Lamina 206 Sorter
Facility Preparation Manual

Document #200-026138-001
Revision F



NOTE: Release Subject to change upon final release of system specification and design reviews.

FORTREND

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Document Change History:

Rev.	By:	Subject:	Date:
A	REM	Preliminary Release	April 23rd 2014
B	REM	Updated Electrical component Details	5/1/14
C	REM	Updated layout and requirements for final design	1/15/15
D	REM	Additional Details added	2/2/15
E	REM	Lock out Tag out details added	2/16/15
F	REM	LOTO verbiage updated; Pictures Updated	5/12/15

1. OVERVIEW

This document is a facility preparation manual for the Fortrend Engineering Lamina 206 EUV and Reticle Transfer system.

The Lamina 206 will transfer reticles between RSP 200 SMIF Pods, EUV Dual SMIF pods, Hoya/ShinEtsu Blank Mask shipping box, DMS Clam Shell Shipping box, IBM Blue Shipping Box, Toppan/Pozzetta Clam shell shipping boxes. The system will also have the capabilities to rotate and flip the Reticles, identify the bar codes and corner chamfers, identify the type and location of the pellicles, and visually inspect the reticles under a bright light.

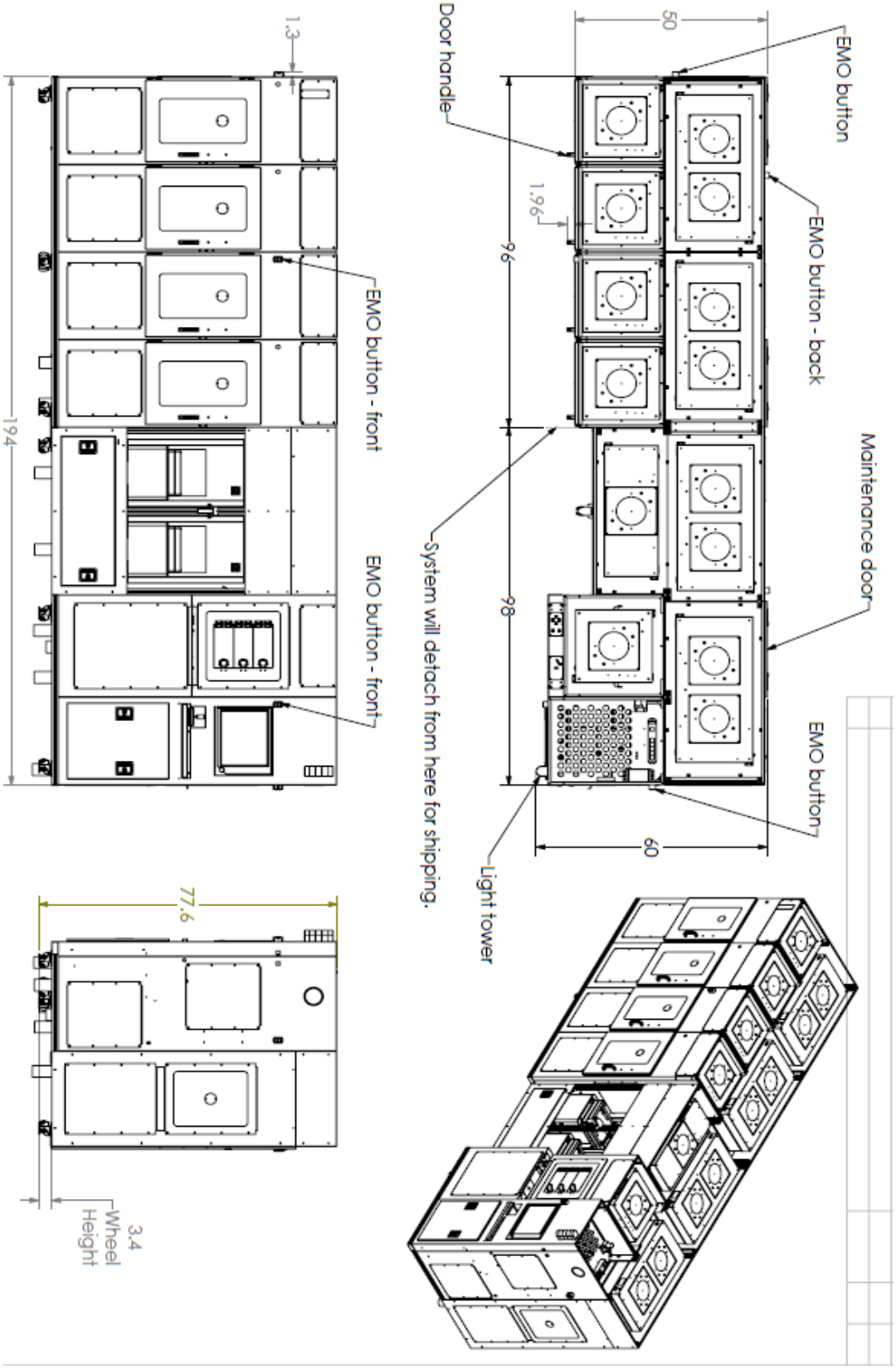
2. SPECIFIC FUNCTIONALITY

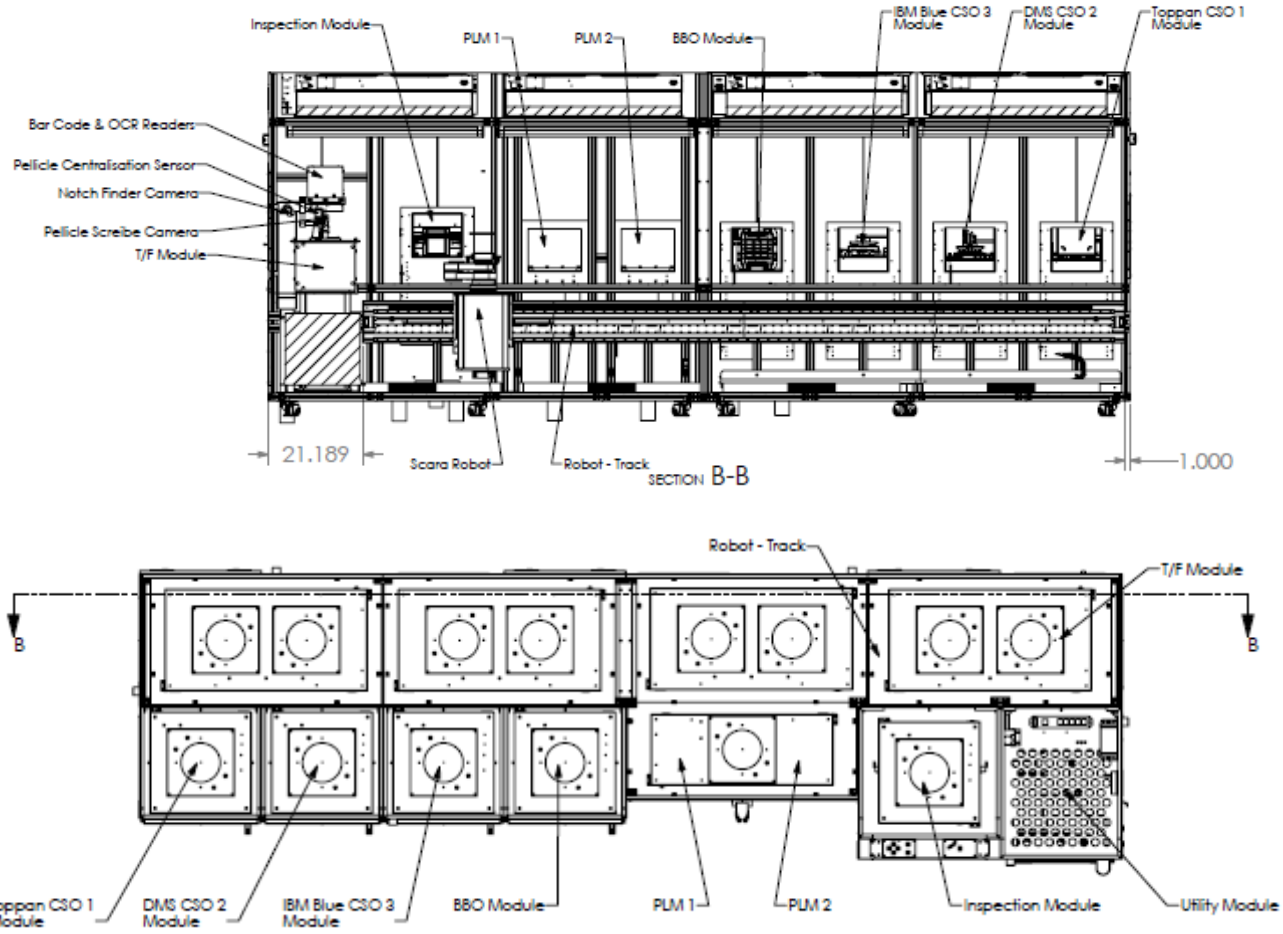
1) The automated reticle handling system is capable of transferring masks between any of the shipping or process pods and boxes.
2) The operator selects the type of transfer through the GUI control or receives an automated transfer via the Facility factory automation system.
3) The system uses a number of recipes to transfer, inspect, and manipulate the Reticle orientation selected from the system GUI or via the factory automation system.
4) After the operator loads the selected SMIF pods and/or Shipping boxes to the load ports the system will carry out the requested transfer.

