

Proven Qualified

40 Years



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AW-303R Downstream Etcher, Low Plasma Damage



Proven Qualified

Mainly For Compound Materials

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AW-303R Downstream Etcher, Low Plasma Damage



Proven Qualified

**Originated From
The Dominant
Plasma Etcher
of 2-6" Single Wafer in 80's,90's**

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Proven Qualified



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Advanced Technologies

**Designed with
III-V Production
in mind**



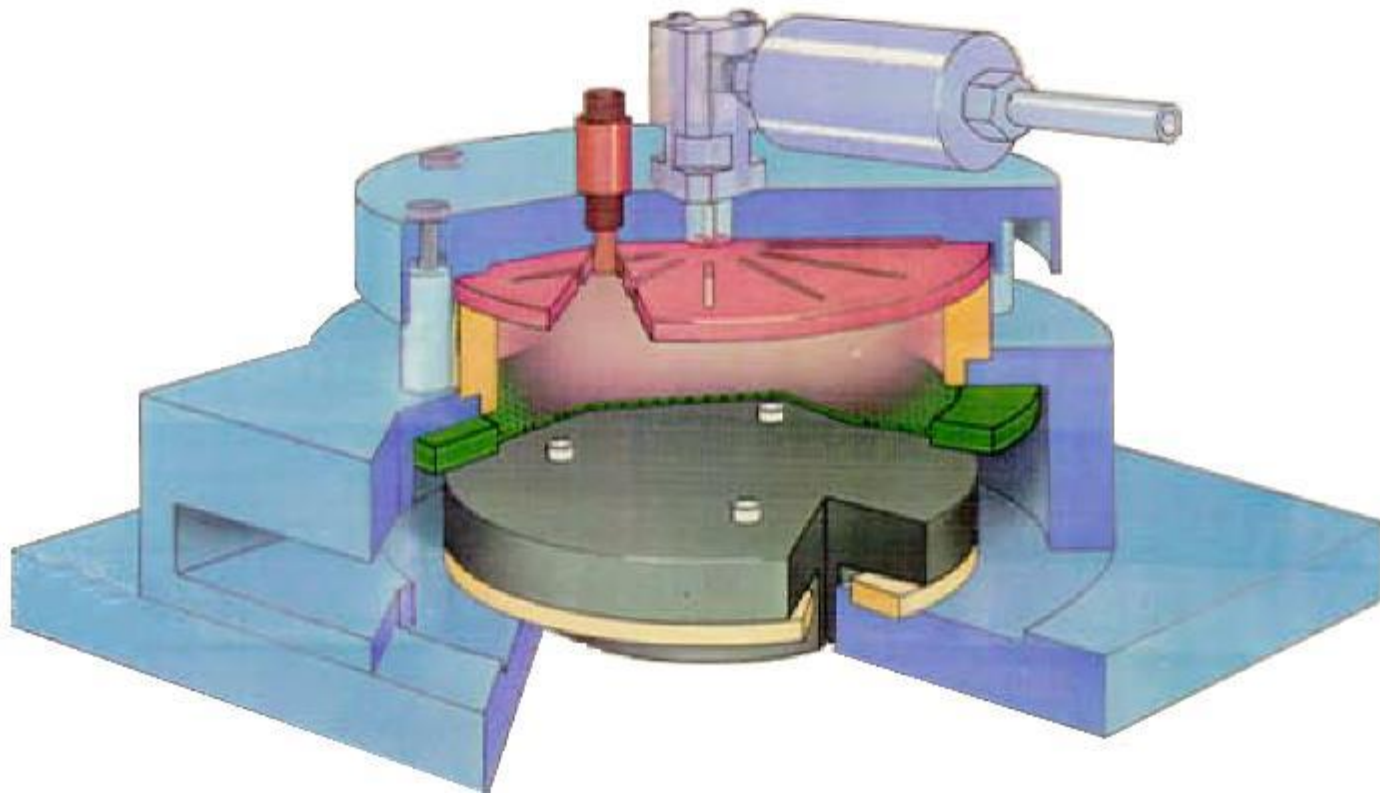
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Advanced Technologies

