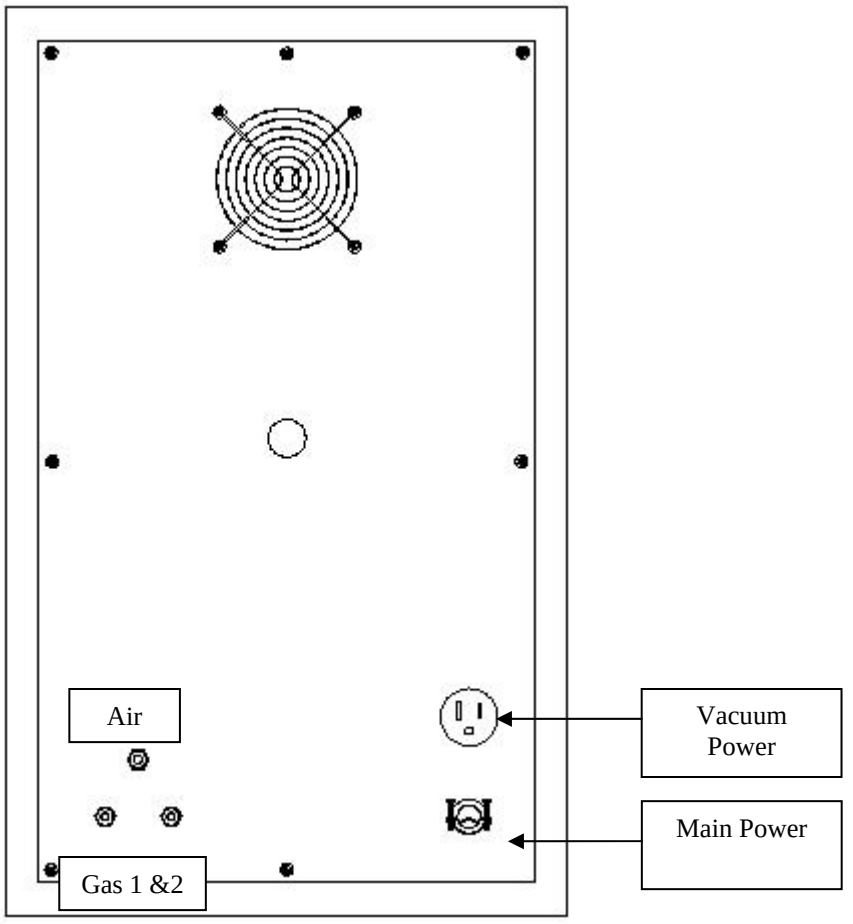


FIGURE 1

1. AC Service

   At the Plasma Console rear, locate the coiled system primary AC power cord and connect to an appropriate power source. Securely tighten the cable clamp and install the AC power Plug (***user supplied***). ***Do not connect the power cord to the AC source at this time.***

   Connect the Temperature Bath (Optional) to an appropriate AC power source.

2. Gas Sources

   All gas sources should be equipped with two stage brass regulators (***user supplied***), with a low pressure range of 0-30 PSIG (15 PSIG midrange). ***Single stage regulators are not***

acceptable for this application.

A correct fitting (CGA number) must be specified with each regulator. Fitting numbers are dictated by the gas type (i.e.; oxygen, nitrogen, argon, etc.) being ordered. Contact the gas supplier for correct CGA fitting numbers.

All gas lines to be ¼" OD X .040" wall thickness, black (UV inhibited) polyethylene tubing (***user supplied***).

Route and connect the ¼" tubing from the gas sources to the appropriate gas connections at the rear of the plasma console. The gas connection hardware at the plasma console rear is supplied with the system.

3. Compressed Air Source

The compressed air line to be ¼" OD X .040" wall thickness black (UV inhibited) polyethylene tubing (***user supplied***). The compressed air connection at the vacuum pump is supplied with the system.

Route and connect the ¼" tubing from the compressed air source to the rear of the system cabinet.

4. Vacuum Pump Exhaust Plumbing

Vacuum pump exhaust runs should be as short as possible, having no horizontal runs and no low points.

If an exhaust air scrubbing system is used, an air gap must be provided in the exhaust line. ***Hard plumbing of the vacuum pump exhaust to the air scrubber will result in excessive vacuum pump oil consumption.***

Route and connect the vacuum hose (***user supplied***) from the vacuum pump exhaust to the building exhaust. Connecting hardware is supplied for connection at the vacuum pump exhaust.

SYSTEM INSTALLATION

Position the Plasma Console in its final location and screw down the stabilization jacks (4 each).

Unbolt the Vacuum Pump from the shipping pallet and attach the rubber pads supplied with the system to the Vacuum Pump base. ***Do not tip the pump, as it is fully charged with vacuum pump oil ($$$$$$$).*** Position the Vacuum Pump in its final location.

1. System Control Cables **(Refer to Figure I)**

Route the cables for main power and vacuum pump to their perspective locations, located at the lower rear of the Plasma Console.

2. Gas Connections

   Connect the process gases to Gas 1 and Gas 2 input as necessary.

3. System Environment

   The system and in particular the R.F. generator, requires sufficient heat dissipation to ensure maximum service life. To ensure maximum service life from the system, it is recommended that the plasma room temperature not be allowed to exceed 85°F

4. Temperature Bath (Optional)

   Verify proper fluid levels and turn on the power. Inspect the chamber for leaks before proceeding. Set the desired temperature (refer to the bath instruction manual).

5. System Power Phasing Check (3 phase motors)

WARNING:

System power phasing must be checked prior to attempting operation of this equipment.

Operation of this equipment with improper power phasing will permanently damage the vacuum pump.

Do not apply system power, except as noted below.

Connect the system power cable to the facility AC source.

For correct operation, vacuum pump rotation must be counter clockwise, as viewed from the fan end of the vacuum pump drive motor. When viewing this fan, determining the direction of rotation visually can be deceiving. The most reliable method we have found is to insert just the tip of a small plastic tie wrap into the fan opening and verify rotation by making contact with the fan blade.

The vacuum pump may be jogged to check vacuum pump rotation by having an assistant momentarily depress the vacuum pump motor starter. The vacuum pump must be jogged only momentarily to check phase rotation. Power must be applied to the vacuum pump only for short periods, while checking for proper rotation.

6. FACILITY INSTALLATION IS COMPLETE

1.0 GENERAL

1.1 This section defines the operating procedures for the PE Series Plasma Surface Treatment and Etching System.

1.2 A detailed description of plasma processing is provided in the System Manual, Section V, “Plasma Processing Methods & Procedures”. It is assumed that the operator has thoroughly familiarized himself with this document, prior to attempting operation of the system.

1.3 System preventative maintenance is defined in the System Manual, Section VI, “Preventative Maintenance Procedures”. It is assumed that the operator has thoroughly familiarized himself with this document, prior to attempting operation of the system.

1.4 All controls referenced in “UPPER CASE” are located on the system control panel.

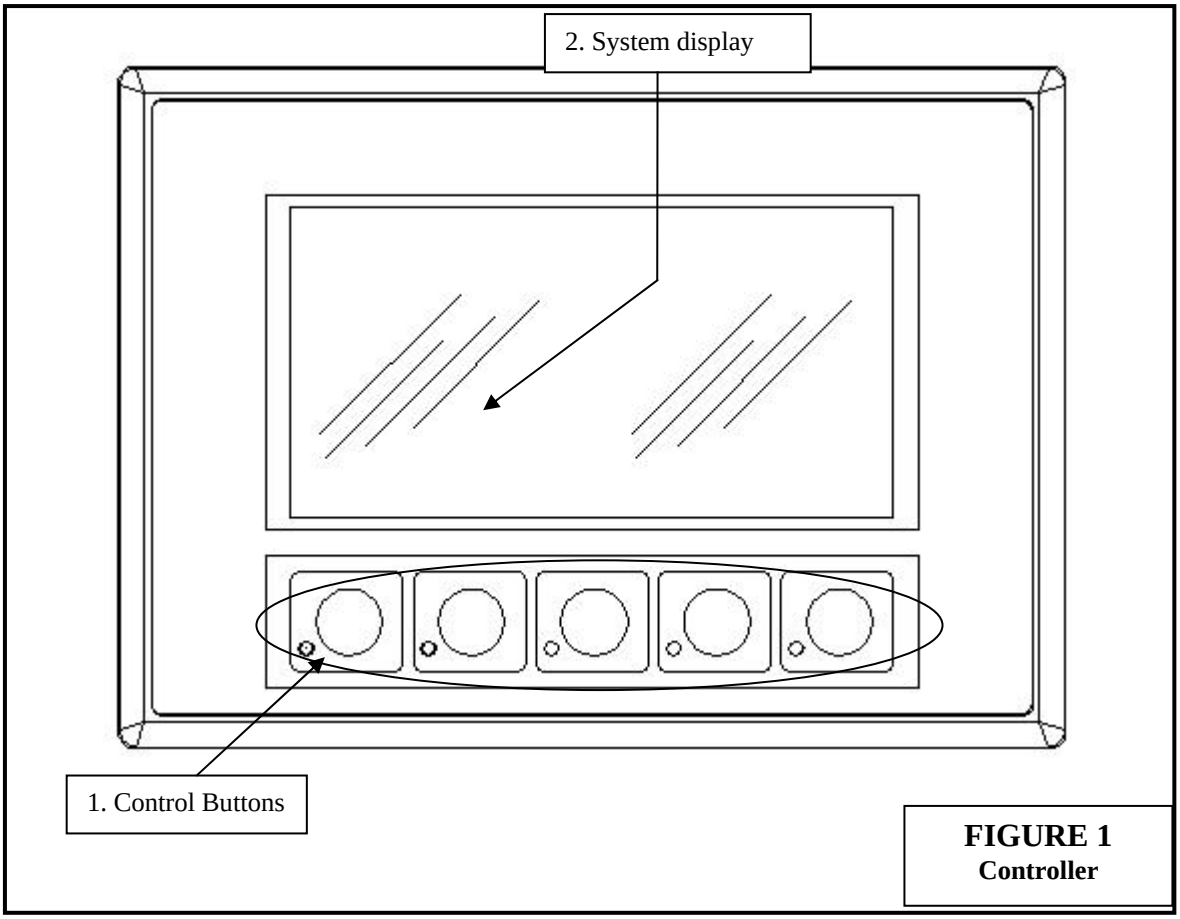


FIGURE 1
Controller

2.0 CONTROLLER INTRODUCTION

2.1 System operation is monitored and controlled through the Touch screen. Refer to F**igure 1** for locations.

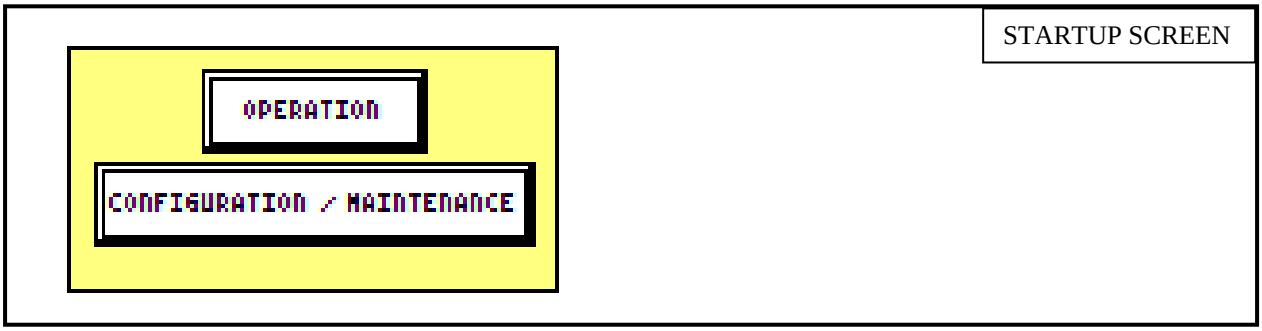
1. **Control Buttons** – System operation is controlled using these buttons.

2. **System display** – Displays system messages, machine status and configuration information.

3.0 SYSTEM CONFIGURATION

3.1 Set the POWER circuit breaker to the ON (Up) position. Refer to Figure 2 on page 6**.**

3.2 Once the system is powered on the screen will display the startup screen.



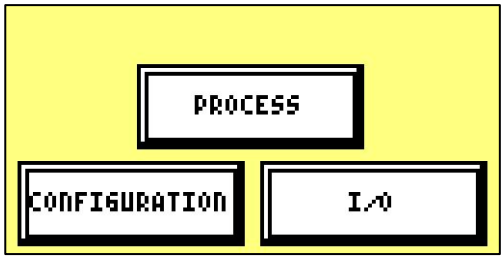
3.3 **Configuration/Maintenance**

Touching the “CONFIGURATION / MAINTENANCE” button takes you to the configuration, process and I/O monitor menu. A password is required to enter this menu. The password is set to “48” at the factory and cannot be changed.