3. LAMINA 206 HARDWARE

1. Two SEMI compatible SMIF pod openers to open SEMI E100 complaint RSP200 or SEMI E152 EUV Pod openers.
2. One DMS Clam Shell box opener
3. One Hoya/ShinEtsu Blank Box opener
4. One IBM Blue Clam Shell Box opener
5. One Toppan/Pozzetta Clam Shell Box Opener
6. One Turn/Flip Robot Module
    a. Two barcode readers.
    b. Chamfer Detect Camera
    c. Pellicle measurement Sensor
    d. Pellicle Scribe Camera
7. One SCARA reticle transfer robot with side grip end effector.
8. One horizontal linear motor robotic track.
9. One Bright light review module
    a. LED Bright Light source.
    b. 1X, 10X, 100X Camera array on X-Y Stage
    c. Nitrogen Blow off Gun
10. One integrated electronics rack with utility panel, Battery back Up, GUI control panel, robot controller, computer and power distribution box.
11. Fan Filter Units

4. SYSTEM LAYOUTS




Inspection Module
PLM 1
PLM 2
BBO Module
IBM Blue CSO 3 Module
DMS CSO 2 Module
Toppan CSO 1 Module
Bar Code & OCR Readers
Pellicle Centralisation Sensor
Notch Finder Camera
Pellicle Scribe Camera
T/F Module
21.189
Scara Robot
Robot - Track
SECTION B-B
1.000
Robot - Track
T/F Module
B
B
Toppan CSO 1 Module
DMS CSO 2 Module
IBM Blue CSO 3 Module
BBO Module
PLM 1
PLM 2
Inspection Module
Utility Module

5. SYSTEM CONTROL

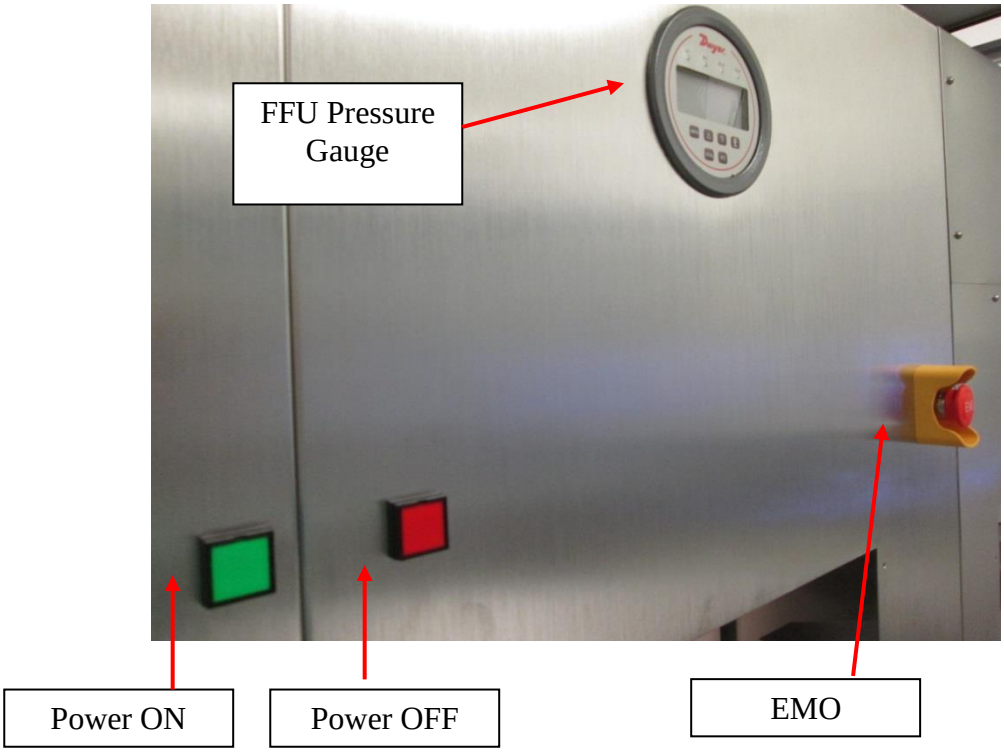
The Lamina 206 is controlled by an onboard GUI system through the touch screen monitor. Connected to the factory automation system for remote operations.

Control Panel Buttons include:

EMO: When pushed, shuts down the system. (4 – 6 EMO Buttons on system locations TBD) Battery back-up system allows on board computer to do a controlled shut down.

Power ON: When pushed, turns power ON to the system

Power OFF: When pushed, turns OFF power to the system.



6. SYSTEM SPECIFICATIONS

Mask Size	150 mm
Overall Height	2082 mm (82”)
Width	4928 mm (194”)
Depth	1524 mm (60”)
Pod Compatibility (customized)	SEMI E100 compliant 200mm RSP SEMI E152 EUV Dual Pod DMS Clam Shell (770-550306-10) IBM Blue Clam Shell ShinEtsu 5 slot blank box HOYA 5 slot blank box Pozzetta clam shell PZT-600-69925
Cleanliness	ISO Class 1
Power requirement	208VAC, 30 Amps, Single Phase, 50/60 Hz (Full load is 24 Amps)
Air	CDA @ 90psig, minimum flow rate of 1cfm
Vacuum	19″ Hg, minimum flow rate of 1cfm
Nitrogen	N2 @ 90psig, minimum flow rate of 1cfm
Weight	2050 Kg (4,500 lbs.)
Process Temperature	19°C to 21°C (66°F to 70°F)
Humidity	39 +/- 4 % RH
Pod Load Height	SEMI compliant
Noise level	< 70 dB
Chemical Information	None Used on System
Exhaust Requirements	None – Modules Dump to FAB Floor

8. SYSTEM UTILITIES

Figure 1 illustrates the location of the Utility Panel and the AC Power Distribution Box on the Stocker.

