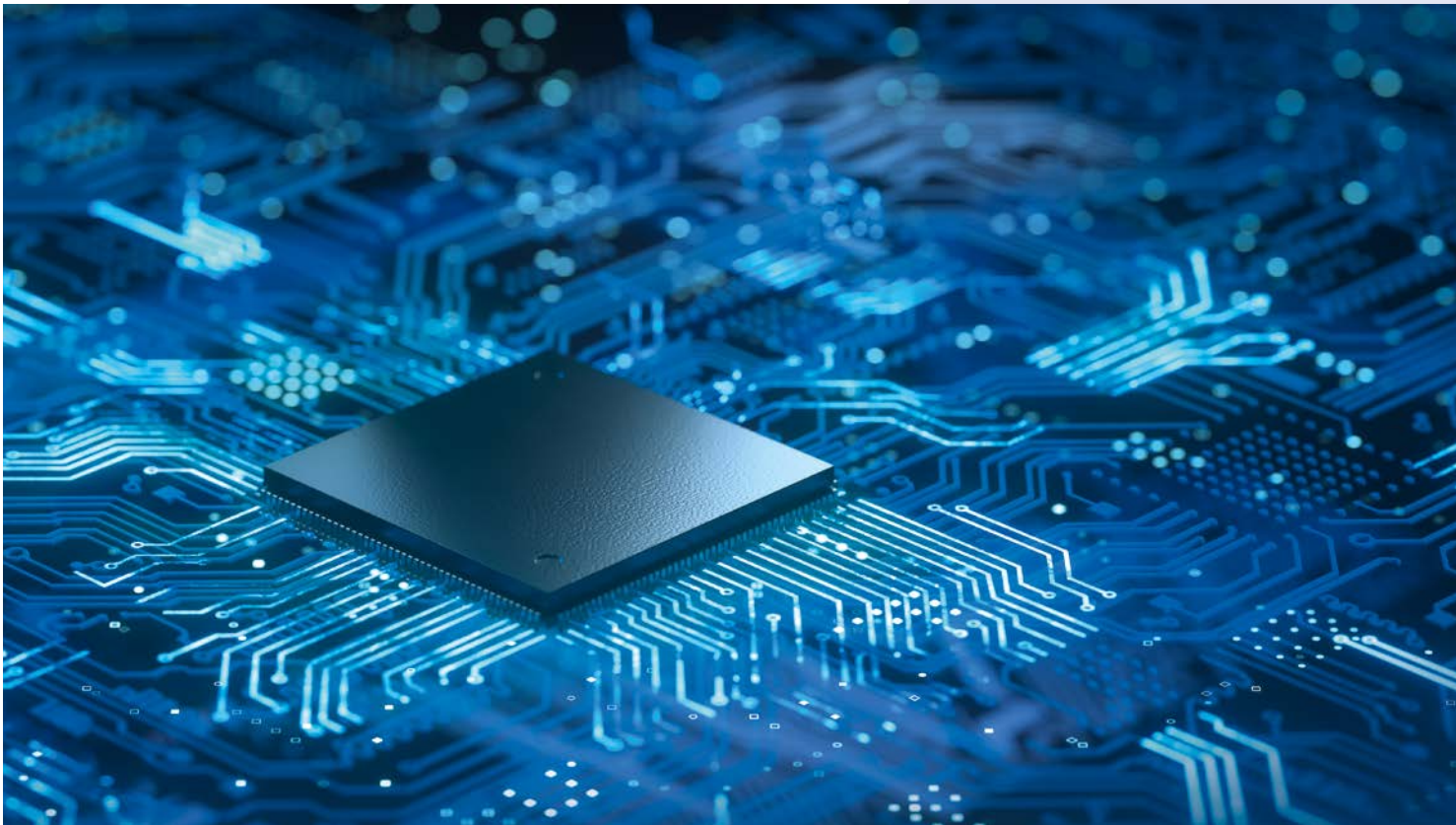




YOUR PARTNER FOR LEGACY TOOL SUPPORT

Range of Services



REUSE. REFURB. RENEW. RECYCLE.