*****CAUTION *****

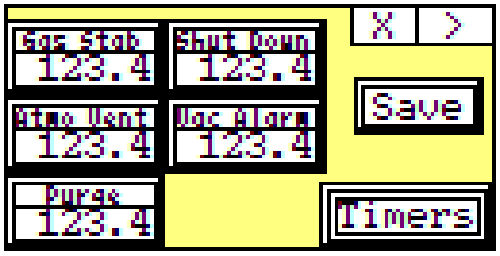
ONLY AUTHORIZED AND QUALIFIED PERSONNEL SHOULD ACCESS THIS AREA. IMPROPER CONFIGURATION CHANGES AND I/O FORCING CAN CAUSE MACHINE DAMAGE AND/OR DANGER TO PERSONNEL

CONFIGURATION/MAINTENANCE MENU

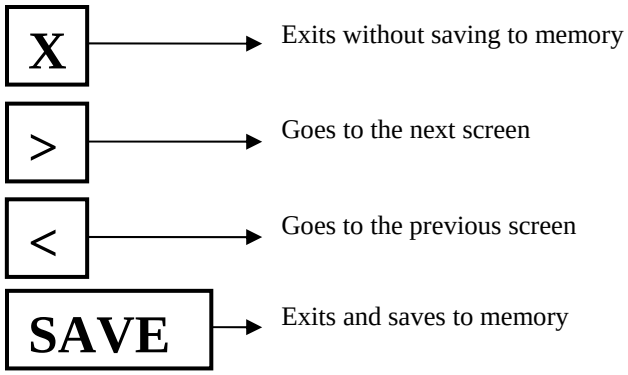


3.4 **Configuration - Timers**

CONFIGURATION - TIMERS



CONTROL BUTTONS



3.4.1 Gas Stab: 0-999.9 seconds – Delay before RF Power is applied after process gases are on..

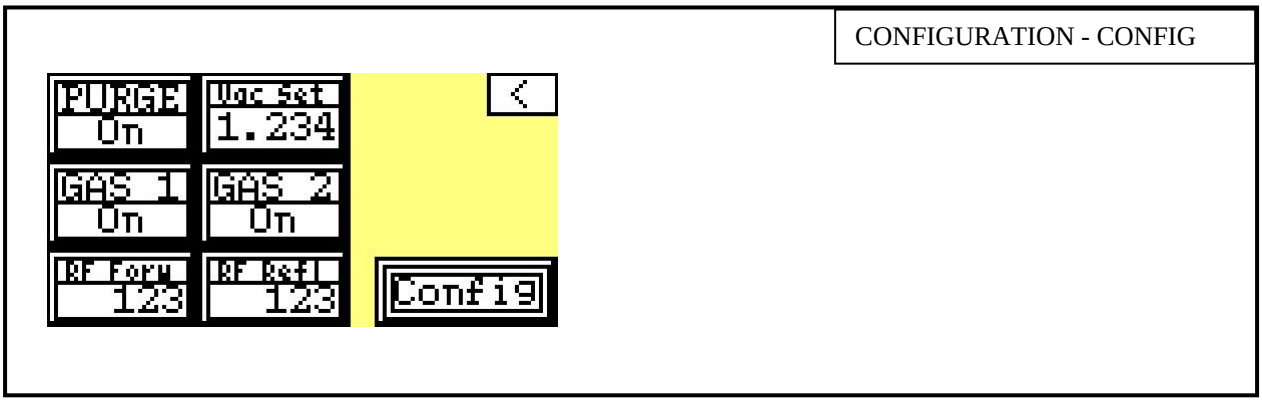
3.4.2 Atmo. Vent: 0-999.9 seconds – Time allowed for chamber to vent to atmosphere when “CYCLE STOP” is initiated.

3.4.3 Purge Vent: 0-999.9 seconds – Time allowed for purge air to be introduced in the chamber at the completion of a cycle.

3.4.4 Shut Down: 0-999.9 seconds – Delay before RF generator and Vacuum Pump AC power is Shut off when "SHUT DOWN" is initiated.

3.4.5 Vac Alarm: 0-999.9 seconds – Amount of time required to pump the system down to vacuum set point before initiating an alarm.

3.5 **Configuration – Config**



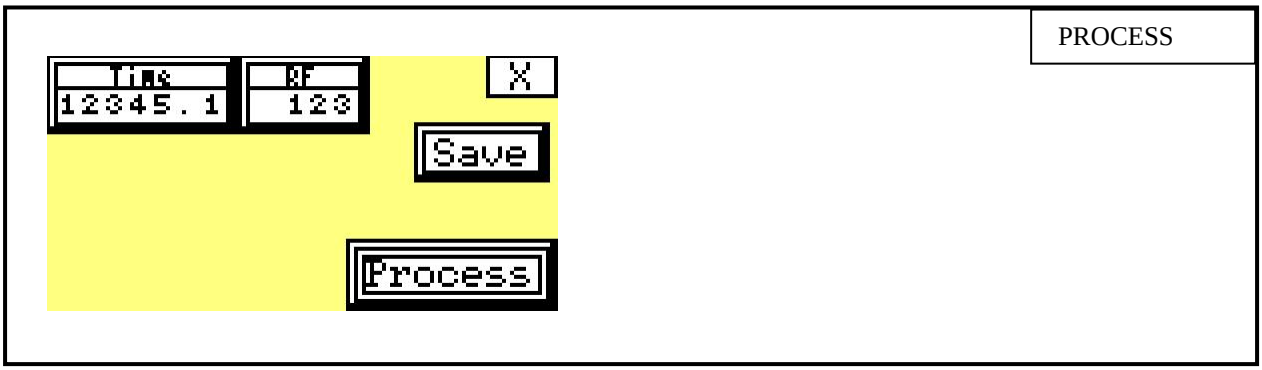
3.5.1 Purge Enable: (0 = OFF) (1= ON) – Disables/Enables the end of cycle chamber purge.

3.5.2 Vacuum Set: 0-1.000 Torr – Vacuum level that must be achieved prior to the start of the plasma process.

3.5.3 Gas1, 2 Enable: Enables gas channel 1 and 2 valves.

3.5.4 RF Forw Scale: 0-9999 Watts – Maximum RF forward power level of installed generator.

3.6 **Process**



3.6.1 Time: 0-99999.9 seconds. Sets the amount of plasma process time.

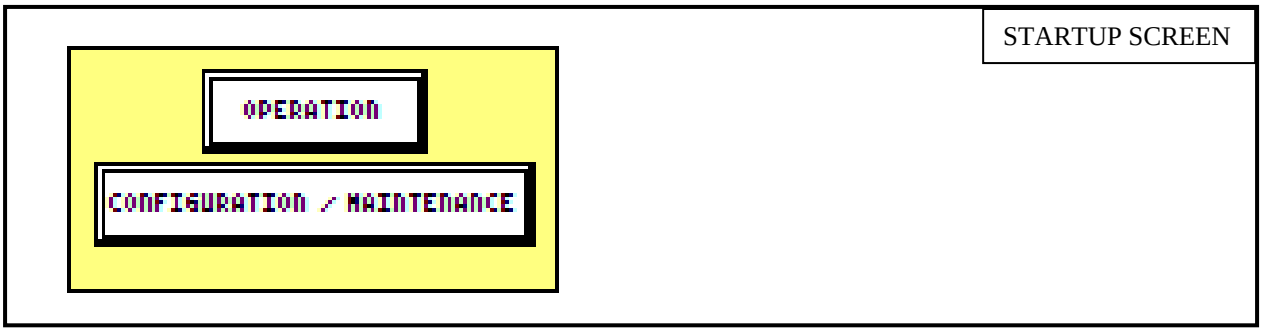
3.6.2 RF: Sets the RF power level of the process. The RF power level should not exceed the RF Forward power scale set in section 3.5.

4.0 SYSTEM OPERATION

4.1 At the gas sources, slowly open the gas cylinder valves (fully CCW). Sudden opening of the valves may damage the gas regulators. Maintain gas pressure at approximately 15 PSIG.

4.2 Set the POWER circuit breaker to the ON (Up) position. Refer to F**igure 2.**

4.3 Once the system is powered on the screen will display the Startup screen.



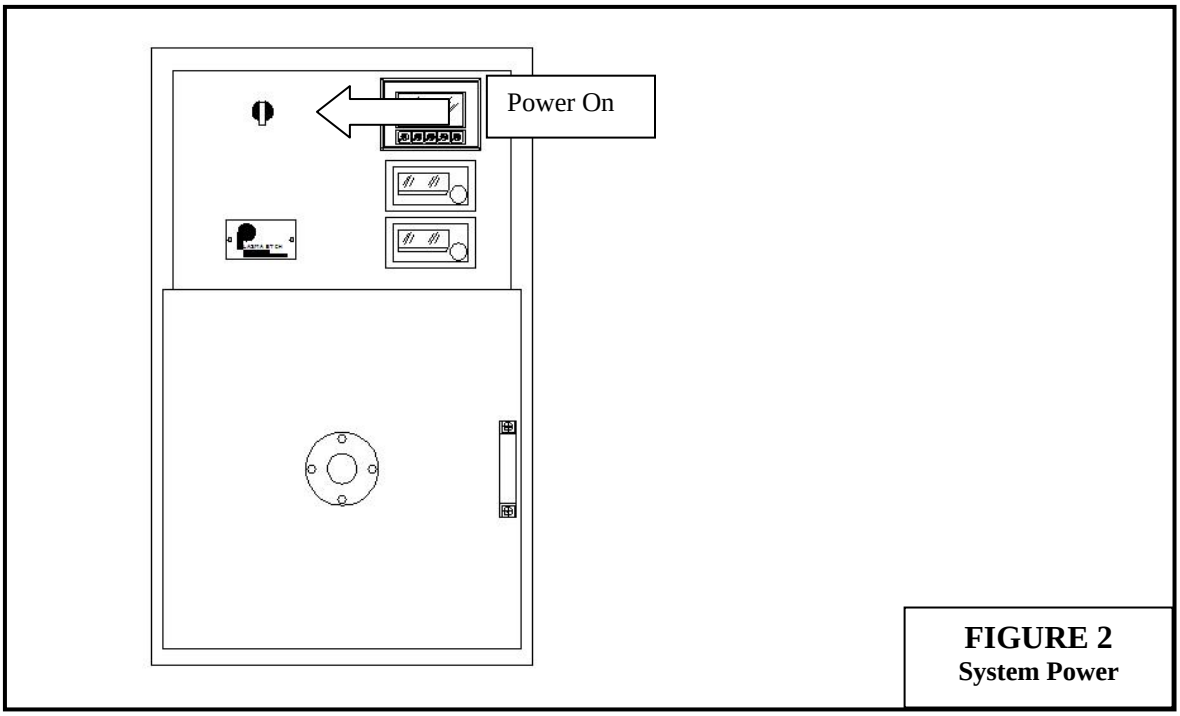
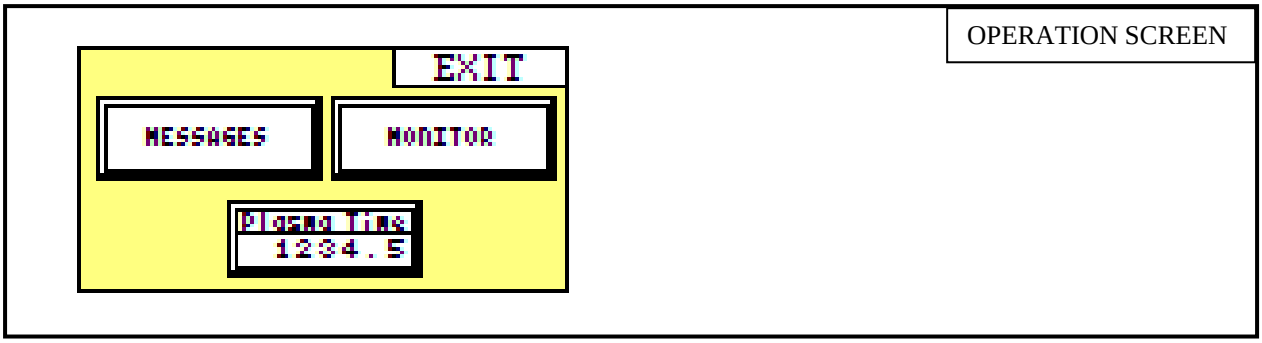
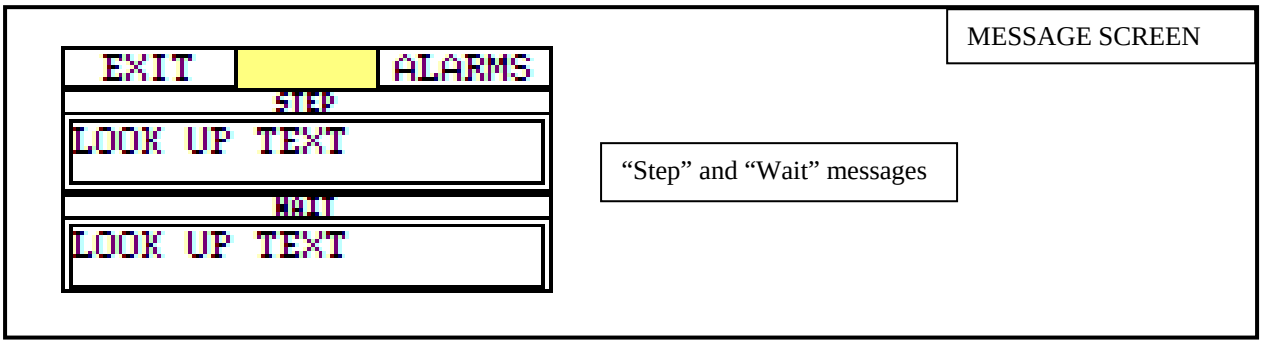


FIGURE 2
System Power

4.4 Touch the “Operation” button on the startup screen to enter the operation screen.



4.5 Touch the “Messages” button to observe the system messages. Two system messages are displayed. The first message is labeled “Step”, describing the current state of the machine, the second message labeled “Wait”, describes what event the system is waiting for to proceed to the next step.