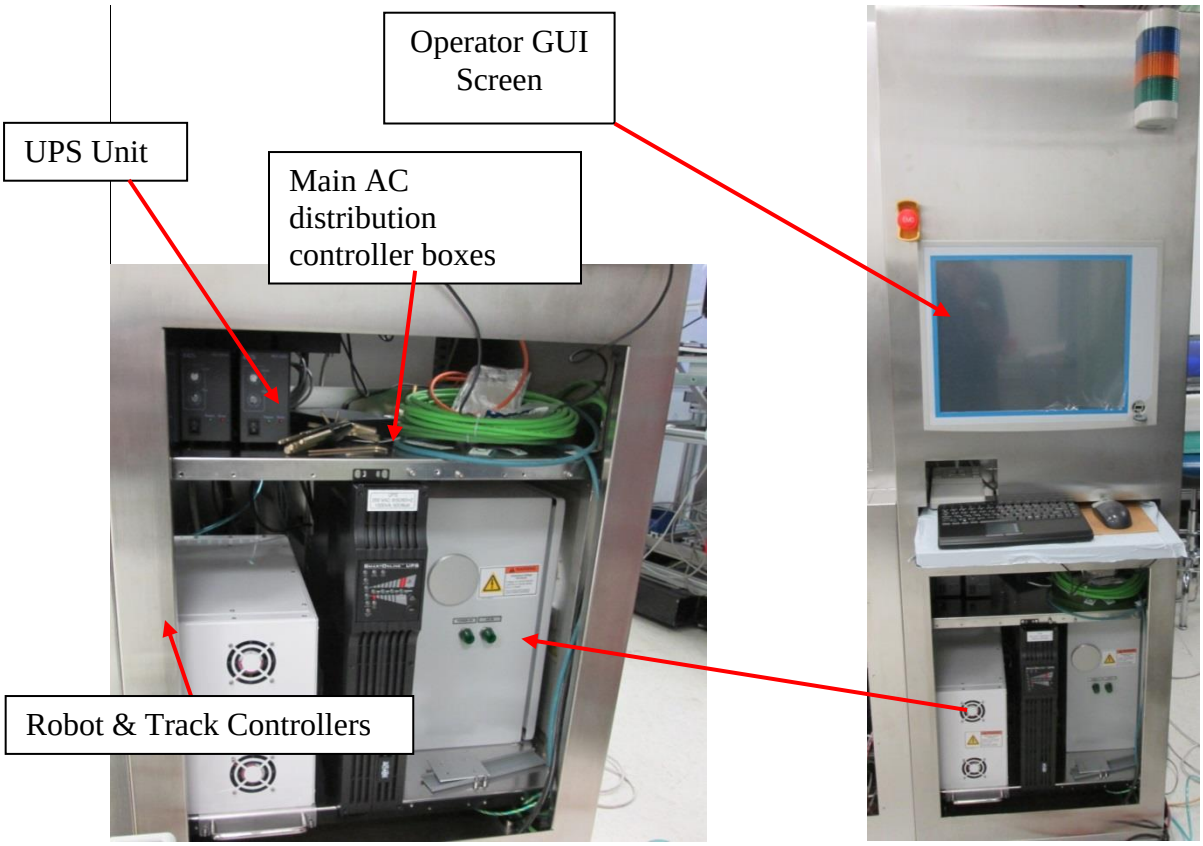
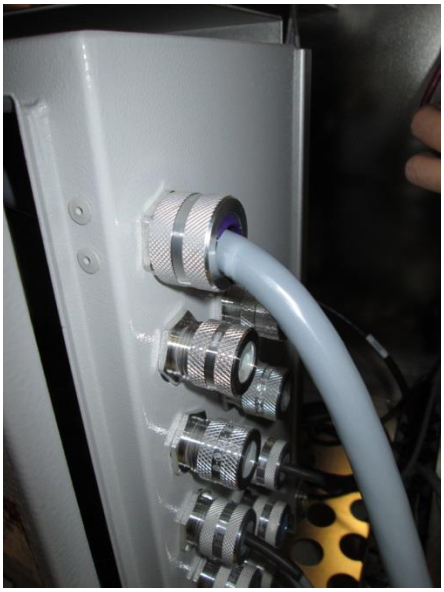
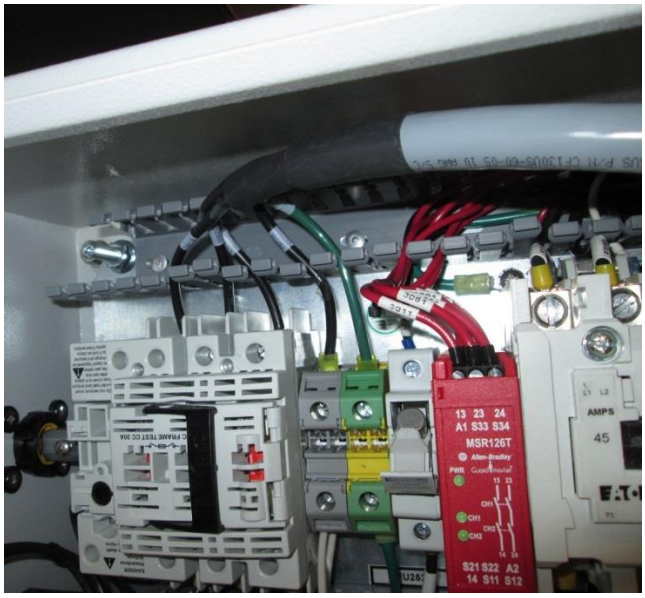


Figure 1: Utility Panel and AC Power Distribution Box Locations

Power Connection

The Power is supplied from the IBM Facility via a cable supplied by IBM which terminates inside the AC Power distribution box inside the Utility module.





Air, Vacuum and Nitrogen Connections

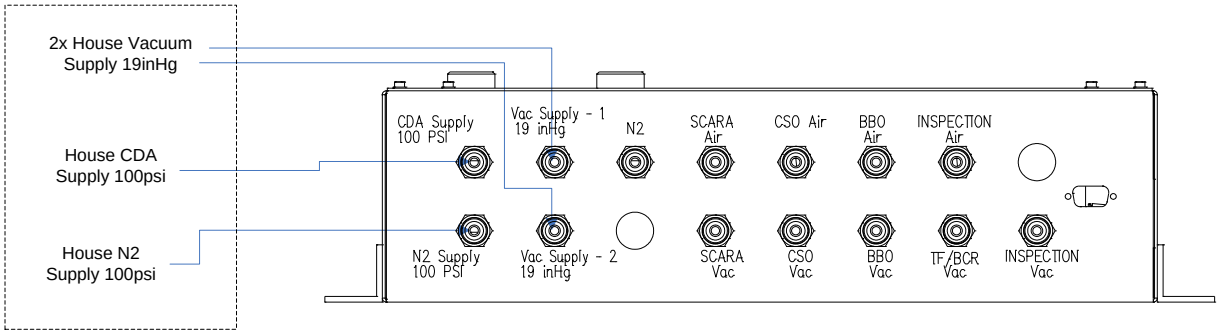
The Air Vacuum and Nitrogen are connected to the Distribution box located inside the Utility Module. The Fittings are ¼" quick push fit fittings SMC Part Number KQE07-00-X2



