OPERATION

MODEL PSC-101

RINSER/DRYER

General Description

1. The model PSC-101 allows the programming of 1 recipe which consists of 5 steps, a rinse, a quality rinse, a purge and two dry cycles. The RPM and time of the rinse, purge, and dry cycles must be programmed. The desired resistivity and RPM is programmed in the Quality Rinse cycle.

2. 16K EPROM, and 2K battery backed-up RAM allow the system to retain its recipe memory with the power OFF.

3. A 16-character display allows easy programming and readability of status information.

Options

The options described below are available on the PSC-101 SRD. Only the information on the options which you have ordered with your SRD will be in the OPTION section of this manual.

1. 1 Serial Port - For SECS Communications.

2. CY-20 Anti-Static Unit.

3. RM-20 Resistivity Monitor

4. WR-20/WR-20A Recirculation Valve

5. Quickchange Bowl

6. Quickchange Rotor
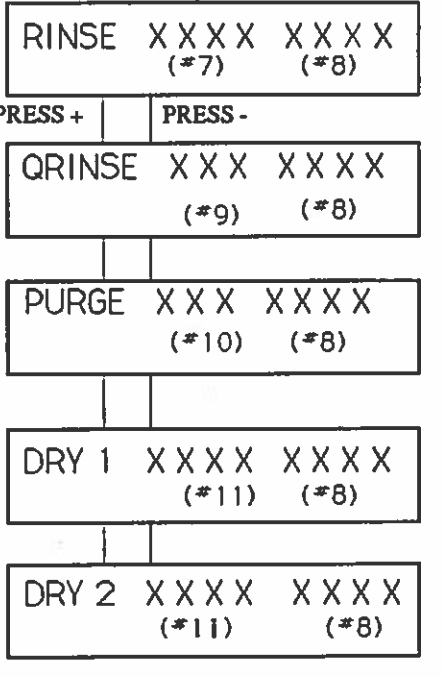
PSC-101 CONTROLLER FLOWCHART

SERVICE MODE

This mode allows a qualified serviceman to troubleshoot various hardware functions of the Rinser Dryer. A Port Map is needed to do this efficiently. Refer to detailed explanation of each display on page listed.
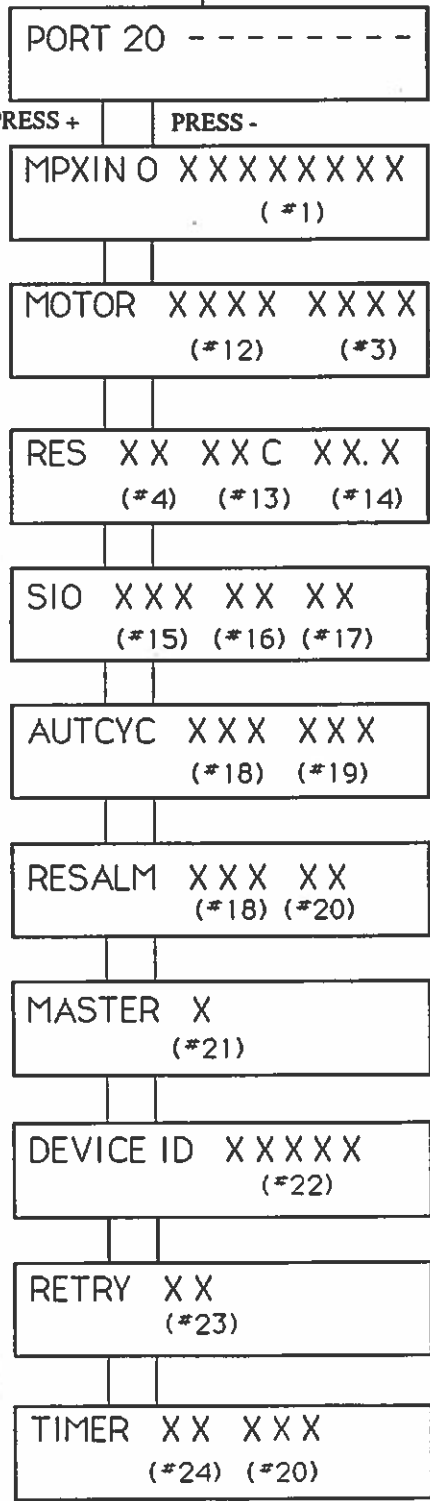
RUN MODE