4.6 The following system status message will be displayed when system is first powered on.

Step: HOME
Wait: POWER ON

4.7 The system is in the “Home” state and waiting for the SYSTEM POWER control button to be pushed. Refer to Figure 3 on page 8. Observe the following:

4.7.1 At this point the RF Generator and Vacuum Pump contactors will energize.
4.7.2 The SYSTEM POWER button light will be lit indicating power to the generator and pump.
4.7.3 A new system status message will be displayed.

Step: POWER ON
Wait: CLOSE DOOR

4.8 Load material to be processed. Close the chamber door. The following system status message will be displayed.

Step: POWER ON
Wait: CYCLE START

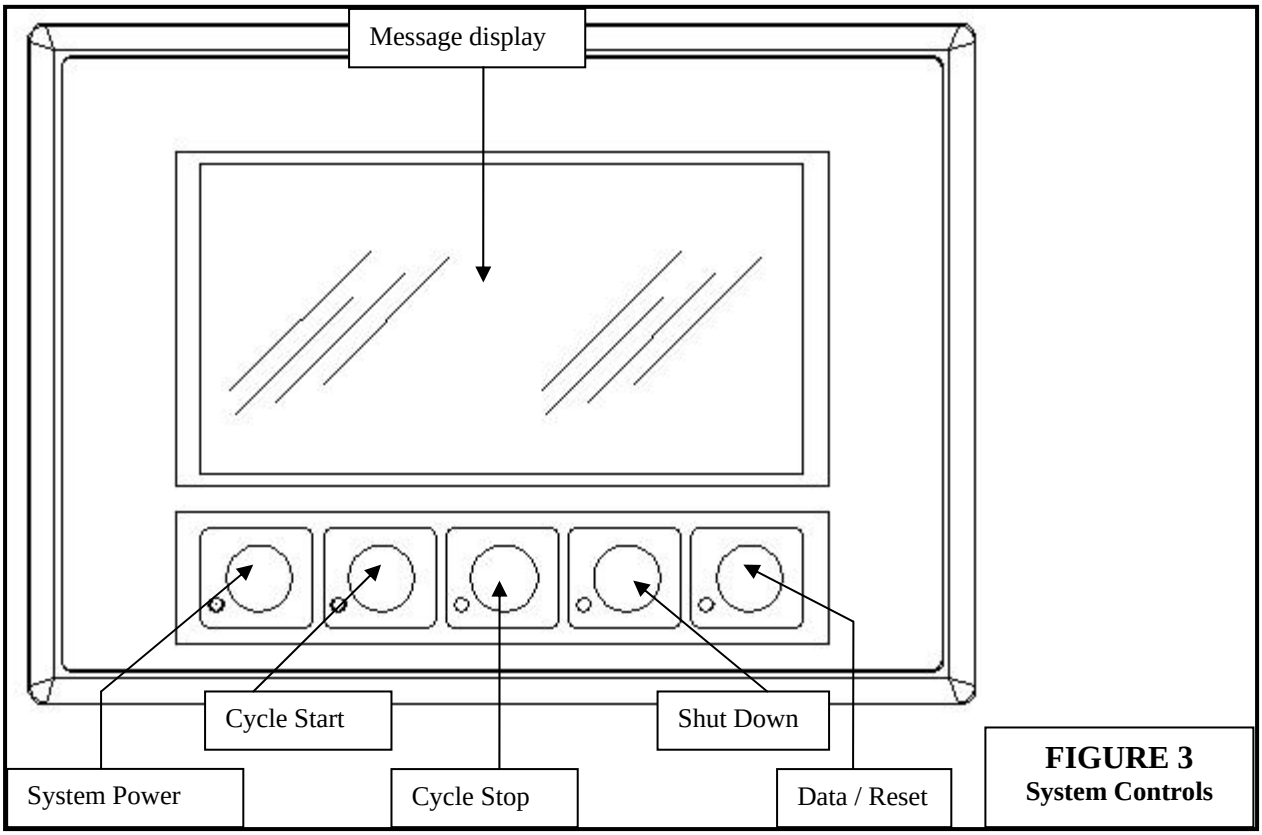


FIGURE 3
System Controls

WARNING: Use the chamber door handle when closing the chamber door to avoid a pinch point when chamber is evacuated.

4.9 Actuate the CYCLE START button to start the cycle. Refer to Figure 3. Observe the following:

4.9.1 The Blank-Off valve opens to start evacuating the chamber.

4.9.2 The chamber vacuum reading will be displayed. The following system status message will be displayed:

Step: PUMPDOWN
Wait: VACUUM SET: 0.000
ACTUAL: 0.000

4.9.3 The chamber will pump down to the setting programmed in the "Vac Set" parameter in the configuration section. Refer to section 3.5.

4.10 Once vacuum set point has been reached the following will occur:

4.10.1 The process gases will be introduced into the chamber. The active gas channels are set in the "Configuration-Process" section 3.7.

4.10.2 The gases will stabilize for a period defined in the "Gas Stab" setting in the configuration section. Refer to section 3.5. The following system status message will be displayed:

Step: STABILIZE GAS
Wait: SET: 000.0
ACTUAL: 000.0

4.11 After the process gases are stabilized RF power is enabled. The wattage is determined by the "RF Power" setting in the Process section. Refer to section 3.7. The following will be observed:

4.11.1 A plasma glow will occur in the chamber.

4.11.2 The plasma process is started and the plasma process timer will start. The process time is determined by the "Time" setting in the Process section. Refer to section 3.7.

4.11.3 The following system status messages are available for viewing:

Step: PLASMA TIME
Wait: SET: 00000.0
ACTUAL: 00000.0

Step: PLASMA (RF)

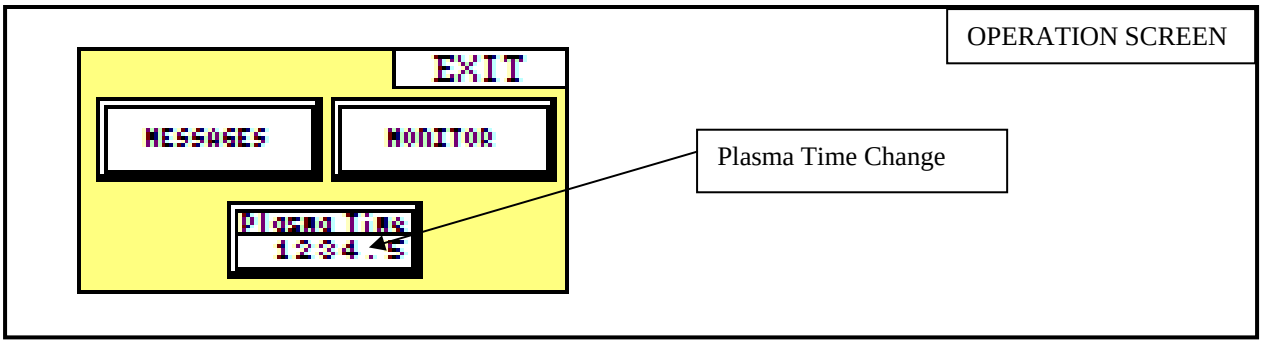
Wait: SET: 0000
ACTUAL: 000(F) 000(R)

Step: PLASMA (VACUUM)

Wait: TORR: 0.000

4.11.3.1 "Plasma Time" is the default message to be displayed. The other readings are iterated by actuating the DATA/RESET control button. Refer to Figure 3 on page 8.

4.11.3.2 The "Time" setting can be changed while in process. The value can be changed by pressing the "Plasma Time" entry icon.



NOTE: If the plasma time is changed here, the original Plasma Time and RF Power settings will be restored to what is stored in the "Process" settings at the completion of the cycle. Refer to section 3.7

4.12 Plasma timer complete (Chamber purge enabled). Observe the following:

NOTE: If vacuum chamber purge is disabled proceed to section 4.13. For information on the "purge enable" setting refer to section 3.5

4.12.1 RF power is disabled.
4.12.2 Plasma glow is extinguished.
4.12.3 Process gas valves are shut off.
4.12.4 Blank-Off valve is shut.
4.12.5 Chamber vent valve is opened for time set in "Purge Vent" timer. Refer to section 3.5. The following system status messages will be observed:

Step: VENT (PURGE)
Wait: SET: 000.0
ACTUAL: 000.0

4.12.6 At the completion of the timer, the chamber vent valve is shut and the blank-off valve is opened.
4.12.7 The chamber is pumped down to vacuum set point programmed in the "Vacuum Set" parameter in the configuration section. Refer to section 3.5. The following system status messages will be observed:

Step: EVACUATE (PURGE)
Wait: SET: 0.000
ACTUAL: 0.000

4.12.8 Proceed to step 4.14.

4.13 Plasma timer complete (Chamber purge disabled). Observe the following:

4.13.1 RF power is disabled.
4.13.2 Plasma glow is extinguished.
4.13.3 Process gas valves are shut off

4.14 Process is complete. Observe the following:

4.14.1 The following system status messages will be displayed:

Step: CYCLE COMPLETE
Wait: CYCLE STOP

4.15 Actuate the CYCLE STOP Button. The chamber is vented for a time programmed in the "Atmo Vent" parameter in the configuration section or until the chamber door is opened. Refer to section 3.5. The following system status messages will be observed:

Step: VENT (OPEN DOOR) **Wait: SET: 000.0** **ACTUAL: 000.0**

4.16 When chamber is vented, open the door to remove processed material. Proceed back to step 4.8.

5.0 SYSTEM SHUT DOWN

5.1 When CYCLE STOP has been actuated and the chamber vent has timed out or door is opened SHUTDOWN mode can be initiated.

5.2 Actuating the SHUTDOWN button initiates the SHUTDOWN timer. Refer to section 3.5. The following system status messages will be observed:

Step: SHUTDOWN **Wait: SET: 000.0** **ACTUAL: 000.0**

5.3 At the completion of the timer the following system status messages will be observed:

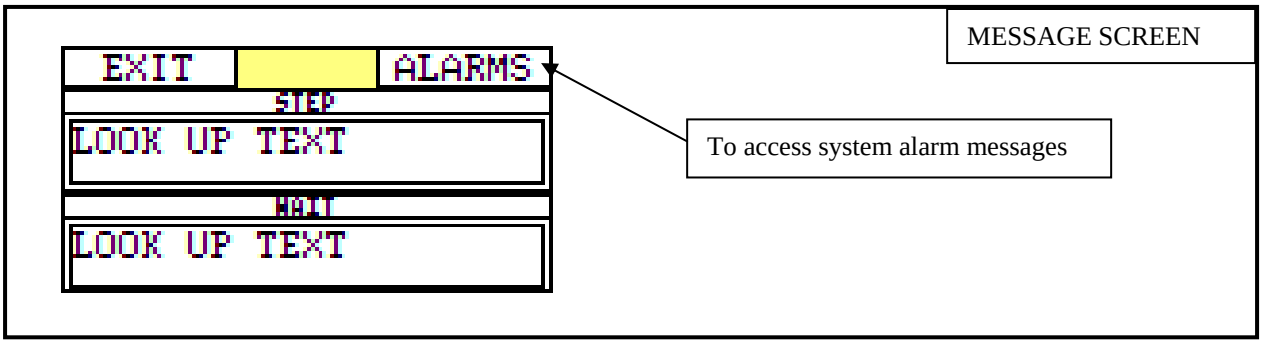
Step: HOME **Wait: POWER ON**

5.4 Set the POWER circuit breaker to the OFF (Down) position. Refer to Figure 2 on page 6.

6.0 SYSTEM ALARMS

6.1 Any activated system alarm will cause the touch screen message display background color to flash red. Refer to figure 3 on page 8.

6.2 A corresponding system alarm message will be displayed with the alarm. These messages can be viewed by pressing the “ALARMS” button on the message screen.



6.3 The following is a list of possible alarms:

6.3.1 Vacuum sensor voltage failure. Indicates a problem with the output voltage from the vacuum transducer. The system will initiate a CYCLE STOP command aborting any running process. The alarm requires a reset by actuating the DATA / RESET button.

ALARM TITLE:	**VACUUM READING**
ALARM DATA:	**READING: 0.000V**

6.3.2 Vacuum set point alarm. When the cycle is started and the vacuum doesn't reach the configured vacuum set point within the configured time the system will initiate a CYCLE STOP command aborting any running process. The alarm requires a reset by actuating the DATA / RESET button.

ALARM TITLE:	**VACUUM SET POINT**
ALARM DATA:	**SET POINT NOT ACHIEVED**

6.3.3 RF power low alarm. Indicates the RF power level read back has fallen below 10% of RF set point. This parameter is only checked during a plasma cycle.

ALARM TITLE:	**RF LOW**
ALARM DATA:	**WATTS - SET: 0000 ACTUAL: 0000**

6.3.4 RF power high alarm. Indicates the RF power level read back has risen above 10% of RF set point. This parameter is only checked during a plasma cycle.