View of Inlet connections for Lamina 206



Bulkhead Fitting
Fortrend Part Number
002-0153



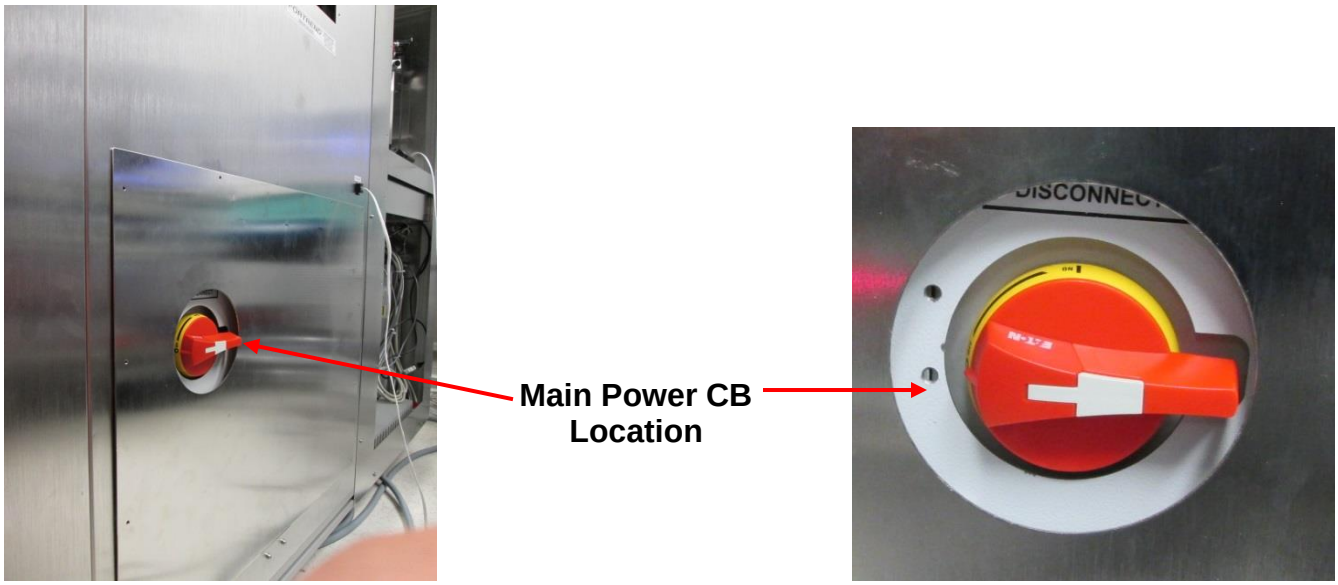
Schematic of Vacuum, Air and Nitrogen Inlets

9. FACILITY REQUIREMENTS

The following information pertains to facility flow, pressure requirements, and electrical requirements.

Main Circuit Breaker Location

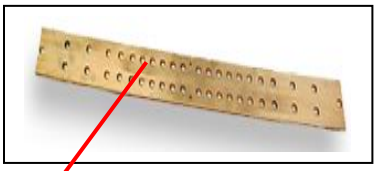
The main power Circuit Breaker is found on the right handed of the system on the side panel of the electronics cabinet.

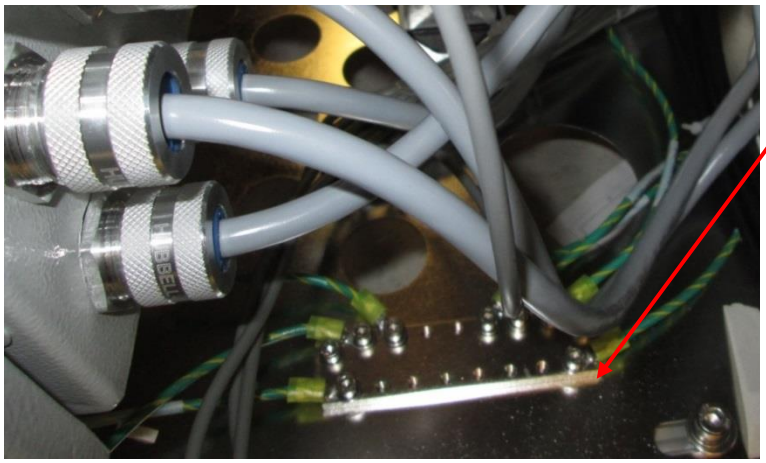


Grounding Bar Location for System

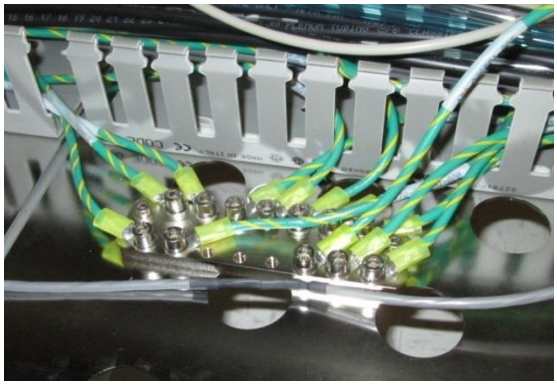
Three copper ground bus bars are provided on the tool.

1. In the Utility Module





2. In the Center of the Robot Chamber of the Utility Module Side



3. In the Center of the Robot Chamber of the Box Opener Module Side



10.LOCK OUT/TAG OUT (LOTO) PROCEDURE

DANGER!!

Always follow standard LOTO procedures for the Lamina 206 to ensure safety of the operator and service technicians.

A/C Power LOTO

The main power Circuit Breaker is found on the right handed of the system on the side panel of the electronics cabinet.

1. Turn OFF the Lamina 206 Main power disconnect circuit breaker switch located on the Side of the Operator Utility module, and attaches a site-approved LOTO service tag.
2. Make sure EMO buttons are pulled out. Press the green Start button on the system to ensure it is not working.
3. After servicing, turn on the main power disconnect circuit breaker the power cord to the Lamina 206 and turn ON the Main circuit breaker.
4. After the Lamina 206 is powered ON, remove the LOTO service tag from the tool.

Air LOTO

The air LOTO shut off valve should be located on the FAB facility panel within 6 meters of the system in line of site. When working on the system turn off the Air valve and attach the lock and Tag to the valve.
After service remove the tag and lock, turn on the air to the system.

Vacuum LOTO

The Vacuum LOTO shut off valve should be located on the FAB facility panel within 6 meters of the system in line of site. When working on the system turn off the vacuum supply valve and attach the lock and Tag to the valve.
After service remove the tag and lock, turn on the vacuum to the system.

Nitrogen

The Nitrogen LOTO shut off valve should be located on the FAB facility panel within 6 meters of the system in line of site. When working on the system turn off the Nitrogen supply valve and attach the lock and Tag to the valve.
After service remove the tag and lock, turn on the Nitrogen to the system.

11.MODULES EXHAUST DUCTS.

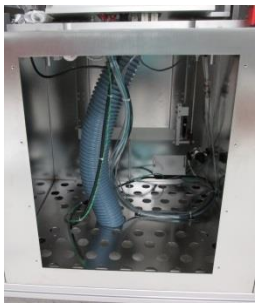
Each module on the Lamina 206 has one or two Exhaust dusts that blow down to the floor under the system. The ducting used is 3" ID flexible tubing.



