PTW Asia
SINGAPORE

Hitachi CD SEM Equipment and Lasers

ABOUT US

VISION STATEMENT

"To be the Supplier of choice for upkeep and Capacity extensions for Hitachi CD SEM Equipment and Laser."

PRODUCT RANGE

- Aligner
- Sensor
- AV Assembly
- Power Supply
- Encoder Laser
- EVAC
- Filter
- Ion parts
- Valve
- Power unit
- MHV
- OBJ
- OM Camera
- Robot
- Turbomolecular parts

OUTLINE

- We are dealing with semiconductor spare parts for Hitachi CD SEM equipment and lasers in particular to precision and surface scan.
- We also provides services for periodical maintenance/repair module/installation/un-installation for Hitachi CDSEM & SEM equipment.
- We also provides services to repair & overhaul Laser (Precision & Surface Scan)

HITACHI CDSEM & REVIEW SEMS

CD-SEM Refurbished Tools

We take in the Tool/Process specs and design a system spec for a tool to refurbish and meet the customers specs. We work together from :

- Spec Setting
- Tool configuration
- Tool sourcing (if non existent)
- Complete refurb and overhaul
- Installation and Process approval

Tools Types

S-9380II

S-92xx

S-88xx

Hitachi CDSEM & Review SEM –Training Courses

- A CD-SEM (Critical-dimension scanning electron microscope) measures the dimensions of the fine pattern formed during a semiconductor manufacturing process, thus enabling high quality semiconductor devices to be manufactured.

- We are able to provide training courses to engineers. This helps engineers to familiarize themselves with the tools. Training modules can be customized to suit end users requirements.

EVAC System Training

Syllabus:

1.1 Understanding of AV valves operation

1.2 TMP calibration

1.3 Understanding of Hitachi Evac operation

1.4 Hands on practise

Training hours: 10am to 5pm, inclusive of 1 hr lunch break

Max trainees: 4 pax

Required tool time: 4 hrs (this is for hands on practise)

Hitachi CDSEM & Review SEM –Training Courses

Robot Training

Syllabus:

1.1 Understanding of Robot movement

1.2 Robot teaching concept

1.3 Hands on robot teaching practise

Training hours: 10am to 5pm, inclusive of 1 hr lunch break

Max trainees: 4 pax

Required tool time: 16 hrs (this is for hands on practise)

Image Alignment Training

Syllabus:

1.1 Mechanical Alignment

1.2 Electrical Alignment

1.3 High voltage basic theory

1.4 Optical microscope mechanical focus of bulb replacement

Training hours: 10am to 5pm, inclusive of 1 hr lunch break

Max trainees: 4 pax

Required tool time: 4 hrs (this is for hands on practise)

HITACHI CDSEM & REVIEW SEMS

Hitachi Capabilities

- We have technical capabilities with S88XX, S92XX, S93XX, CG4000, CG4100, RS3000 & RS4000.
- We provides periodic maintenance packages and have a team of experienced engineers to help end users to conduct HYPM and PM
- We carry a number of consumable and spare parts used in Hitachi CDSEM machines.

Hitachi CDsems & Review Sems PM flow

Day 1

Pre-check image quality → IP Range → Pre-check evac status: pump & utilities values → Parts replacement* → Outer bake overnight

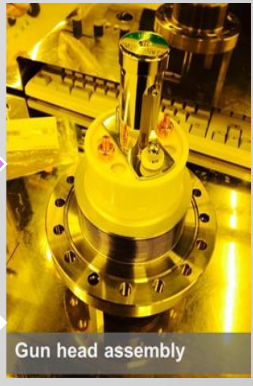
*Parts to be replaced include: SE Tip, objective plate, Av1 o-ring, gaskets, spring, fixed apt

Day 2

Turn on ion pump → LC cleaning → XY ball screw cleaning → Inner bake overnight

Day 3-4

Tip startup → Image calibration → Cycling check → Release to customer


Gun head assembly

HITACHI CDSEM & REVIEW SEMS

- Fab Shutdown and Power up support for CDSEM
- Hitachi Aligner & Laser exchange and installation
- Various Hitachi PCB & Module one to one exchange (HV controller & display rack Pcb)
- Robot Repair
- Relocation of machine, machine trading or sale (with warranty coverage)

Hitachi CDSEM Protective Maintenance Services

Quarterly Protective Maintenance (QPM)

Package 1 covers the following items

a) Cleaning of X, Y & Ball screw

b) Greasing of X, Y & Ball screw

c) Chamber cleaning only if it is necessary

Package 2 covers the following items

a) Cleaning of stage

b) Greasing of stage

c) Chamber cleaning only if it is necessary (Require 2 staffs if customer want to do it)

d) If AV-1 Oring or OBJ plate to be change during QPM. The chamber needs to be air and this will affect the ion pump valve. Need to bake out the chamber to recover the ion pump.