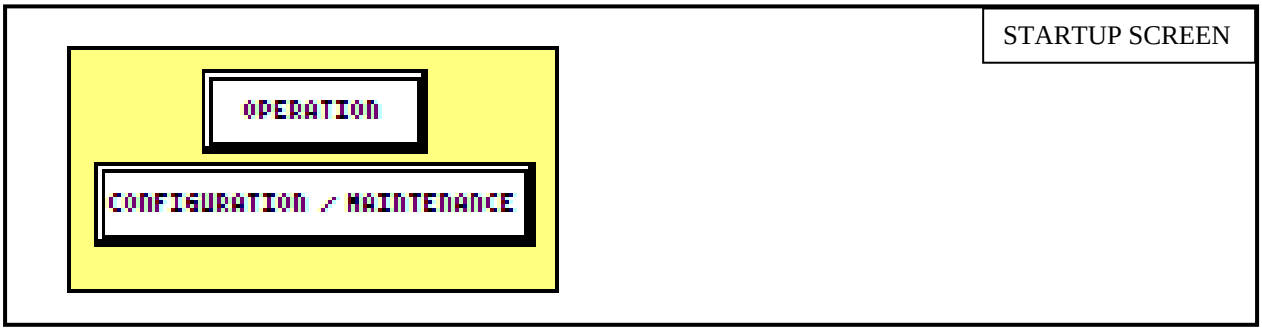
ALARM TITLE:	**RF HIGH**
ALARM DATA:	**WATTS - SET: 0000** **ACTUAL: 0000**

6.3.5 If there is no active alarm the alarm message will display:

ALARM TITLE:	**ALARM: NONE**
ALARM DATA:	**NO CURRENT ALARMS**

7.0 SYSTEM I/O

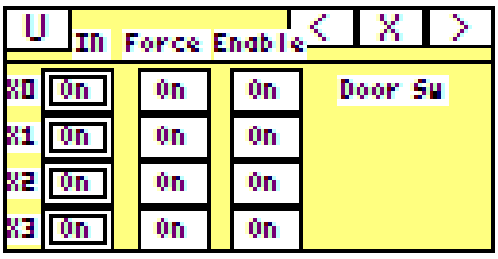
7.1 The I/O monitoring screen can be accessed b touching the “CONFIGURATION / MAINTENCE” button. A password is required to enter this menu. The password is set to “48” at the factory and cannot be changed.



*****CAUTION *****

ONLY AUTHORIZED AND QUALIFIED PERSONNEL SHOULD ACCESS THIS AREA. I/O FORCING CAN CAUSE MACHINE DAMAGE AND/OR DANGER TO PERSONNEL IF USED INCORRECTLY AS IT CAN BYPASS SAFETY FEATURES.

FIRST I/O SCREEN

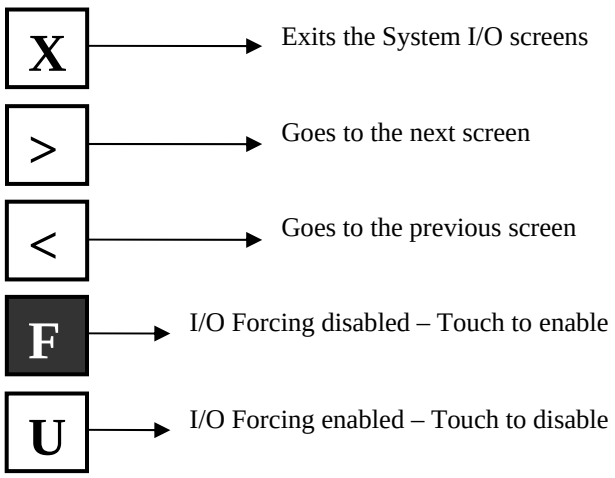


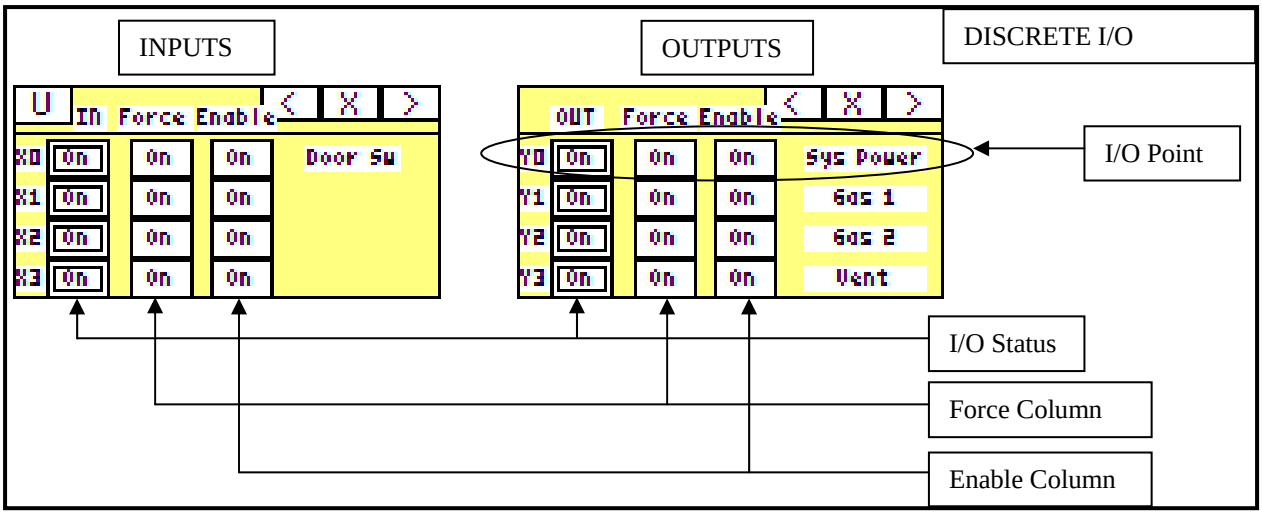
7.2 All system I/O can be monitored from this area. All control button functions are explained below.

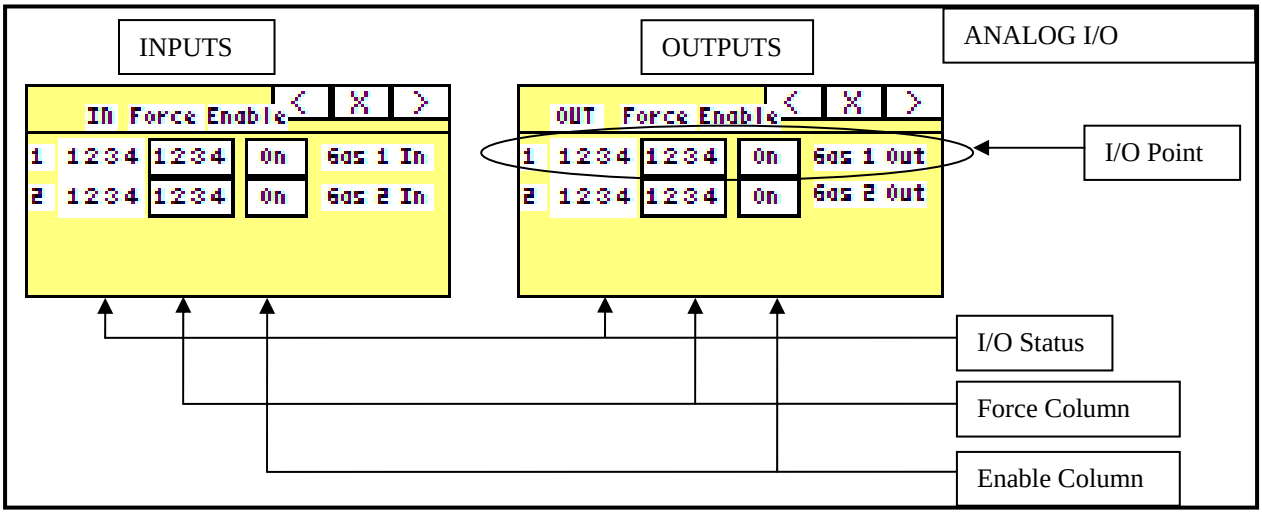
7.3 I/O forcing is achieved by selecting the appropriate I/O point and turning on the enable button. Once enabled the I/O point is now under forcing control. The force column is used to force the enabled I/O point.

7.3.1 Discrete I/O forcing is toggled On or Off.
7.3.2 Analog I/O takes a 12 bit BCD value (0-4095) representing minimum to maximum scale.

CONTROL BUTTONS







8.0 SYTEM OPERATING INSTRUCTIONS COMPLETE

1.0 GENERAL

1.1 This document defines general plasma processing methods and procedures.

2.0 PLASMA PROCESSING PARAMETERS

2.1 Specific plasma processing parameters are uniquely define by the application and should be determined experimentally.

2.2 RF Power

2.2.1 The maximum RF power capability of the Model PE100 with a 300 watt generator is 300 watts. It is recommended that the maximum RF power levels be limited to approximately 250 watts.

2.2.2 Higher RF power levels cause process temperatures to rise. Care must be taken that the RF power level does not cause excessive temperature rise in the materials being processed.

2.2.3 Excessive RF power levels do not contribute measurably to processing rates and should be avoided.

2.3 Gas Flow

2.3.1 Optimum processing results are obtained when gas flow rates are selected to maintain the vacuum level in the range of 0.15-0.30 Torr. Higher vacuum levels (higher pressures) will result in process non-uniformity.

2.3.2 Excessively high levels of gas flow do not contribute measurably to processing rates and should be avoided.

3.0 PLASMA PROCESSING METHODS & PROCEDURES COMPLETE

1.0 VACUUM SYSTEM (OXYGEN SERVICE)

1.1 General

1.1.1 Proper maintenance of the vacuum system is critical to system reliability. Adherence to recommended preventive maintenance procedures will greatly extend the life of the equipment.

1.2 Vacuum Pump Lubrication

WARNING:

This vacuum pump is configured for oxygen plasma service. Oxygen service plasma requires that only the specified vacuum pump oil be used. Substitution of other than the specified vacuum pump oil could result in an explosion.

Do not substitute or mix oil types.

Refer to Vacuum Pump Manual for proper oil.

1.2.1 The vacuum pump oil level should be checked daily while the vacuum pump is at operating temperature and the plasma system is under full vacuum.

1.2.2 The sight glass must be maintained at ¼ to ½ full.

1.2.3 While checking the oil level, also observe the oil color and clarity. The oil color must be colorless to amber and the oil clarity must be clear.

1.2.4 Reference the system manual, Section IX, “Recommended Spare Parts List”, for replacement oil type and refill capacity. The specified oil is stocked by Plasma Etch.

1.3 Vacuum Pump Oil Replacement

1.3.1 Because the system can be used for a variety of applications, it is recommended the oil be monitored periodically for clarity and color. If any significant changes are observed, it is recommended that he vacuum pump oil be drained and replaced.

1.3.2 Contaminated vacuum pump oil may be reclaimed for reuse. Contact Plasma Etch for information for oil reclamation.

1.4 Scheduled Vacuum Pump Maintenance

1.1.1 Reference the vacuum pump manual for recommended vacuum pump maintenance requirements.

2.0 VACUUM CHAMBER

2.1 Vacuum Chamber Seals

2.1.1 Monthly clean the vacuum chamber door O-ring gasket and mating flange surface. To clean, lightly wipe the O- ring and the flange surface with alcohol.

2.1.2 Inspect the O-ring for cuts, abrasions or normal wear. Replace as required.

2.1.3 No lubrication (vacuum grease, et.) of the O-ring is required or recommended.

2.1.4 Inspect the mating flange area for scratches. Minor scratches can cause significant vacuum leaks. Scratched areas can be resurfaced using an orbital sander and No. 320 grit or finer sand paper.

2.1.5 Reference the System Manual, Section V, “Recommended Spare Parts List”, for replacement O-ring part number. The specified O-ring is stocked by Plasma Etch.

2.2 Vacuum Chamber Cleaning

2.2.1 Every three months inspect the vacuum chamber internal surfaces for debris.

2.2.2 If cleaning is required, carefully blow out the vacuum chamber with compressed air.

3.0 CABINET FANS AND FILTERS

NOTE:

Frequency of inspection is dependant on the system environment.

3.1 For systems with external filters, inspect filters daily for obstructions and clean as necessary.

3.2 Inspect all cabinet fans for obstructions and excess dirt buildup. Clean as necessary.

DANGER:

LETHAL VOLTAGES PRESENT. OBSERVE ALL WARNINGS.

Only qualified personnel should access any components within equipment enclosures.