Toppan Module



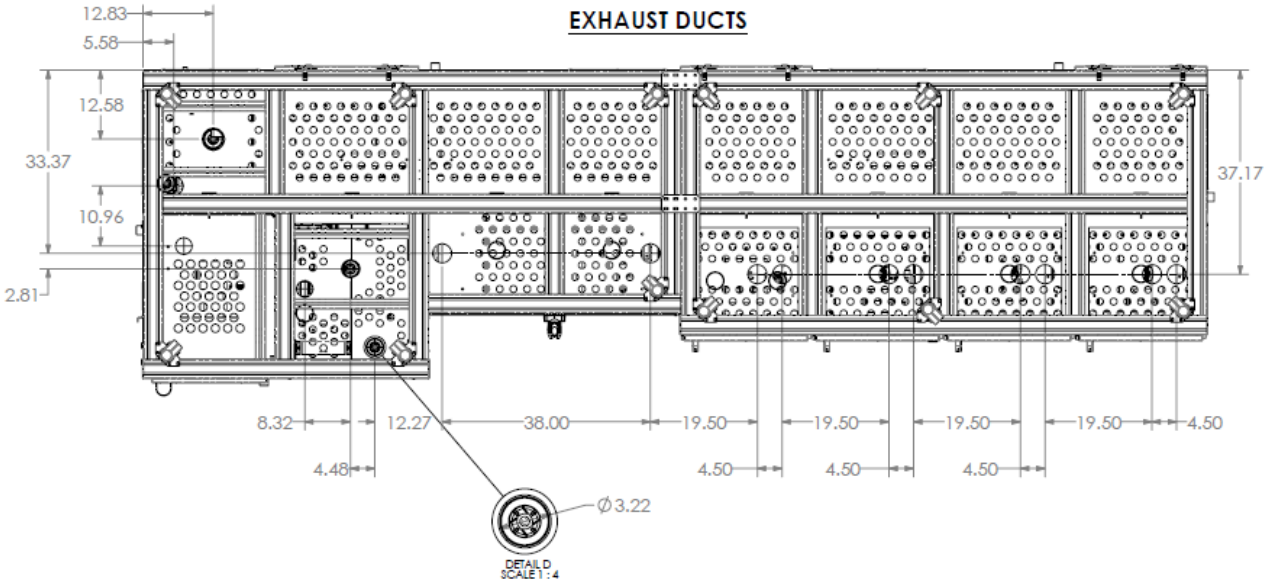
DMS Module



IBM Blue Module

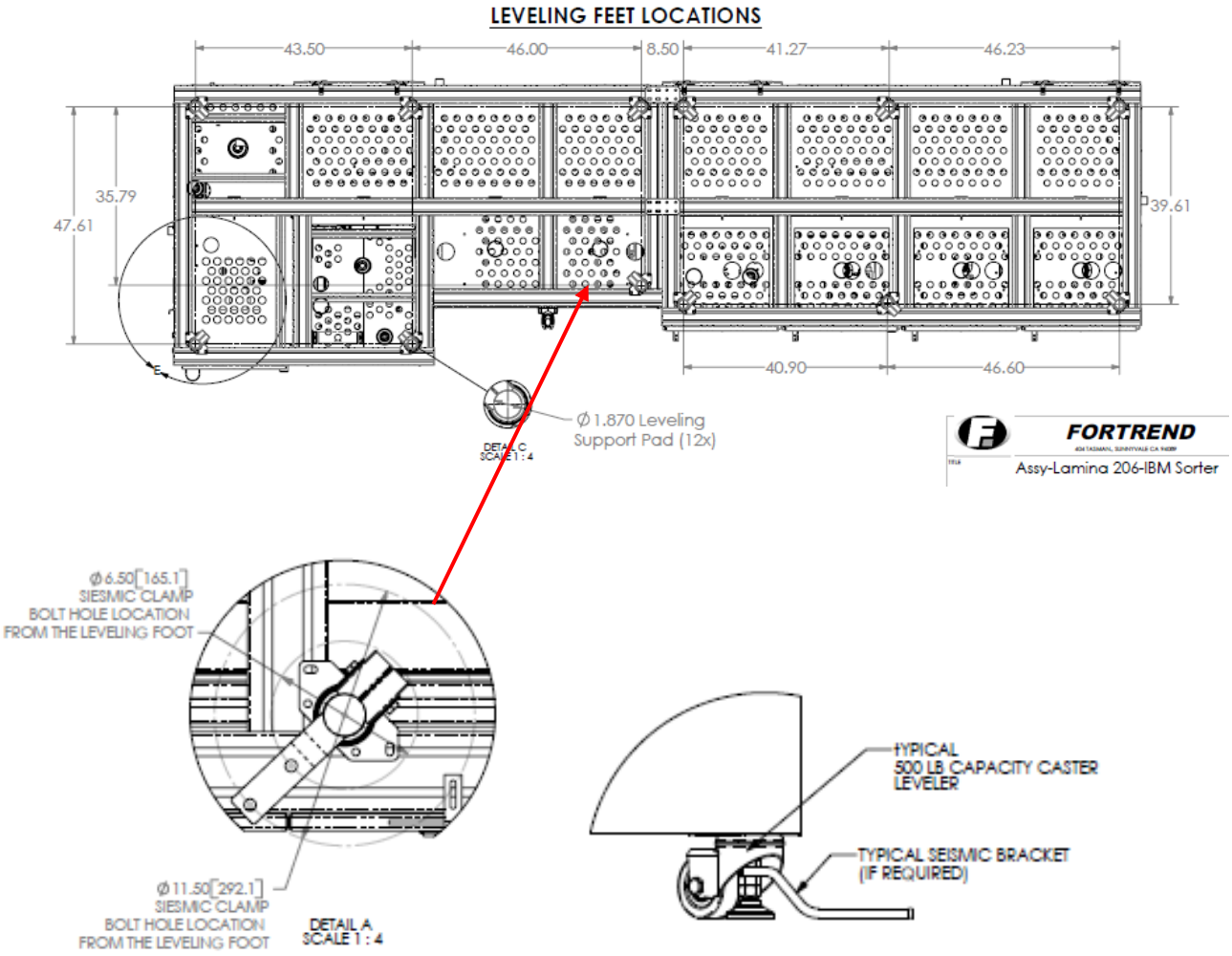


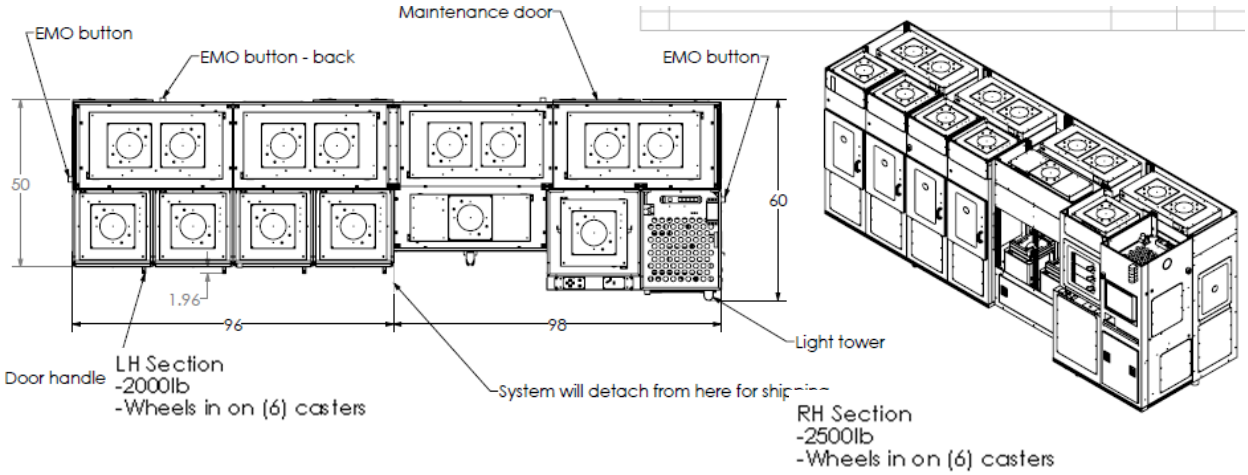
Hoya Module



12.SEISMIC RETAINERS

The drawing below illustrates the top view of the system frame, and possible locations for seismic retainers. The location of the seismic retainers can be adjusted to suit the facility floor.





