FACILITY REQUIREMENTS 2512HV-40CFX

MC MACHINERY SYSTEMS, INC
A COMPANY OF MITSUBISHI CORPORATION
LASER DIVISION

1500 MICHAEL DRIVE
WOOD DALE IL, 60191
PH. 630-616-5900
FAX. 630-616-4066

Company Contacts

-If you have questions concerning this document, delivery dates, install dates, where your order is at in the credit process, or general questions concerning your order. please call.

Michael T. Brown
Install Supervisor
Phone 630-616-5940
Fax: 630-616-4066

Mark Johnson
Manager, Installation Group
Phone: 630-616-5940
Fax: 630-616-4066

-If you have any questions concerning where your order is at in the credit process, please call the credit department.

Jim Nickel, CBA
Credit Analyst
Phone: 630-860-4218
Fax: 630-860-4718

If you have any questions concerning setting up training classes or what is covered during training. Please call the training department.

Robert Gross
Manager, Laser Training Group &
5-Axis Project Manager
Phone: 630-616-2980
Fax: 630-860-7824

Richard A. Caron
Sr. Manager, Support Group
Customer Service & Support
Phone: 630-616-5950
Fax: 630-860-9816

After your machine is installed please call 630-616-5900 for technical assistance and part orders.

Facility Requirement Check List

Please read and understand the following facility requirements for your new Mitsubishi Laser Processing System. Many future problems will be prevented by completely understanding these requirements. Please notify MC Machinery 1 week in advance of your scheduled installation date if any of the following requirements will not be completed upon the technician's arrival.

- ☐ Rigging
- ☐ Machine location
- ☐ 208 VAC 3 phase connected to the machine tool
- ☐ 208 VAC 3 phase connected to the chiller
- ☐ (Optional order item) 208 VAC 3 phase connected to the dust collector
- ☐ (Optional order item) Electricity supplied for cutting N2 generator
- ☐ 2 Bottles of Laser Mix (special mix), on site
- ☐ 2 Bottles of (UHP N2) Ultra high purity nitrogen on site
- ☐ Assist / cutting gas: oxygen, nitrogen, compressed air, on-site
- ☐ Purge nitrogen for beam passage
- ☐ Regulators and hoses for assist gases, resonator gases, and beam path purge on site
- ☐ 30-40 gallon, de-ionized water for the chiller, on site

Signature_____ Date_____

When all requirements are completed please fax to Michael T. Brown at 630-616-5940
If items are incomplete when the technician arrives, we reserve the right to reschedule the install at a latter date.

Rigging Information

Prior to the installation you are required to contract a rigging company to uncrate, set the machine in place. Please make sure that the rigger that you contract is properly insured.

Description	Length (Inches)	Width (Inches)	Height (Inches)	Weight Lbs.	
				Gross	Net
Machine Unit	248	102	102	17,637	15,366
Accessory Crate	113	81	82	5,997	5,336
Chiller	80	42	90	3,300	3,200
Dust Collector	80	64	104	2,000	1,900

- Equipment Damage
  - **It is the customer's responsibility to inspect the equipment for damage before signing the bill of lading.**
  - Record any damage on the bill of lading and make a copy that can be sent to MC Machinery.
  - Take pictures relevant to the damage and provide them to MC Machinery. If possible e-mail the pictures to, Michael Brown, MB1@mcmachinery.com
  - Notify Michael Brown of the Laser Installation Department immediately. He can be reached at (630) 616-4066.
- Before the machine arrives mark your floor using the attached drawings. This will allow your riggers to quickly and correctly place the equipment.
- The machine tool can NOT be lifted with a crane. Please use a forklift with 8ft forks to lift the machine off the skid. (A crane can be used to lift the crate off the truck)
- The machine manuals and leveling pads are in the accessory crate inside one of the cardboard boxes.
- When rigging the machine into place please put the leveling pads under the machine, there are 2 sizes. Please place the small leveling pads, (approx. 3" in diameter,) under the machine tool. The large pads, (approx. 4" in diameter) go under the resonator.
- The install technician will level the machine. There is no need to have the riggers perform the leveling.

