SIL 8000 wafer loader

USER
MANUAL
Rev. 1.0
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SIL 8000 WAFER LOADER FOR VISUAL INSPECTION MICROSCOPES

SIL 8000 is a simple and effective tool for wafer visual control.

It have been especially studied for all that cases where it is required a simple, fast and cost effective solution in wafer inspection.

A simple yet powerful unit, featuring a sophisticated and easy to use computer control, which have been designed as loading unit for the DM 8000 inspection microscope.

1. <u>Introduction</u>

SIL 8000 have been especially designed to be used as a tool to load wafers on inspection microscopes.

It can be described as composed of three main parts, all into the same case:

Mechanical part;
Motion and I/O controller;
Computer with display and keyboard.

All the parts are contained in a single stainless steel body, with a granite base for higher stability and better vibration insulation.

The whole system have been designed to be easy to use and maintain, and in particular the provided computer interface have been studied to allow a simple use and configuration.

In the following we will introduce the basic use of SIL 8000 system, with special attention to the operator interface and the use of its configuration software.

About installation, first startup and adjustments, refer to the Engineering and Service Manual.

2.First run

Once the installation and first startup is done (see Engineering and service manual), machine will be ready for the normal use.

First, switch on the system by turning to ON the main switch placed on the front panel. Be sure that the EMO switch (again on the front panel) is released: in case release it by turning CCW.

After having switched on the system, Proteus Inspection program will automatically run.

After launch, the first screen displayed is the following :

A picture of the interface with the meaning of each area and button is given into the following figure:

To run the inspection, press the INSPECTION button, will then run the next interface, which is the proper user interface.

A picture of the inspection interface with the meaning of each area and button is given in the following picture:

3.Running machine cycle

This will be the screen displayed when accessing the normal cycle run interface:

This screen has five different parts:

- button section, where all the functional button are placed;

- cassette display section, where the current cassette is represented, giving information about its status;

-counter bar, where the INSPECTED counter will give the status of the present cassette inspection;

- information bar, where are given: wafer size and configuration (recipe) name;

- message line, where is displayed a message with machine status or operator recommendations.

Buttons can be accessed by pressing the touch screen display.

To start machine cycle, simply press START.

System will then ask the operator to load the proper recipe needed to work the cassette.

The size and recipe selection screen is then displayed:
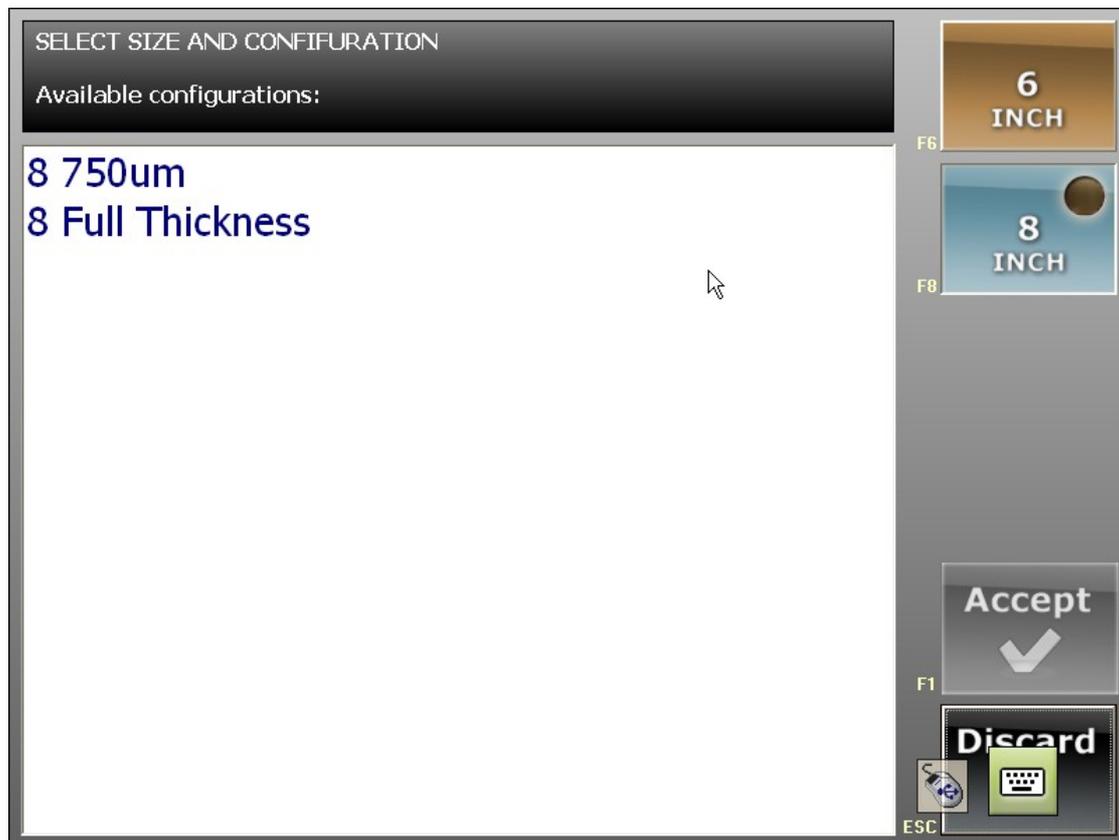
Select the proper size and recipe, and then confirm by pressing "Accept"

