RiteTrack 88 Series -- Automatic Coater and Developer Tracks

Version of 2014, update 2017-09-12. **Get the latest one at**
cmi.epfl.ch/photo/files/RT/RT88.manual.pdf

Linear track system for coating (front track) and develop (rear track) of 100mm wafers.

Introduction

The Rite Track Coater and Developer system is an automated production unit (refurbished SVG Serie88) with high throughput. Deposition of positive photosensitive resist + soft baking OR development + hardbaking are the standard recipes (with or without Edge Bead Removal as an option). 3 dispense lines feeded with AZ9221, AZ ECI 3007 and AZ ECI 3027 are currently loaded in the caoter. AZ MIF 726 and AZ 400K (diluted) are available in the developer.

Operation Guidelines and Restrictions

- Standard process for 100mm silicon wafers only

- ⚠️Insulator wafers like pyrex, float glass or fused silica are accepted in "single" mode. A dummy Si wafer is inserted manualy to prepare cassette indexing and toggle with the insulator substrate just after.
- To avoid any cross contamination soft bake with 50µm proximity are alwazs included in recipes.
- Only stable metallic layers are accepted (without risks of delamination)

- ⚠️After development always rinsed your wafers in the Plade wet bench SRD.
- Do not power cycle or restart the system at any times. Conatact staff in case any probems occurs.
- In case of problems during process, wafers removed from wthin the track must immediately be replaced with a dummy wafer in such a way that handling interlocks will not be activated.
- Cassettes can only be removed in the up position.

Description

The system consists of two independent tracks (top view schematic) :

send cassette	hotplate	chillplate	developer	hotplate	chillplate	receive cassette
send cassette			coater	hotplate (softbake)	chillplate	receive cassette

Coater Line: Track 1, Controler #1
The front line of the machine; to coat wafers with positive photoresist, perform the softbake, then cool the wafer and place it in the receive cassette (order is reversed).

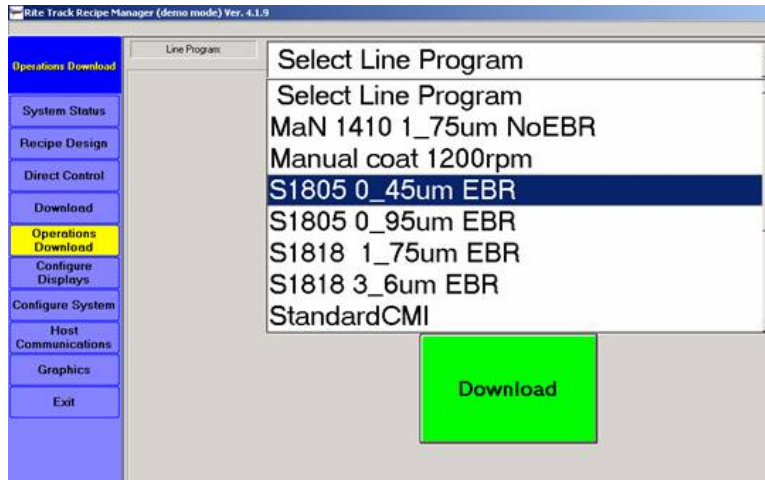*Develop Line: Track 2A, Controler #2 and Track2B, Controler #3*
The back line of the machine is composed of two sections. The first is used to perform PEB (post-exposure bake) requiered for reversible photoresists. The second includes the developer bowl, a second hotplate for hard bake and a cool plate. The wafers are placed in the receive cassette (order is reversed).

Each track has a sender and a receiver carrier allowing to process a batch of up to 25 wafers in one run. The process by default is in "Automatic mode" - this means that the machine will process each wafer found in the carrier. In "Single" mode, wafers are processed one by one as the user initiates by pressing the "Start" button for each wafer. These modes can only be used for wafers with a conductive layer, since they are detected by a capacitive sensor. To process nonconductive substrates reefere to "Single mode" in the section "Running a recipe" below.
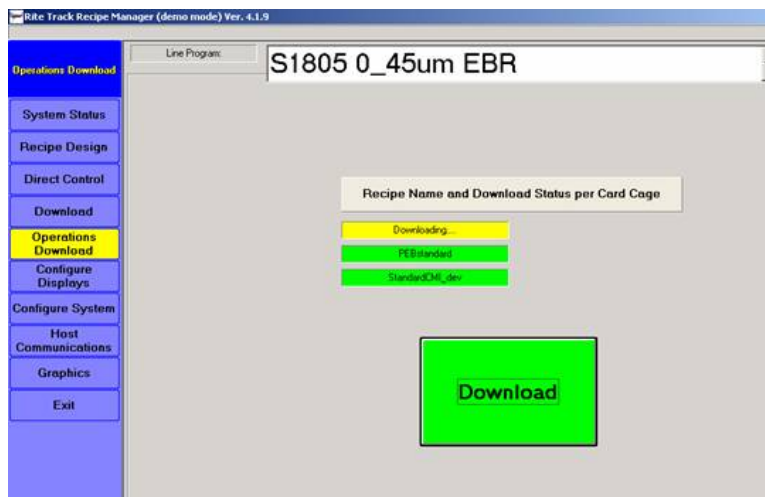
Selecting a recipe

- Recipes for different photoresists and thicknesses are saved in the system. Users cannot modify recipes. If a modification, or a new recipe is needed, please contact Staff
- Logon and enable the equipment using the control access PC of Zone 01. The RiteTrack is split to two separate systems "Z01 RiteTrack coater" and "Z01 RiteTrack developer" which can be operated independently.
- Using the PC above the machine, check that Recipe Manager software is launched and enter the « Operations Download » section to select recipe in the drop down menu.

