

Proven Qualified Dry Etcher

40 Years



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AW-901eR AW-903eR Plasma Etcher RIE



Proven Qualified Dry Etcher

Giant Fabs/Labs



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AW-901eR AW-903eR Plasma Etcher RIE



Proven Qualified Dry Etcher

Production

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AW-901eR AW-903eR Plasma Etcher RIE



Proven Qualified Dry Etcher

**Originated From
The Dominant
Plasma Etcher
of 3-6" Single Wafer in 80's,90's**

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Proven Qualified Dry Etcher



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Advanced Technologies

3-axis Integrated Solid Robotic Wafer Transfer



**For Desktop
/Stand Alone**



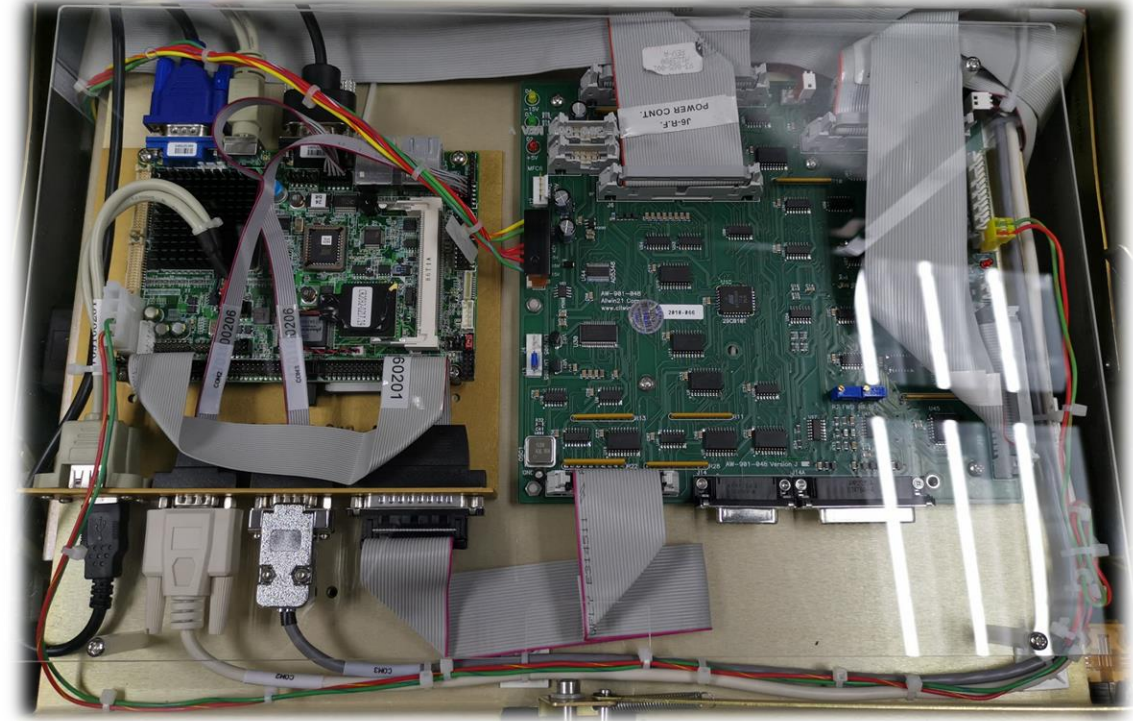
For TTW

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Advanced Technologies

Industrial Grade Computer with Large Hard Disk Driver