Hitachi CDSEM Protective Maintenance Services

Yearly Protective Maintenance (YPM)

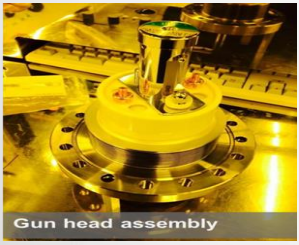
Hitachi 9xxx/8xxx 12 months PM service with Tip change services
Lead-time: 3-4 weeks Upon PO

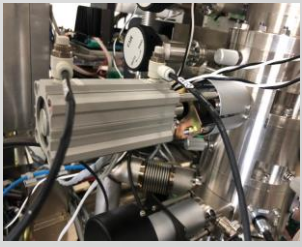
Yearly PM covers the following items

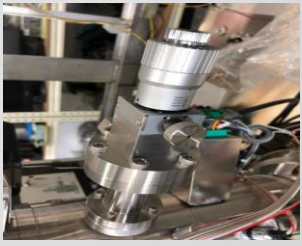
a) OBJ aperture plate change

a) Tip change

a) AV1 Oring change



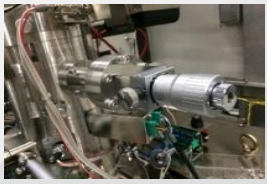




Hitachi CDSEM CONSUMABLES & SPARE PARTS

ELECTRON OPTICS SYSTEM

- OBJ Auto
- OBJ Manual Control
- OM Camera
- Lamp House
- EO Cont Board



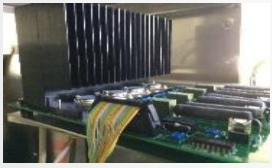
HIGH VOLTAGE UNIT

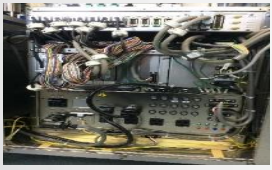
- HV Controller
- MHV

Hitachi CDSEM CONSUMABLES & SPARE PARTS

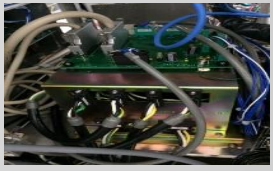
STAGE

- Amplifier Sensor
- DEF Power Supply
- Stage Laser
- Len Power Supply





- Mini E Power Unit
- SPM Sensor
- Stage Power Supply
- XY Motor Driver



Hitachi CDSEM CONSUMABLES & SPARE PARTS

VALVE

- AV1 Assembly
- AV3 Assembly
- Leak Valve
- MV Valve




CONTROL AND DISPLAY SYSTEM

- Workstation
- SEM


WAFER TRANSFER UNIT

- Robot
- Robot Arm
- Robot Unit
- Robot Controller
- Aligner

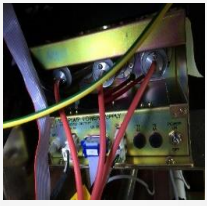




Hitachi CDSEM CONSUMABLES & SPARE PARTS

EVACUATION SYSTEM

- Ion Pump
- Ion Pump Battery
- Ion Pump Power Supply
- Turbomolecular Pump
- Turbomolecular Pump Controller
- Rough Pump