Press « Download » and check that it was correctly transferred to the cardcage by the color codes:

- Yellow: download in progress
- Red: download failed; check the machine is in standby, otherwise call staff
- Green: ready

Preparation

Check that the temperatures on the Watlow controllers have the right set points (green values) according to the following table. These controllers are located on the right side of the machine.

Card Cage Controller	Watlow #	Setpoint (green)
1 (Softbake)	1	115°C
2A (PEB)	2	95°C
2B (Hardbake)	3	115°C

In case the setpoint on the Watlow is different, it needs to be updated as follows:

- Press « Clear » on the cardcage
- Press « Station select » until the cross (" + " or " * " on the left of the line) is at the hotplate section
- Note the number of the program (first digit on the left under PRGM)
- Change the number of program to #9: press « 9 » then « Program select »
- Download the selected recipe again to the cardcage
- Setpoint is updated; a few minutes delay might be necessary to reach temperature

Running a recipe

Depending on the kind of substrate, the proper mode for wafer handling must be selected:

« Auto » mode:

This mode is used for full automated processing of wafers with a conductive layer; silicon wafers or insulating wafers with a layer of metal covering the whole surface.

- Load the wafers into the cassette and place it on send platform. Wafers must face up, and the flat has to be oriented outside.
- Check that there is a wafer cassette on the receive platform. To reset the sensor, the cassette must be removed and put back, otherwise it will not start.
- Check the position of all of the lift-pins at the hotplates (must be up); and the chuck in the bowl (must be in middle position).
- Check button "Manual/Single/Auto" is on "Auto" mode
- Press « Start » to run the batch
- In case of trouble, red buttons on the cardcage « transfer stop », « coater/developer stop », « oven stop » allow to lock an event during handling of wafers. Acknowldege with « Start ».
- When finished, press « Index Reset » to lift up the receive carrier.

« Single » mode:

This mode is used for semi-automated processing of insulator wafers without a metallic layer covering the surface.

- Load the wafers in the send cassette **with 2 silicon test wafers in the bottom position**, and place it on send platform.
- Check that there is a wafer cassette on the receive platform. To reset the sensor, the cassette must be removed and put back, otherwise it will not start.

- Check the position of all of the lift-pins at the hotplates (must be up); and the chuck in the bowl (must be in middle position).
- Change to "Single" mode by pressing the "Manual/Single/Auto" button
- Press « Start » to run first silicon wafer
- Once this wafer is in the coater/develop bowl and the sender has moved down one slot, quickly reverse the position of second silicon wafer and first insulator wafer.
- When first silicon wafer is on the hotplate, press « Start » to launch process on first insulator wafer
- Repeat this sequence for all the wafers individually
- In case of trouble, red buttons on the cardcage « transfer stop », « coater/developer stop », « oven stop » allow to lock an event during handling of wafers. Acknowldege with « Start ».
- When finished, press « Index Reset » to lift up receive carrier.

Technical Features

- Controlled hotplates can heat up to 250°C. Proximity mode by steps of 50µm
- Spinning speed up to 9'900 rpm (preferred until 7'000 rpm)
- Carriers for 25 wafers, 100mm diameter only
- 3 positive tone photoresist lines available
- 2 developers available

FAQ

Error during download

In case of failure during download of the recipe, most probably the track is busy. The easiest way to check the problem is to load a test wafer in the send cassette and press « Start » to launch the process. If it ends correctly, it will free the machine and the recipe needed can be downloaded. In case it doesn't end correctly, continue to "Error During Process" section.

Error during process

During a process, multiple errors may occur:

- Check wich track has the problem - verify alarm source and blinking red lamp near the temperature controller.
- Check the error message on the corresponding cardcage: press « Clear » to stop the alarm and « Diagnostic select », « 1 » to read message.
- Try to fix the problem according to the error message if possible and press « Start » to continue. Press « WAFER LOST » immediately if wafer is removed by hand followed by « Start » to continue. If unsure, contact staff.
- In case you don't want to take risks with the process wafers, you can pick them up from the machine. In this case immediately replace it with a dummy wafer. Otherwise it will be difficult to fix the problem and leads to a chain of errors difficult to handle correctly.

Frequent error messages

Sender (receiver) strt ?	Means that the switch of send and/or receive platform was not toggled. Lift cassette and put back.
Spindle at top ?	Forgot to log in on PC zone
CVFrame ?	Cover of coating or develop bowl is missing or in wrong position
Temp. out of band	Hotplate is at wrong temperature. Check setpoint and wait until temperature stabilization
Develop. Low level	Contact staff
-- any message -- WLST? STRT?	Wafer is lost, user has right to remove the lost wafer by hand. Press « WAFER LOST » to recover.