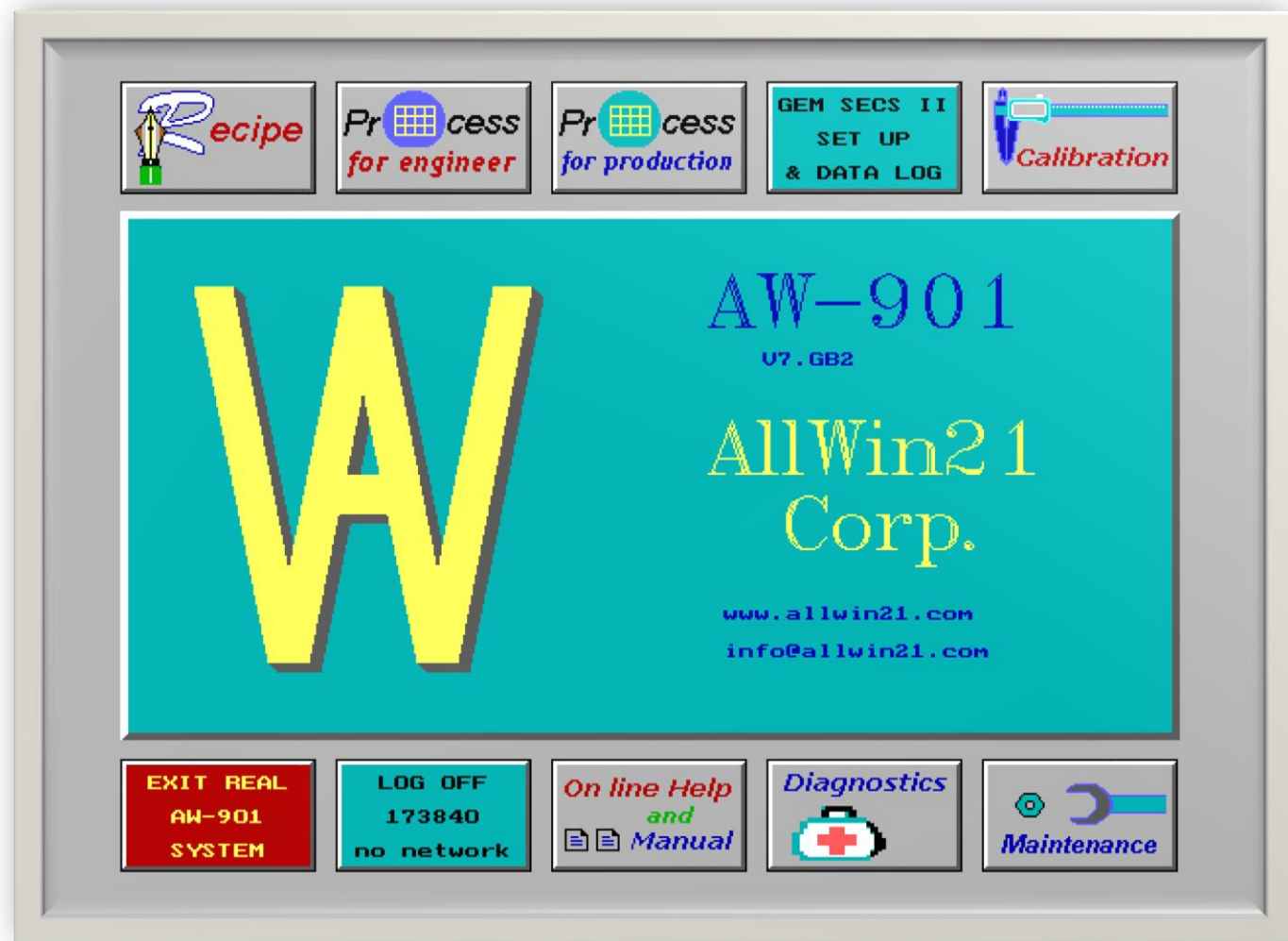


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Advanced Technologies

Touch Screen Or LCD Monitor GUI



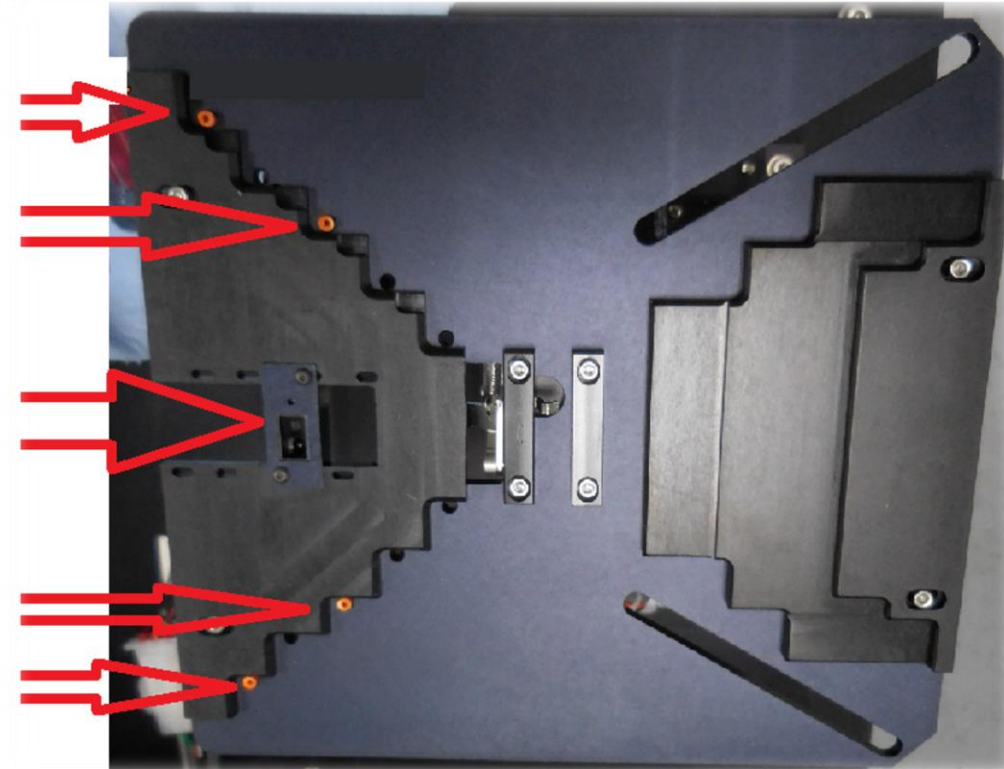
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Advanced Technologies

Fixed Cassette Station with Sensors (Optional)



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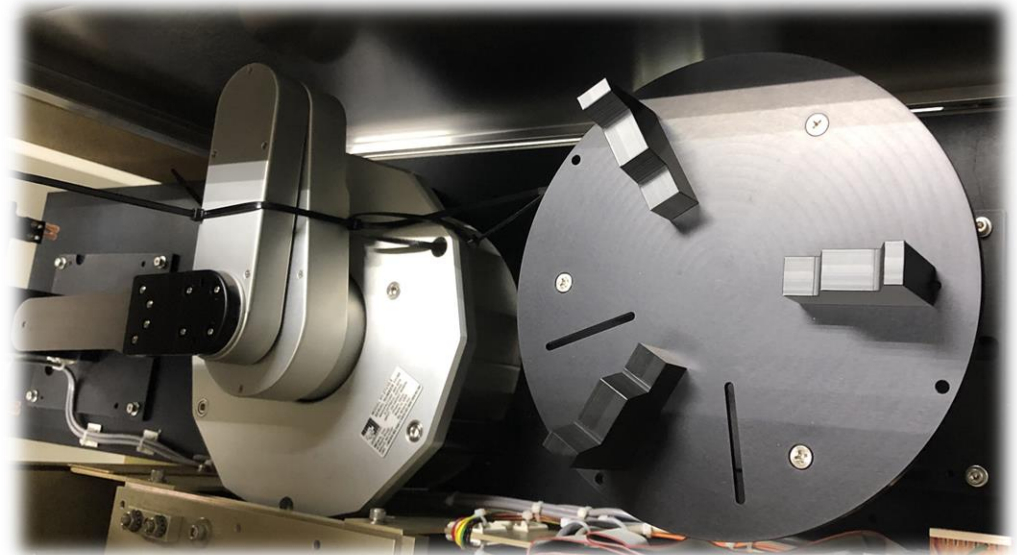
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Center Aligner Function