3.3 Open access cover to RF generator section to insure all air intakes are clear of obstructions.

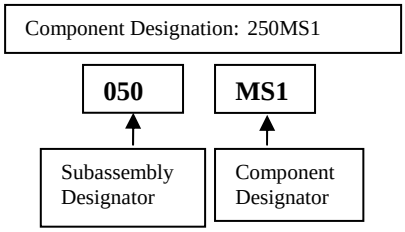
4.0 PREVENTIVE MAINTENANCE PROCEDURE COMPLETE

Troubleshooting Chart

Symptoms	Possible Cause	Remedy
RF power alarm	Excessive reflected power	Readjust matching network/transformer positions, Check for shorted electrodes or loose connection.
	Generator malfunction	Refer to RF generator manual, verify proper inputs to generator
Vacuum level increasing or not achieving set point	Chamber door seal faulty	Inspect and replace as necessary
	View port o-ring faulty	Inspect and replace as necessary
	Chamber vent valve or blank-off valve faulty	Verify proper power input and replace as necessary
	Vacuum pump system faulty	Blank off Vacuum system to verify vacuum level (< 50mtorr), refer to Vacuum system manual
Vacuum Reading error	Recorder output on vacuum gauge is < 50mv.	Repair bad connection on recorder output connection on rear of vacuum gauge.
System process results degraded	Bad vacuum.	Verify system vacuum.
	Chamber and/or electrodes contaminated	Inspect chamber and electrodes, clean as necessary
PLC Communication Timeout error	Bad communication cable between controller and PLC	Fix or replace cable connection.
	PLC not in RUN mode	Place PLC in RUN mode

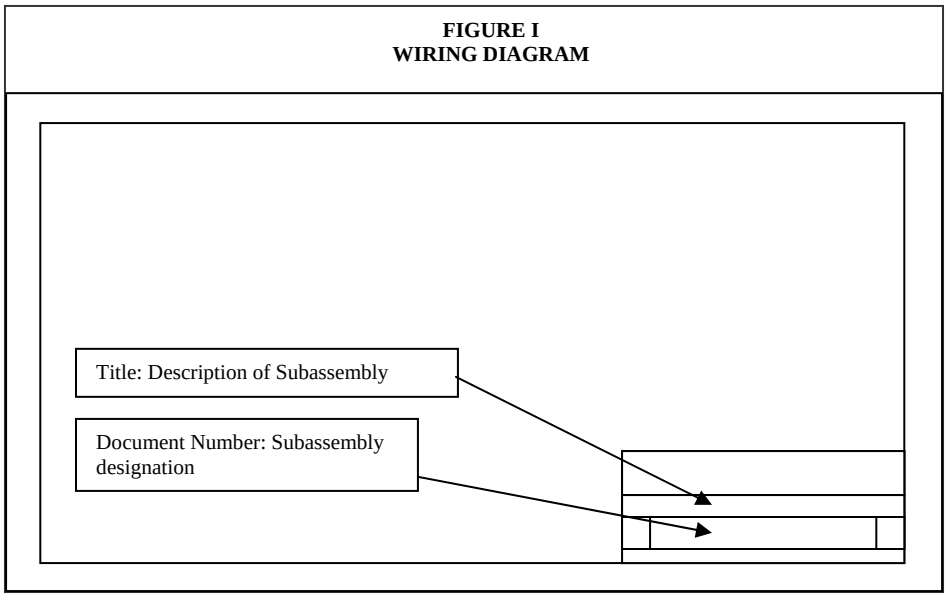
System Subassembly Locations

The system is organized in various subassemblies. Bill of Materials and spare parts list will be organized using the subassembly numbers. Below is an example of a component designation.



Wiring diagrams will also follow the same component designation convention. **(Refer to Figure I)**

FIGURE I
WIRING DIAGRAM



The table below describes the various subassemblies. **(Refer to the layout section of the schematics in section X)**

Assembly Designation	Assembly Description
020	Control Panel Assembly
030	Gas Control Assembly
050	AC Power Control and PLC Assembly
060	Vacuum Chamber Assembly
070	RF Generator Assembly
330	Plumbing Distribution

Bill of Materials

Model # PE-100-Touch

Company GE

Order ID 615

REF_SYMBOL	*PE STOCK #*	*DESCRIPTION*	*QTY*
020	**Control Panel Assembly**		
Circiut Breaker			
CB01			
	PE- 542	Circuit Breaker, SPST, 250VAC, 60HZ, 15A	1
Controllers			
TS01			
	PE- 1400	Cable, Micro-Graphic, RJ12, DL05\06\205	1
	PE- 1803	Touch Panel, 3", STN White	1

REF_SYMBOL	PE STOCK #	DESCRIPTION	QTY
030	**Gas Control Assembly**		
Mass Flow Controller			
MFC01			
	PE- 1701	Mass flow controller, w/valve & battery, 500 sccm, 02	1
MFC02			
	PE- 1727	Mass flow controller, w/valve & battery, 500 sccm, Argon	1
Plumbing			
MISC			
	PE- 1234	Check Valve, 1/8"NPT, Female In, Male Out	2
Valve			
V01			
	PE- 891	Solenoid Valve, N/C, 1/8", Brass	1
V02			
	PE- 891	Solenoid Valve, N/C, 1/8", Brass	1

REF_SYMBOL	PE STOCK #	DESCRIPTION	QTY
050	**AC Power & PLC Assembly**		
Contactor			
K01			
	PE- 956	Contactor, 120/230VAC, 3 Phase, 120VAC Coil, 5 HP/9A	1
Controllers			
PC01			
	PE- 1303	DL05, 8 DC Input, 6 (AC/DC) Relay Output	1
	PE- 1404	4 Point Analog in/2 Point Analog out (0-5V/0-10V), DL05,06	1
Fan			
B01			
	PE- 560	Finger Guard, 5" Square (PE-100 & PE-200)	1
	PE- 563	Fan, 88 CFM, 5" Square (PE-100 & PE-200)	1
Fuse			
F01			
	PE- 257	Fuse, Fast-Acting, 3AG, 1.0A, 250V	1
Motor Starters			
MS01			
	PE- 956	Contactor, 120/230VAC, 3 Phase, 120VAC Coil, 5 HP/9A	1
	PE- 969	Overload Relay, 7.0-10.0A	1
Plugs/Connectors			
J02			
	PE- 1107	Receptacle, single, 15A-125V, NEMA 5-15	1
P01			
	PE- 1359	Power Cord, 14/3, 15A, NEMA 5-15 Plug, Black\White\Grn	1
Power Supply			
PS01			
	PE- 103	Power Supply, +24VDC @ 1.2A (PE-100 & PE-200)	1
Relay			
K02			
	PE- 538	Socket, Relay	1
	PE- 539	Mounting Strip, Relay	1
	PE- 540	Relay, 4PDT, 120VAC Coil	1
Terminal Block			
TB01			
	PE- 264	Terminal Block	1
	PE- 268	Marker Strip, Terminal Block	1
TB02			
	PE- 264	Terminal Block	1
	PE- 268	Marker Strip, Terminal Block	1
TB03			
	PE- 235	Terminal Block	1
	PE- 241	Marker Strip, Terminal Block	1

REF_SYMBOL	PE STOCK #	DESCRIPTION	QTY
050		**AC Power & PLC Assembly**	
Vacuum Pump			
VP01			
	PE- 1354	Vacuum Pump, RV12, 8CFM, 1 Ph 50/60Hz 110/240V	1
	PE- 1355	Oil Mist Filter Assembly, EMF20	1
	PE- 1356	Gas Ballast Oil Return Kit (RV12)	1

REF_SYMBOL	PE STOCK #	DESCRIPTION	QTY
060	**Vacuum Chamber Assembly**		
Chamber			
CHAMB01			
	PE- 298	Viewport, Pyrex, 2" Dia. X 1/4" Thk. (PE-100, -200 & -1000)	1
	PE- 1358	Handle, Thermoplastic, Black	1
Meter			
M01			
	PE- 1099	Thermocouple Vacuum Gauge, 1 Torr	1
	PE- 1571	Tee, 1/8", pipe, brass	1
Miscellaneous			
MISC			
	PE- 467	O-Ring, Blank Off Valve (BT-1) (Varian Valve), (New PE-100 View port)	1
Switch			
S01			
	PE- 159	Switch, Momentary, SPST (Door Open)	1
Valve			
V01			
	PE- 66	Solenoid Valve, N/C, 1/8", Brass	1
	PE- 1596	Nipple, 1/8" x 3", brass	1
V02			
	PE- 1393	Valve, Blank-Off	1

REF_SYMBOL	PE STOCK #	DESCRIPTION	QTY
070	**RF Generator Assembly**		
Generator			
PS01			
	PE- 1130	300 Watt Generator, 750VA Max (4A @ 208V)	1
Matching Network			
MN01			
	PE- 901	600 W Matching Network w/ Controller (N female)	1

REF_SYMBOL	PE STOCK #	DESCRIPTION	QTY
500	**Consumables**		
Miscellaneous			
MISC			
	PE- 1418	O-Ring, Chamber Door (PE100)	1
Vacuum Pump			
VP01			
	PE- 933	Vacuum Pump Oil (per kg)	2

Recommended Spare Parts List

Model # PE-100-Touch

Company GE

Order ID 615

	PE STOCK #	DESCRIPTION	USAGE
020		**Control Panel Assembly**	
	PE- 542	Circuit Breaker, SPST, 250VAC, 60HZ, 15A	1
030		**Gas Control Assembly**	
	PE- 891	Solenoid Valve, N/C, 1/8", Brass	2
050		**AC Power & PLC Assembly**	
	PE- 103	Power Supply, +24VDC @ 1.2A (PE-100 & PE-200)	1
	PE- 257	Fuse, Fast-Acting, 3AG, 1.0A, 250V	1
	PE- 540	Relay, 4PDT, 120VAC Coil	1
	PE- 560	Finger Guard, 5" Square (PE-100 & PE-200)	1
060		**Vacuum Chamber Assembly**	
	PE- 66	Solenoid Valve, N/C, 1/8", Brass	1
	PE- 159	Switch, Momentary, SPST (Door Open)	1
	PE- 298	Viewport, Pyrex, 2" Dia. X 1/4" Thk. (PE-100, -200 & -1000)	1
	PE- 467	O-Ring, Blank Off Valve (BT-1) (Varian Valve), (New PE-100 View port)	1
500		**Consumables**	
	PE- 933	Vacuum Pump Oil (per kg)	2
	PE- 1418	O-Ring, Chamber Door (PE100)	1

FILE	COMMENTS	
COVER		
PE1020-1	Control Panel	
PE1030-1	Gas Board	2
PE1050-1	AC POWER & PLC ASSY	
PE1050-2	AC POWER & PLC ASSY	
PE1060-1	Chamber Assy	
PE1070-1	RF Assy	1
PE1330-1	Plumbing Dist.	

PE-100

NOTES:
STANDARD (115 VAC)

1 - SEREN L301 or R301
2 - NEW BO VALVE, AIR OPERATED
3 - NO MFC'S, DL05

Door switch moved to 0505TB2

4 in 2 out analog

Water cooled electrode Plumbing option

PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706

TITLE
Cover Sheet

DOCUMENT NUMBER
PE100-Cover

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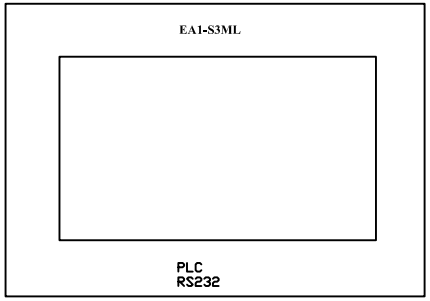
(115 VAC LINE)

(050TB1-1)

CB1

(115 VAC SWITCHED)

(050TB1-2)



PLC
RS232

(050PC1-PORT 1)

PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706

TITLE
Control Panel Assy

DOCUMENT NUMBER
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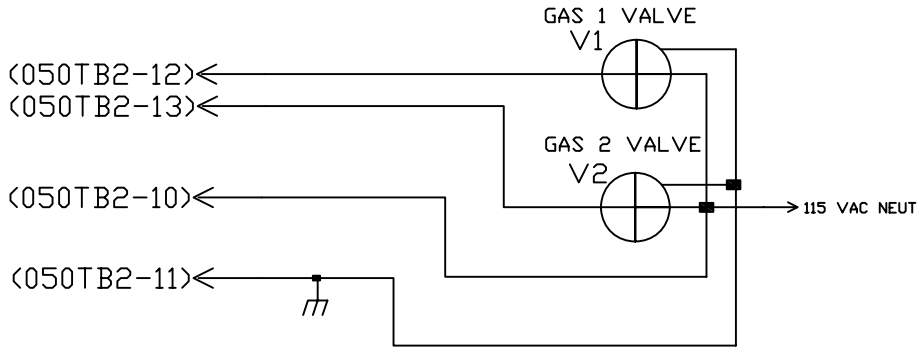