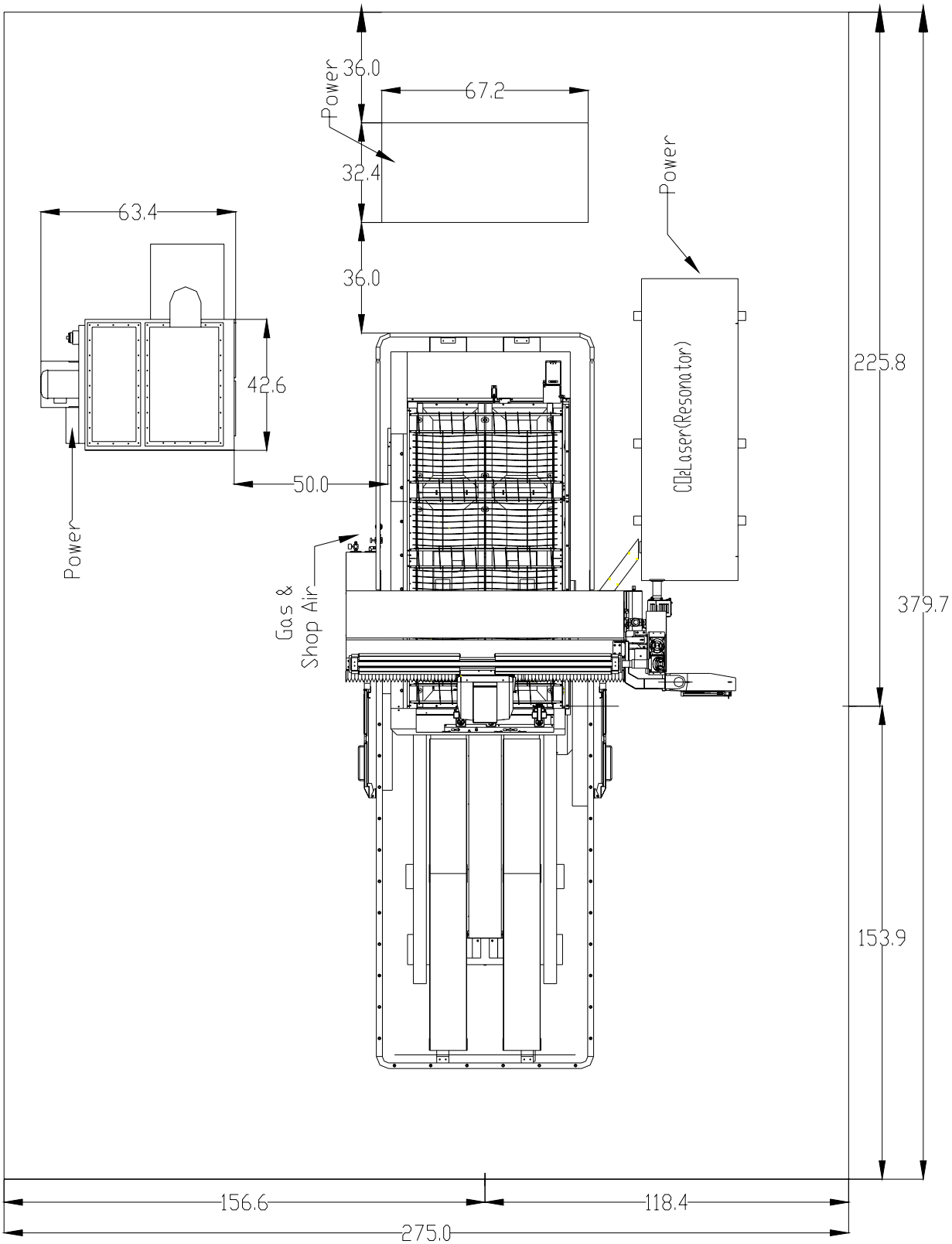
Machine Location

It is the customer's responsibility to prepare the machine location, per the listed specifications, before delivery of the equipment.