For Desktop/Stand Alone



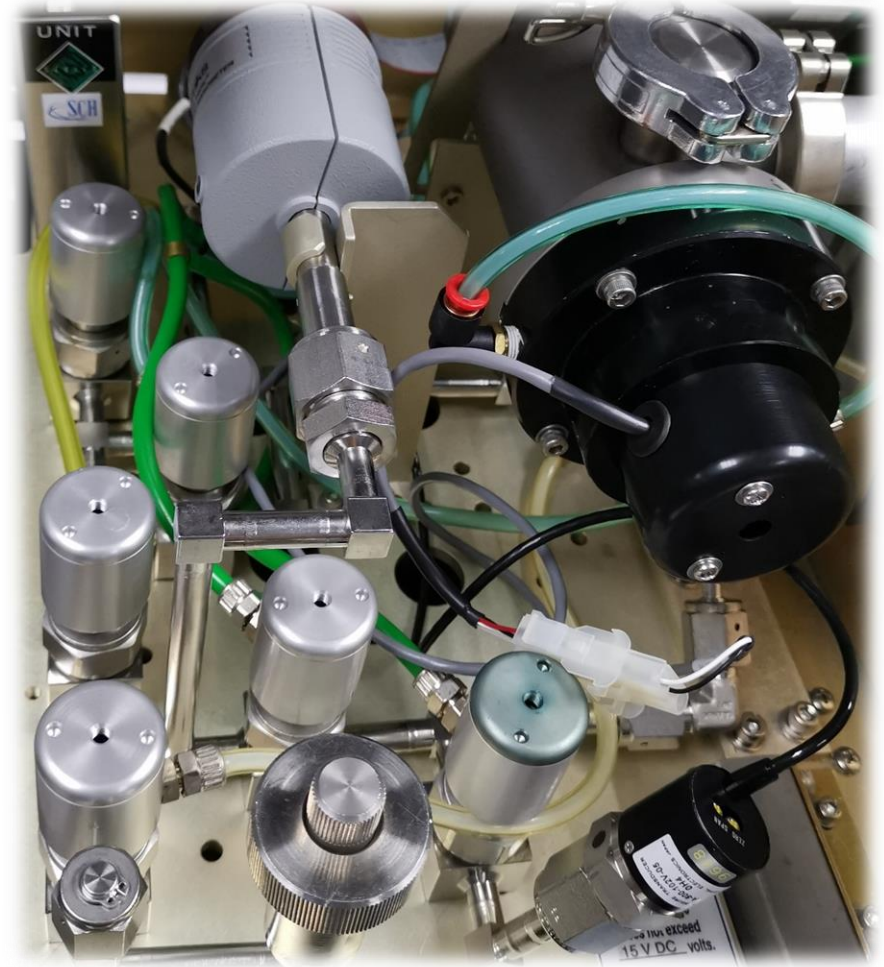
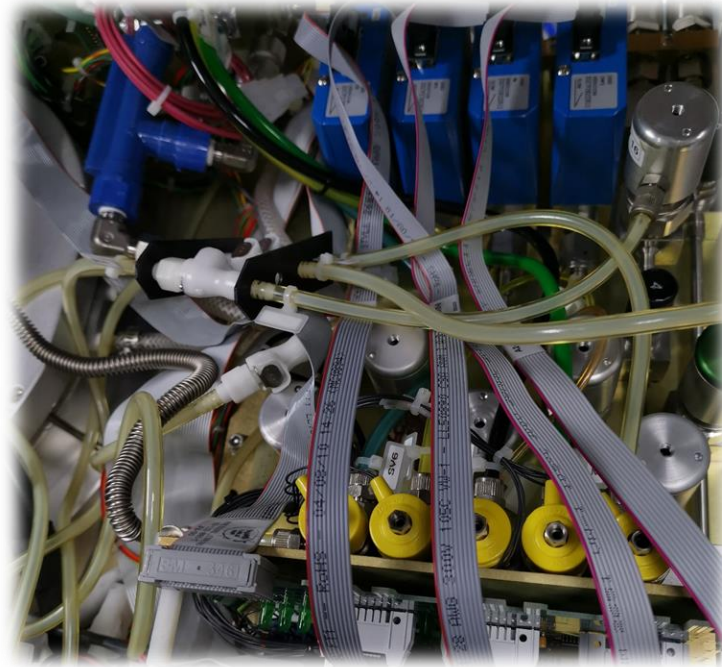
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Modern Components