- Vacuum Switch
- EVAC Board
- EVAC Display
- EVAC Power Supply
- Gas Filter

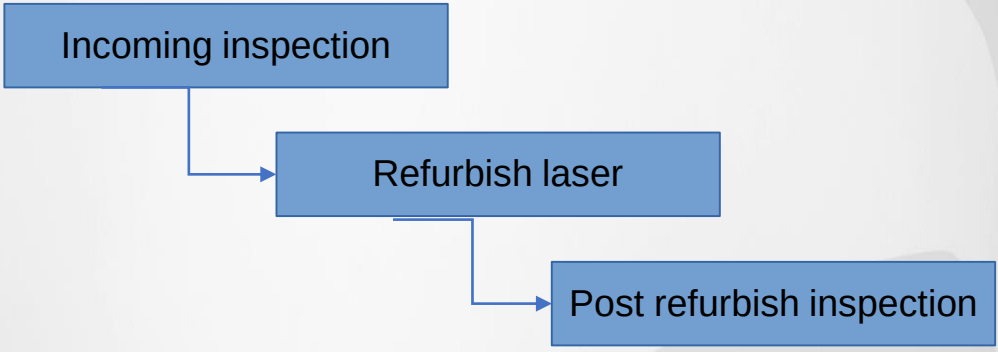
Hitachi Hi-SEM & FeSEM

Hitachi Capabilities

- We have maintenance services for the following Hitachi series
  1. Hi-SEM: TM1000, TM3000/30, S3000N, S3400N, S3700N, S3500, SU1510, SU3500, S2700
  2. FeSEM: S4500, S4000, S4700, S4300, S4800, S-5000, S-5500, SU-8000, SU-8200
- We have troubleshooting and relocation capability
- We provides periodic maintenance packages and have a team of experienced engineers to help end users to conduct HYPM and PM
- We carry a number of consumable and spare parts used in Hitachi SEM machines.

Laser

WORKFLOW FOR LASER REFURBISHMENT



INCOMING INSPECTION

- **Incoming laser is tested to understand the current state of the laser**
- **Laser powered on**
- **Check for locking signal (pass/fail)**
- **If laser able to lock**
  - Check for power
  - Check for reference frequency
  - Check for alignment
- **If laser unable to lock**
  - Trouble shoot power supply
  - Trouble shoot control/feedback circuit
- **Determine whether laser can be refurbished**

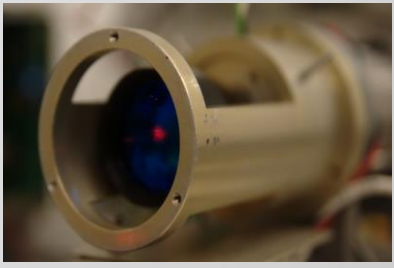
Laser

REFURBISHMENT

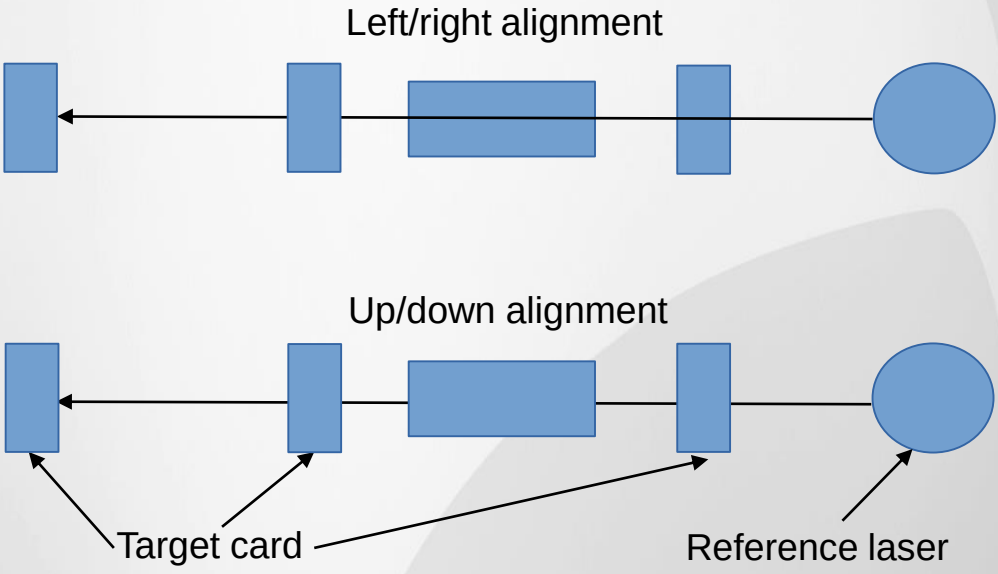
- Replacement of power circuit electrolytic capacitor
- New tube installation
- Lens and mirror clean up and alignment
- Power and frequency tuning