- The manufacturer recommends that the machine be installed on 10" reinforced concrete to minimize floor vibrations.
  - It is possible to install the machine on concrete that is less than 10"
  - MC Machinery does NOT recommend installing the machine in an area that is less than 6" of reinforced concrete.
  - Installing the machine in an area that is not properly prepared could cause increased maintenance interval due to shifting of that slab. This could cause the bend mirrors to become misaligned. It could also cause improper alignment of the machine with the pallet changer.
- The floor where the laser is installed must be level to within 0.39" over the entire length of the machine.
- If the machine is installed near a stamping press, turret punch, or sheer, the foundation slab should be separated to prevent vibration transfer. Vibration transfer could cause the bend mirrors to become misaligned.
- The machine MUST be anchored. If the machine is not anchored, damage will occur.
- The chiller hoses that come with the machine are approx. 10 feet long, allowing the chiller to be placed within 5-6 feet from the resonator.
  - If longer chiller hoses are desired, MC Machinery recommends that they not be extended more than 30ft, as insufficient cooling will occur.
- Ambient temperature must be between 41 and 95 degrees Fahrenheit.
- Humidity should not exceed 75% to prevent condensation.
- Do not run the machine without dust collection.
  - Dust can affect beam divergence and cut quality. Dust can also damage optical and electrical components.
- The laser system should not be installed in a location where corrosive gas or mist is present.
- Materials that produce a corrosive gas during laser processing should not be cut.
- The laser system and air compressor should not be installed in a location where carbon dioxide or water vapor density is abnormally high, or solvents (such as thinner, trichloroethylene, acrylic combustion gas, freon, or welding gas) are present.
- Do not install the laser in direct sunlight.

Recommended Machine Layout.

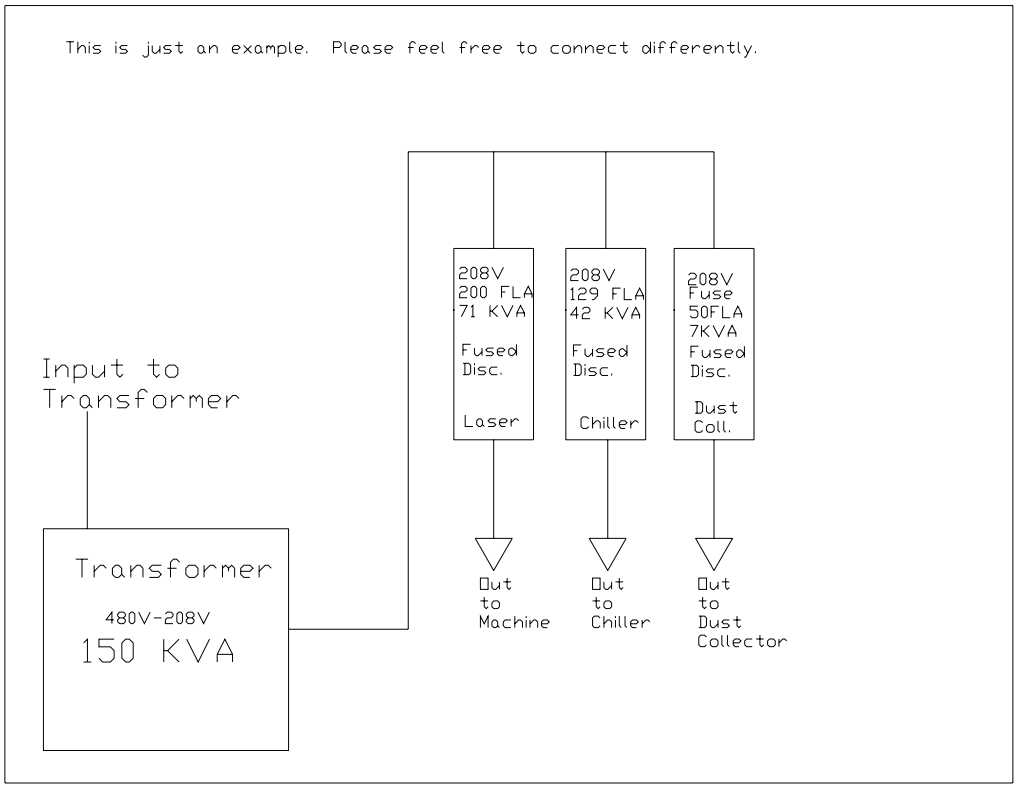
Please see next page.