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Allwin21 Software

Recipe Edit

Step No.	Step Function	Step Time (sec)	Temp (°C)	Gas 1 (CF4 %)	Gas 2 (H2 %)	Gas 3 (O2 %)	Gas 4 (CF4 %)	Gas 5 (SO2H)	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

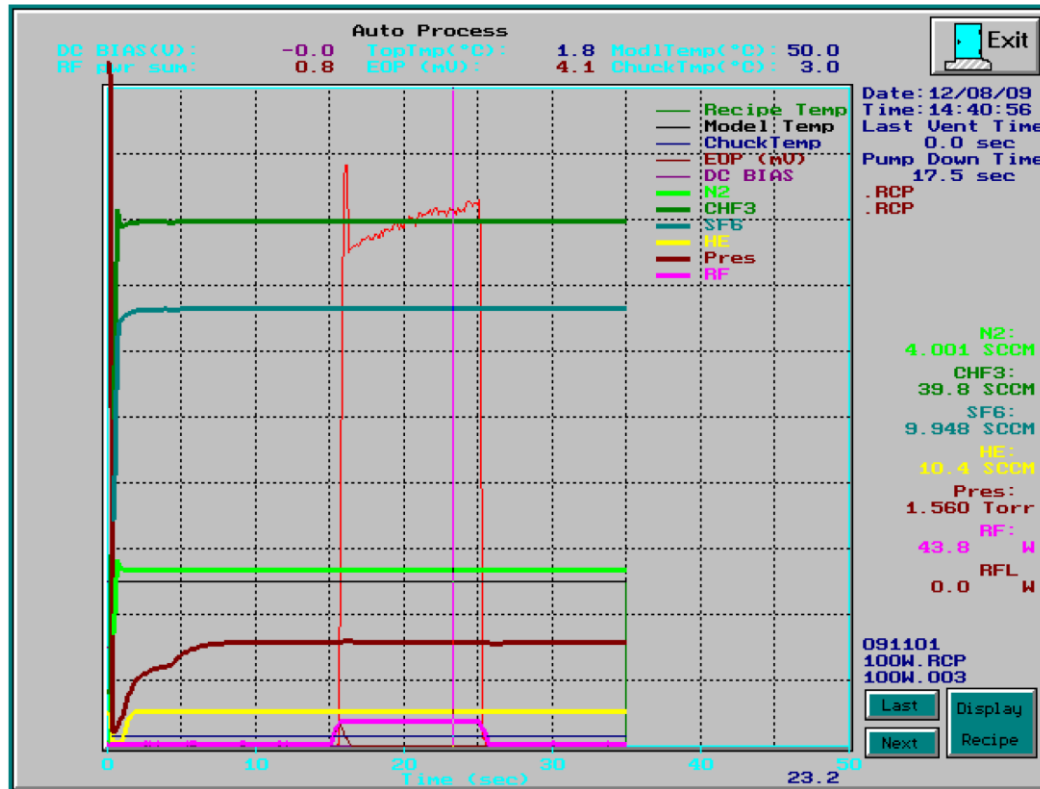
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Advanced Technologies

