PlasmaPro®**Estrelas**100

4 OPERATING INSTRUCTIONS

This chapter describes how to operate the Oxford Instruments Plasma Technology **Plasma**Pro®**Estrelas**100 tool. All procedures described here must only be performed by personnel with the appropriate skills and training.

The chapter comprises the following sections:

- Emergency shutdown
- Performing basic operations
- Maintenance or engineering operation
- Manager operation
- Starting up and shutting down the tool
- Pumping, venting and opening the process chamber
- Creating and editing recipes
- Tool alerts
- Recovering a process wafer
- Recovering the tool after a loss of services
- Using datalog pages
- Leak detection and MFC calibration
- Service mode

4.1 Emergency shutdown

In an emergency, press any of the red **Emergency Off** buttons (see Figure 1-2). Once operated, a button latches in the off position to ensure that hazardous electrical power is removed from the tool.

The **Emergency Off** buttons are intended for use when electrical power must be immediately removed from the tool in order to prevent personal injury or an immediate hazard. You must also operate a button if the building is being evacuated because of fire, earthquake, flood or other major event.

	Emergency Off Buttons
⚠️ **Caution**	Only use an **Emergency Off** button if an immediate hazard is perceived. Repeated use of **Emergency Off** buttons can degrade the tool's hardware, resulting in premature failure.

Note that pressing an **Emergency Off** button does not remove all potential hazards from the tool. Refer to Section 1.7.1 for a list of hazards that may still be present after pressing an **Emergency Off** button.

When the emergency situation has been rectified and it is safe to operate the tool, perform the start-up sequence described in Section 4.5.4 to recover from the shut-down.

4.2 Performing basic operations

This section describes basic machine operations that apply to all users.

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4.2.1   Logging on and off

The PC4500 application incorporates several different levels of login to match the job functions of different personnel who might use the tool. Section 4.4.1 describes how a person with *MANAGER* privilege can create and manage new login accounts.

The login procedure is the same for all login levels.

When the PC4500 application is first started, the Access Control page is automatically displayed (Figure 4-1). You can also access this page at any time by selecting the **User Log In** item from the system menu (see Figure 3-3).

Figure 4-1   Access Control window

To log on to the controller:

1   Type your account user name in the **Enter User** field.

2   Type your account password into the **Enter Password** field. The password is case-sensitive: for example, **Password** and **pAsswOrd** are different passwords.

3   Ensure that the **Demonstration** button is NOT selected.

4   Click **Verify**.

5   If the information entered is correct, the log-in status is displayed in the **Current User** and **Access Level** fields.

6   Click **Ok**. The PC4500 application now loads and displays the Pump Control page or the Production page, depending on your access level.

7   If the login information is not verified correctly, re-enter your name and password and click **Verify**.

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4.2.2   Opening and closing the loadlock

4.2.2.1   Venting and opening the loadlock

To open the loadlock:

1   If the loadlock is not vented, click the **menu** icon .

2   Select the **Pumping** menu option. The Pumping page opens.

3   Click **stop** in the Loadlock panel.

Figure 4-2   Loadlock panel on the pumping page

4   Click **vent**. The appropriate valves operate automatically to vent the loadlock.

5   Wait until the **Pirani** field in the Loadlock panel displays 760 mTorr, indicating that the loadlock is at atmospheric pressure.

WARNING	**PINCH POINT** **If the loadlock gas springs fail, the pinch point between the loadlock lid and the loadlock body could cause severe injury. Make sure that the shroud on the right gas spring is engaged when opening the loadlock lid.**

6   Using the handle fitted to the loadlock lid, lift the lid upwards until it locks in the open position.

4.2.2.2   Closing and evacuating the loadlock

To close the loadlock:

1   Grip the handle on the loadlock lid.

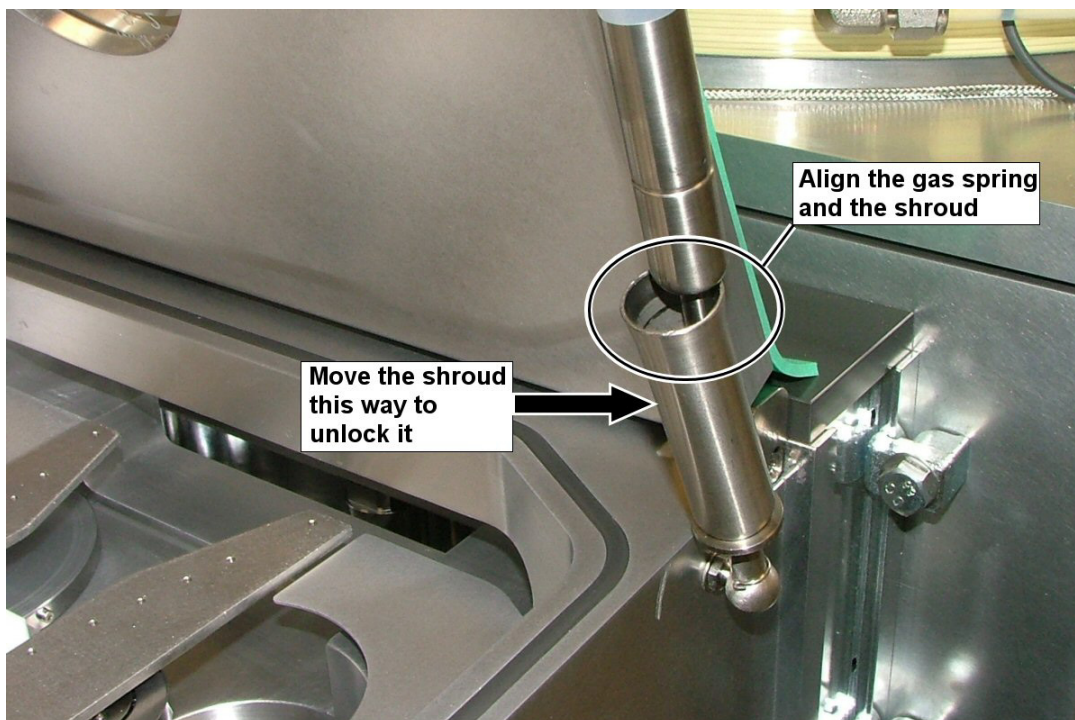2   Using the other hand, move the shroud on the right gas-spring, until the gas-spring is free to move.

Figure 4-3   Unlocking the loadlock lid

3   Lower the lid until it rests on the top of the loadlock.

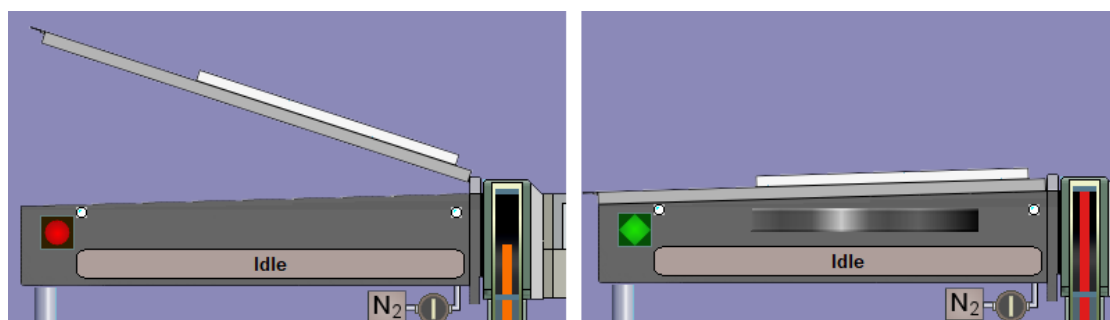4   Check that the graphical display on the Pumping page indicates that the lid is closed.

Figure 4-4   Pumping page showing the loadlock lid open and closed

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5 Click **evacuate** in the Loadlock panel. A prompt opens asking for a wafer identity. If you have loaded a process wafer into the loadlock, enter the identity of the wafer and click **OK**. If there are no wafers in the chamber, click **Cancel**.
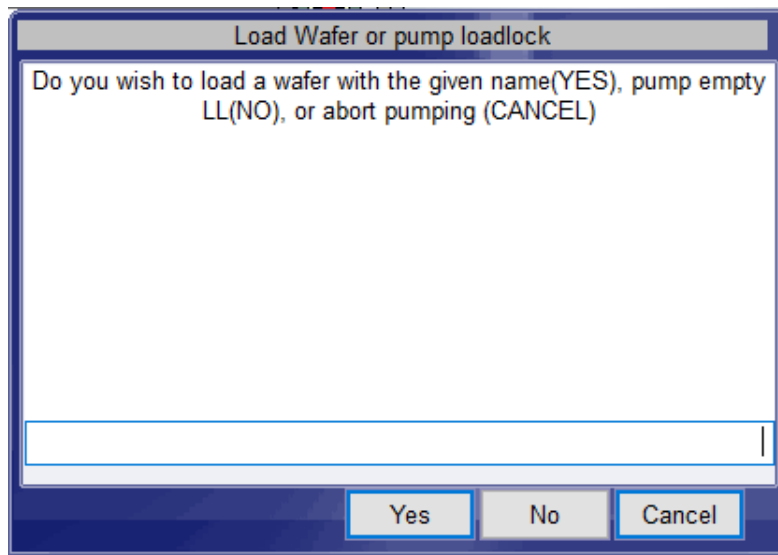