Then, the inspection screen will be displayed again: press START again.

Indexer platform and loading arm will then be driven to home position, to prepare loader to receive the cassette.

The message "Put cassette on stage" is now displayed, and a box with two buttons is then displayed.

Load the cassette on indexer platform taking care that it is the proper one (size and wafer type) and proceed by pressing OK.
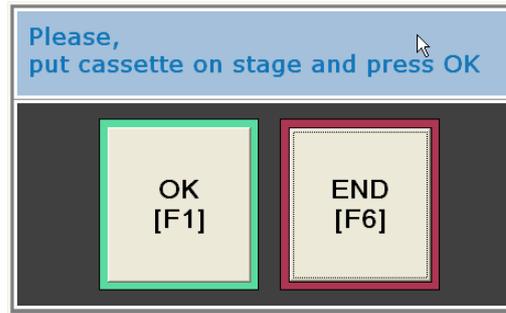
Cassette mapping will then be started to identify wafers into cassette. When mapping is finished, machine will wait for the microscope stage in exchange position. The screen displayed at this time will include the graphics indication of wafer found in cassette. Type of inspection active will be the same given int the recipe. It is possible to modify this selection before starting the cycle.

To load the first selected wafer, put the microscope stage in exchange position (left rear with the XY stage, activating the exchange sensor for at least 2 seconds) and then loader will proceed extracting the first wafer selected starting from cassette bottom.

Wafer will be extracted and placed on the macro inspection chuck.

Once extracted, wafer on the graphics will turn the color from light blue to yellow, showing that it is during inspection cycle.

Bright light inspection will be done at first, if selected, and to proceed to the microscope, press the OK button displayed.

At this point, machine will wait to have the exchange sensor not active and then pressed again for at least 2 seconds, and then will take wafer to put it back to the cassette.

If switch will remain pressed, loader will take the next wafer and put it again to the chuck.

If only Bright light mode is selected, and microscope inspection is not needed, at the first START the first wafer will be extracted and driven to inspection position, switching on the illuminator (optional) pressing OK button will return the wafer to cassette and extract the following one.

4. Special modes

4.1 Single Cycle operation

It is possible to enable SINGLE CYCLE operation, by selecting the proper button.
The button will then be marked with a yellow dot into its left high corner.

This will force the machine to process a wafer at a time, waiting for a START key before proceeding with the next one. Of course microscope stage must anyway be placed to the exchange position activating the stage presence switch for at least 2 seconds, but the loading of wafer will not be started until the START button is not pressed.

SINGLE CYCLE can be disabled by pressing again its key, and then START to proceed with normal mode..

4.2 Step by step operation

It is possible, mainly for setup or service purposes, to run machine in step by step mode
.
To do so, simply press F1 key during operation. It can be seen that START button changes to PAUSE when machine is running.

Pressing PAUSE during operation forces machine to stop at the end of the current phase or movement... It is important to remember that this key is not an instant stop key. The current movement is anyway finished and then machine stops. The next screen shows the Pause condition.
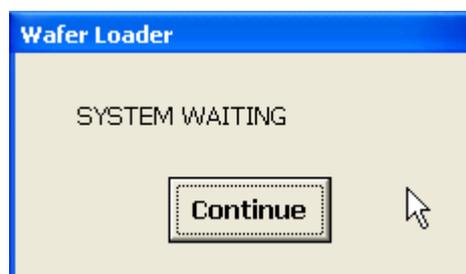
If a mapping is running, it will be finished before stopping.

To restart, simply press "Continue" on the message box.

4.3 Ending a cassette

If a cassette inspection must be aborted, simply press the END key.

Machine will stop after the end of the current wafer and will be ready for a new cassette. This will happen also if the cassette is removed from the indexer platform before the normal end.

4.4 Emergency STOP

It is possible, in case of need, to stop machine by pressing the EMERGENCY button placed on the left side of the front panel.

This will force the machine to completely and immediately STOP.

This will also produce a vacuum or air loss, which could result in wafer breakage.