36.0
67.2
Power
32.4
36.0
63.4
42.6
50.0
Power
Power
CO2Laser(Resonator)
Gas &
Shop Air
225.8
379.7
153.9
156.6
118.4
275.0

Power Requirements

Machine	208V 3 phase +10% -5%	71 KVA	200 Full Load Amps
Chiller	208V 3 phase ± 10%	42 KVA	129 Full Load Amps
Dust Collector	208V 3 phase ± 10%	7 KVA	20 Full Load Amps Fuse for 50 Amps
Total		120 KVA	379 Full Load Amps

- Machine operates using 208 VAC only. If you do not have 208V you will need to supply a transformer. The machine can not be changed to run on anything other than 208 V.
- The customer is required to prepare the incoming power supply system for the laser machine, and to terminate the connection at the machine, chiller, and dust collector.
- The incoming power for the laser system should be separated from the power supply line to other equipment, such as welders or large motors.
  - Welders, plasma machines, and large motors create electrical noise that could cause problems with the laser system.
- The power cables and grounding cables from the CO_2 laser power supply unit should be laid down away from other power and signal cables used for electronic equipment. (Phone, fax, Internet, etc.)
- Since the system uses a high-tension power supply, grounding should be made in accordance with the relevant electrical equipment / facilities standards.
  - A ground rod MUST be installed, and comply with all local electrical code.
- Each grounding cable should be independently terminated near the respective equipment.



Gas Requirements

Laser Gas

- Specific to the Mitsubishi Laser
- **Carbon Monoxide (4%), Carbon Dioxide (8%), Helium (28%) , Nitrogen (60%) Total 100%**
- Laser Gas must be certified to ±5% of each percentage to ensure proper operation of your machine.
  - Co (3.8%-4.2%), CO_2 (7.6%-8.4%), He(26.6%-29.4%), N_2(57%-63%)
  - A dew point of -48 degrees C is required.
- You will need 2 bottles for startup. Each bottle will last 6 months to 1 year depending on the amount of use.
- This gas source will be regulated to 28psi

Ultra High Purity / Resonator Maintenance Nitrogen

- This gas is referred to as UHP or Pre-purified nitrogen.
- Must be certified to 99.99% min.
- A dew point of -48 degrees C is required
- Used for normal resonator maintenance to bring the resonator to atmospheric pressure.
- 1 or 2 bottles will be needed for startup.
- 1 bottle will last 3-6 months performing normal maintenance.
- This gas source will be regulated to 50-70psi.

Cutting / Assist Gas

OXYGEN

- Assist gas used for cutting.
- Requires a purity of 99.9% min. with a dew point of 10 degrees C or less.
- Usually used to process steel.
- You will need 2 liquid tanks rated to 350PSI on the pressure relief valve or 1-12 pack of high-pressure bottles.
- Consumption will vary with material type and how much processing is performed.
- This gas source will be regulated to 250psi at 65cfm maximum, for cutting aluminum.
- Normal setting is 150psi at 30cfm.

Nitrogen

- Assist gas used for cutting.
- Requires a purity of 99.9% min. with a dew point of 10 degrees C or less.
- Usually used for daily setup, and to process stainless steel, thin mild steel and aluminum.
- You will need 1-2 liquid tanks rated for a minimum of 350psi on the pressure relief valve, (500psi is recommended) or 1-12 pack of high-pressure bottles.
- Consumption will vary with material type and how much processing is performed.
- This gas source will be regulated to 350psi at 75cfm maximum. Gas type (4)
- This will also be regulated to 150psi at 35-40cfm. Gas type (3)

Beam Passage Purge

Based upon historical data, it is strongly recommended to purge the beam path with nitrogen, not shop air.

Nitrogen

- Purity should be 99.99% min. with a dew point of less than –48 degrees C.
- Regulated to approximately 75psi at 50L/min (106 CFH)
- Recommended source is liquid bottle or bulk system.

MC Machinery sells a nitrogen generator for beam path purge. The nitrogen generator does not use electricity and has a low maintenance cost. Your compressor supplies air so there is not need for extra bottles. If you would like more information on nitrogen generators, please call your salesman.

Special notes about liquid gas bottles. (Dewars)

- It is strongly recommended that an evaporator be used when using liquid bottles.
- If an evaporator is not used, super cold liquid gas can be delivered to the machine components permanently damaging them. This damage will not be covered under warranty.
- The small evaporators that hang on the liquid bottle are not recommended.

Regulators and Hoses

- MC Machinery Systems, Inc. offers a regulator kit that contains all the regulators, hoses, and fittings needed to hook up the gasses to the machine. The part number for this kit is (ASYMITS-1).
- To place an order for the assist gas package, please call your salesman. You can also place an order with the parts department at 630-616-2965, please choose option 1 when prompted.
- If you choose not to order the kit from MC Machinery, the specifications are as follows.