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Carson City, NV 89706

TITLE
Gas Control Assy

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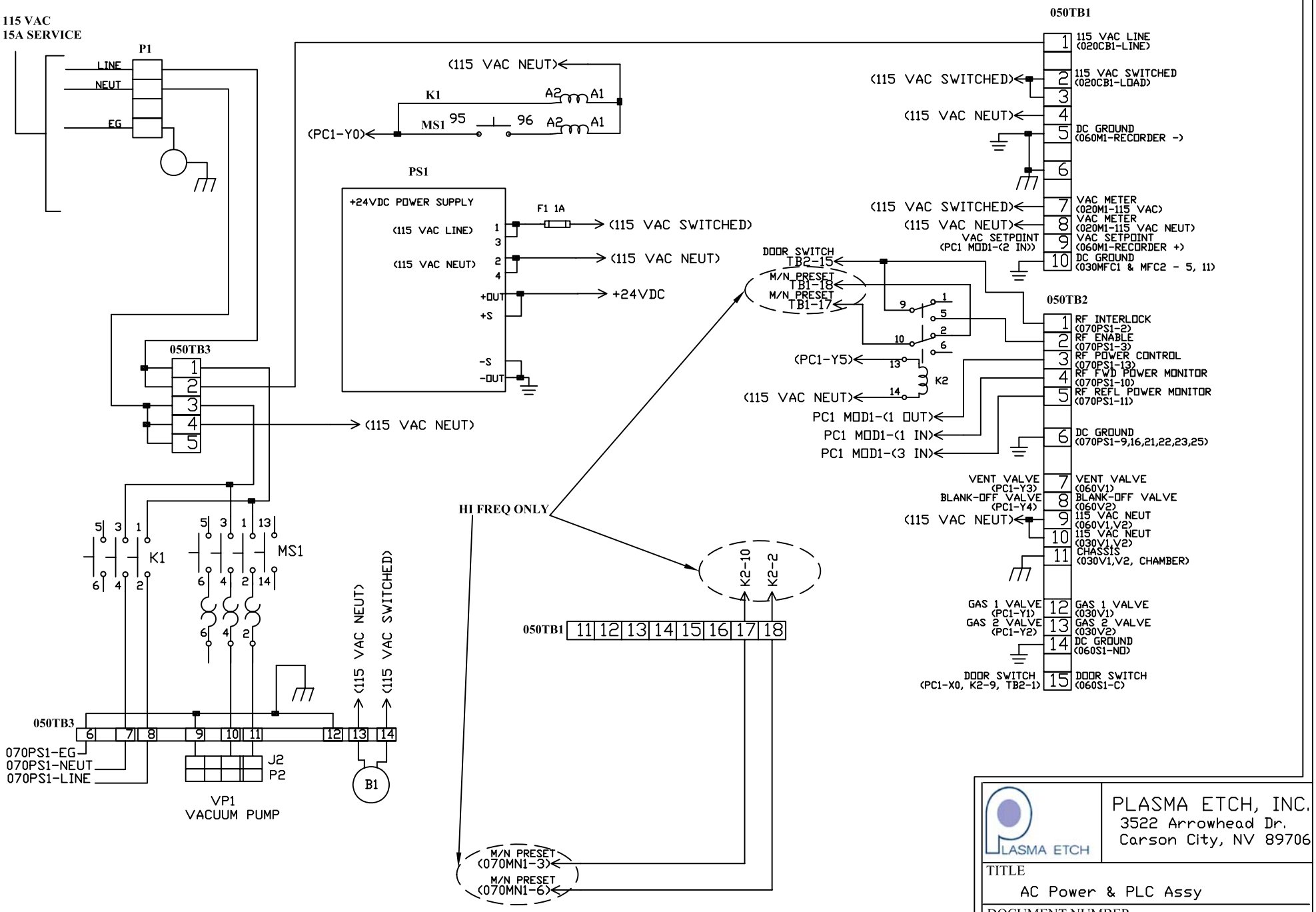

PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706

TITLE
AC Power & PLC Assy

DOCUMENT NUMBER
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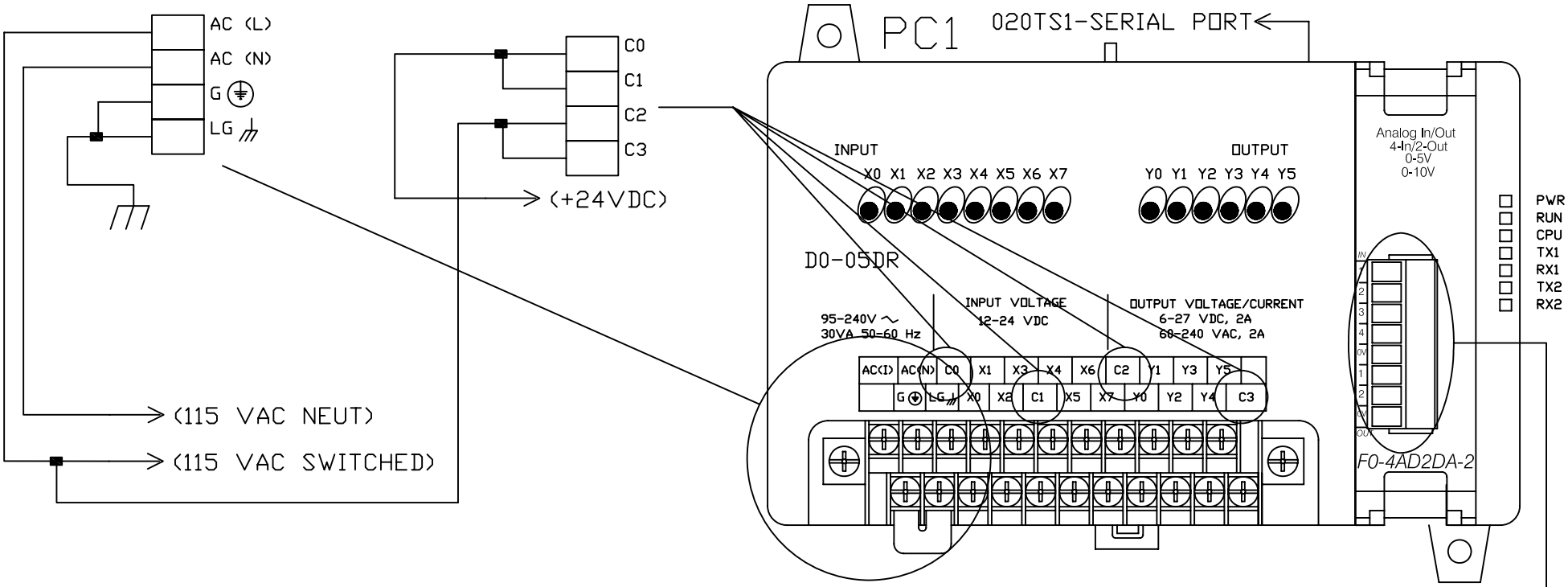

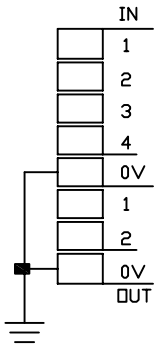

IO ASSIGNMENTS		
I/0 CODE	FROM	DESCRIPTION
X0	050TB2-15	DOOR SWITCH
X1		
X2		
X3		
X4		
X5		
X6		
X7		
Y0	MS1-95/K1-A2	SYSTEM POWER
Y1	050TB2-12	GAS 1 CHAN 1 SELECT VALVE
Y2	050TB2-13	GAS 2 CHAN 2 SELECT VALVE
Y3	050TB2-7	CHAMBER VENT VALVE
Y4	050TB2-8	BLANK OFF VALVE
Y5	050K2-13	RF ON

IO ASSIGNMENTS (MODULE 1)		
I/0 CODE	FROM	DESCRIPTION
1 IN	050TB2-4	RF FORWARD POWER MONITOR
2 IN	050TB1-9	VACUUM MONITOR
3 IN	050TB2-5	RF REFLECTED POWER MONITOR
4 IN		
1 OUT	050TB2-3	RF POWER CONTROL
2 OUT		

PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706

TITLE
AC Power & PLC Assy

DOCUMENT NUMBER
PE100-050

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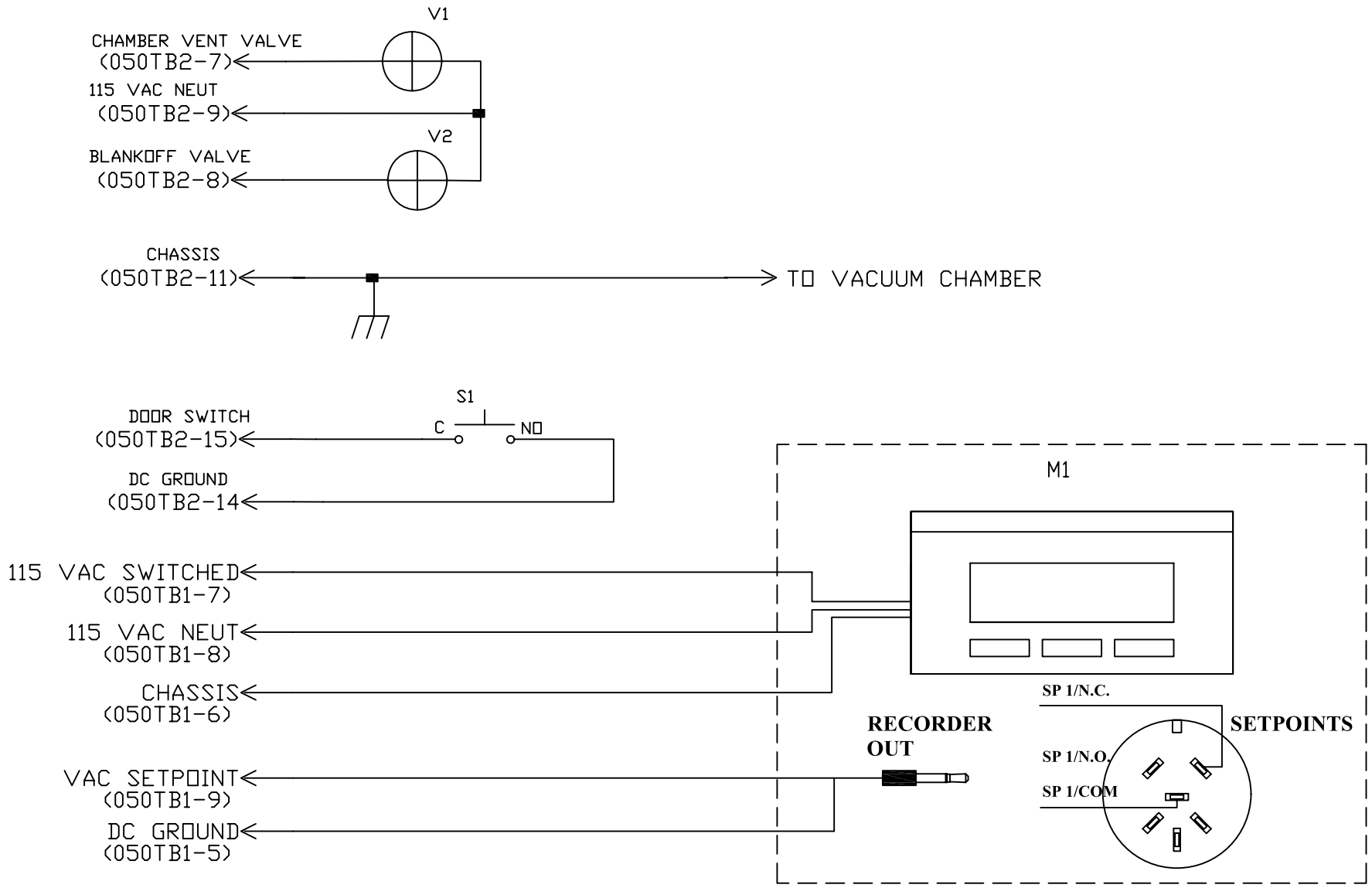

PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706

TITLE
Vacuum Chamber Assy

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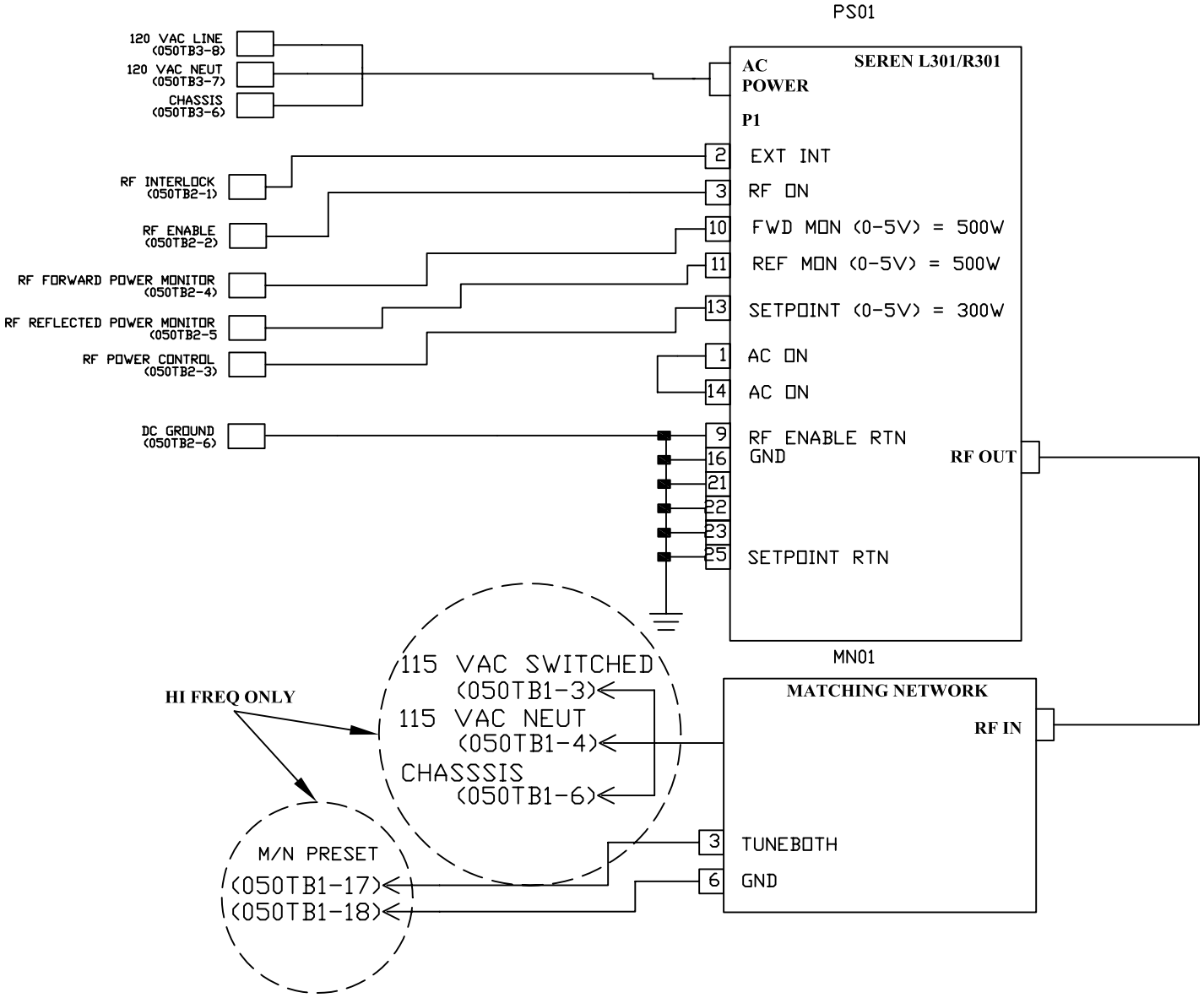

PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706

TITLE
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DOCUMENT NUMBER
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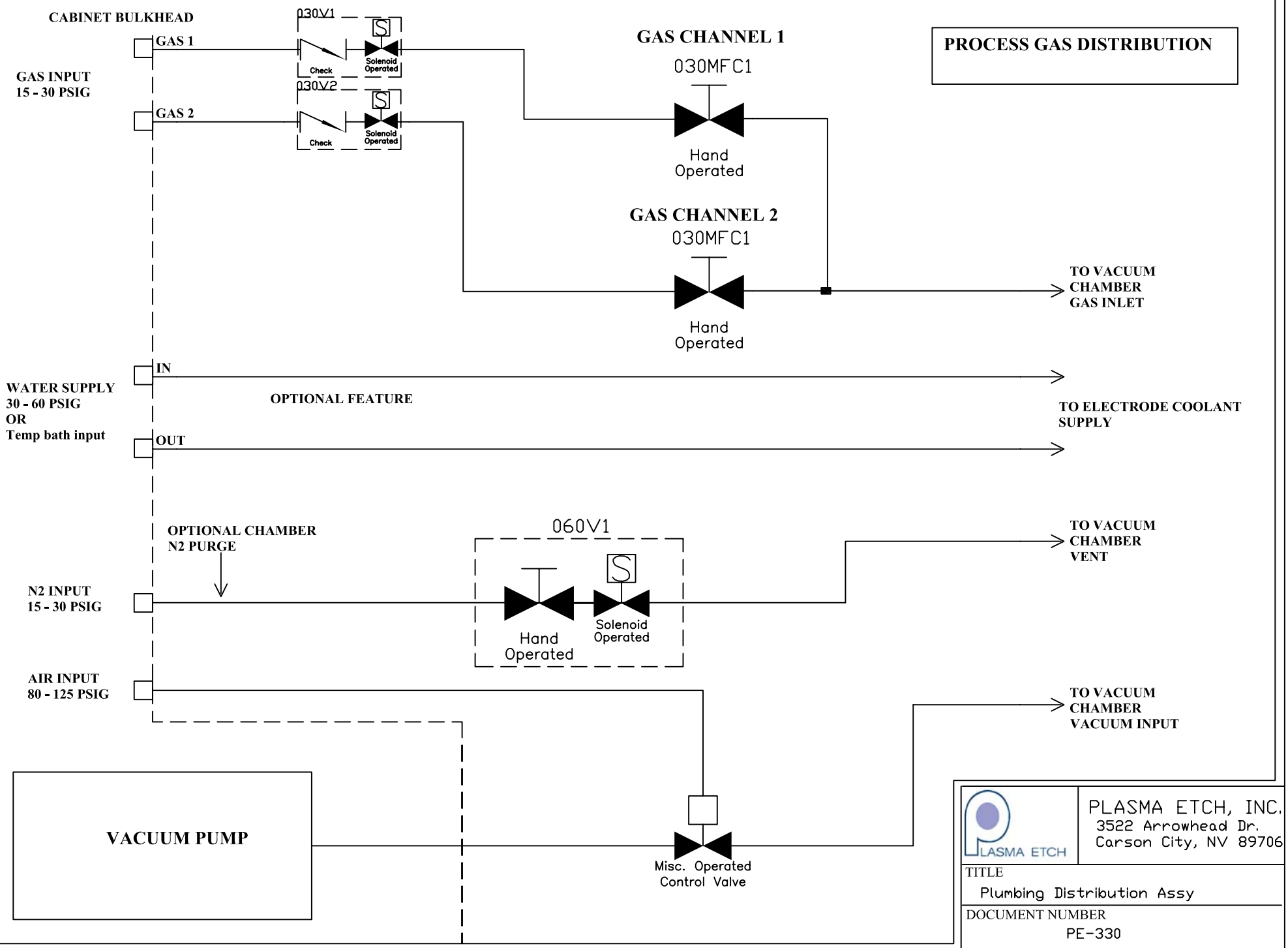
CABINET BULKHEAD
GAS 1
GAS 2
GAS INPUT
15 - 30 PSIG
030V1
030V2
Check
Solenoid Operated
GAS CHANNEL 1
030MFC1
Hand Operated
GAS CHANNEL 2
030MFC1
Hand Operated
PROCESS GAS DISTRIBUTION
TO VACUUM CHAMBER GAS INLET
WATER SUPPLY
30 - 60 PSIG
OR
Temp bath input
IN
OUT
OPTIONAL FEATURE
TO ELECTRODE COOLANT SUPPLY
OPTIONAL CHAMBER
N2 PURGE
N2 INPUT
15 - 30 PSIG
060V1
Hand Operated
Solenoid Operated
TO VACUUM CHAMBER VENT
AIR INPUT
80 - 125 PSIG
TO VACUUM CHAMBER VACUUM INPUT
VACUUM PUMP
Misc. Operated Control Valve
PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706
TITLE
Plumbing Distribution Assy
DOCUMENT NUMBER
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Plasma Etch
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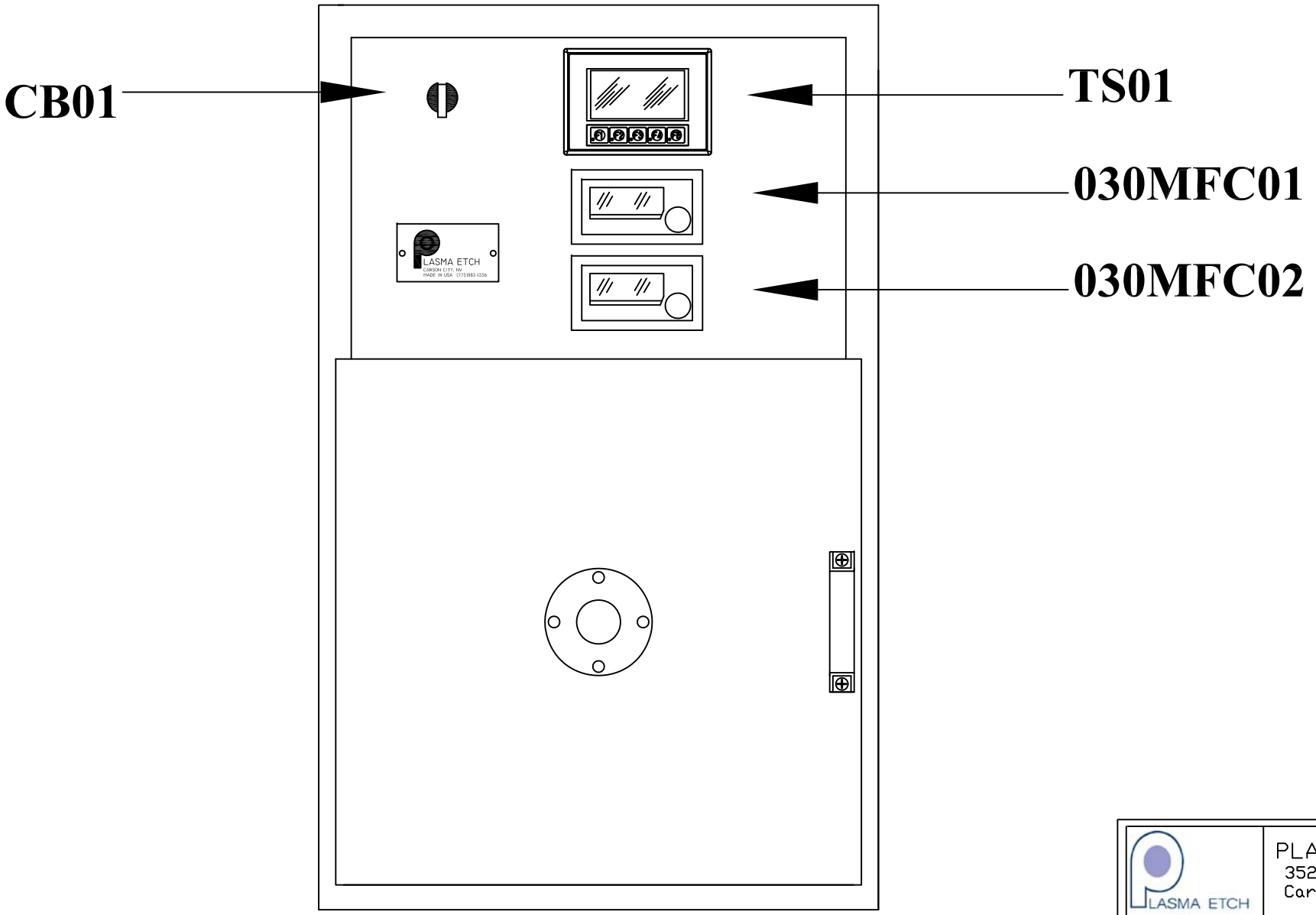

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Carson City, NV 89706

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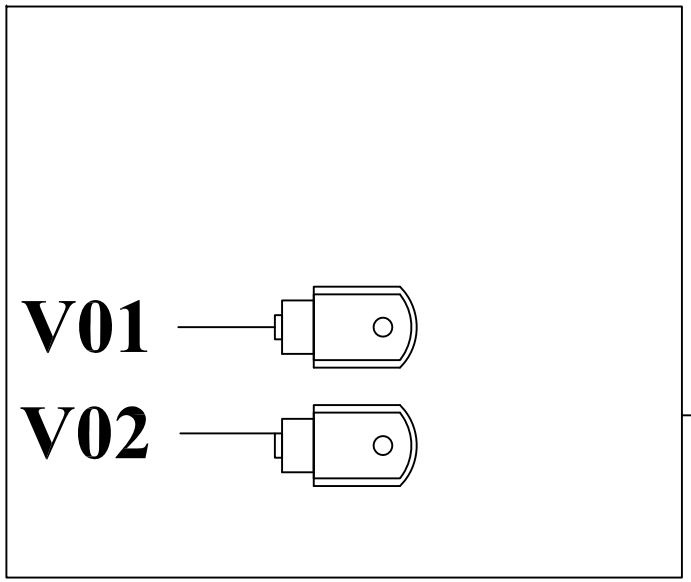