Machine will detect within about 30 seconds (depending on computer status) the emergency condition, giving a message and then stopping the program from running. In this case a message will be given and program will be restarted.

WARNING: USE EMERGENCY STOP BUTTON ONLY IN CASE OF REAL NEED, SINCE ITS IMPROPER USE CAN RESULT IN WAFER BREAKAGE

4.5 Changing a configuration

It is possible to run a different recipe for inspection. Basically differences from a recipe (configuration) to another can be in wafer size, motion parameters or inspection strategies.

We will describe in the proper section how to modify a configuration, but switching from one configuration to another can be done each time an inspection is started, as explained previously.

4.7 Going back to startup menu

It is possible to access the startup menu from operator interface screen. This can be useful if it is needed to access the recipe editing section.

To do so, press the ESC key in the left down corner of the inspection interface. The startup menu will then be displayed.

5. Editing Configurations

From the Main menu, it is possible to access configuration menu. To do this, press CONFIGURATION (F1) key. To access the configuration menu in EDIT mode, a password will be required.

A dialog box as showed will then be displayed.

Input the correct password and then the configuration selection display will appear.

This menu is similar to the one which can be accessed from the CHANGE key on the user interface, bu capabilities.

To select a configuration, select before wafer size and then configuration name by clicking on it. When configuration is selected, press CONFIRM (F5) to edit.
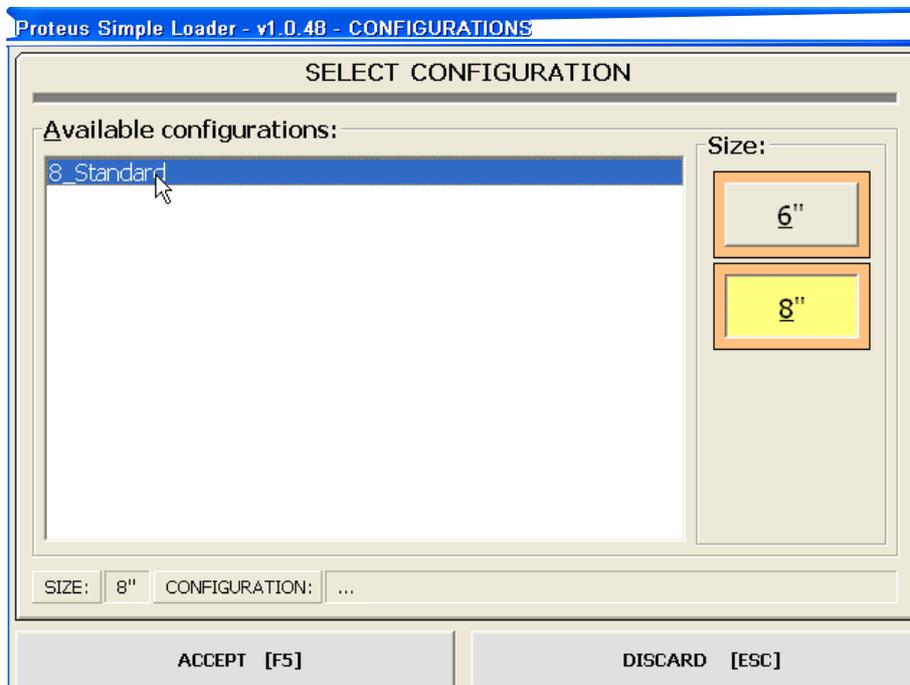

There are two sections inside editor. The first one is about inspection strategies and the second is about motion parameters.

Inspection strategies can be selected from the following given

options.