Welcome to PTW

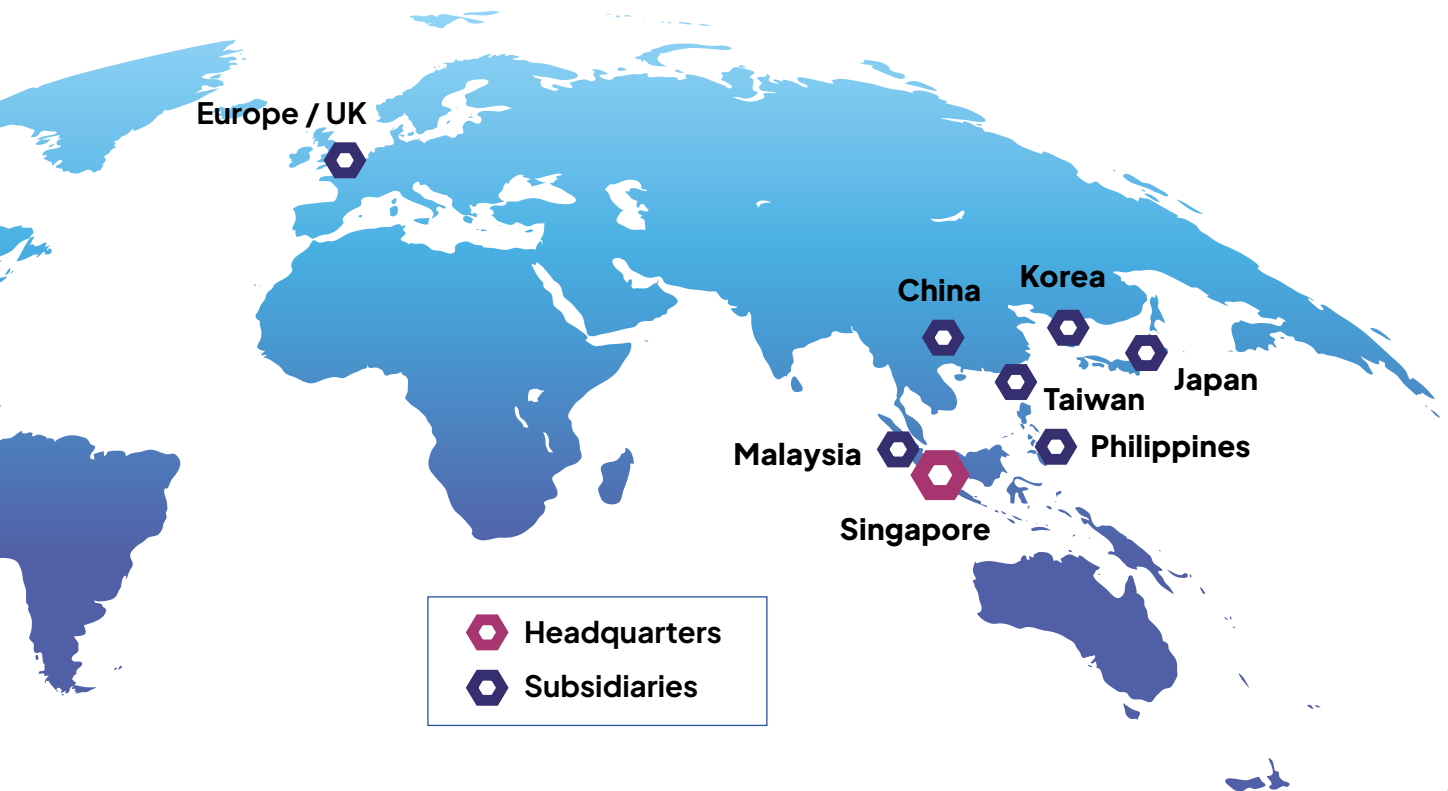


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Sr. Vice President
Business Development



Hans Peters
General Manager Europe

Worldwide Locations



Harry Engwer
General Manager America



Torsten Seifried
Managing Director



Ji Hyeon Mun
General Manager Korea

About PTW GROUP



” OUR VISION

To be the Supplier of Choice for Supporting Legacy Equipment in the Semiconductor Industry. ”

For more than 15 years, PTW GROUP has been a valued partner for legacy tool support. We have been focusing efforts for more sustainability through reuse, refurb, renew and recycle programs.

We are ready to collaborate with you on addressing your challenges and needs. Our end to end support includes onsite service, part level repair and exchange, upgrades to entire system reconfiguration and refurbishment, as well as specialized engineering projects.

Let us support you!

Range of Services



Legacy Tool Support

- Spare parts (OEM new, repaired or refurbished)
- Replacement for discontinued parts
- Upgrades and exchange parts program



Tool Refurbishment

- Sales of refurbished tools
- Reconfiguration
- Installation
- Warranty



Tool Trading

- Buy and sell "As is, where is"
- Bulk buy
- Target purchases



Customer Service

- Corrective maintenance
- Preventive maintenance

SEZ Product Range

PTW
PRODUCT
OFFERING

**With over 25 Years of Experience
we are able to Offer**

- Tool refurbishment
- Installation, tool move & training
- Corrective & preventive maintenance
- Specialized upgrades

**Our Specialty is Tool Modifications for
Thin Wafer Handler.**

Refurbishments are carried out in
our refurbishment centres and are
offered as turnkey solutions.

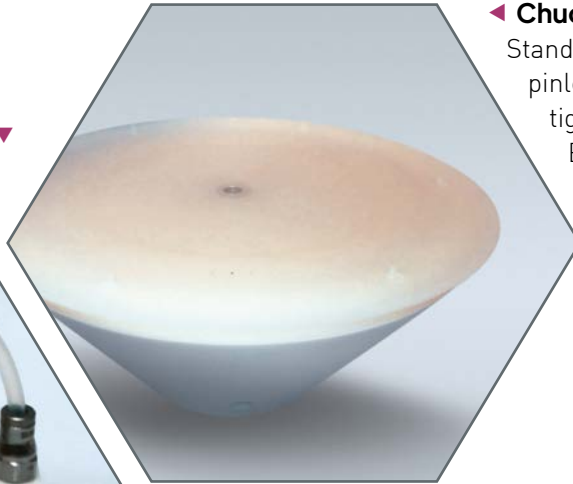
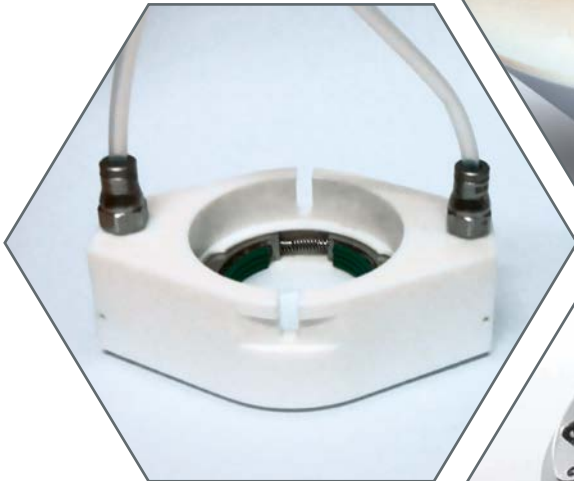
We also offer conversions from
6" to 8" (starting with 200-series
tools) including installation
and training.



SEZ Product Range

Chuck Brakes ▼

Available for 100-series and 200-series



◀ Chucks & Chucks Refurbishment

Standard pins, NC-chuck pins, pinless, undercut and step chucks, tightened OEM specifications. Each chuck assembly is checked before delivery to meet our tighter tolerances.

New Bearing Units ▶

2nd Source new for all models. Available in exchange program or as part of a refurbishment service.