Gas Type	**Regulator output requirement**	**Hose ID and Material**	**Machine Fittings**
Laser Mix	28-35psi low flow Stainless steel diaphragm	¼" ID Low permeation**	¼" Female NPT
Purge N_2	28-35psi low flow Stainless steel diaphragm	¼"ID Low permeation**	¼" Female NPT
Assist N_2 Gas type (4)	350psi max 75 CFM	½" ID	½" Female NPT
Assist N_2 Gas type (3)	150psi max 35-40 CFM	½" ID	½" Female NPT
Assist O_2 Gas type (1)	200psi max 65 CFM	½" ID	½" Female NPT
Beam purge N_2	100psi max 50LPM	¼" ID Low permeation**	¼" Female NPT

** Low permeation hose is dense polyethylene, that prevents contaminates such as water, oxygen, hydrocarbons, from penetrating the hose. These contaminates will shorten the life of your optics.

- If stainless steel hose is used for laser mix or purge nitrogen it must NOT be cleaned for oxygen use. The solvents used in this process will contaminate the resonator and significant damage will occur. This damage will not be covered under warranty,

Shop Air

- Must be dry to 30 degrees Fahrenheit minimum.
- Must be oil free
- Regulated to 72psi at 15cfm
- The laser system and air compressor should not be installed in a location where CO_2 or water vapor density is abnormally high or solvents such as thinner, trichloroethylene, acrylic combustion gas, freon or welding gasses are present.

VERY IMPORTANT

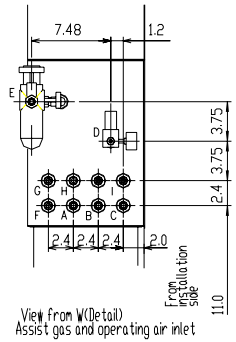
SHOP AIR USED FOR PNEUMATIC DEVICES MUST BE FREE OF MOISTURE AND OIL VAPOR. FAILURE TO SUPPLY CLEAN SHOP AIR WILL CLOG PNEUMATIC DEVICES. THIS DAMAGE WILL NOT BE COVERED UNDER WARRANTY.

De-ionized Water

- 30-40 gallons will be needed to cool the laser. (*If you have extended your chiller hoses, you will need more.)*
- If de-ionized water can not be found, distilled water can be used.
- Please make sure not to use "distilled for drinking " water. This has had minerals put back in and could shorten the life of the de-ionization filter slightly.
- No additives such as antifreeze rust inhibitor, or algaecide can be added to the water. The resonator and water-cooled power supply could be damaged.