5.1 Choosing inspection strategies

The inspection strategy can be chosen by the selection screen. It is possible to program ALL wafers for inspection, and this option will not imply any further choice.
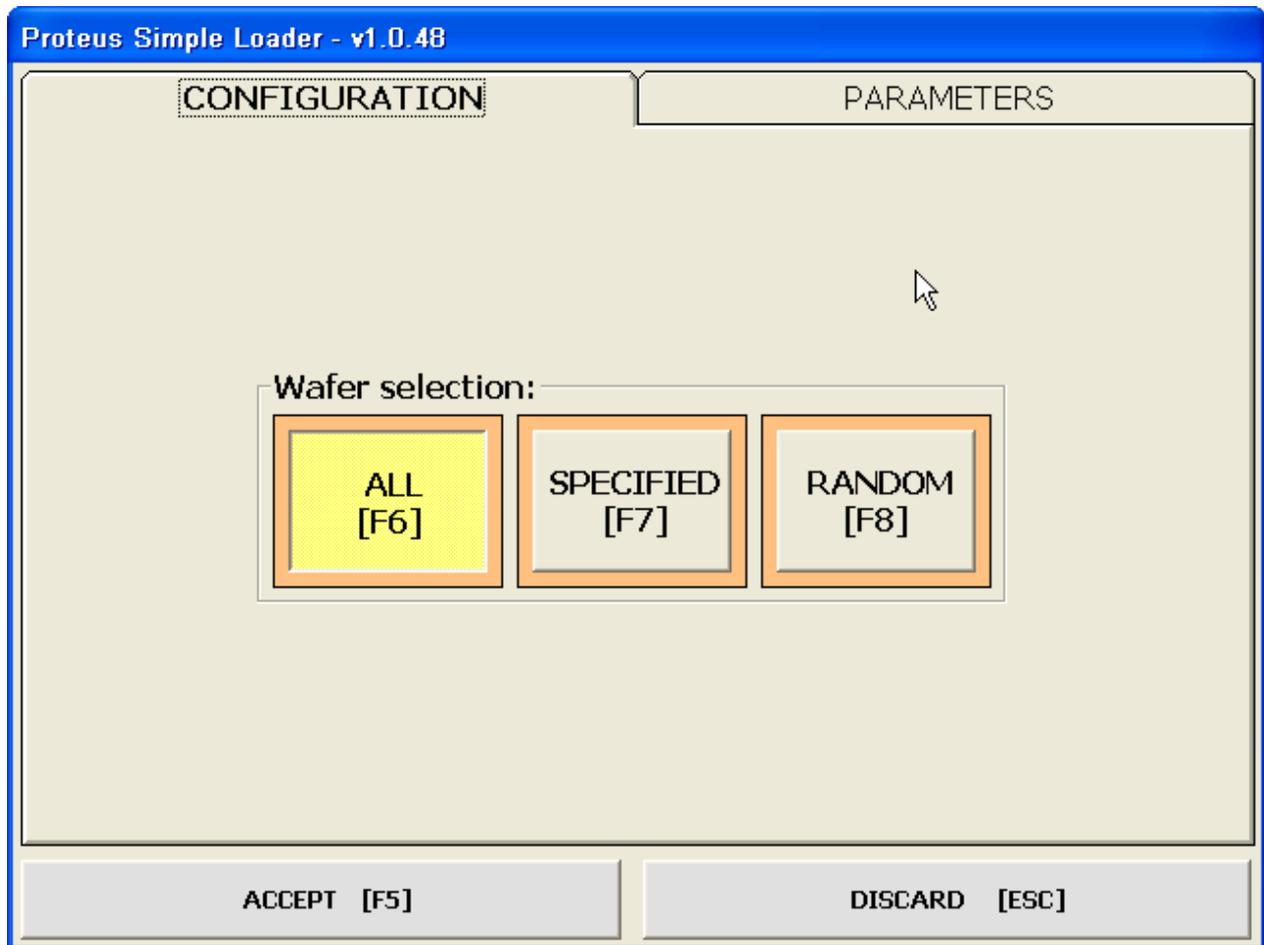
If the SELECTION mode is selected, only specified wafers will be inspected, and these wafers must be selected in a further screen as follows, by selecting it with up/down arrows and by pressing, the ENABLE or DISABLE key (only clicking).

The screen with wafer selection will then appear, as represented into the following figure.
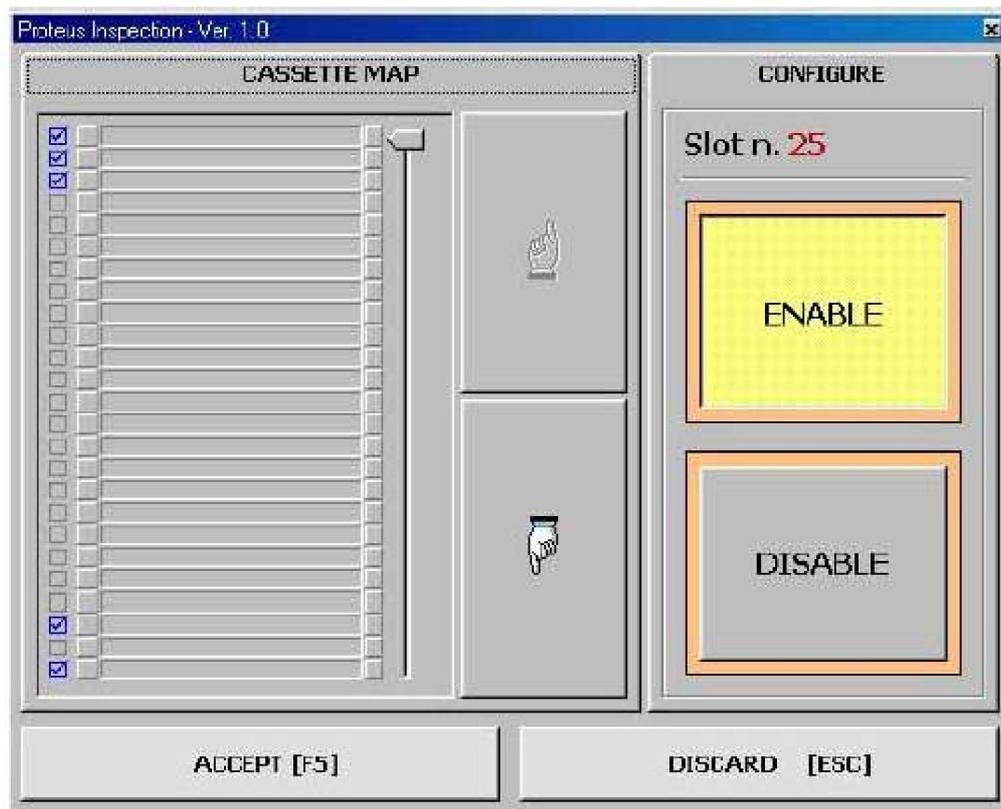
Selected wafer will then be marked and will remain until deselected.