▼ Motors & Pump



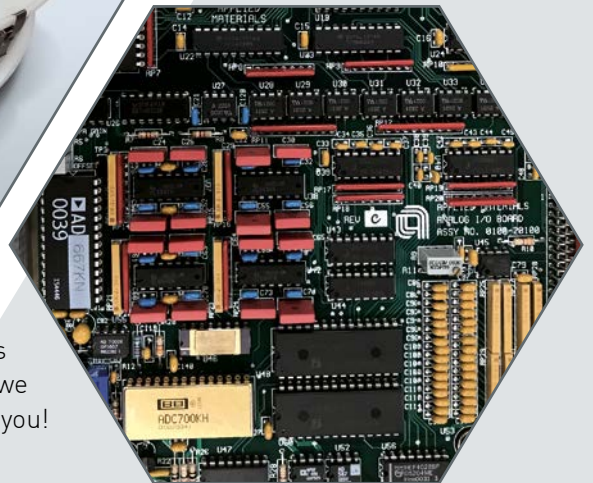
Process Chamber ▶

Available in 5", 6", 8" & 12". Either available as complete chambers or spare parts. Alterations and desired improvements possible.



PCB Repairs ▶

We offer repair for SEZ's PCB boards. Simply send us your non-working PCB and we will repair them for you!



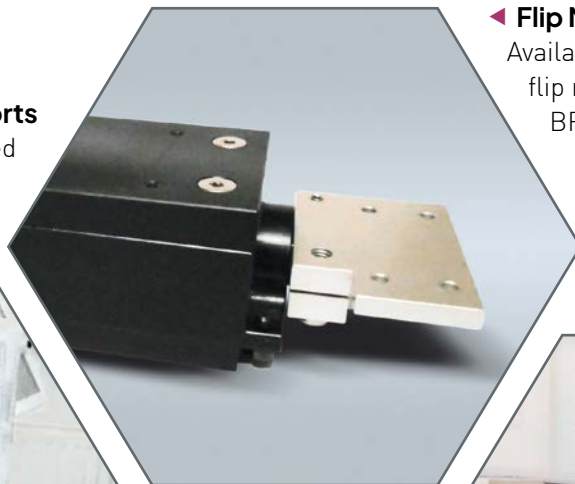
SEZ Robot & Handling

PTW PRODUCT OFFERING



◀ Eco Gripper

Available in 5", 6", 8" & 12", with BERNOULLI, standard eco or double eco, spare parts available



◀ Flip Modules

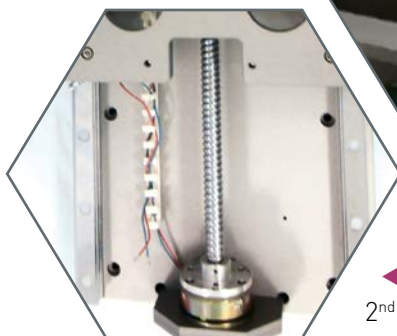
Available as new or refurbished flip modules, refurbishment of BROOKS robots

▼ 12" Load Ports
Available as refurbished or as part of an exchange program



▼ SEZ Robots

Available as refurbished robots or as part of a refurbishment program



◀ New Elevating Unit

2nd source new for all models, available in exchange program or as a refurbishment service



◀ BERNOULLI Gripper

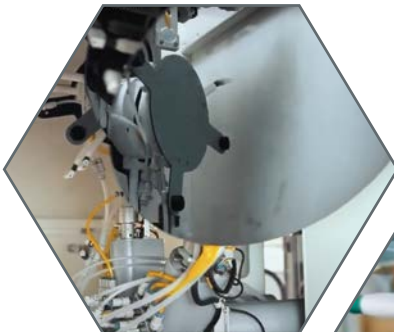
Available in 6", 8" & 12", new or refurbished end effectors and grippers

Further Available Parts

- Single & double-sided end-effector
- Lock nuts (bearing units)
- Ball bearings
- Preflush manifold
- Labyrinth seal
- Chuck pins (and other Consumables always on stock!)
- Distancing rings
- Brakes
- Pinless top-plates

Further Upgrades

- Improved suck back box for ultra-high viscosity medias
- Pump upgrade to replace NIPPON pillar pumps enabling:
 - Better process uniformity for wafer to wafer
 - Significant costs reduction
 - Important maintenance time reduction
 - Speed pack upgrade for elevating units



SEMITOOL

PTW PRODUCT OFFERING

Tool Types

- Raider-series
- Storm
- Spectrum
- SST
- SAT

Expertise

- Tool refurbishment
- Installation, tool move & training
- Corrective & preventive maintenance





Exchange Parts

- Motors
- Chamber control block
- DYNATRONIX power supply
- PCB boards

Part Repair / Refurb

- Actuator refurbishment
- Gold boxes
- DYNATRONIX power supply
- Lift rotate module
- SEMITOOL raider robot



HITACHI SEM

PTW PRODUCT OFFERING

Offerings

- Tool refurbishment
- Tool upgrades
- Installation, tool move and training

Expertise

CD-SEM

- 7, 8 & 9-series
- CG 4000

Fe-SEM

- S 4-series
- S 5000 & 5500
- SU 8000 & 820

Hi-SEM

- TM 1000 & 3000/30
- S 2700 & S 3-series
- SU 1510 & 3500



Refurbishment

Controllers

- HV controllers
- Stage & EVAC controllers

Robot and handling

- Rotation arm units
- TAZMO robots
- Aligners

EVAC System

- Ion pumps
- Turbo pumps
 - TMP controllers
- Vacuum switch
- EVAC board
- EVAC display
- EVAC power supply
- Gas filter

Valve Assy

Stage

- Amplifier sensor
- DEF power supply
- Stage laser
- Len power supply
- Mini E power unit
- SPM sensor

Upgrades

- Sic upgrade
- Datastation upgrade



Electron Optics System

- OBJ auto
- OBJ manual control
- OM camera
- Lamp house
- EO cont board

Services

- Corrective maintenance
- Preventive maintenance



Coater/Developer

PTW PRODUCT OFFERING

Tool Types

- ACS 200 & 300
- FAIRCHILD FALCON
- SCREEN

OEM New and Second Source Parts

- Motors
- Chucks and bowls
- Sensors
- Media valves
- SM and libbert cards

Refurbishments and Repairs

- Hotplate refurbishment
- Spinmotor and controller
- Robots
- End effectors
- Complete coater and developer modules
- Gear unit process arm refurbishment
- Spin chuck repair
- Wafertec pump repair



