

## ULVAC NE950EX

*The Ulvac NE950-EX is a batch ICP etcher designed to anisotropically etch most any thin film used in the semi, compound semi, solar, hard disc and photonic industries. Utilizing its patented ISM (Inductive Super Magnet) design to create a high density plasma, a cathode powered by a 12.56 MHz gen/match for biasing, and process gasses that include chlorinated and fluorinated chemistries, it can etch most films.*

**Partial list of materials it can etch:** Metals and noble metals (ex. Al, Ti, W, WSi, TiW, Ta, Cr, Mo, Ir, Au, Pt, Cu), metal oxides, dielectrics, polyimide, BCB, poly Si, compound semiconductors (GaN, GaAs, AlGaAs, InGaAs, InGaP, InP, SiC, etc), TCOs (ITO, and AZO, etc.) and tough to etch materials like piezo electrics (PZT, BaTiO<sub>3</sub>, LiNbO<sub>3</sub>), ferroelectric materials (BST, SBT), Ceramics (Al<sub>2</sub>O<sub>3</sub> including sapphire, ZnO<sub>2</sub>) and DLC.



**Front End NE-950 EX**

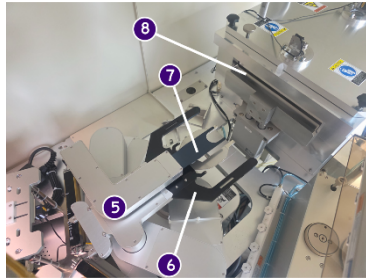
**Fully Automatic:** This tool is fully automatic and is configured for batch etching of 150 mm wafers. Two cassettes of 6-inch wafers are loaded into the front end along with two 330 mm wafer carriers that hold 3 x 150mm wafers each. The atm robot aligns the wafers and loads them onto the carriers via a Bernoulli handling mechanism. The carrier is then aligned and transfered into the transfer chamber. The vacuum robot in the L/L picks up the carrier and transfers it to the process chamber. Processed wafers residing on the carrier are then returned to the L/L and then back into transfer chamber where the atm robot returns the individual wafers back into the cassette.

### Features and Benefits:

- Ulvac's patented ISM chamber design uses magnets to confine the plasma causing more collisions compared to traditional ICP designs. More collisions result in higher plasma density at lower pressure, improving etch rate, anisotropy and selectivity.
- Ulvac's patented star electrode features a self-cleaning function that prevents material buildup on the RF window, enhancing uniformity, ensuring consistent power delivery for long-term process stability, eliminating the need for frequent manual chamber cleaning.
- The system utilizes an advanced ESC to enhance electrical clamping and Helium backside cooling to maintain precise wafer temperatures, preventing thermal damage during high-power runs necessary to anisotropically etch tough material like ferroelectrics, precious metals, and magnetic films.
- The cathode is powered by a 3000W 12.56 MHz Adtec power supply/match for biasing.
- This system features a dual Endpoint Detection system consisting of an optical emission spectrometer (OES) that monitors real time plasma emissions to detect the exact moment an etch layer is completed. In addition, it has a laser interferometer that uses optics to precisely determine the etch depth, guaranteeing sub-nanometer precision without etching to the stop layer.
- Two gas boxes holding ten MFCs each for Ar, O<sub>2</sub>, CF<sub>4</sub>, N<sub>2</sub>, CHF<sub>3</sub>, BCl<sub>3</sub>, Cl<sub>2</sub>, SiCl<sub>4</sub> and HBr support etching of most semiconductor, compound semi, solar, hard disc and photonic thin films.
- The temperature of the chamber liners and cathode is independently controlled from -40 to 250C via a SMC HRZ004-H-C heat exchanger charged with Fluorinert FC-3280.
- The vacuum system features a Shimadzu TMP-1303 MTG (30300 RPM) turbo pump and a VAT 65046-IHHC pendulum valve that allows independent pressure control regardless of the gas flow.
- Ion gauges, pirani gauges and a cap manometer is used to measure pressures in the L/L and process module.
- The system is powered by a Toshiba FA2100SS industrial computer with Ulvac's version 2.1 software providing semi or automatic modes, stored recipes, data and event logging, and maintenance programs.