Fortrend uses the following seismic restraints, which attach to the feet.

The seismic restraints attach to the leveling feet between the two top nuts, and then the restraints are bolted to the fab floor.







The total system weight is assumed to be evenly distributed among the 12 leveling feet and seismic brackets.

Therefore, the vertical load at each anchor point is calculated at 4500 Ibs/12 = 375 Ibs.

Each leg is rated at 500 Ibs, well above the estimated 375 Ibs per leg.

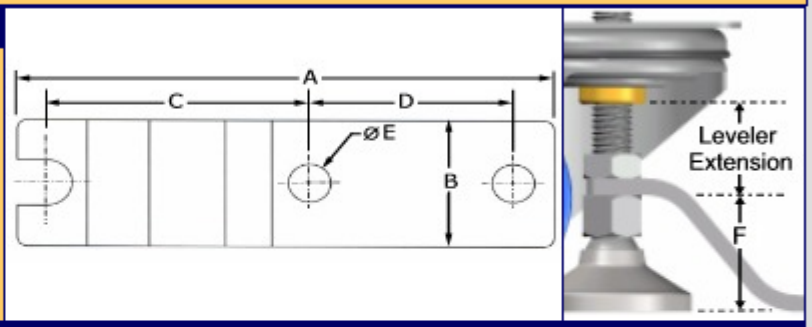
Seismic Restraint Details

SEISMIC RESTRAINTS

Our heavy duty seismic restraints are intended to provide a sturdy and cost-effective means to secure industrial machinery to the ground. However, the response of industrial equipment to seismic activity is very unpredictable given that every machine is a unique mechanical system and no two earthquakes are the same. For example, mechanical resonances can amplify the response and soil conditions can amplify the seismic event itself in a particular area. Clearly, these factors are beyond Atlas' control, so customers must determine the fitness of these products for their application. See DISCLAIMER.

Quality Features

- made from high strength heat treated stainless steel
- all surfaces have an attractive bead blasted finish
- industrially cleaned, passivated, and individually bagged
- electropolishing available as an option



Specifications All Dimensions in Inches/Pounds **CAD Files & Spec Sheets**

STUD SIZE	OVERALL LEN. (A)	WIDTH (B)	FIRST HOLE (C)	HOLE TO HOLE (D)	HOLE DIA (E)	PRONG HT. (F)	THICK-NESS	NUT/BOLT TORQUE	MAX LEV EXTENSION	MAX LOAD
1/2	6.63	1.50	3.25	2.50	0.52	1.75	0.25	55+ ft-lbs	1.25	375
5/8	6.63	1.75	3.25	2.50	0.52	1.75	0.25	60+ ft lbs	1.50	625

NOTES & WARNINGS

WARNING: Using these products within the specifications does not guarantee any particular result or safety factor. Customers must determine the fitness of these products for their application.

WARNING: Leveler must be secured to the restraint with the leveler locknut as shown above.

WARNING: Use stainless hex leveler studs with seismic restraints - our strongest studs.

- 1/2 in. restraints are supplied with an aluminum spacer that fills the space between the leveler retract length and the prong height
- For concrete, we recommend Simpson Wedge-All anchors. See simpsonanchors.com

The Lamina 206 uses the ½" Stud size Leveling feet and brackets.

13.PEDESTAL REQUIREMENTS

None

14. LASER INFORMATION

The Lamina 206 uses the following lasers within the system for measuring the Pellicle location and the orientation of the Blank Mask box.

The Lamina 206 Certification File Identification Number: **PENDING – Submission Date to FDA 2/28/15**

Laser	Values
Usage Area (Mfg./Development)	Pellicle Location inside Turn/Flip Module
Laser Manufacturer	Optic/Fastus
Model #	LS-100C
Medium (HeNe, Krypton, etc.)	Red Semiconductor Laser
Wavelength (nanometers)	655 nm
Maximum Power Density (watts/cm^2) **or** Maximum Power (watts) **or** Maximum Energy (joules)	1 mW
Product Classification	Class II (FDA part 1040.10) (IEC Class 2)
Continuous or Pulsed?	Continuous



Laser	Values
Usage Area (Mfg./Development)	Blank Box Opener
Laser Manufacturer	Keyence
Model #	GV H130
Medium (HeNe, Krypton, etc.)	Visible Semiconductor Laser
Wavelength (nanometers)	655 nm
Product Classification	Class II (FDA part 1040.10) (IEC Class 2)
Continuous or Pulsed?	Continuous



15.ERGONOMICS INFORMATION

Ergonomic Requirement	Lamina 206
Description of work activity	Loading and unloading SMIF pods, shipping and Storage pods from load ports on system
Position (sitting, standing, other)	Standing
Work surface height (inches)	Load ports - 900 mm (35.5”) GUI Screen – 1200 to 1500 mm (47.2” to 59”)
Does work activity involve a Reach, Push, Pull, Lift, or Lower	1. Reach into loading stations – Max 300 mm (12”) 2. Push – Closing Load port doors 3. Pull – Opening Load port doors 4. Lift – Picking up Boxes from load ports 5. Lower – Putting boxes on load ports
Horizontal distance from body during handling (inches)	Max 300 mm (12”)
Weight of object (pounds)	Max 7 kg (15.4 lbs.)
Maximum handling frequency (times/hour)	Up to 30 times per hour
Vertical start height of lift and/or lower (inches)	900 mm (35.5”)
Vertical end height of lift and/or lower (inches)	1000 mm (39.5”)
Will employees be required to perform repetitive (< 2 min. interval) motions or assume awkward postures (hands, wrists, arms, neck) while operating this tool or workstation	NO
Will employees be required to maintain a fixed or static body posture during operation	NO
Describe any ways to improve tool ergonomics	
Does this tool comply with SEMIK S2-0200 and SEMI S8-0701? Is a third party review available (provide a copy to Safety as requested)?	YES 3rd Party review avaliable at shipment.
Does any portion of the tool produce noise > 80 dBA continuously or intermittently, > 130 dB peak impact or impulse noise?	NO
State the initiatives taken to reduce chemical or energy usage	

16.SHIPPING AND PACKING LIST INFORMATION

The system will be cleanroom packaged, vacuum packed and shipped in a number of wooden crates. Each crate is designed with special padded support frames where the system will be situated.