Coater/Developer Upgrades

Resist Pump

INNOPUMP: Resist Pump Upgrade

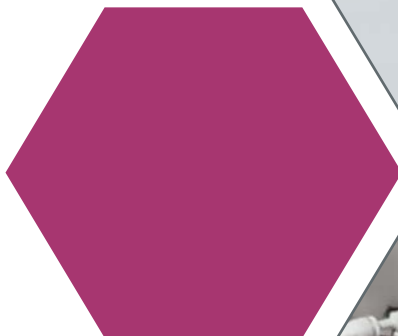
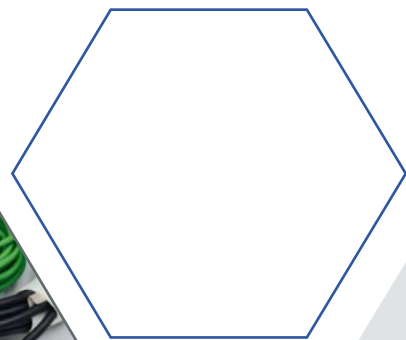
- Fully integrated system for SÜSS with controlled and logged flow rates
- INNOPUMP micro-controller: high accuracy (+/- 3 %) for low & high viscosities
- Cost reduction, bubble detection, prevents rework, reduced maintenance

Spray Nozzle

INNOSPRAY: Spray Nozzle Upgrade for Polyimide Developer Systems

- Fully integrated system for SÜSS (coming soon for TEL & DNS)
- Easily adjustable nozzle, drop size and spray angle

- Cost reduction up to 50 %: minimal waste, misting & overspray, reduced extraction and process time, no N₂ needed



Coater/Developer Upgrades

PTW PRODUCT OFFERING

Hot Plate

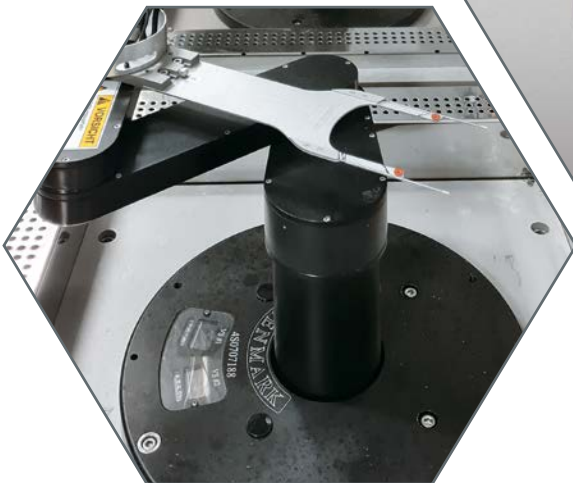
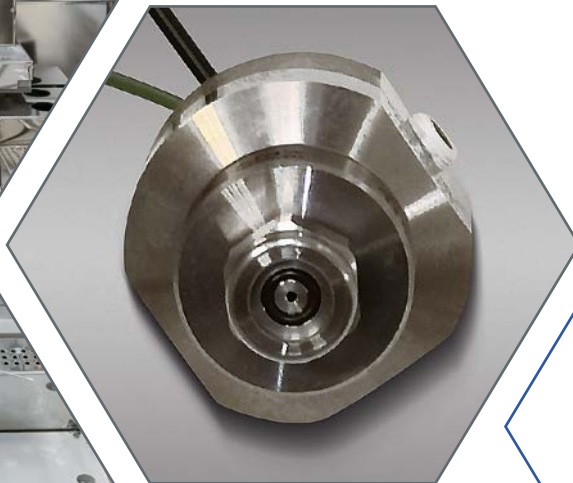
Hot Plate Wafer Tilt Detection

- Fully integrated system for SÜSS coaters (coming soon for others)
- Detects foreign material on hot plates
- Alarms if a wafer is not positioned correctly

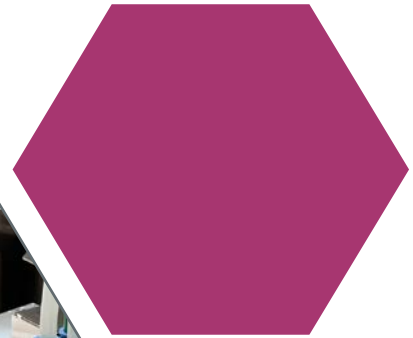
Wafer

Wafer Edge Detection

- Fully integrated system for SÜSS coaters (coming soon for others)
- Vision sensor mounted on EBR arm
- Wafer centering control before process
- Wafer edge control after coating & wafer edge removal
- Less rework, less scrap



SÜSS Coater/Developer



Parts

- Spin motors
- Load port adapter
- Flow control
- End-effector assembly and blades
- Pumps
- Process bowls
- Process arm custom nozzles
- Gear unit process arm