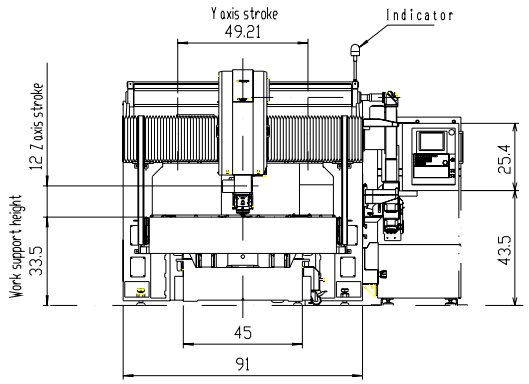
Dust Collector (Optional) Micro Air

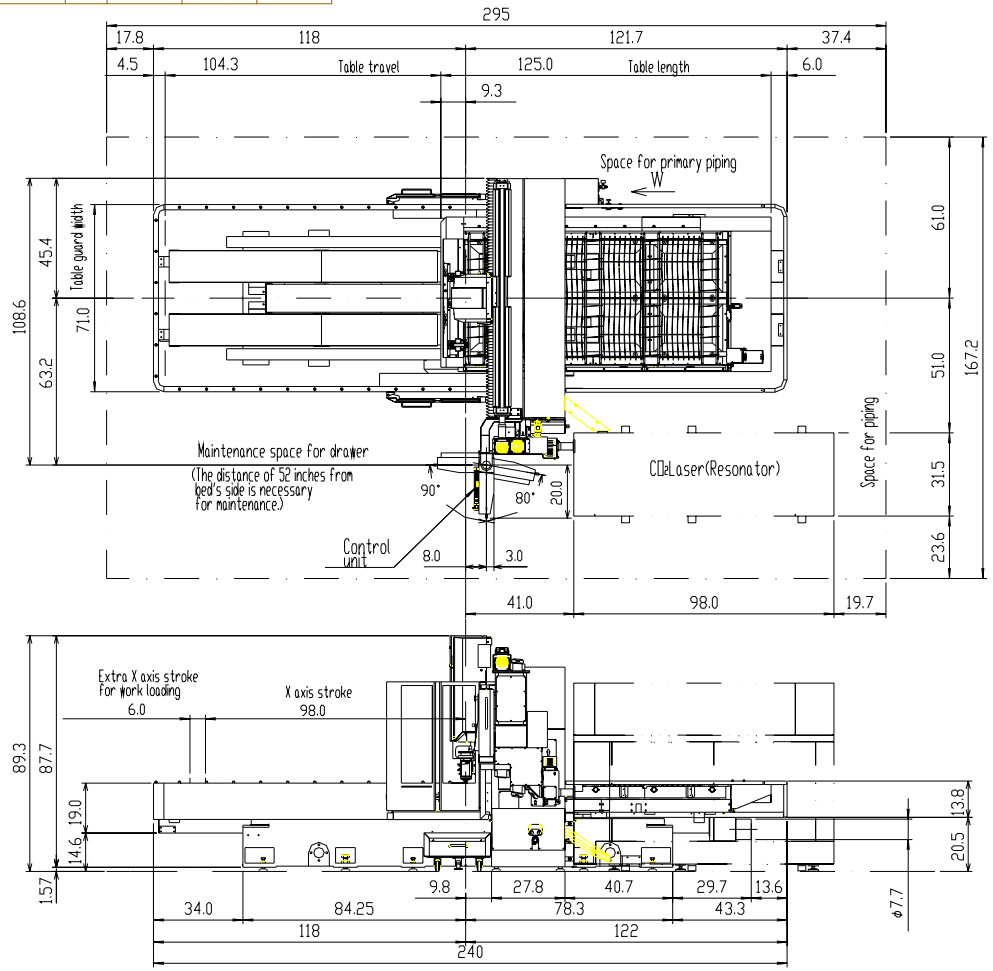
- It is the customer's responsibility to connect electricity, air, and ductwork.
- The dust collector distributed by MC Machinery runs on 208V only.
- Please provide clean, dry compressed air to the dust collector.
  - If the air provided is wet or oily it will greatly shorten the life of your filters.
  - The air provided should be regulated to 90psi max.
- Ductwork connected from the machine to the dust collector should be heavy gauge metal duct
  - Duct size is 8"
  - Recommended that the ductwork be kept less than 45 feet but more than 10 feet with minimal number of elbows. The manufacturer recommends 4 or less.
  - Please use elbows that have a bend radius at least 1.5 times the diameter. Installing elbows that have a radius less than 1.5 times the diameter of the pipe will greatly decrease the efficiency of the dust collector.
- The fan curve for the dust collection requirements required for optimal performance are as follows.
  - 1400cfm @ 15.9"wg. and 1765cfm@13.1"wg.



No.	Kinds of assist gases	Connection port diameter
A	Assist gas1	PT1/2 (Female screw)
B	Assist gas2	PT1/2 (Female screw)
C	Assist gas3	PT1/2 (Female screw)
D	Beam passage purge	PT1/4 (Female screw)
E	Operating Air	PT1/2 (Female screw)
F	Laser gas	PT1/4 (Female screw)
G	Purge gas	PT1/2 (Female screw)
H	Assist gas4(Option)	PT1/2 (Female screw)
I	Assist gas5(Option)	PT1/2 (Female screw)

Attention)
Carry-in size of the processing machine: Width 94 inch * Length 240 inch * Height 100 inch
In addition to the size above, at least 4 inch interspace is necessary for each side of the carry-in route and entrance.
However the required space may differ depending on the layout of the factory.





MITSUBISHI ELECTRIC CORPORATION

DATE	' 07/15/05	APPROVED
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DESIGNED		

Mitsubishi CO2 Laser Processing System

TITLE Outline Drawing

ML2512HV-40CFX

DWG.No.