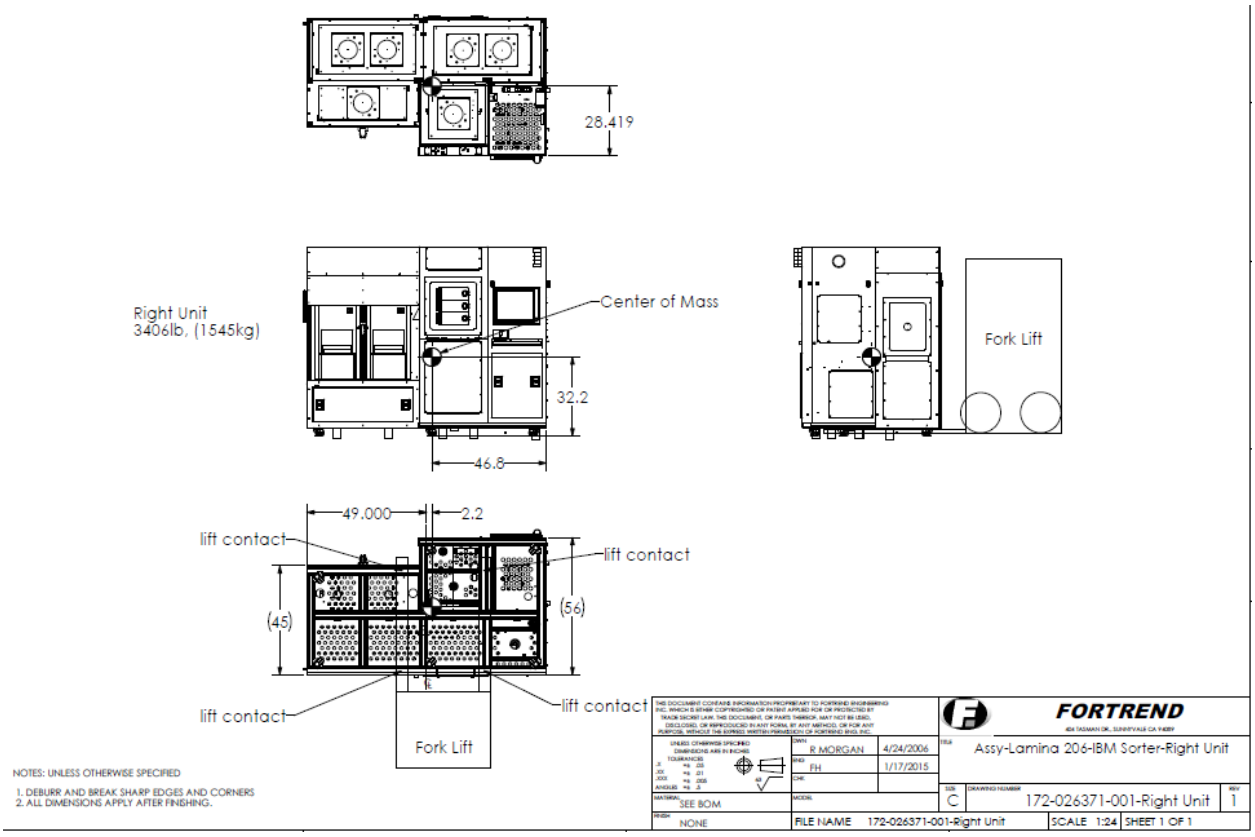
The packing list will consist of the following units:

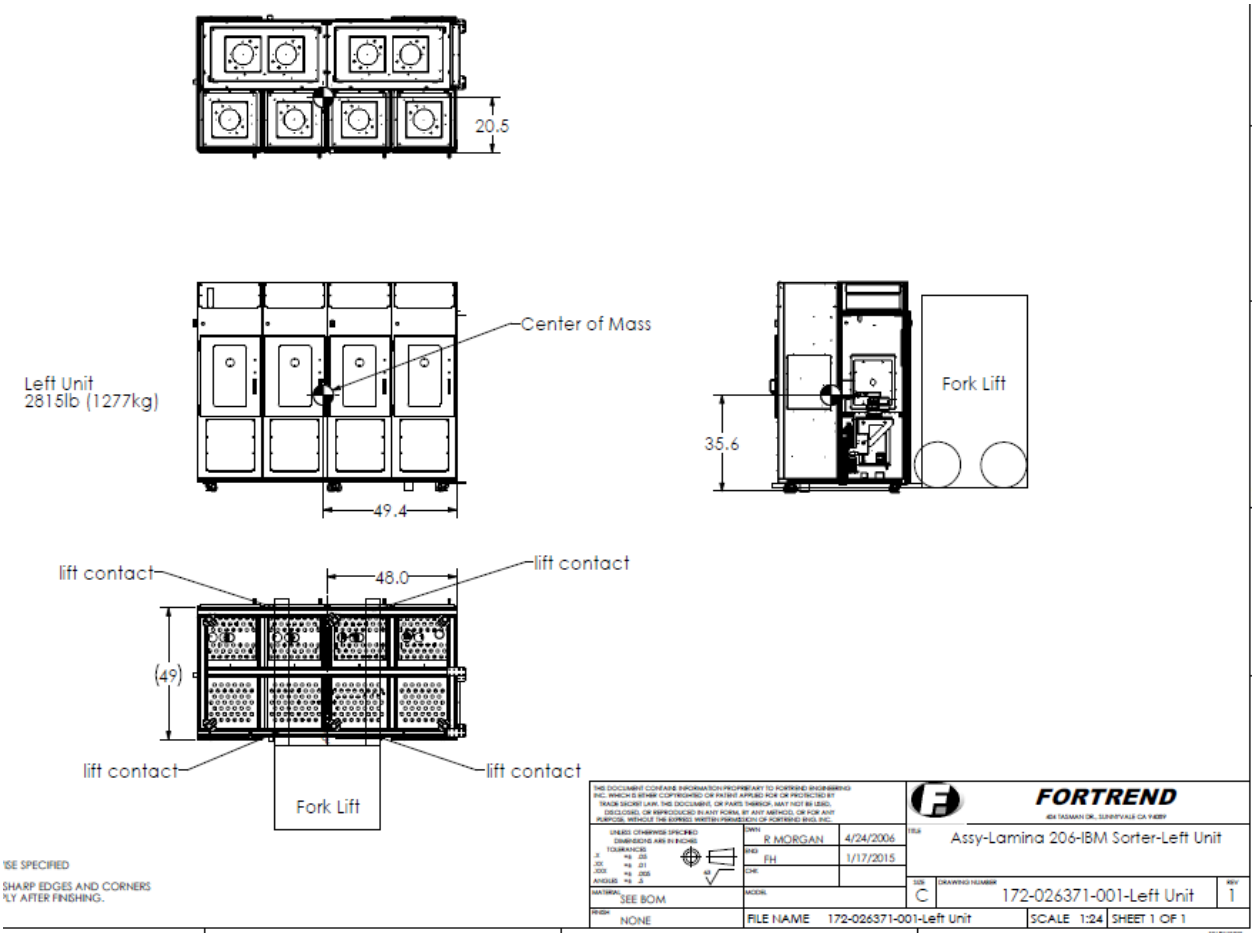
1. Transfer Chamber – Shipping Boxes (Module Size: 96” Wide x 50” Deep x 78” High)
2. Transfer Chamber – Inspection Modules (Module Size: 98” Wide x 60” Deep x 78” High)

The Shipping Boxes sizes:

1. Transfer Chamber – Shipping Boxes – Size: 112” Wide x 68” Deep x 96” High.
2. Transfer Chamber – Inspection Modules – Size: 112” Wide x 75” Deep x 96” High.