Expertise

- Fairchild Falcon
- SÜSS ACS 300
- SÜSS ACS 200
- DNS/screen

Refurbishment

- Coater/developer module
- Hot plate/cool plate
- Robots

Upgrades

- Spray nozzle upgrade
- Wafer edge detection
- Wafer tilt detection

ASM

PTW PRODUCT OFFERING

Tool Types

- Furnace A400 - A412
- Epitaxy E2000 - E3200

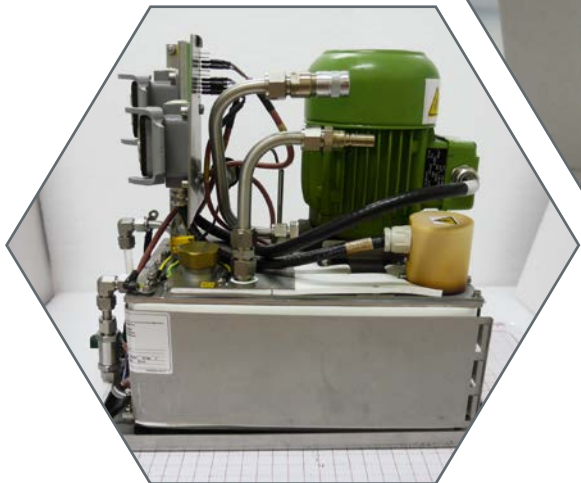
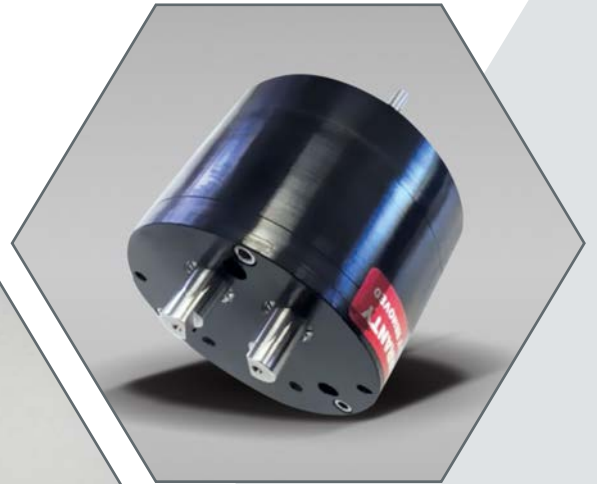
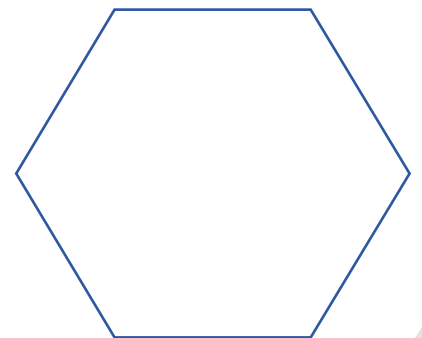
Product Range

- PCBs, including CPU & FOXBORO boards
 - Component repair for all PCBs, tested on tools
- LVC-414 controller
 - Repair of liquid vapor controller for E2000
- Injector
 - Cheaper, better linearity and repeatability, built to last
 - Better sealing, reducing particle emissions
- Wafer wand
 - 2nd Source new for epitaxy
- Compumotor driver
- Reflector
 - Different reflectors available
- Thermocouple
 - The larger outside diameter of the quartz ensures a 20-40 % longer lifetime



Upgrades

- Gear box
 - Less wobble caused by shocks, resulting in more precision
- Add in water leakage sensor
 - Preventing electron sensor damages or water dripping onto the wafer
- Retrofit of TCF/TCU cooling system
 - Making replacement of damaged parts easier and faster
- Zirox O₂ analyser
 - Replaces the no longer available PBI Dansensor O₂ analyser
- Golden coolant upgrade (TCF)
 - Better heat exchange & longevity compared to glycol (TCU)



Robot Measurement Cassette

PTW PRODUCT OFFERING

Innovative

- Reduction of wafer scratches, chips and breakages
- To replace individual perceptions based on eye sights

Measurement Functions

- Measurement resolution: 0.01 mm or 0.01 %
- Cassette levelling
 - Slot 5**
 - Paddle level
 - Tilt of wafer
 - Slot 1**
 - Position of wafer
 - Slot 25**
 - Lift of wafer