Figure 4-5   Load Wafer or Pump chamber window

The appropriate valves operate automatically to evacuate the loadlock.

6 When the base pressure has been reached, the Loadlock panel on the Pumping page displays the message *Ready*.

4.2.3   Moving wafers between the loadlock and process chamber

4.2.3.1   Move a wafer from the loadlock to the process chamber

1 Click the **menu** icon .

2 Select the **Pumping** menu option. The Pumping page opens.

3 Check that the loadlock and the process chamber both display a green diamond symbol, indicating that they are evacuated.
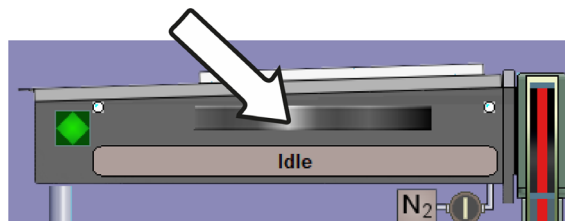
4 Click the wafer symbol in the loadlock.

Figure 4-6   Wafer in loadlock

5 A blue line appears on the screen, indicating the possible transfer paths that may be chosen. Click on the blue wafer table symbol in the process chamber.
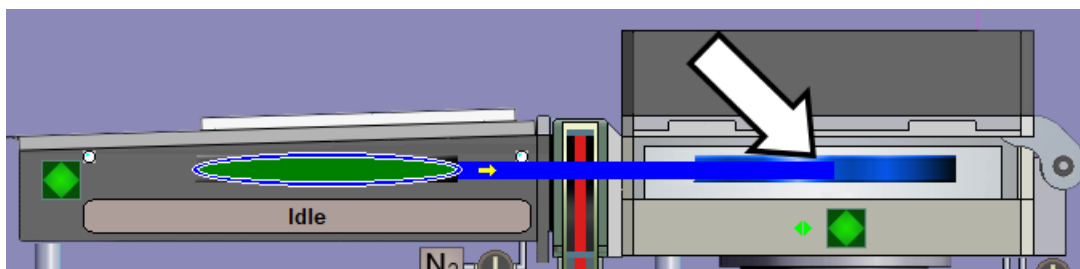

Figure 4-7   Select the process chamber

6 The slit valve opens and the wafer is moved to the process chamber.

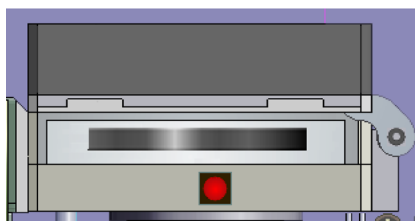**7** When the transfer is complete, the wafer symbol moves to the process chamber (see below).

Figure 4-8   Wafer symbol in process chamber

4.2.3.2   Move a wafer from the process chamber to the loadlock

1 Click the **menu** icon .

2 Select the **Pumping** menu option. The Pumping page opens.

3 Check that the loadlock and the process chamber are both evacuated.

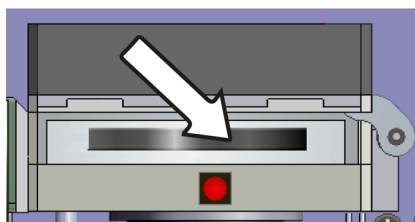**4** Click the wafer symbol in the process chamber.