POST REFURBISHMENT TESTING

- Ensure laser power up and able to lock within 10 minutes (spec)
- Power output reading (total power, V and H power)
- Reference frequency reading
- 8 Hrs stability testing (frequency, measurement output) in interferometer setting
- Alignment check



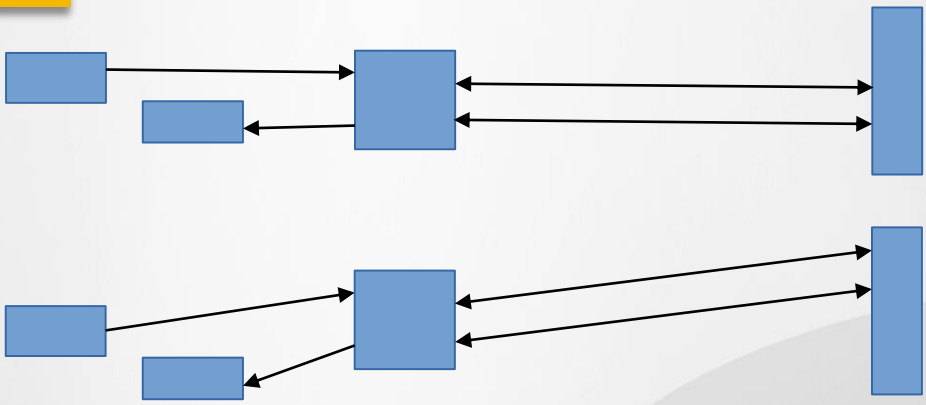
LASER BEAM ALIGNMENT



- **Laser beam is aligned with jig setup referenced to a standard laser beam for straightness.**
- **Furthest target setup at ~5m away from laser head under test**

Laser

BEAM NOT ALIGNED



- **Large mis-alignment will cause measurement system to fail. Lost track and unable to measure displacement of mirror.**
- **Minor mis-alignment will cause intermittent lost track.**
- **Need to consider overall system alignment, not just laser head. Every pitch and yaw in each component contribute to overall misalignment of the system**
- **Effect on the measurement result will be reduced accuracy (for most system this is well below the machine mechanical capability. e.g. accuracy will be reduced by nm, while mechanical control usually is in micron level)**

Laser

EFFECT OF LASER PARAMETER

- **Power**
  - Higher power – better signal to noise ratio
  - Low power reduce noise immunity, too low power will cause the laser to loose lock and unable to stabilize (ready light will keep blinking)
- **Split frequency**
  - Reduced frequency will reduce the capability of laser to measure fast moving object
  - Higher frequency will cause measurement electronic to loose count

CURRENT LASER REFURBISHMENT CAPABILITY

- **HP/Agilent/Keysight 5517 Series**
  - 5517A (1.5-1.9MHz)
  - 5517B (1.9-2.4MHz Nikon Lithography, ASML Lithography, Hitachi CDSEM)
  - 5517C (2.4-3MHz Nikon/ASML Lithography, Amat Compass)
  - 5517D (3.4-4MHz Nikon/ASML Lithography)
  - 5517DL (4.4MHz Nikon Lithography)
  - 5517D/DL C300 (>5.1MHz ASML Lithography)

WHAT WE CAN DO FOR PROACTIVE SERVICES

Protective Maintenance Services

- Cleaning/Greasing of X, Y & Ball screw
- Cleaning/Greasing of the stage assembly
- Chamber cleaning
- AV-1 Oring or OBJ aperture plate change
- Tip change

Laser Refurbishment

- Incoming inspection to test laser current status
- Replacement of power circuit
- New tube replacement
- Power and frequency tuning
- Alignment check

Spare parts readiness

- Support most on Non consumable local and overseas inventory as defined
- Lower cost on consumable parts local and overseas inventory
- Parts refurbishment
- Parts flexibility - OEM or PTW Asia

Training support

- On site training at lower cost
- Training at our facility is also available

OUR GAME PLAN

- ✓ Technical support : 24/7
- ✓ Includes Major Planned Maintenance and technical troubleshooting services
- ✓ Bring in Legacy tools in local warehouse for part exchange program
- ✓ Supports CIP to improve tool utilization performance

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