This mode is the functional operating mode. Once the parameters have been porgrammed (in program mode) and the switch placed back in RUN, the controller is ready to run process. When "start" is pressed, the steps listed below will be executed.
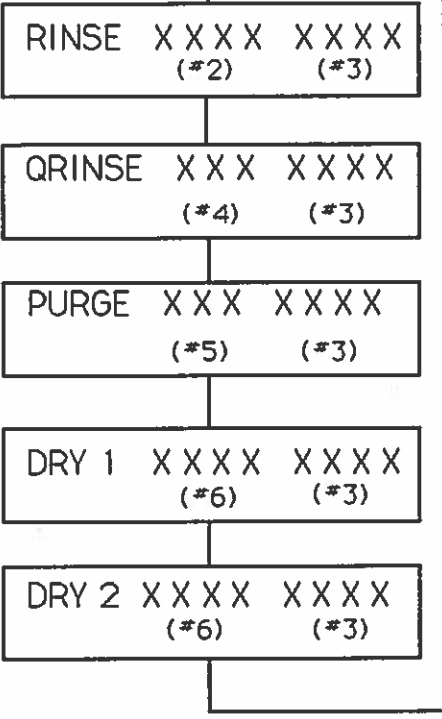
PROGRAM MODE

This mode allows the user to set certain precess parameters. The cursor and digit buttons are active at this time to allow the user to program time and setpoints used by the controller in each step.

```
PORT 20 - - - - - - - -
```

PRESS +   PRESS -

```
MPXIN 0  X X X X X X X X
              ( #1)
```

```
MOTOR   X X X X   X X X X
        (#12)     (#3)
```

```
RES   X X   X X C   X X . X
     (#4)  (#13)  (#14)
```

```
SIO   X X X   X X   X X
     (#15)  (#16) (#17)
```

```
AUTCYC  X X X   X X X
        (#18)   (#19)
```

```
RESALM  X X X   X X
        (#18)  (#20)
```

```
MASTER  X
        (#21)
```

```
DEVICE ID  X X X X X
              (#22)
```

```
RETRY  X X
       (#23)
```

```
TIMER  X X   X X X
       (#24)  (#20)
```

```
RINSE  X X X X   X X X X
       (#2)      (#3)
```

```
QRINSE  X X X   X X X X
        (#4)    (#3)
```

```
PURGE  X X X   X X X X
       (#5)    (#3)
```

```
DRY 1  X X X X   X X X X
       (#6)      (#3)
```

```
DRY 2  X X X X   X X X X
       (#6)      (#3)
```

```
RINSE  X X X X   X X X X
       (#7)      (#8)
```

PRESS +   PRESS -

```
QRINSE  X X X   X X X X
        (#9)    (#8)
```

```
PURGE  X X X   X X X X
       (#10)   (#8)
```

```
DRY 1  X X X X   X X X X
       (#11)     (#8)
```

```
DRY 2  X X X X   X X X X
       (#11)     (#8)
```

#1) Current State of input bit 0
#2) Rinse Time
#3) Actual Motor RPM
#4) Actual Riesistivity
#5) Chamber Purge Time
#6) Dry Time
#7) Programmed Rinse Time
#8) Programmed Motor RPM
#9) Setpoint Resistivity
#10) Programmed Purge Time
#11) Programmed Dry Time
#12) Setpoint Motor RPM

#13) Temperature
#14) Calculated Resistivity
#15) Baud Rate
#16) Character Sent
#17) Character Received
#18) On or Off
#19) Idle Time
#20) Timeout period
#21) On/Off Bit
#22) 5-Digit I.D.
#23) Number of retries
#24) Timer ID

MODULES

Control Panel - Located on the front, contains 4 programming switches and status display.