Downstream Single Wafer Process Design



LOW PLASMA DAMAGE

- CV: $<0.1V$ from control;
- Mobile Ion: $<1-2 E10$;
- Vt : 0% total shift on 98% of points tested no shift $>5\%$
- Process Dependent

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Advanced Technologies

3-axis Integrated Solid Robotic Wafer Transfer



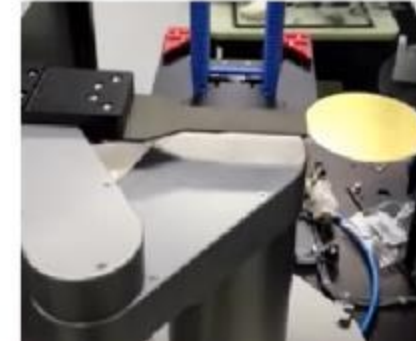
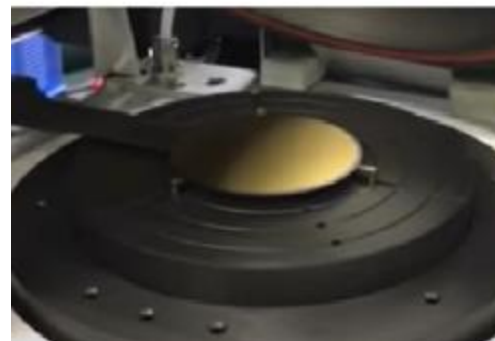
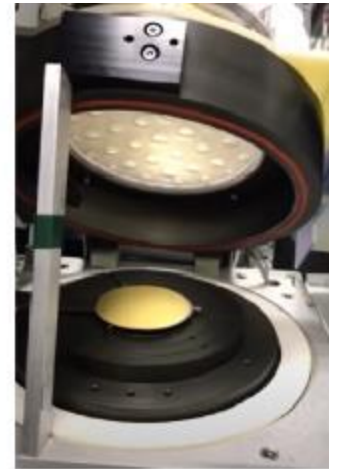
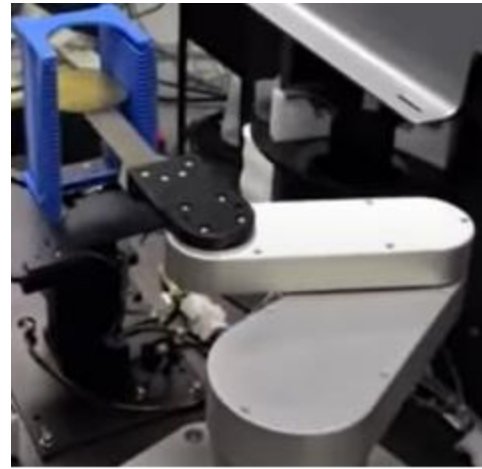
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Wafer Thickness:

- **50um-1000um**
- **Customized**



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Industrial Grade Computer with Large Hard Disk Driver