When done, press CONFIRM or CLOSE . If confirmed, modifications will be
recorded into the recipe data base.

If the RANDOM option is selected, the user can define a number of wafers to be inspected, and
each time the recipe is run (for each cassette) the given number of wafers will be randomly
selected within the 25 cassette slots. If a selected slot is empty, wafer will not be inspected.

The number of wafers to be inspected will be given in the following dialog box.

Input wafer number and click OK or press ENTER.

Wafer positions will be generated by a random number generator, to allow inspection of different wafers each time.

5.2 Changing position and program parameters

From the parameters section of recipe editing it is possible to change some control parameters, such as positions and some threshold and setup for centering and alignment system.

This section can be accessed by clicking on the PARAMETERS folder bar from the default editing screen.

When selected, this screen will appear as follows:
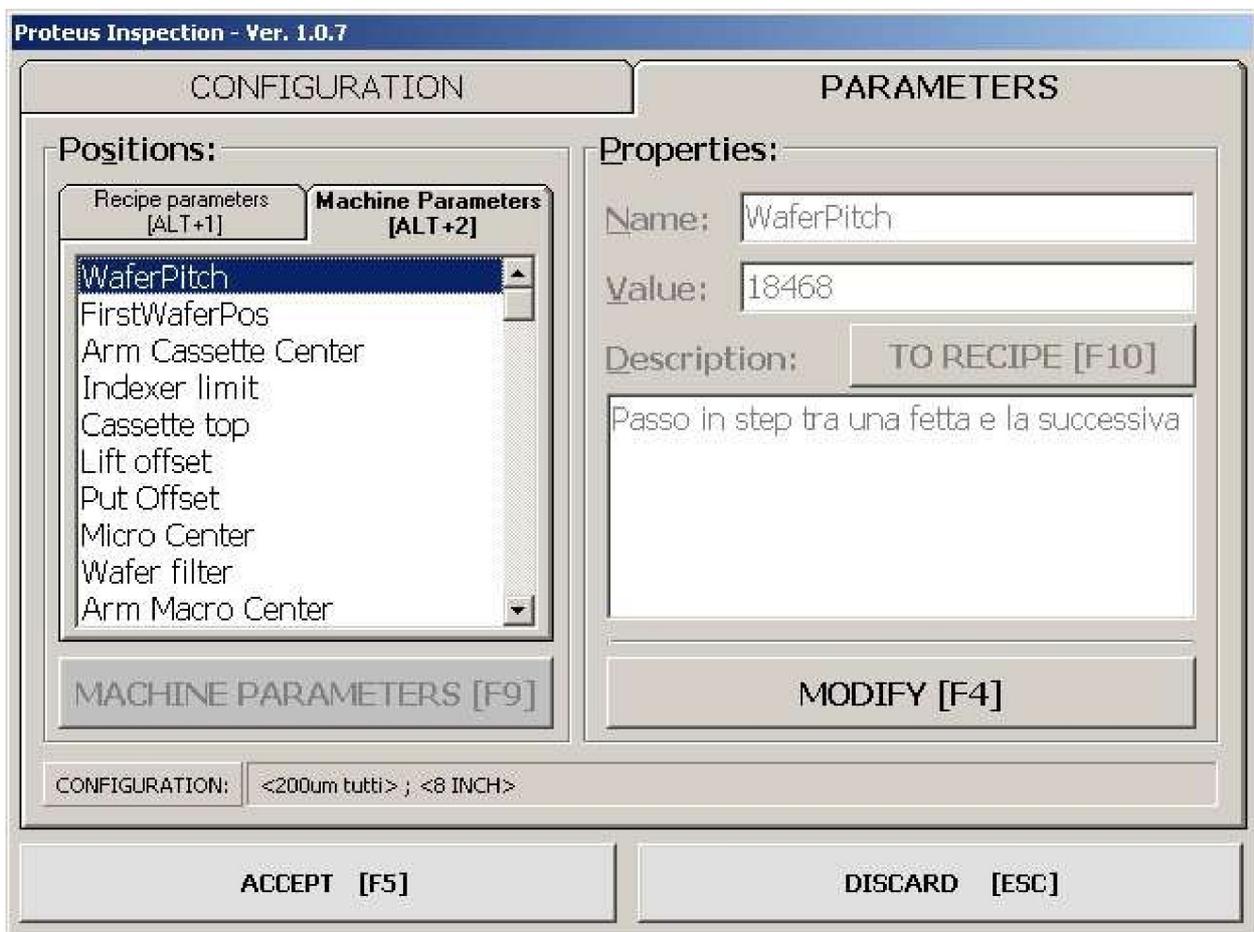
The parameter section is divided into two sections: RECIPE PARAMETERS and MACHINE PARAMETERS.