Figure 4-9   Wafer in process chamber

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5 A blue line appears on the screen, indicating the possible transfer paths that may be chosen. Click on the blue wafer symbol in the loadlock.
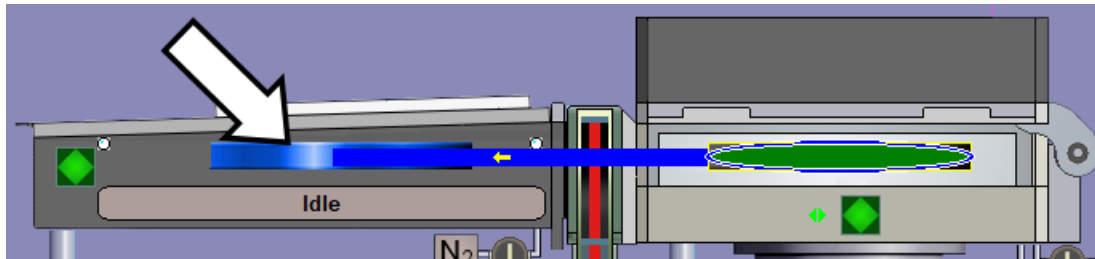

Figure 4-10 **Select the transfer destination**

6 The slit valve opens and the wafer is moved to the loadlock.

7 When the transfer is complete, the wafer symbol moves to the loadlock.
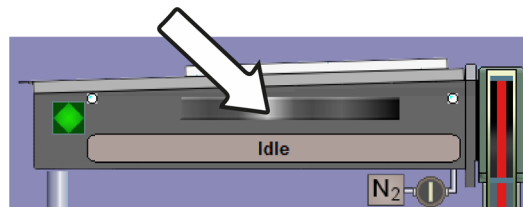

Figure 4-11 **Wafer symbol in loadlock**

4.3 Maintenance or engineering operation

A user with *MANAGER* privilege can process wafers by running a recipe or by manually entering process parameters. This flexibility suits process development, maintenance and engineering functions. The processing options available to a user with *MANAGER* privilege are:

Single button automatic process run
This method allows the user to run a multi-step recipe, and is suited to production or high volume processing (see Section 4.3.1).

Manual process run
This method requires the user to manually enter all of the processing parameters for the run (see Section 4.3.2). A recipe is not used, so only a single process step can be performed at a time. This method is designed for engineering use or for process development.

4.3.1 Single button automatic process run

This section describes a single button automatic process run, which allows a complete process to run automatically once the wafers have been loaded into the loadlock.

1 Check that the following conditions are true:

a) The tool is started up, with all vacuum pumps running (see Section 4.5.1).

b) The process chamber is evacuated (see Section 4.6.1).

c) The loadlock is vented (see Section 4.2.2).

2 Open the loadlock lid (see Section 4.2.2).

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3   Place the wafer on the loadlock arm or carrier.