Master Power ON/OFF Switch - Illuminated when power is ON.

Main Logic Board - Contains microprocessor, serial communications chip, bit input/output and
RAM/ROM memory.

Power Supervisor Chip - Supervises the power supply voltage and inhibits operation
if it should drop below a predetermined level. Also ensures that microprocessor
starts up in a known manner.

2 Sets of DIP Switches - Determine SECS baud rate and program/service mode lockout.

The controller can be "CLEARED" by pressing the (<>) select button and the (+ -) plus and
the minus buttons and turn the Power switch ON at the same time if the DIP switch DSI-6 is
on, this allows operator to clear recipe memory if reset is desired. The Step Advance and
Hold functions can be enabled by switching DIP switch DSI-7 to the ON position.

Hardware reset switch - Located on the left-hand side of the controller board. This push-
button forces the machine to restart as if the power were turned off. See maintenance
section for operation of these switches.

Power Supply : +5 at 1 Amp, +5 at 1 Amp and +24 at 1 Amp.

Motor Control Board - SEE THE AUTOMOTION BRUSHLESS MOTOR CONTROL INFORMATION
IN THE OPTION SECTION OF THIS MANUAL FOR DETAILS.

FRONT PANEL INDICATORS
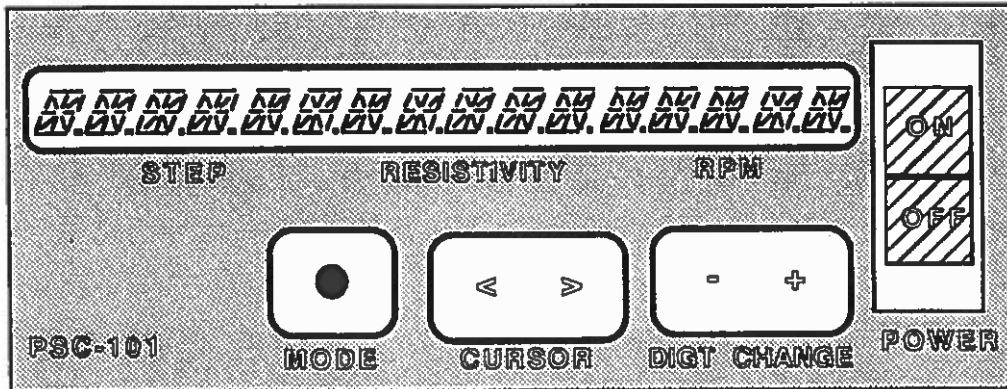
Cursor - The cursor is positioned on the digit or group of digits which are blinking, and can be positioned with the left and right arrow keys.

"<" SELECT ">" - Moves the cursor to the right or left.

"+" and "-" - Changes modes and digits of controller.

SERVICE / RUN / PROGRAM rocker-switch - Allows the user to select between a service, run, or program mode. Entry to service and program modes may be denied, if desired, by setting internal DiP switches (see *Accessing the PSC-101 Diagnostic Routine* in the maintenance section).

STEP - A total of 5 steps per recipe are available. Each step has a programmable RPM and time, except the quality rinse, which has programmable resistivity and RPM.

TiME - Measured in seconds from 0 - 9999.

RESISTIVITY - Programmed in the same manner as other functions. In run mode, this segment dispiays current resistivity from 0 to 18.2 megohms. If resistivity is over 18.2 megohms (which normally Indicates a dry probe), it will display 22.0 megohms.

RPM - RPM is in the range from 0 to 3200.

OPERATOR CONTROL PANEL

1. START - Performs a dual function:

    A. Starts the process from recipe Step 1.

    B. Performs a step advance when pressed. After the first step of the recipe has begun, the start switch advances the process to the second step in the recipe. Subsequent pressing continues the step advance function.

2. STOP - Also a dual function switch:

    A. Stops the Process.

    B. Clears error messages after the error conditions have been corrected.

3. DOOR TOGGLE (Autodoor) - Opens the door if the door is currently closed, closes the door if it is currently open.

Initialization Routine

Each time the tool is powered up, the following messages should be seen.