To access MACHINE PARAMETERS it is needed to input the password. The password required is the same, but the request is intended to ask the operator to be sure about his request to access machine parameters.

It is strongly recommended not to change any value if machine is correctly running and to perform changes by working on a dummy wafers cassette.

On any machine each value is described into the description section, to allow a correct understanding of its meaning. In another part of this manual a list of the default recipes for each wafer size is given.

To change a value, select the desired position or parameter by clicking on it, then click MODIFY (F4), input new value and then ckick MODIFY (F4) again to accept modifications. When done click CONFIRM (F5) to accept or DISCARD (Esc).

IF THERE ARE DOUBTS IN MODIFYING PARAMETERS, CREATE A PAPER COPY OF THE ORIGINAL CONFIGURATION AND ACT ON A NEW RECIPE WITH THE SAME PARAMETERS BEFORE.
ERRORS MAY RESULT IN WAFER BREAKAGE: BE CAREFUL!!!!!!!!!

It is also possible to change parameter name and description, in the same way used to change values.

Finally, it is possible to move parameters from the Machine section to the Recipe section, by pressing the given button (F10) during the MODIFY mode. This is intended to allow the operator to access easily to parameters which will be often modified.

5.3 Creating a new configuration

To create a new configuration, when accessing in edit mode to the configuration menu, press NEW (F2) key.

This will access the dialog box where the name of new configuration can be given.

Write the name and press CONFIRM to accept. CANCEL will abort new configuration creation.

After this, access the Strategies and parameters sections. Values will be, at this point, the same than DEFAULT configuration, and can be modified according to needs.

5.4 Deleting a configuration

To delete a configuration, select configuration to delete by clicking on the list and then choose DELETE on the configuration selection screen.

6. Password change

Password is required to access recipe editing menu.

There is a simple system to manage password change. When accessing to the password request box, press MODIFY key to access the password change dialog box as follows:

Simply insert the old password in the first line, then the new one in the second and confirm it in the last one.

When done, press CONFIRM or CANCEL to accept or reject new password.

7.Parameters

Please note in the following area each parameter of DEFAULT recipe for all the sizes used configurations, before making any modification. A complete description of recipe parameters is given into the service manual.

PARAMETER NAME   VALUE 6"   VALUE 8"   COMMENTS

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8.Errors and malfunctions

There are some conditions which can result in errors.

These conditions are especially related with sensor verification, and especially vacuum sensor and position sensors.

Basically, when an expected sensor is not activated, or deactivated, within a given time (timeout), an error occurs.

In this case, a dialog box with the error message like the following will be displayed.
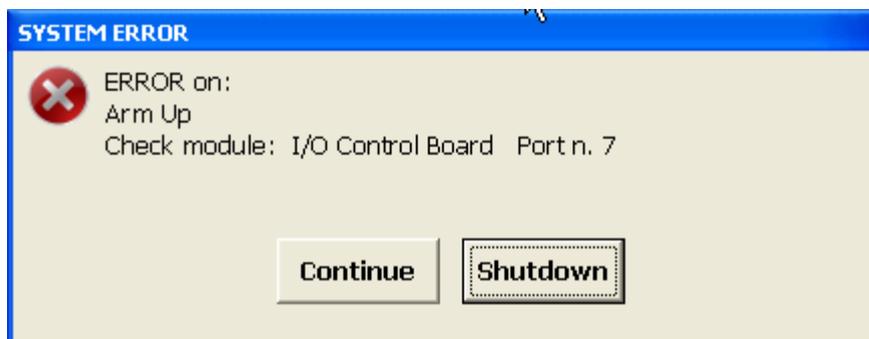
There are two possibilities:

ERROR IS NOT RECOVERABLE: click on **Shutdown** and program will be restarted.