4   Close the loadlock lid (see Section 4.2.2.2).

5   Evacuate the loadlock and enter the wafer identity (see Section 4.2.2).

6   Click ⬤.

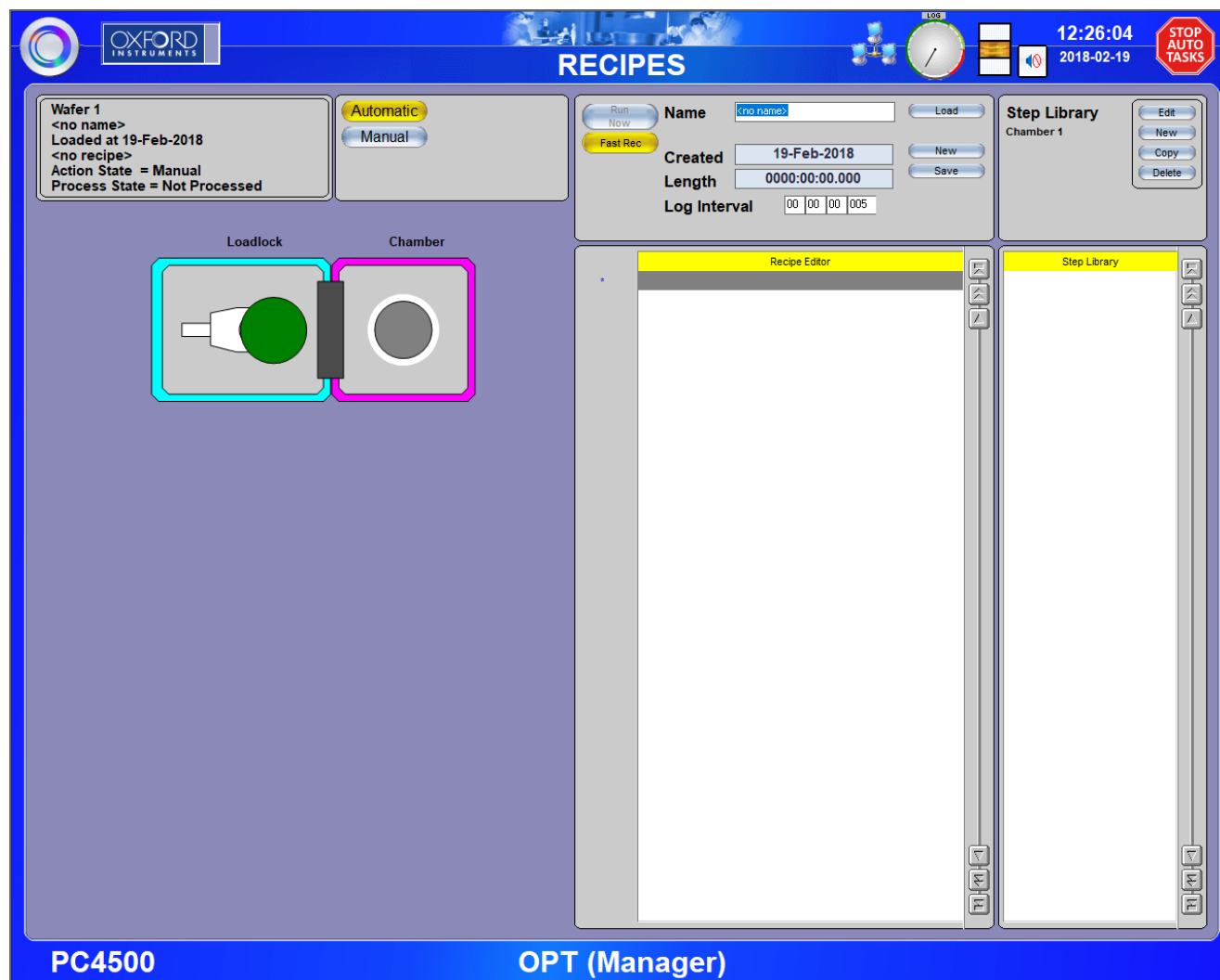7   Select the **Recipes** menu option. The Recipes page opens.

Figure 4-12   Recipes page

8   If there is a recipe displayed in the Recipe Editor panel, click **New** to clear it.

9   Click **Load**. The Load Recipe window opens.

10   Select a recipe from the displayed list and click **OK**.

11   Inspect the list of recipe steps in the **Recipe Editor** panel to confirm that the correct recipe has been loaded.

12   If you want to automatically load a wafer into the process chamber, click **Automatic**. The colour of the button changes to yellow to confirm that it has been selected.

13 If you want to run the recipe without loading a wafer into the process chamber, click **Manual**. The colour of the button changes to yellow to confirm that it has been selected. You might select **Manual** to run a cleaning recipe, or if a wafer is already present in the process chamber.

14 Click **Run Now** (Figure 4-12). This initiates the following automatic sequence:

    a) The Process Control page opens to allow you to monitor the progress of the run.

    b) The loadlock is evacuated (if **Automatic** is selected).

    c) When the process chamber reaches its base pressure, the wafer is transferred into the process chamber (if **Automatic** is selected).

    d) The process starts.

15 To pause the process at any stage, click **pause** on the Process Control page. This immediately switches off the plasma RF power and stops the step time at its present value.

Figure 4-13   Control buttons on the Process page

16 To re-start the process, click **pause** again (Figure 4-13). This switches on the plasma RF power and re-starts the step timer from its present value.

17 To stop the process, click **stop** (Figure 4-13). This causes the process to abort and resets the step timer to zero. The message **Process Complete** is displayed. You can then run the same process or a different process, if required.

NOTE: DO NOT CLICK .

18 Wait until the process has completed. If you have selected **Automatic**, wait until the wafer has been transferred back into the loadlock.

19 Click .

20 Select the **Pumping** menu option. The Pumping page opens.

21 Vent the loadlock (see Section 4.2.2).

22 Open the loadlock lid and remove the wafer (see Section 4.2.2).

23 Repeat the steps in this section to process further wafers.

24 When you have processed all the wafers, evacuate the loadlock (see Section 4.6.1).