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Touch Screen GUI



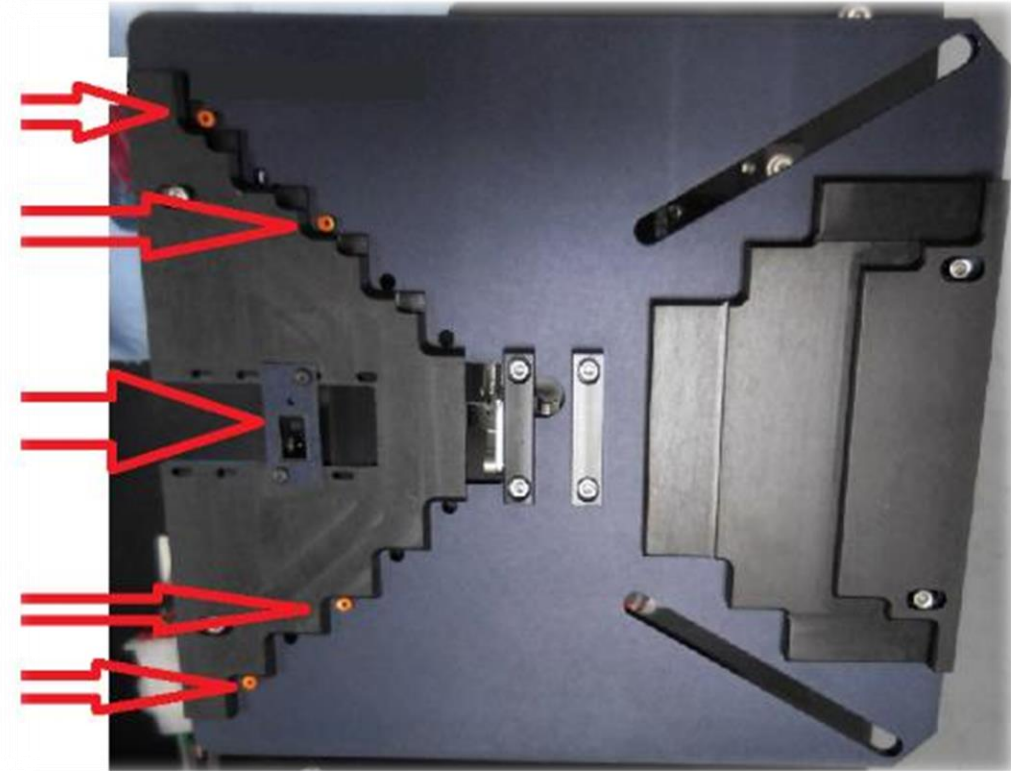
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Cassette Station with Sensors (Optional)

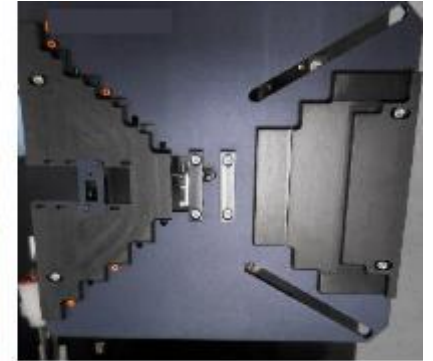
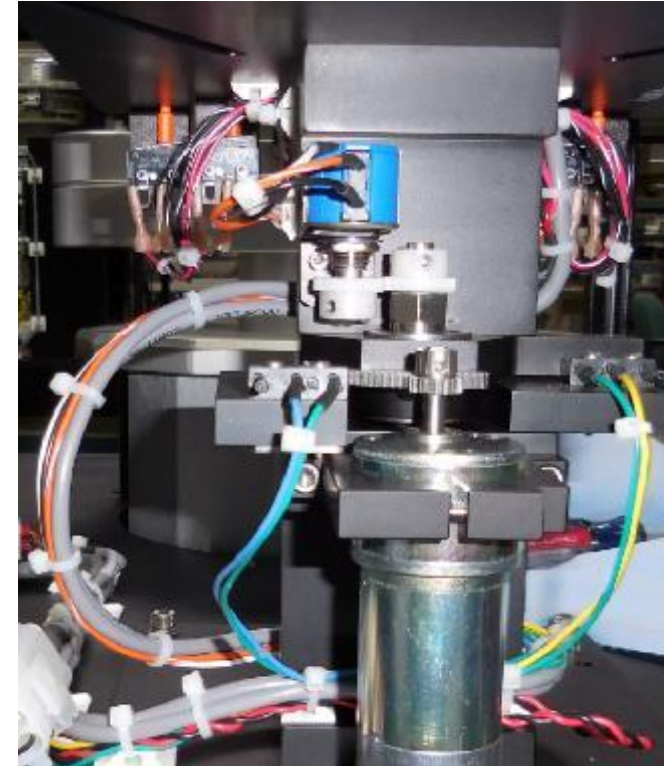