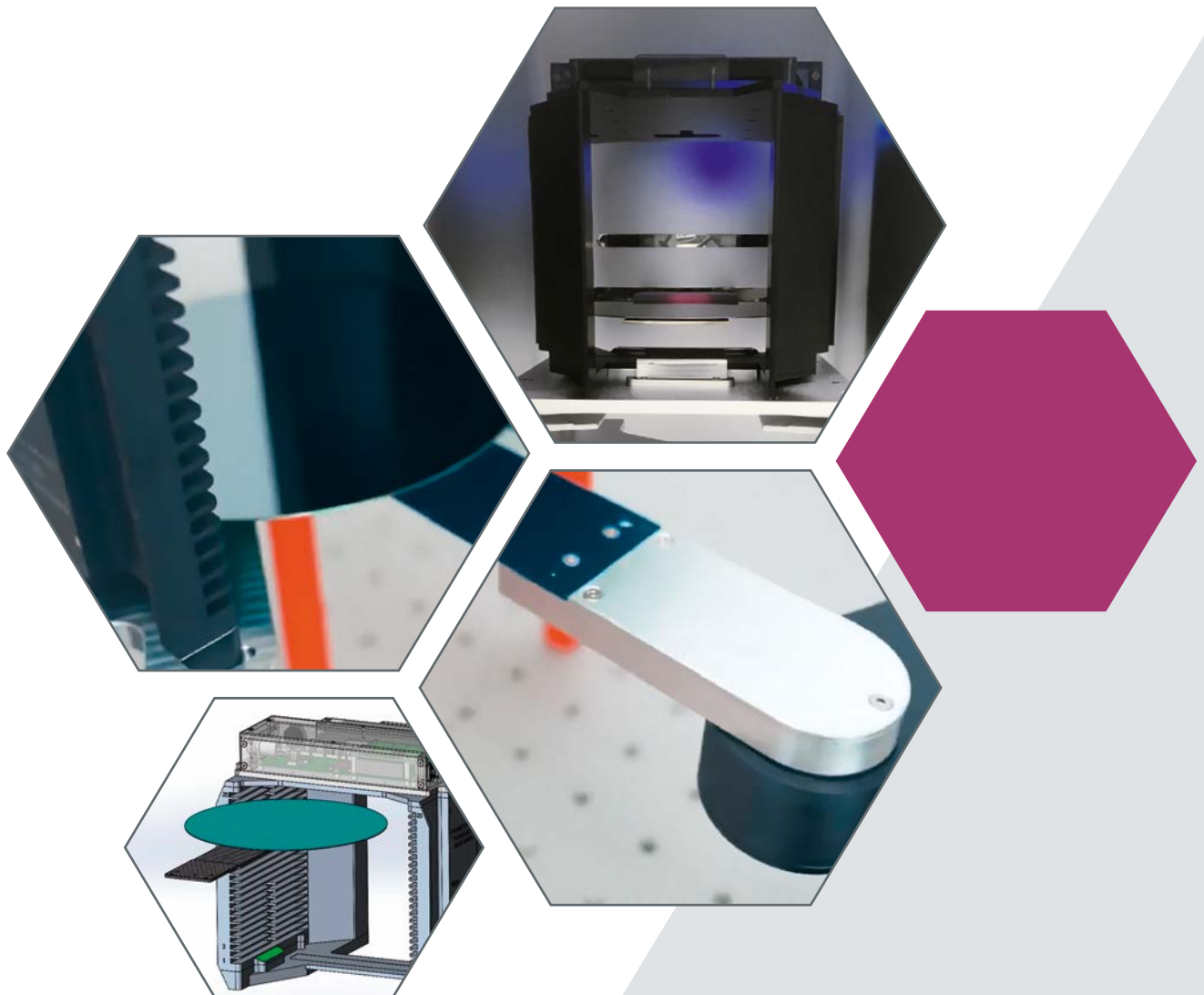
Robot Measurement Cassette

Preventive Maintenance

- Tracking of robot drift to set overhaul intervals
- Robot calibration added to preventive maintenance

Availability

- Available in a wide range of wafer sizes
 - 6" (150 mm)
 - 8" (200 mm)
 - 2" (300 mm)
- Fits in SMIF



Robots

PTW PRODUCT OFFERING

Product Range

**ATM & VTM Robots,
Pre-Aligners, Drive
Box & Controllers**

- Kawasaki
- Brooks
- Genmark

ATM

- Pri
- Rorze
- Shinko
- Yaskawa

VTM

- Pri
- Yaskawa
- Brooks



Expertise

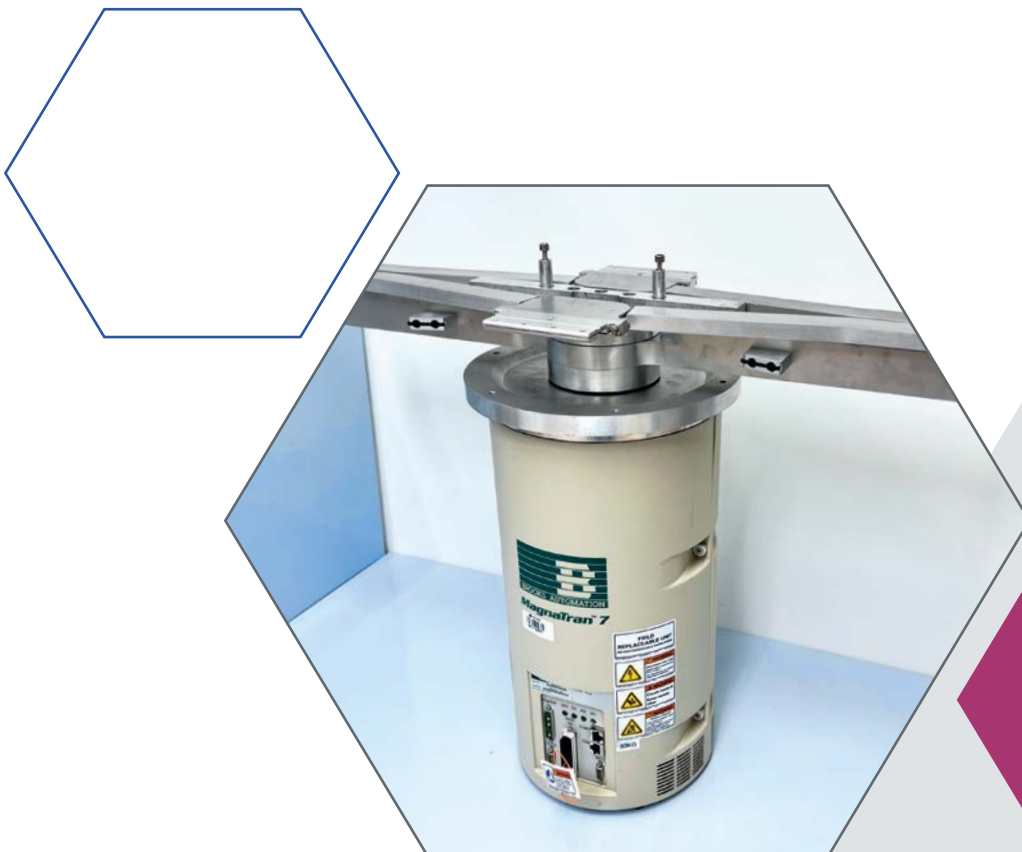
- Refurbished robot sales
- Robot refurbishment & repairs
- Spare parts, parts refurbishment & exchange
- Robot upgrades

Field Service

- Corrective & preventive maintenance
- Installation and de-installation
- Teaching & fine tuning
- Inspection & testing

Cost Savings

- Long life time
- 6 months warranty
- Reduced cost compared with buying new



Ozone Generator

PTW
PRODUCT
OFFERING

Product Range

Repairs & Overhaul for a Wide Range of Generators and Sensors

- MKS & ASTEX:
AX 8200, 8400 & 8500-
series, SEMOZON
- IN USA & TELEDYNE
- Ozone Sensors &
Controllers (IN USA,
TELEDYNE...)