# Hardware Specs

## Ulvac NE 950-EX



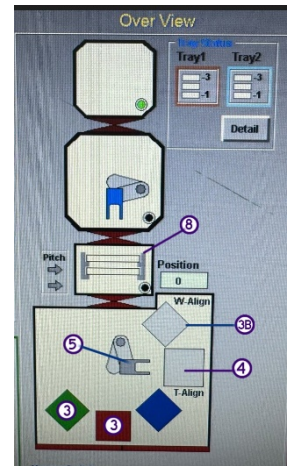
front end interior components

### FRONT END COMPONENTS

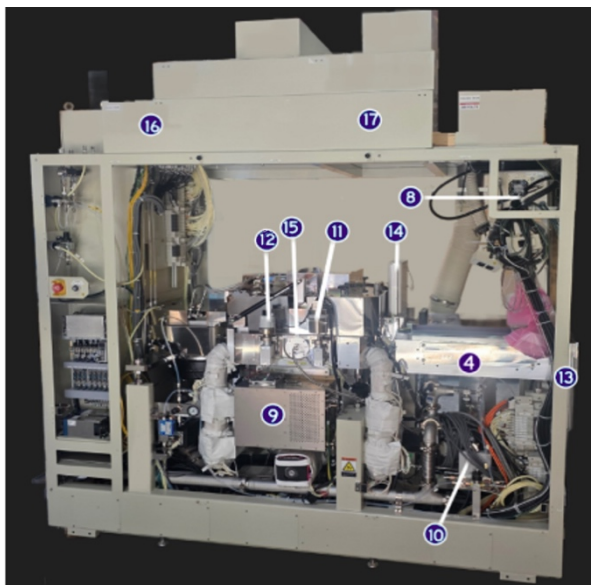
1. Toshiba FA2-100SS computer
2. Computer Screen
3. Cassette Load
- 3B. Cassette aligner
4. Carrier Load / Aligner
5. Atmospheric Robot ith dual end effectors
6. Carrier End effector
7. Wafer end effector
8. Transfer chamber



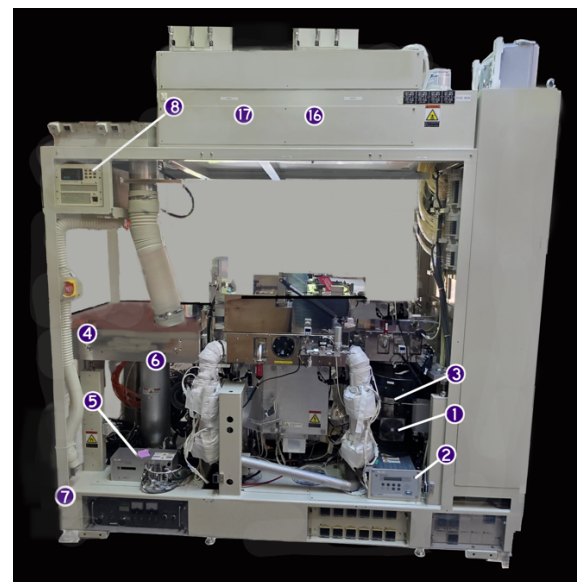
front end ext components



Software showing wafer/carrier transport status



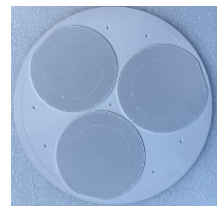
process module components (left side)



process module components (right side)

### Process Module Components

- |                                         |                                                                             |
|-----------------------------------------|-----------------------------------------------------------------------------|
| 1. Shimadzu TMP-1303 Turbo              | 9. Adtec 3kW RF match AMUG-3000                                             |
| 2. Shimadzu Turbo Controller E1-R04MT   | 10. MKS he cooling 20 sccm                                                  |
| 3. VAT Pendulum Valve 65046-IHHC-       | 11. MKS Baratron 628D01TDE1B                                                |
| 4. Load Lock                            | 12. Pfeiffer Vacuum cold cathode IKR 251                                    |
| 5. JEL vacuum robot                     | 13. MC XGT-312-50340-1A-X617 gate valve                                     |
| 6. JEL C4000 4 axis robot controller    | 14. SMC XGT221-46236-IC-X135 (Turbo)                                        |
| 7. Power Supply for ESC 5KM3RCU         | 15. End Point - laser and OES                                               |
| 8. Adtec 3kW RF generator TX30- 12.5MHz | 16. Gas box 1 - 10 STEC 4400 mfcs (Ar, O2, CF4, CFH, SF6, BCl3, Cl2, SiH4)  |
|                                         | 17. Gas box 2 - 10 STEC 4400 mfcs (Ar, O2, CF4, CF3H, SF6, BCl3, Cl2, SiH4) |



330mm Carrier w/  
3 x 150mm wafers