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- **Fixed Cassette Station**
- **Rotated Cassette Station(Optional)**

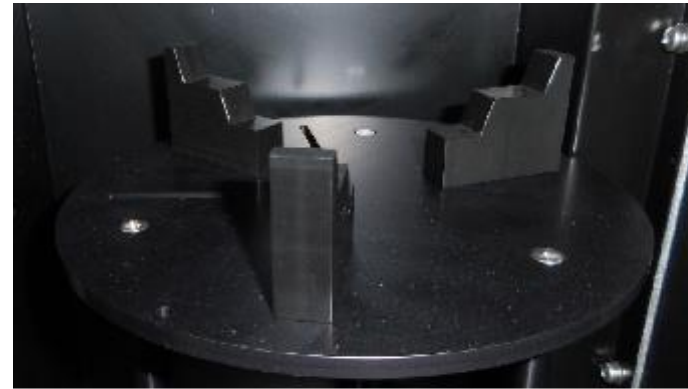


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Center Aligner Function

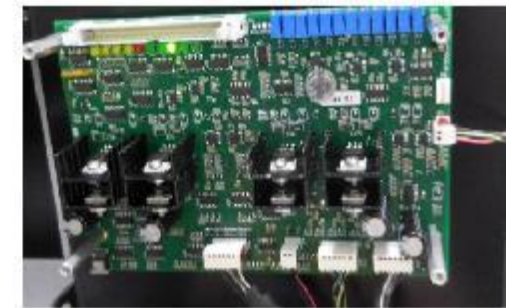


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Modern Electronic Components



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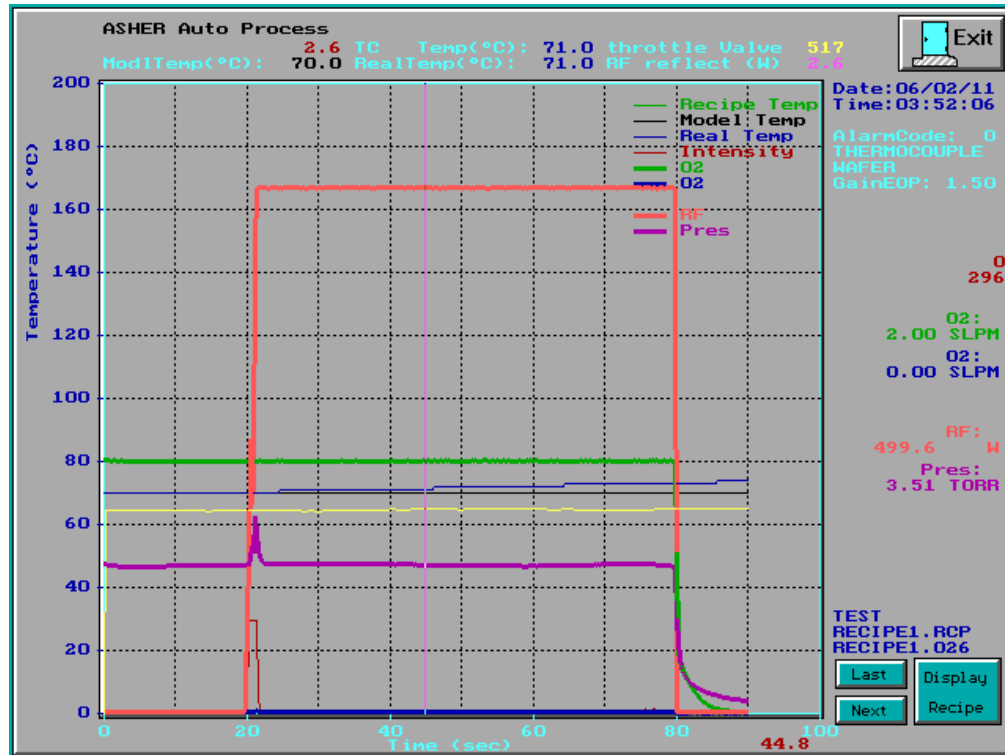
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Advanced Technologies