Cost Savings

- Cost savings from
the reuse of the
Ozone cell
- Same specifications
as OEM
- Fast lead time
- 6 months warranty

Overhaul Process

- Initial cell inspection &
disassembly
- In depth cell cleaning &
repair
- Metallic & ceramic
electrodes replacement
- Cell reassembly, system
reassembly & testing

Testing Process

- Bench test to ensure
OEM performance
standards
- High voltage vacuum test
- Electronic board test &
component repair



Stage Laser Refurbishment

PTW PRODUCT OFFERING

Expertise

HP - Agilent - Keysight 5517-Series

- 5517A (1.5 - 1.9MHz)
- 5517B (1.9 - 2.4 MHz
NIKON & ASML
Lithography,
HITACHI CDSEM)
- 5517C (2.4 - 3 MHz
NIKON & ASML
Lithography,
AMAT compass)
- 5517D (3.4 - 4 MHz
NIKON & ASML
Lithography)
- 5517DL (4.4 MHz
NIKON Lithography)
- 5517D & DLC300 (> 5.1
MHz ASML Lithography)

Inspection

- Initial testing: start-up,
check for locking
signal, reference
frequency, alignment...

- Troubleshoot power
signal & control/
feedback circuit
- Determine whether
the laser is worth
refurbishing

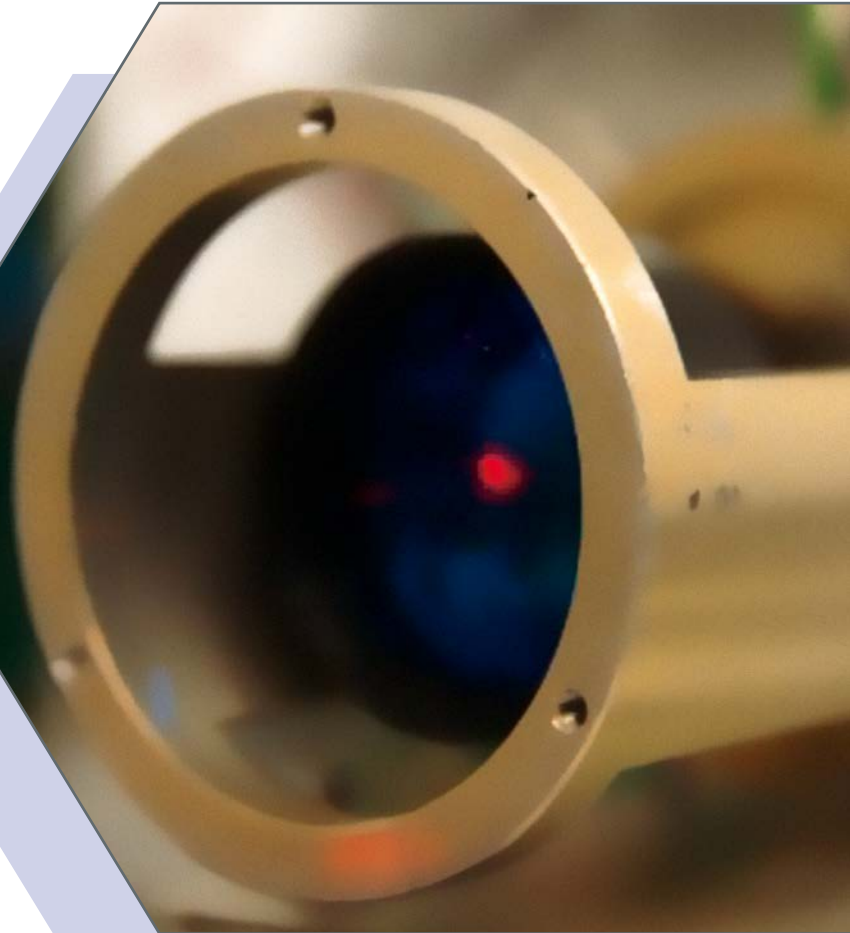
Refurbishment

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

Testing

Laser Should Power-Up and Lock within 10 minutes

- Numerous power
output readings
- Reference frequency
reading
- 8-hours stability
testing in
interferometer setting
- Alignment check



AMHS Robot Wheels

PTW PRODUCT OFFERING

Economical

- Choose between
 - Refurbishing service: save the old wheels
 - New wheels
- No changes needed to your vehicle: direct replacement wheels

Particle Reduction

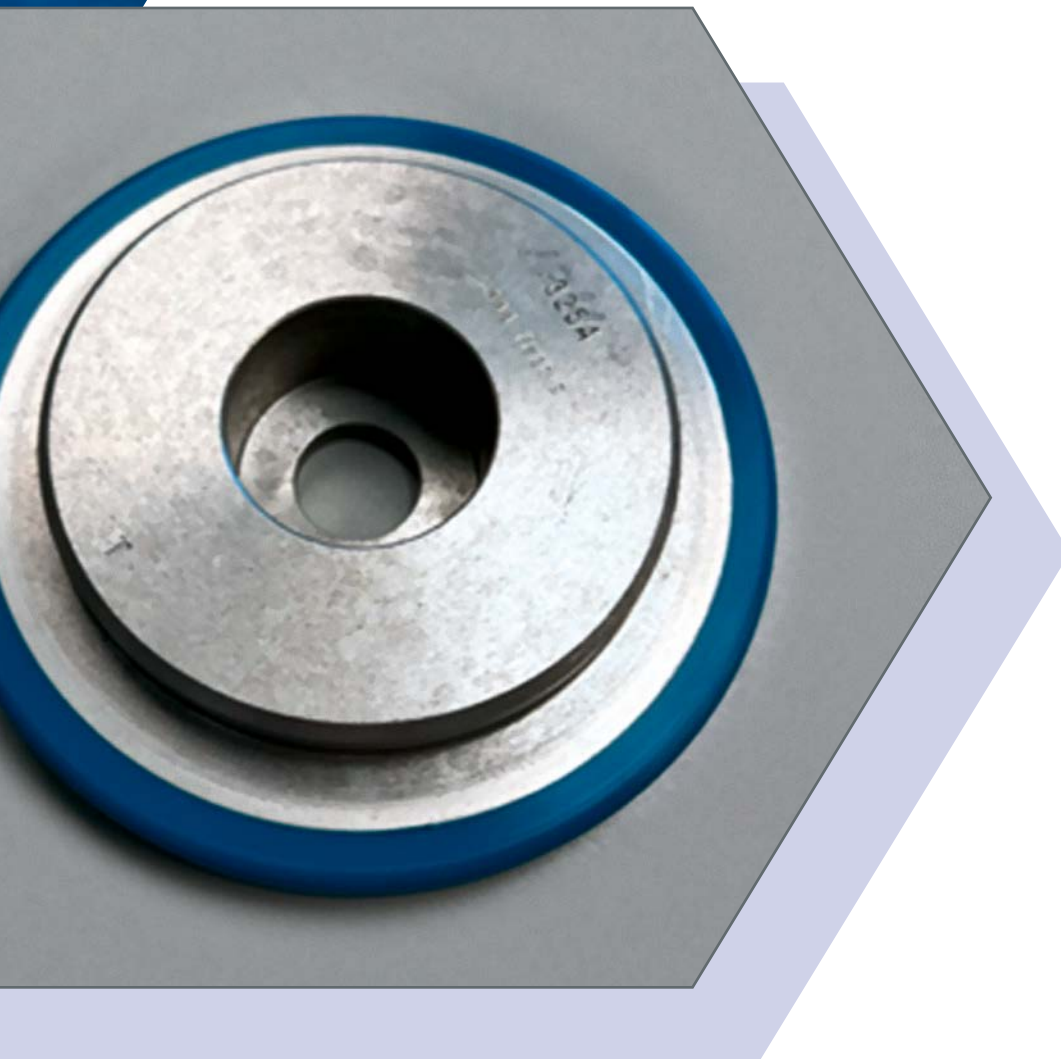
- Proven particle reduction of 80 % in HVM operation
- Tested over 24 months