1. The display check:	All segments of each digit appear.
2. The ROM resident program check:	"EPROM AA 1.0 OK" is displayed.
3. The RAM memory check:	"RAM OK" is displayed.
4. Parameter (recipe, timers, SECS,etc.) check:	"PARAMETERS OK" is displayed.

THE MODE-SWITCH AND DISPLAY

When the mode-switch is in the run position and no errors exist, the machine is ready to operate and the user normally sees the first step of the recipe (rinse), the time remaining in that step, and the motor RPM. When the machine is in process and the rocker-switch is in run mode, the left/right and +/- push-buttons are ignored, and the controller displays the current recipe step and status. If the mode-switch is in program mode and the tool is idle, programming of the recipe may take place. However, if the machine is in process, the recipe may be reviewed, but not altered. Regardless of whether or not the tool is running, the mode-switch may be moved to the service position and all diagnostics and parameter settings may be executed. Moving the mode-switch back to run will cause the controller, once again, to display the recipe step and status.

Warning: When the controller is in service mode, all safety interlocks and error messages are overridden.

THE PROGRAM MODE

Step 1 - Press the mode-switch to program position. The controller will display the first step of the recipe, which is the rinse cycle (if the controller does not enter the program mode, refer to *Accessing the PSC-101 Diagnostic Routine* in the maintenance section). By using the left and right arrow keys, the cursor position may be moved to the left and right. The cursor position is indicated by the blinking portion of the display. If the rinse cycle is to be run for 3 minutes, depress the right arrow key until the 100's place of the time display is blinking, indicating this is the item we are ready to modify. Because 3 minutes is 180 seconds, depress the + key once to program a 1 in the 100's position. To program the 10's place, depress right arrow once. Then depress + key until the display counts up to 8. The "-" key may be used to count backward.

To program an RPM of 500, depress the right arrow key three times to move the cursor to the 100's place of the RPM display. Depress the + key 5 times to increase RPM from 0 to 500.

Step 2 - Press the left arrow key until the word "RINSE" is blinking. When the plus key is depressed, the next step of the recipe, the quality rinse is displayed. With the cursor positioned in the field to the right of the word "QRINSE", set the desired resistivity to be attained. Finally, move the cursor to the rightmost position of the display and set an appropriate RPM.

Steps 3 through 5 -
Follow the same procedure outlined above to set the time and RPM for the purge and dry cycles.

THE RUN MODE

Press the mode switch to the run position. The controller will now display the rinse cycle, the programmed time, and the current actual RPM (0).

Open the door and insert a fully loaded cassette of wafers. Close the door and press the start button.

Caution: The tool must be operated with the specified carrier load. Refer to *Balancing and operating requirements for Semitool Rotors* in the installation section.

CHECK FOR THE FOLLOWING CONDITIONS:

Time - Remaining time of the current step is displayed.

Step - The current step of the recipe is displayed.

The programmed RPM is met on the display.

Check that the rotor is spinning counter-clockwise.

Check that DI water is flowing over the wafer.

Check that the (manually operated) door is properly sealed . Applying light pressure, pull on the door. It should not open.

Check that the SRD switched to the dry cycle. A water manifold purge is energized for approximately 10 seconds. This permits the DI manifold to be purged of all existing DI fluids. After 10 seconds have elapsed, the purge valve will close with a high N2 flow continuing in the dry cycie.

Check for excessive vibration.

Check for rapid rotor deceleration (spin-down) after Dry Cycle.

Check that RSP (Rotor Stop Positioner) has stopped rotor in the correct upright position at the end of the cycle.

When door seal is de-energized, open the door. Using a gloved hand, feel inside the bowl to ensure the SRD was heating.