A forklift will be required to unload and move some of the large crates.

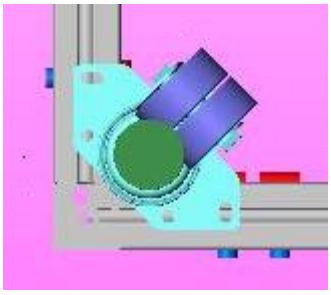


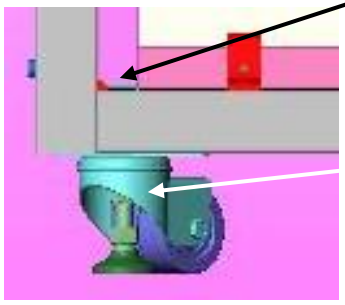


17.ROLL-IN PROCEDURE

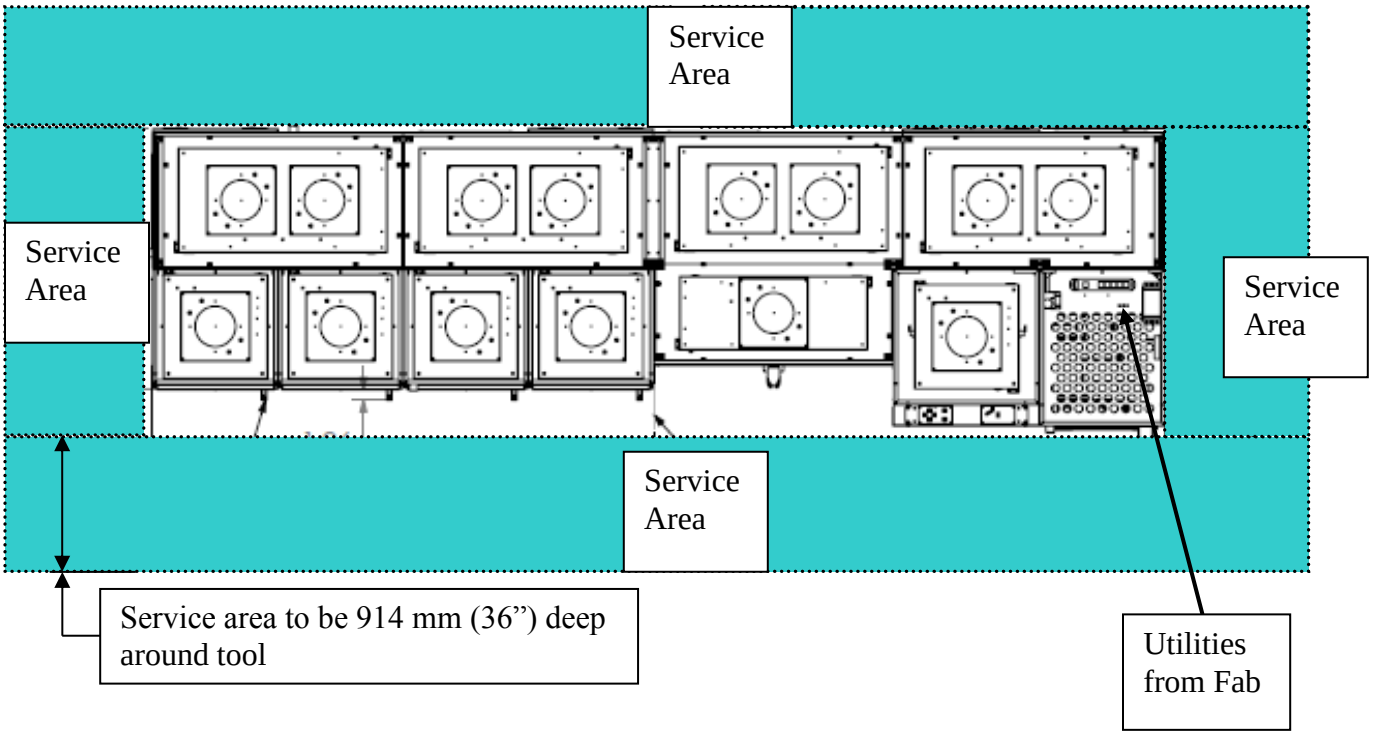
The load ports and mask chambers are located on a leveler/caster combination (see illustrations below). The main frame sits on wheels next to adjustable leveling feet. Once the frame is rolled into place, the leveling feet are lowered into place and locked.

The components will need to be raised from their leveling feet by using a ¼″ Allen wrench. Once they have been removed from the crate, they can be rolled into the cleanroom for further cleaning and wipe-down, and then moved into the fab.

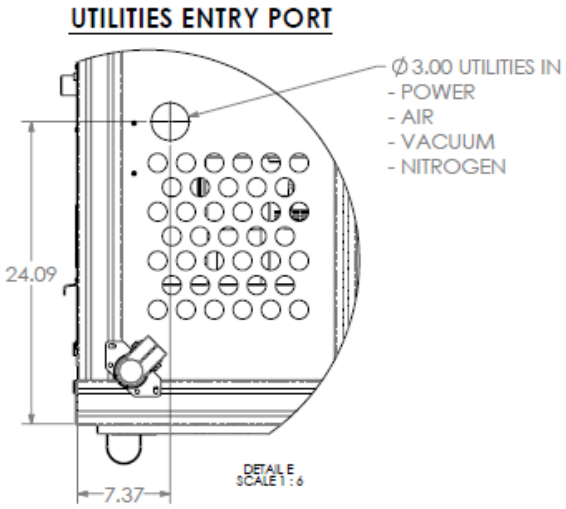




18.UTILITY INPUTS AND SERVICE AREAS



Utilities:
(1) Power 208VAC, 30amp
(1) LAN line for HSMS communication with CIM
(1) 1/4" OD Poly tube, 80 PSI Regulated CDA, 1CFM max, 0.1CFM average use.
(1) 1/4" OD Poly tube, 19 Inch HG Regulated Vacuum, 1CFM max, 0.1CFM average use. (For robots)
(1) 1/4" OD Poly tube, 19 Inch HG Regulated Vacuum, 1CFM max, 0.3CFM average use. (For openers)
(1) 1/4" OD Poly tube, 80 PSI Regulated Nitrogen, 1CFM max, 0.1CFM average use



19.DECOMMISIONING AND MATERIAL RECYCLING

There are no known hazardous materials within the Lamina 206 system. The computer, PCBs, LEDs, fluorescent light and filters should all be disposed of in the normal way in accordance with local regulations on consumable materials.

The following chart lists the various materials used for the components of the Sorter.

Component	Material	Approximate Weight of Material (lbs.)	% of Material in System or Module
Sorter Frame	Aluminum (anodized)	1100	25
Sorter Frame	Stainless Steel	1250	55
Sorter Frame	ABS (plastic)	75	3
Sorter Frame Wheels	Plastic	12	1
Sorter Frame Air/ Vacuum lines	Poly Tube	20	4
Sorter Frame Wires	Copper/ Plastic	100	8
Sorter Frame Miscellaneous	Miscellaneous	50	5
Modules Systems - Frames	Aluminum (anodized)	2000	75
Modules Systems - Frames	Stainless Steel	1500	15
Modules Systems - Belts	Kevlar/ Neoprene	8	1
Modules Systems – Wires, motors, sensors	Copper/ Plastic/ Aluminum	100	5
PCB’s	Copper/Plastic/Chips	5	2
Modules Systems – Handles, guides	Delrin (plastic), ABS (plastic)	30	2