Cost Savings

- Cost savings from the reduced cleaning of the AMHS tracks
- Initial results on 300 mm: increased lifetime of 400 %

Availability

- Wheels for a wide range of AMHS systems
 - DAIFUKU
 - MURATEC
 - BROOKS



Digital Gradient Filter

PTW
PRODUCT
OFFERING

Product Range

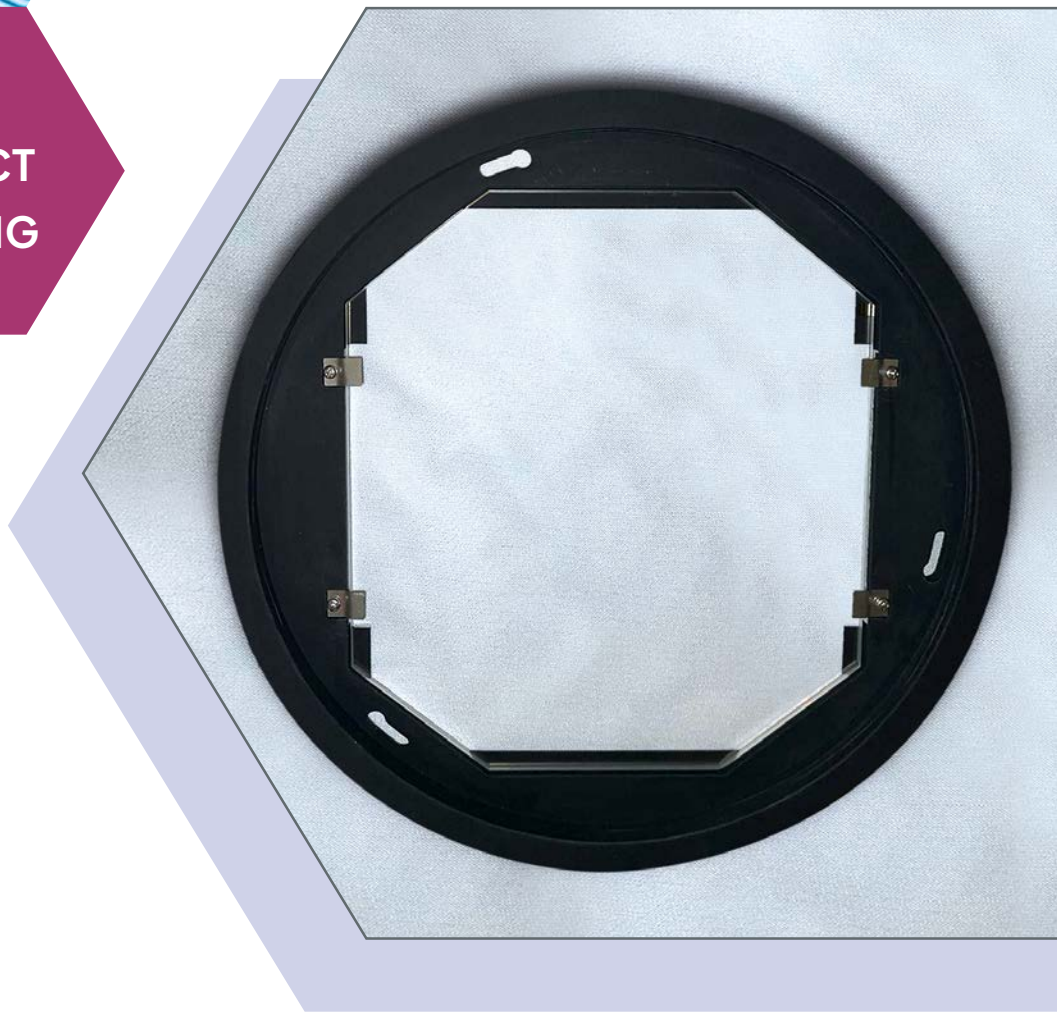
- Digital gradient filter for all stepper & scanner models (300 mm, 200 mm & 150 mm)
- Including I-line customized DGF and immersion type special DGF

Functions

- Installed for better CD & optical projection uniformity
- Prevents UV light from going directly toward the projection lens
- Prevents important stray light effect

Advantages Compared to OEM

- Cost effective solution
- 2/3-year lifetime depending on tool degradation
- Shorter delivery time:
 - PTW: 2-3 weeks from simulation data confirmation
 - ASML special UNICOM or DGF: 30-60 days
- NIKON & CANON special RPF: 1 year
- Designed for solving important variation in light uniformity and to work under low light intensity
- Better corrected slit uniformity (SLU %)





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