THE AUTOCYCLE FUNCTION

"Autocycle" is a machine status which can be either on or off. It instructs the machine to clean the bowl if a recipe has not been run for some interval (usually an hour). The recipe which is run when the function is initialized is the one currently programmed. Autocycle does not close the door. The machine will not start an autocycle if the door is open. If the normal time interval has expired, the machine will keep trying to start the autocycle. Therefore, as soon as the door is closed, the auto-cycle will commence. The operator may touch STOP to abort the process. A similar sequence of events will occur if the machine asks for an autocycle and the controller is interlocked. The machine will not begin the autocycle, but as soon as the door is closed and all interlocks are cleared, the autocycle will commence.

CLEARING RECIPE MEMORY

In case of a recipe checksum error ("PARAMETERS BAD" message), the proper response is:
(1) Turn the power off on the controller; (2) Open the drawer; (3) Depress the memory clear button located behind the display panel; (4) Turn the power on while holding the button. When the tool powers up, the display will indicate that it is clearing the recipe memory. Unless the default recipe is used, the programmed recipe will then be erased and must be reprogrammed.

The normal integral battery life on the DS1220 internally powered memory module is approximately 10 years. The checksum is there to ensure the integrity of the recipe memory and that integrity is checked every time the machine is powered on. Normally, when a change is made to a recipe, the recipe checksum is updated immediately afterward. If the power should fail, however, at the exact instant a recipe is changed and before the checksum can be updated, there is a small possibility for corruption of the recipe memory. Therefore, this clearing feature has been built into the unit.

ERROR CONDITIONS

1. N2 Pressure Loss - An N2 pressure loss will cause the process to abort and a flashing message to be displayed by the controller. When the N2 pressure returns to normal, the message "N2 PRESSURE LOSS" continues to flash. The N2 error must then be cleared by pressing the stop key. However, if the N2 pressure is still low, the error will not be cleared.

2. Door Failure - A door failure is generated if a door sensor is in the wrong position after the door is opened or closed. A door failure causes the controller to abort any recipe in process, and a flashing error message is displayed on the screen. All 4 door valves are turned off when a door error is sensed, and the door will assume whatever position gravity dictates. A door failure is cleared by giving another door toggle or stop command.

3. Rotor Upright - The controller allows 7 seconds to upright the rotor, after the RSP is extended. If the tool is unable to accomplish this within 7 seconds, a rotor upright error will be generated.

RM-20 RESISITIVITY MONITOR

The RM-20 Resistivity Monitor will maximize the process efficiency of a Semitool. Rinsing your product to a quality base rather than a time standard ensures that each lot processed through the rinser/dryer is rinsed to a consistent quality level.

The RM-20 is designed exclusively for use with Semitool's PSC-101 Process Controller. Resistivity setpoint is programmed from the PSC-101 and the resistivity readout is integrated into the controller display.

Connections

Connect the 4-pin resistivity cell cable into the rear of the controller.

Programming Resistivity Monitor Setpoint

The RM-20 powers up with a setpoint of 10.0 megohms. To initialize or alter a resistivity setpoint, move the rocker-switch to the program position and:

1.   Depress the "+" key until the word "QRINSE" appears in the step position.

2.   Depress the right arrow key until the cursor appears in the 10's column of the resistivity readout.

3.   To select 16 megohm, depress the "+" key until a "1" appears in the 10's column. Depress the right arrow key until flashing cursor moves to the units column. Depress the "+" key until a "6" appears in the units column.

Operation

During the quality rinse cycle, when the programmed resistivity setpoint is reached, the rinser/dryer will automatically advance to the next programmed step. If the setpoint is not attained, automatic advance to the next step will not occur until a programmed quality rinse timeout has expired (see mode 7 of the maintenance section). If the timeout expires prior to reaching the resistivity setpoint, the controller will continue with the next step in the recipe and output a flashing error message on the display.

Maintenance

A periodic cleaning of the Resistivity Monitor cell is necessary to maintain accurate resistivity readings. Failure to clean cell regularly will result in inaccurate readings. To clean the cell, sandblast the cell elements inside and out from threads to tip. If a sandblaster is not available, dip the cell elements from threads to tip in a solution of 9 parts DI water and 1 part hydrochloric acid.

Parts Replacement

PART #   Description

61326-2   Resistivity Monitor cell only