Allwin21 Software

Process Monitor



WTM

Buttons: Exit, Help, RUN PROCESS, VENT CHAMBER, RF ON, Auto Stop

RF TIME(hr): 1.66

Buttons: FULL WAFER TRANSFER TEST, SEND SLOT, PUMP LEAK CHECK, PUMP DOWN CHAMBER, AUTO SEQUENCE, 12/08/09 11:58:56

Buttons: SEND ARM HOME, DC BIAS(V): 0.00, SEND STAGING MOVE UP, REC U STAGING MOVE UP, CLEAN O2 VALVE OFF, REC U ARM HOME

Buttons: SEND ARM OUT, N2 (SCCM): 0.0, SEND STAGING MOVE DOWN, REC U STAGING MOVE DOWN, EOP (C): 0.00, REC U ARM OUT

Buttons: SEND CASS TO HOME POSITION, CHF3 (SCCM): 0.0, WATER FLOW NO, REC U STAGING MOVE DOWN, RF SPT (W): 0.0, REC U CASS TO HOME POSITION

Buttons: SEND CASS ONE SLOT UP, SF6 (SCCM): 0.0, Chamber Chuck Up, REC U CASS ONE SLOT UP, RF FWD (W): 5.88, REC U CASS ONE SLOT UP

Buttons: SEND CASS ONE SLOT DOWN, HE (SCCM): 0.0, Chamber Chuck Down, REC U CASS ONE SLOT DOWN, RF REVS (W): 0.00, REC U CASS ONE SLOT DOWN

Buttons: SEND SPACING MOVE UP, Pres (Torr): 0.071, SHUTTLE MOVE TO SEND STAG (C), SHUTTLE MOVE TO CHAMBER (C), SHUTTLE MOVE TO REC U STAG (C), TOP TC (C): -567.0, REC U SPACING MOVE UP

Buttons: SEND SPACING MOVE DOWN, PresFlow (C): 0.0, CHUCK TC (C): -477.6, REC U SPACING MOVE DOWN

Buttons: WAFER CLEAR, Time(sec): []

Buttons: STANDBY, AUTO RUN

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

CALIBRATION FACTORS FOR FEEDBACK

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

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

02 (W) 0 RF RFL(W) -1.1 ANGLE 1430

N2 (W) 0 RF FWD(W) -1.7 THROTTLE VALVE CLOSE

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

CF4 (W) 0 Temp(C) 0.0 VENT VALVE CLOSE

(SCCM) 0 EOP(C) -0.00 MAIN VACUUM VALVE

Chamber Door is CLOSE

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Configurations and Typical Processes

Substrate Capability:

- 3",4",4.125",5",6"
- Round



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AW-901eR AW-903eR Plasma Etcher RIE

Configurations and Typical Processes

RF Power and RF Matching:

- **13.56 MHz**
- **Air Cooling**
- **300W/600W/1000W**



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AW-901eR AW-903eR Plasma Etcher RIE

Configurations and Typical Processes

Model	AW-901eR	AW-903eR
Pressure Range (mTorr)	0-1000	0-5000
Material Etcher	Poly/Nitride	Oxide
Pressure Control UPC	225 sccm	2000 sccm
Pins Length (inches)	1.79	2.125
Water Recirculator	1	2
Wafer Ring	Aluminum	<ul style="list-style-type: none"> • Ceramic (99.5% Alumina) • Castillated
RF Cable to Chuck	Different Length (26.25")	Different Length (16")
Electrode Gap (mm)	38	6
Lower Electrode	Not Anodized, Not Flat Aligned	Anodized, Flat Aligned

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AW-901eR AW-903eR Plasma Etcher RIE

Configurations and Typical Processes

Model	AW-901eR	AW-903eR
MFCs	<ul style="list-style-type: none"> • 50 sccm O2 • 60 sccm Argon • 25 sccm CFCL3 • 100 sccm SF6 	<ul style="list-style-type: none"> • 15 sccm N2 • 50 sccm CHF3 • 15 sccm SF6 • 200 sccm Helium
Upper Electrode	<ul style="list-style-type: none"> • Gas inlet and outlet holes are contained in 1 piece • 221 inlet holes(0.031 dia.) • 60 outlet holes(0.062 dia.) • Coolant flows around outside diameter • Not anodized 	<ul style="list-style-type: none"> • Gas inlet and outlet holes are contained in separate pieces • 593 inlet holes(0.008 to 0.016dia.) • 60 outlet holes (0.130 dia.) • Coolant flows around outside and through showerhead • Showerhead is anodized (exhaust ring is not)