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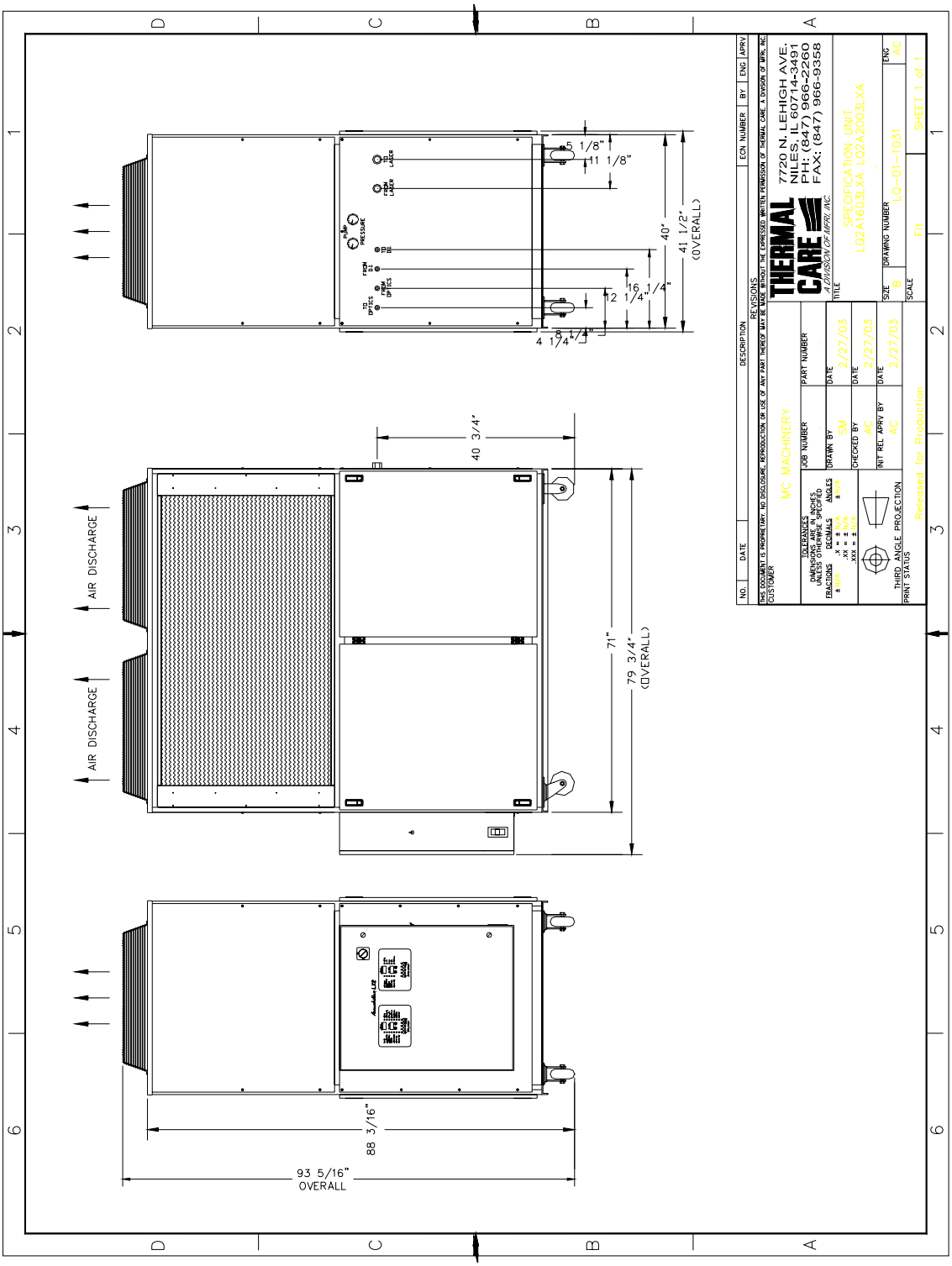
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PRESSURE
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41 1/2"
(OVERALL)
16 1/4"
12 1/4"
8 1/4"
4 1/4"
40 3/4"
AIR DISCHARGE
AIR DISCHARGE
71"
79 3/4"
(OVERALL)
88 3/16"
93 5/16"
OVERALL
NO.
DATE
DESCRIPTION
ECN NUMBER
BY
ENG APRV
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CUSTOMER
MC MACHINERY
JOB NUMBER
PART NUMBER
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2/27/03
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TOLERANCES
DIMENSIONS ARE IN INCHES
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DECIMALS
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XXX = ± N/A
ANGLES ± N/A
THIRD ANGLE PROJECTION
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A DIVISION OF MFR, INC.
7720 N. LEHIGH AVE.
NILES, IL 60714-3491
PH: (847) 966-2260
FAX: (847) 966-9358
TITLE
SPECIFICATION UNIT
LQ2A1603LXA LQ2A2003LXA
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LQ-01-1031
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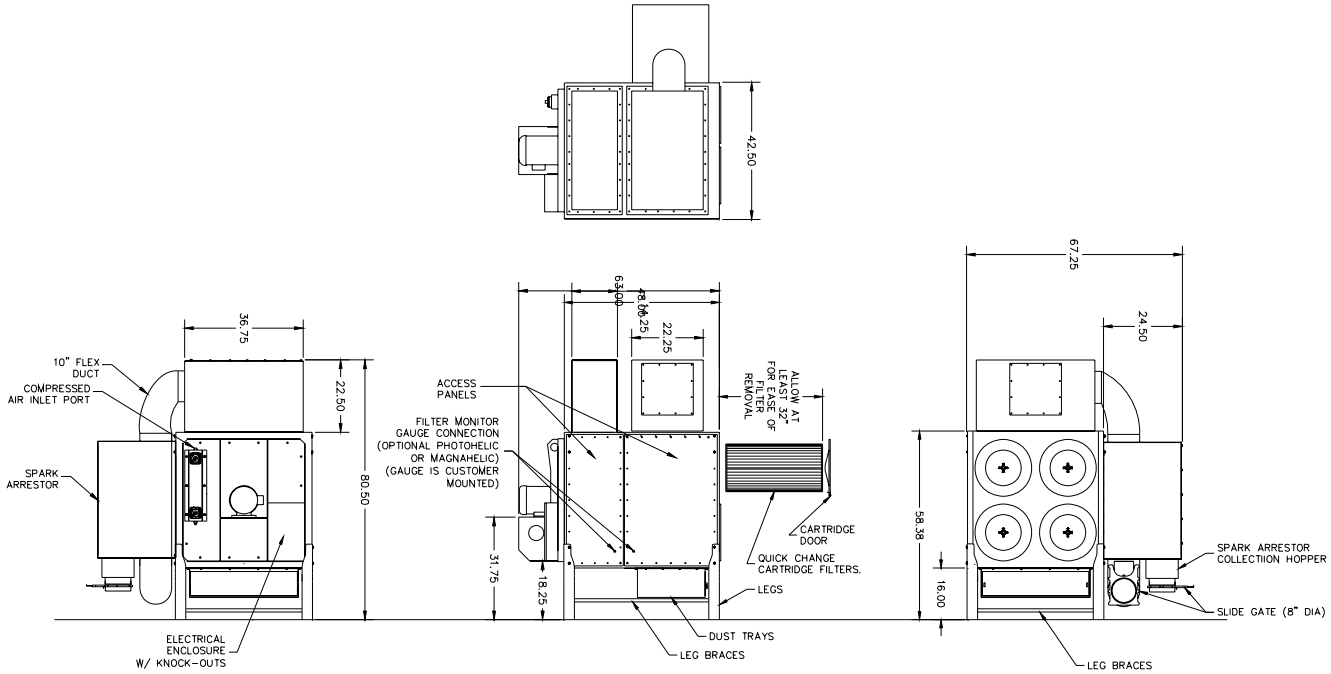
Fit
SHEET 1 of 1