Allwin21 Software

Process Monitor



WTM

Select Station

FROM STATION Send Cassette FROM SLOT 1 PICK FROM (Send Cassette) MOVE FROM (Send Cassette)

TO STATION Send Cassette TO SLOT 1 PLACE TO (Send Cassette) TO (Send Cassette)

Send Cassette

THROTTLE VALVE CLOSE 371

THROTTLE VALVE OPEN 0.00

VACUUM LEAK CHECK 0.00

MAIN VACUUM VALVE N2 (SCCM)

ROBOT STOP Temp(°C) 0.0

ROBOT Init 05/31/11 12:01:34

0x28:00 RF
0x29:00
0x2a:00

Water ATM

RF OFF

TEMP SPT(°C) 50

Pressure(Tr) 0.000

EOP() 0.0

RF SPT (W) 0.0

RF FWD(W) 0.2

RF RFL(W) 0.2

Chamber Door Open

Chamber Door Close

VENT VALVE CLOSE

SOFT START

MAIN VACUUM OFF

RUN PROCESS

WAFER LOAD

WAFER UNLOAD

Exit

Chamber

Center Aligner

Send Cassette

U

L

PIN UP

PIN DOWN

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Advanced Technologies

Allwin21 Software

Recipe Edit

Step No.	Step Function	Step Time (sec)	Temp (°C)	Gas 1 O2 %	Gas 2 N2 %	Gas 3 O2 %	Gas 4 O2 %	Gas 5 SOCH	RF Power (W)	Vacuum Pressure (Torr)	EndPoint DETECT	RF
1	Delay	30	30	100	100	0	0	0	0.0	1.800	0.00	OFF
2	Wait	60	27	100	100	0	0	0	0.0	1.200	0.00	OFF
3	Delay	180	30	19	0	0	0	0	0.0	0.380	0.00	OFF
4	Delay	60	30	0	0	0	0	0	0.0	0.090	0.00	OFF
5	Delay	30	30	14	0	0	0	0	0.0	0.280	0.00	OFF
6	Delay	120	30	14	0	0	0	0	0.0	0.280	0.00	OFF
7	Finish	0	0	0	0	0	0	0	0.0	0.000	0.00	OFF
8	Finish	0	0	0	0	0	0	0	0.0	0.000	0.00	OFF
9	Finish	0	0	0	0	0	0	0	0.0	0.000	0.00	OFF
10	Finish	0	0	0	0	0	0	0	0.0	0.000	0.00	OFF

Factory Set Up

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Allwin21 Software

Board Test

Exit ? Help

D/A BOARD

D/A CH0	0.000
D/A CH1	0.000
D/A CH2	0.000
D/A CH3	0.000
D/A CH4	0.000
D/A CH5	0.000
D/A CH6	0.000
D/A CH7	0.000

A/D BOARD

A/D CH0	0.000	A/D CH8	0.000
A/D CH1	0.000	A/D CH9	0.000
A/D CH2	0.000	A/D CH10	0.000
A/D CH3	0.000	A/D CH11	0.000
A/D CH4	0.000	A/D CH12	0.000
A/D CH5	0.000	A/D CH13	0.000
A/D CH6	0.000	A/D CH14	0.000
A/D CH7	0.000	A/D CH15	0.000

DIGITAL I/O

J2-1	0:00	J2-11	0
J2-2	0:01	J2-12	0
J2-3	0:02	J2-13	0
J2-4	0:03	J2-14	0
J2-5	0:04	J2-15	0
J2-6	0:05	J2-16	0
J2-7	0:06	J2-17	0
J2-8	0:07	J2-18	0