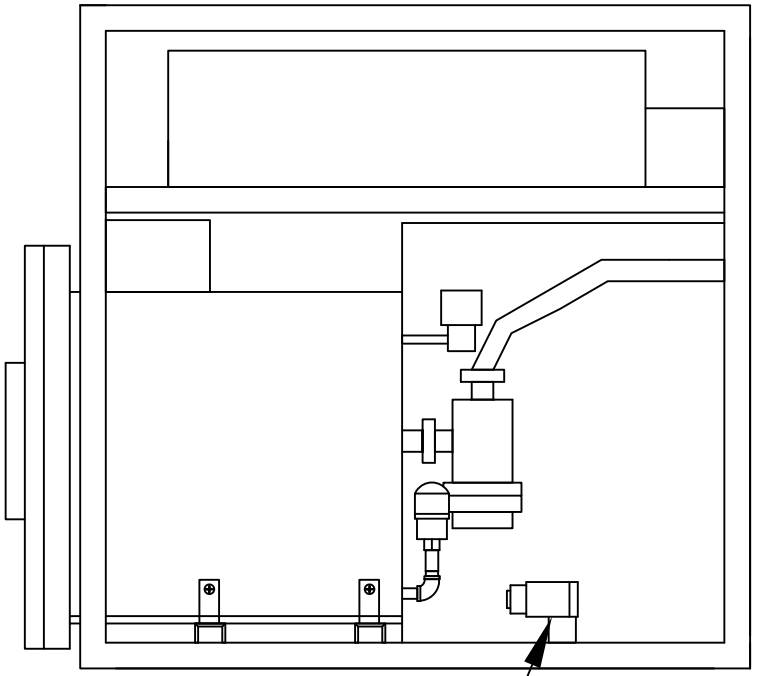

PLASMA ETCH, INC.
3522 Arrowhead Dr.
Carson City, NV 89706

TITLE
030 Layout

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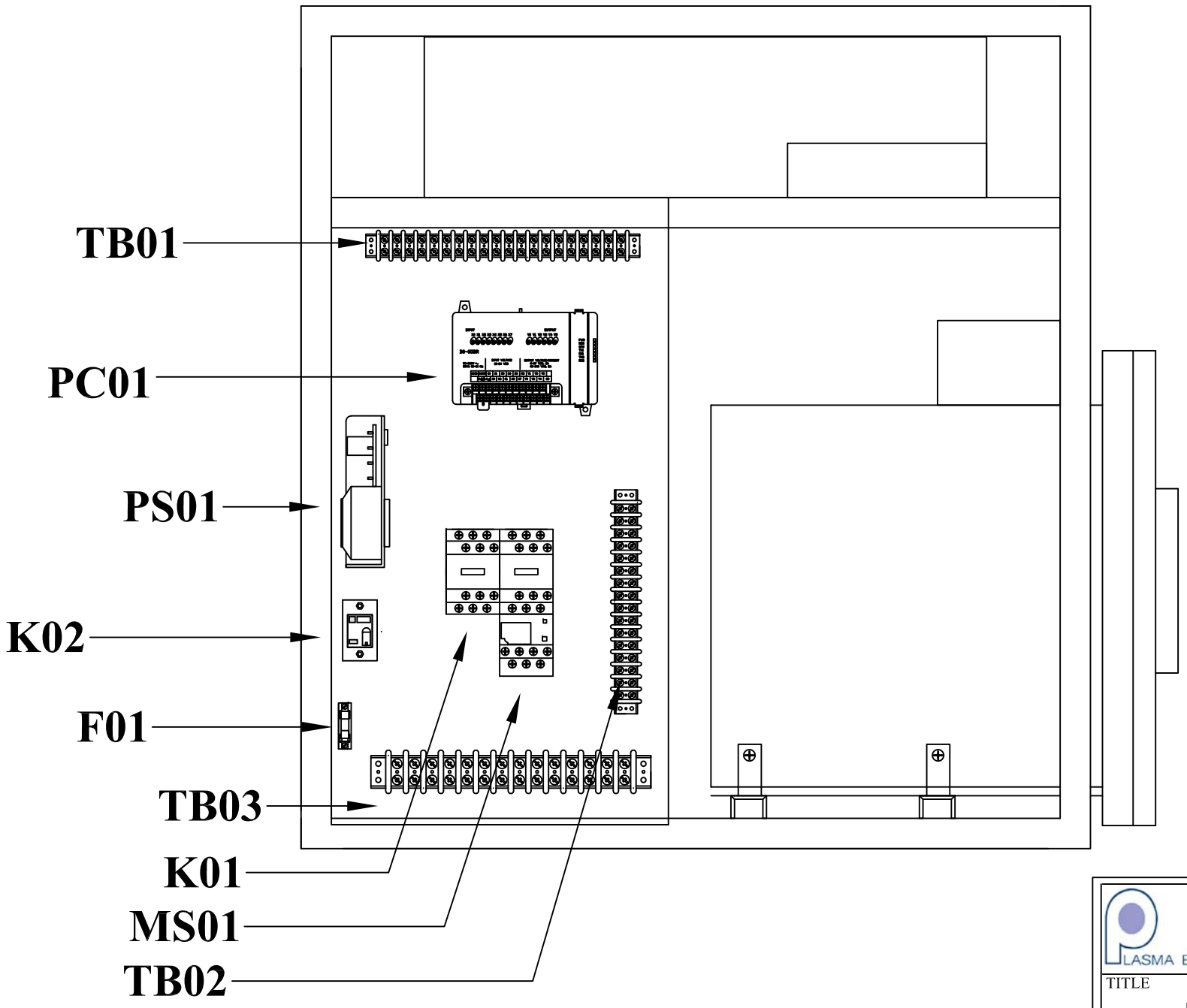

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Carson City, NV 89706

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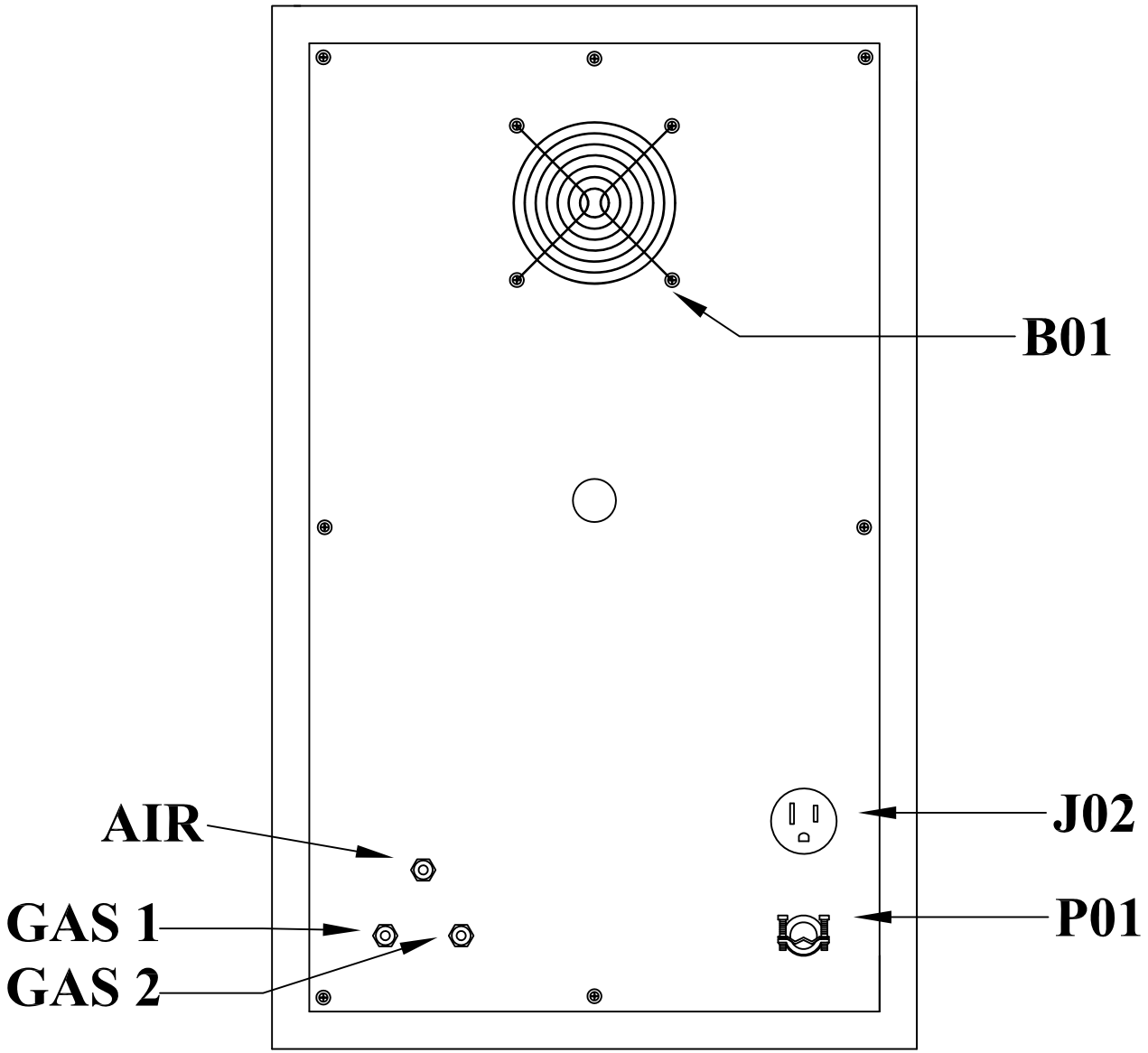

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Carson City, NV 89706

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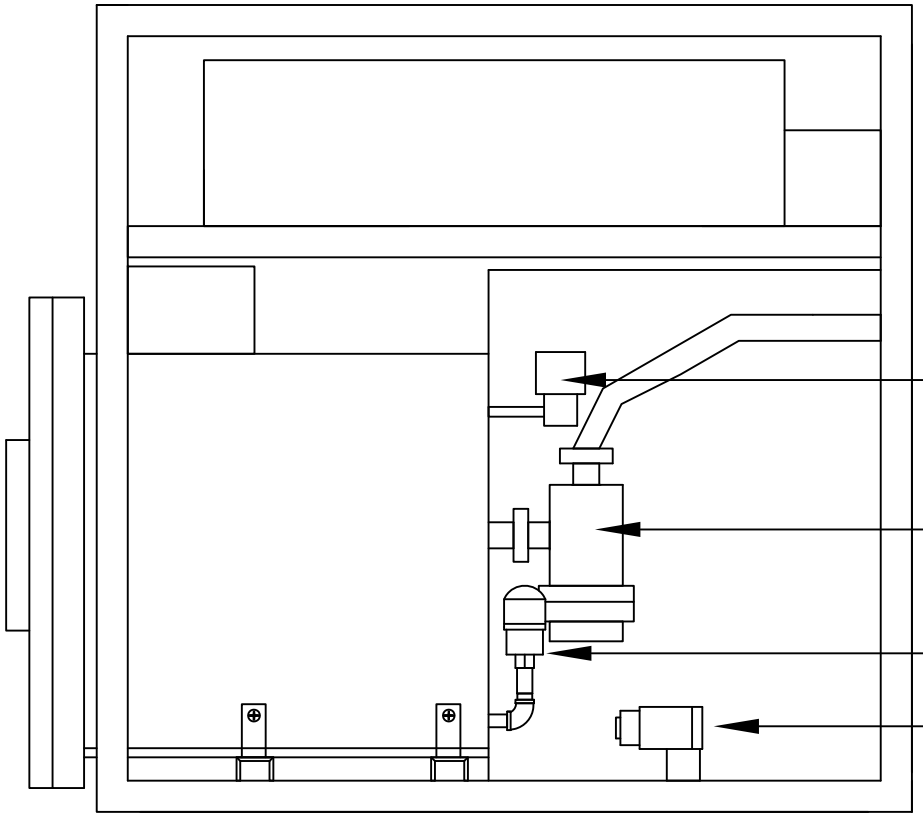

PLASMA ETCH, INC.
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Carson City, NV 89706

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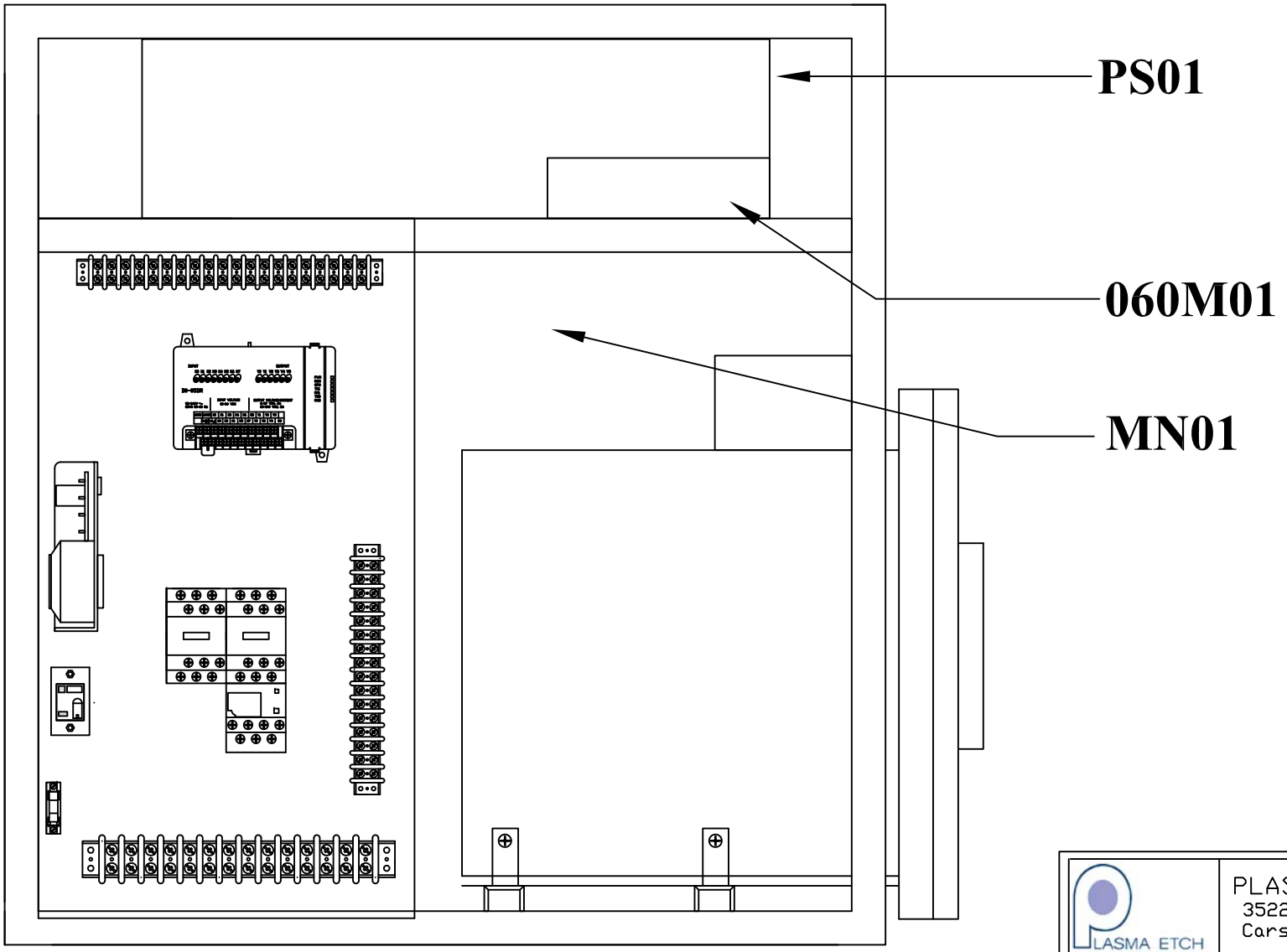

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Carson City, NV 89706

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