In this case program is automatically restarted program and the startup screen will appear after some seconds. In case there will be problems with boards or controller, use the **QUIT** button and the **Shutdown** option and then completely restart the system.

In this case it is possible that a wafer will remain out from cassette. PUT MANUALLY THE WAFER BACK TO THE CASSETTE BEFORE RESTARTING.

ERROR IS RECOVERABLE OR HAVE BEEN ALREADY SOLVED: (this condition can happen for example in case of a momentary loss in vacuum, or other similar conditions) click on **Continue** to make the program continue.

The dialog box includes also the indication of description, number of sensor and hardware module, to enable the service to understand what happens. Number of line and module are represented into the schematic diagram given with this documentation.

WARNING: BEFORE CONTINUING IN CASE OF ERROR, BE ABSOLUTELY SURE THAT MACHINE IS IN A SAFE CONDITION, TO AVOID WAFER BREAKAGE. IN CASE OF DOUBT, QUIT PROGRAM AND RESTART.

If arm is in a dangerous position, such a s inside a full cassette, it can be manually moved. In this case, RESTART MACHINE.

9. System shutdown

To shutdown the system, follow this procedure: First of all, go to the main machine screen. Then

press QUIT (F6). IN CASE OF INSPECTION STATIONS PROGRAM WILL THEN QUIT

a shutdown screen will be presented as follows:
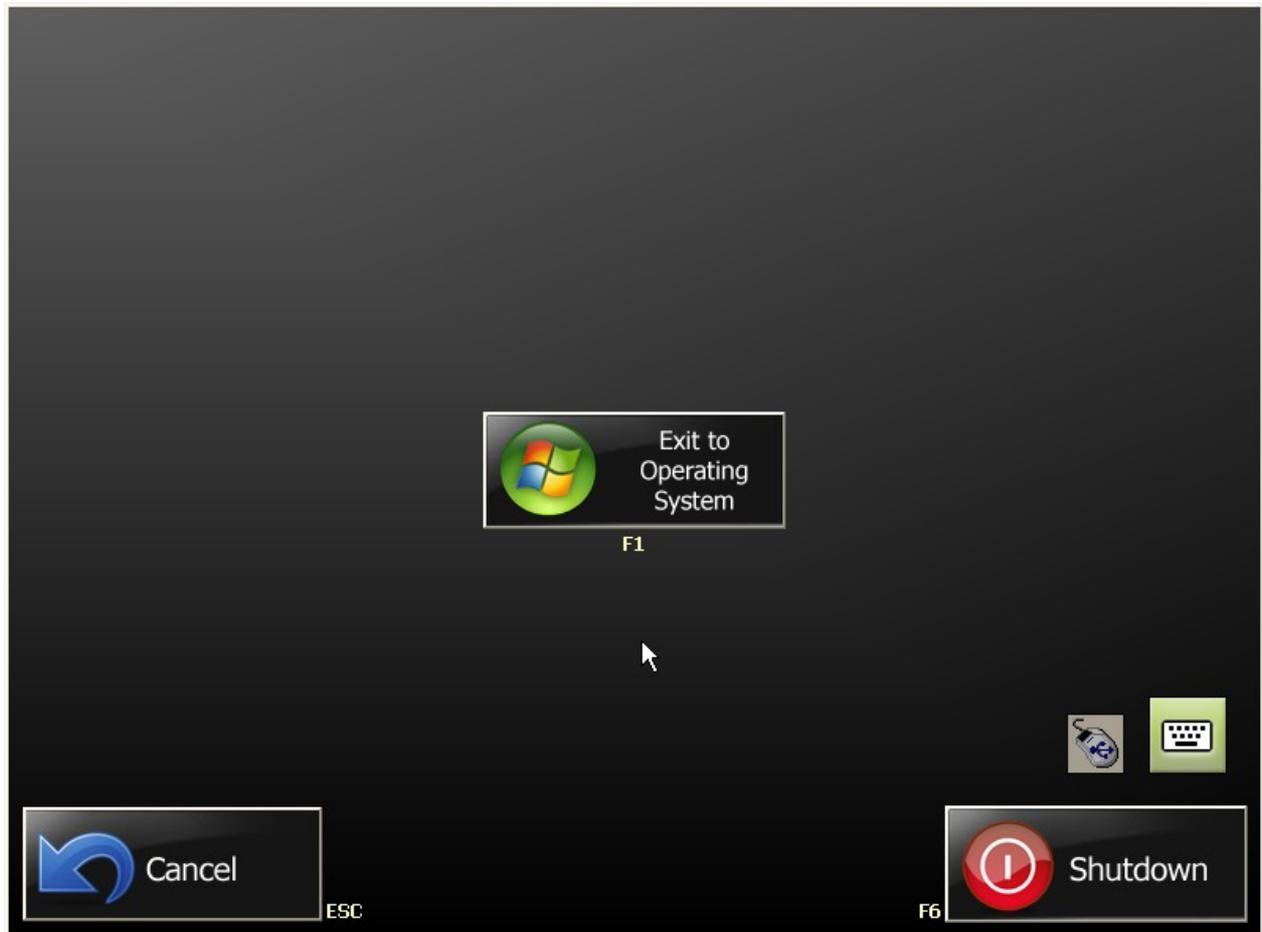
There are three possibilities:

The first is leave the computer and restart under Windows. This operation is allowed only to service personnel and requires a special password which is not public. When pressing this key, a next screen will be presented to enter password.
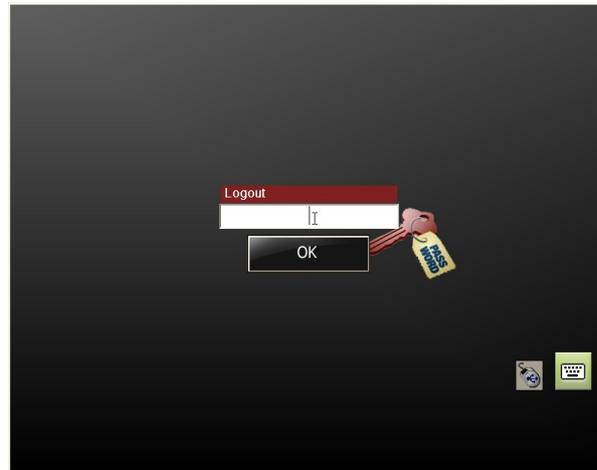
If password is not correct, the system will not be allowed to restart under Windows. If password is correct, syst down Windows to restore machine at the next restart.

By pressing SHUTDOWN system will shut down, turning the computer off. After computer shutdown, press the main switch to shut down machine completely.

By pressing CANCEL   system will return to the main screen.

10. **The Screen Keyboard**

Normally Simple Loader machine is working without any keyboard connected, even if it is possible to work with a standard keyboard connected by one of the available USB connections.

To input passwords or parameters, a screen keyboard is provided and launched together with the machine software to enable the user to type data. Screen keyboard is launched at startup is accessible by its icon on any screen given.

When it is needed to use the keyboard, just tap on its icon with the touch pen or the fingertip, and it will be opened as follows.
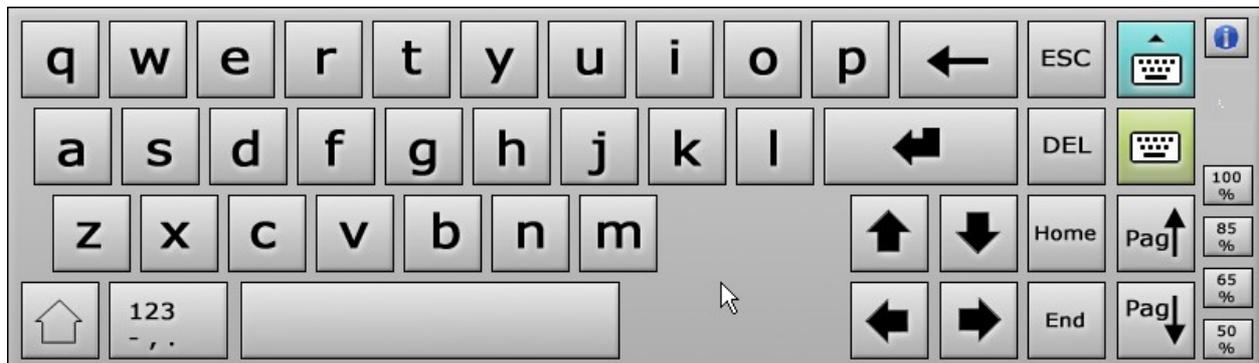
Keyboard can be used by pressing the buttons with the touch pen or the fingertips, and can be reduced by tapping on the reduce key (the green keyboard icon).

Keyboard have some options, such as moving it up and down on the screen, which can be done by dragging it or by tapping on the light blue keyboard icon.

There is also the possibility to make it transparent. Just tap on one of the four keys with % on the right side of the keyboard to obtain different transparency levels.

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