PORT1 0x20

PORT2 0x28 0x28: ee

Pressure Calibration

Exit ? Help CALIBRATION FOR RFL 05/17/17 14:48:29

READING ON COMPUTER FEEDBACK

RECORD 1	RECORD 2	RECORD 3	RECORD 4
FDBK1(W)	FDBK2(W)	FDBK3(W)	FDBK4(W)
1.7	296.8	486.4	789.5

READING FROM RF METER

STD1(W)	STD2(W)	STD3(W)	STD4(W)
0.0	302.0	495.0	775.0

SETPOINT ON THE COMPUTER

SET1(W)	SET2(W)	SET3(W)	SET4(W)
0.0	300.0	500.0	800.0

CALIBRATION FACTORS FOR SETPOINT

UPDATE CALIB FACTORS	calib k1	calib b1
	9.9338E-01	0.0000E+00
	calib k2	calib b2
	1.0363E+00	-1.2953E+01
RESET CALIB FACTORS	calib k3	calib b3
	1.0714E+00	-3.0357E+01

CALIBRATION FACTORS FOR FEEDBACK

UPDATE CALIB FACTORS	calib k1	calib b1
	1.0232E+00	-1.7200E+00
CALIB NUM	calib k2	calib b2
4	1.0178E+00	-1.1637E-01
RESET CALIB FACTORS	calib k3	calib b3
	9.2391E-01	4.5570E+01

RF ON RF SPT(W) 0.0 MAIN VACUUM PUMP OFF

02 (↻) 0 RF RFL(W) -1.1 ANGLE 1430

N2 (↻) 0 RF FND(W) -1.7 THROTTLE VALVE CLOSE

02 (↻) 0 Pressure(Tr) 760.360 THROTTLE VALVE OPEN

CF4 (↻) 0 Temp(°C) 0.0 VENT VALVE CLOSE

<SCCM> 0 EOPC -0.00 MAIN VACUUM VALVE

Chamber Door is CLOSE

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Small Footprint

- **Width: 27.5"**
- **Depth: 44"**
- **Height: 62"**



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AW-303R Downstream Etcher, Low Plasma Damage

Configurations and Typical Processes

Substrate Capability:

- 2",3",4",5",6",6.25"
- Round
- Multiple wafer sizes **without hardware change**

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AW-303R Downstream Etcher, Low Plasma Damage



Configurations and Typical Processes

RF Power and RF Matching:

- **13.56 MHz**
- **Air Cooling**
- **300W/600W**
- **NRTL/CE Certificated**



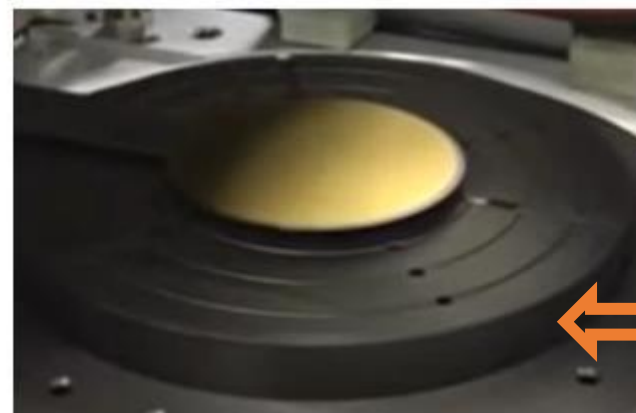
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Configurations and Typical Processes

Temperature:

- 20-120°C
- Customized



- Chiller Cooling
- Element Heating

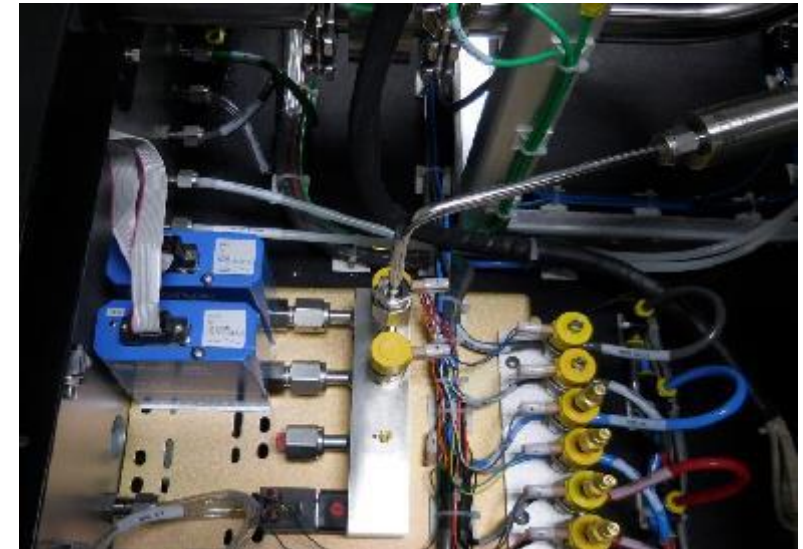
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Configurations and Typical Processes

Gases:

- **1-3 Gases. Typical Gases:**
NF₃, SF₆, O₂, He
- **MFC**
- **Customized.**



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Configurations and Typical Processes

GEM/SEC II Function:

- **Optional**

Exit Help

FILES

PROCESS PROGRAM DIR: NAH-RTA\RECIPE\
EQUIPMENT CONSTANTS: NAH-RTA\CONST.LO
ALARM CONFIGURATION: NAH-RTA\ALARM.LO
Report Configuration: NAH-RTA\RPRT.LO

Initialize

Process Program Code: All
Initial Comm State: Enabled
Initial Control State: Local, Remote

Configuration

Alarm: S5F73, S5F71, S5F1
Connect: S1F13, S1F65, S1F1
Events: Annotated Aperts, S6F11, S6F9
Set W-Bit to 1: Alarms-Stream 5, Event-Stream 6, Terminal-Stream 10

S1F2

MODEL: Tegal-901
REVISION: U7.7A1

MAX POLL DELAY: 0
HOST LINK ID: 0

GEM SECS II COMMUNICATION CONSTANT SETUP

Exit Help

COMMANDS

ENABLE COMMUNICATION, REMOTE COMMUNICATION, RECIPE DOWNLOAD, RECIPE UPLOAD

EQUIPMENT MESSAGE

EQUIPMENT ALARM TEST, EQUIPMENT MESSAGE DIALOG, EQUIPMENT MESSAGE SEND

HOST MESSAGE

GEM: Statistic Manager

IN REPAIR, IN PRODUCTION, SCHEDULED DOWNTIME, UNSCHEDULED DOWNTIME, ENGINEERING, STANDBY

STATUS

COMMUNICATION STATE: COMMUNICATING
ENABLED STATE: ENABLED
LOCAL/REMOTE STATE: LOCAL

Exit Help

GEM SECS II TEST SCREEN

GEM SECS II MANAGER SCREEN

GEM SECS II GEMSTONE

Exit Help SEND EVENT CUID: 61

GEM LIST

PROCESS DATA SEND, S1F13 SEND, S1F1 SEND, DATE & TIME REQUEST

HOST MESSAGE

EQUIPMENT MESSAGE

EQUIPMENT ALARM TEST, EQUIPMENT MESSAGE DIALOG, EQUIPMENT MESSAGE SEND

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Configurations and Typical Processes

Etcher Rate Capability

- **>2000 A/min Th Oxide**
- **>1600 A/min LPCVD Nitride**
- **Process Dependent.**



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Configurations and Typical Processes

Selectivity Capability

- **>10:1 PR: Oxide**
- **Process Dependent.**



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Configurations and Typical Processes

Uniformity Capability

- $< \pm 3-5\%$
- **Process Dependent**



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Configurations and Typical Processes

Particle Capability

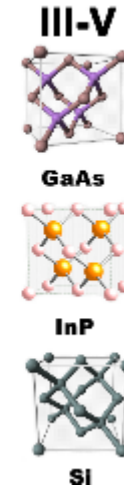
- $<0.15 /\text{cm}^2$
(0.3 μm or greater)
- Process Dependent



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