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AW-901eR AW-903eR Plasma Etcher RIE

Configurations and Typical Processes

GEM/SEC II Function:

- **Optional**

Exit Help

FILES

PROCESS PROGRAM DIR: \AW-RTA\RECIPE\

EQUIPMENT CONSTANTS: \AW-RTA\CNST.LO

ALARM CONFIGURATION: \AW-RTA\ALARM.LO

Report Configuration: \AW-RTA\RPRT.LO

Initialize

Process Program Code: All

Initial Com State: Enabled Disabled

Initial Control State: Local Remote

Configuration

Alarm: S5F73 S5F71 S5F1

Connect: S1F13 S1F65 S1F1

Events: Annotated Rports S6F11 S6F9

Set W-Bit to 1: Alarms-Stream 5 Event-Stream 6 Terminal-Stream 10

S1F2 MODEL: Tega1-901

REVISION: U7.7A1

DAY POLL DELAY: 0

HOST LINK ID: 0

GEM SECS II COMMUNICATION CONSTANT SETUP

Exit Help

COMMANDS

ENABLE COMMUNICATION

REMOTE COMMUNICATION

RECIPE DOWNLOAD

RECIPE UPLOAD

STATUS

COMMUNICATION STATE: COMMUNICATING

ENABLED STATE: ENABLED

LOCAL/REMOTE STATE: LOCAL

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

Exit Help

GEM SECS II TEST SCREEN

GEM SECS II MANAGER SCREEN

GEM SECS II GEMSTONE

Exit Help

SEND EVENT

CEID: 61

GEM LIST

PROCESS DATA SEND

S1F13 SEND

S1F1 SEND

DATE & TIME REQUEST

HOST MESSAGE

EQUIPMENT ALARM TEST

EQUIPMENT MESSAGE DIALOG

EQUIPMENT MESSAGE SEND

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AW-901eR AW-903eR Plasma Etcher RIE

Configurations and Typical Processes

EOP Function:

- Optional

Exit

EOP NORMALIZE DISABLE

EOP PERCENTAGE ENABLE

PLASMAON EOP
0.00

RECIPE VERSION: AW-04
CREATED: 04-26-2017
CHANGED: 04-26-2017

Normalize Start time (sec)
10

Normalize Time (sec)
0

Recipe Normalize k
0.000000

System Normalize k
0.000000

Normalized Usalib
0.00

Percentage Start time (sec)
35

EOP SENSE NEGATIVE LEVEL

SLOPE GAIN FACTOR
1.0

SLOPE AVERAGE NUM
10

Slope check Start time (sec)
10

EOP HARDWARE GAIN
4




EOP HARDWARE OFFSET
2.00

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Configurations and Typical Processes

Small Footprint

Desktop	Stand Alone	Through The Wall(TTW)
44"X44"X26" (WXDXH)	44"X44"X51" (WXDXH)	48"X34"X61" (WXDXH)
		

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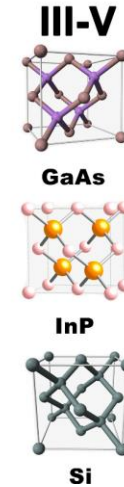
Configurations and Typical Processes

Material Etched	Polysilicon	Nitride	Oxide, SOG, PECVD Nitride
Equipment Model	AW-901eR		AW-903eR
Typical Etchant Gases	SF6, O2 , CHClF2	SF6,O2	CHF3, SF6, Helium
Typical Process Pressure (mTorr)	200-450	250-350	1600-3000
Typical RF Power (Watts)	100-250	200-300	400-600
Typical Temperature (°C):	30	30	23

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