NOTES
1.) UNITS MUST BE ATTACHED TO IN-PLANT COMPRESSED AIR SUPPLY FOR CLEANING MECHANISM TO FUNCTION (90 MAX psig CLEAN DRY AIR)
2.) WELDED STEEL CONSTRUCTION OF 12 Ga. MILD STEEL.
3.) FINISH: INDUSTRIAL GRADE STORM GREY INSIDE & OUT.
4.) DUST TRAY CAPACITY: 2.0 CUBIC FT.

SPECIFICATIONS
TOTAL VALVES.
TOTAL CARTRIDGES. 4
COMPRESSED AIR 2.7 SCFM @80psi

DIR # 3	REVIEWED & APPROVED BY
DWG. #:SUB_#	ENGINEER: ENGINEER
SCALE: DWG_SCALE	CONTRACTOR: CONTRACTOR

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Revision	Revision Description	By	Date	Checked
REV_2	DESC_2	REV2	REV2DATE	
REV_1	DESC_1	REV1	REV1DATE	

JOB: JOB TITLE
ARCHITECT: ARCHITECT
ENGINEER: ENGINEER
CONTRACTOR: CONTRACTOR
Drawn by: DRAWN Date: DWG_DATE
Description:
MICRO AIR
AIR CLEANERS
WICHITA, KS. 67201

MITSUBISHI